BRIDGES IN MATHEMATICS 2

BRIDGES GRADE 2 SUPPLEMENT

Indiana Sets

Activities & Worksheets

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Bridges in Mathematics Grade 2 Supplement Indiana Sets

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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

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Bridges in Mathematics Grade 2 Supplement

Indiana Sets

Introduction

The *Bridges Grade Two Supplement* is a collection of activities written to enable teachers in Indiana to fully address the Academic Standards for Mathematics established by the state in 2000. This material is published online as downloadable files on the Math Learning Center website. See www.gotomlc.org/in.

Many of the activities included here are designed to be used in place of selected sessions in *Bridges Grade Two* starting at the end of Unit One. Others replace one or more days of *Number Corner* during certain months. All of the activities are listed on pages 2–4 in the order in which they appear in the Supplement. They are listed in recommended teaching order on pages 5–8. On pages 9–28, you'll also find a set of sheets designed to replace the Planning Guides found at the beginning of Units 1, 2, 3, 5 and 7 in the *Bridges* Teacher's Guides. These sheets show exactly how the Supplement activities fit into the flow of instruction. We suggest you insert these sheets into your *Bridges* guides so you can see at a glance when to teach the Supplement activities through the school year.

The majority of activities and worksheets in this supplement come in sets of three or more, providing several in-depth experiences around a particular grade level expectation or cluster of expectations. Many of the activities will take 30–45 minutes of instructional time, though some are longer, requiring an hour. Activities that replace *Number Corner* workouts should be allocated 15–20 minutes. Suggestions for optional literacy links and/or extensions to provide additional challenges have been included throughout the Supplement.

Almost all of the activities are hands-on and require various math manipulatives and/or common classroom supplies. The blacklines needed to make any overheads, game materials, and/or student sheets are included after each activity. Some of the supplement sets in this collection include independent worksheets, designed to be completed by students in class or assigned as homework after related activities. See pages 29–30 for a complete list of materials required to teach the activities in each Supplement set.

Note Second grade standards not listed on pages 2–4 are adequately addressed in *Bridges* and/or *Number Corner* sessions. For a full correlation of *Bridges Grade Two* to the Indiana Academic Standards for Mathematics, see pages i–xii..

Activities & Indiana Academic Standards for Mathematics

(Activities Listed in Order of Appearance in the Supplement

SET A2 NUMBER & OPERATIONS: SOLVING EQUATIONS		
Page	**Name**	**Indiana Academic Standards for Mathematics**
A2.1	Activity 1: The Blue Square Game, Part 1	2.3.1 Relate problem situations to number sentences involving addition and subtraction. 2.3.2 Use the commutative and associative properties for addition to simplify mental calculations and to check results.
A2.9	Activity 2: The Blue Square Game, Part 2	
A2.15	Independent Worksheet 1: Addition & Subtraction Puzzles	
A2.17	Independent Worksheet 2: Missing Numbers	

SET A4 NUMBER & OPERATIONS: PLACE VALUE		
Page	**Name**	**Indiana Academic Standards for Mathematics**
A4.1	Activity 1: Hundreds of Seeds	2.1.5 Compare whole numbers up to 100 and arrange them in numerical order. 2.1.7 Identify odd and even numbers up to 100.
A4.11	Activity 2: Pick Up Sticks	
A4.15	Activity 3: Place Value Triple Roll	
A4.21	Activity 4: Target 700	
A4.25	Activity 5: 4-Digit Shuffle	
A4.29	Activity 6: Will the Real Value Please Stand Up?	
A4.33	Independent Worksheet 1: Large Numbers	
A4.35	Independent Worksheet 2: Thinking about Place Value	

SET A5 NUMBER & OPERATIONS: MULTI-DIGIT ADDITION & SUBTRACTION		
Page	**Name**	**Indiana Academic Standards for Mathematics**
A5.1	Activity 1: 52 Weeks; 365 Days	2.1.1 Count by ones, twos, fives, and tens to 100. 2.1.3 Identify numbers up to 100 in various combinations of tens and ones. 2.1.4 Name the number that is ten more or ten less than any number 10 through 90. 2.2.1 Model addition of numbers less than 100 with objects and pictures. 2.2.2 Add two whole numbers less than 100 with and without regroup-ing. 2.2.3 Subtract two whole numbers less than 100 without regrouping. 2.5.10 Know relationships of time: seconds in a minute; minutes in an hour; hours in a day; days in a week; and days, weeks, and months in a year.
A5.5	Activity 2: Jump-a-Ten	
A5.11	Activity 3: Jump-a-Hundred	
A5.17	Activity 4: Modifying the Base Ten Bank	
A5.33	Independent Worksheet 1: Different Ways to Tell about the Same Numbers	

SET A6 NUMBER & OPERATIONS: MONEY		
Page	**Name**	**Indiana Academic Standards for Mathematics**
A6.1	Activity 1: Dollars & Cents	2.5.12 Find the value of a collection of pennies, nickels, dimes, quarters, half-dollars, and dollars.
A6.9	Activity 2: Three Spins to Win	
A6.15	Independent Worksheet 1: Mr. Mole's Money	

SET A7 NUMBER & OPERATIONS: NUMBERS TO 1,000 ON A LINE OR GRID		
Page	**Name**	**Indiana Academic Standards for Mathematics**
A7.1	Activity 1: Mystery Numbers on a 101–200 Grid	2.1.1 Count by ones, twos, fives, and tens to 100. 2.1.2 Identify the pattern of numbers in each group of ten, from tens through nineties. 2.1.4 Name the number that is ten more or ten less than any number 10 through 90. 2.1.5 Compare whole numbers up to 100 and arrange them in numerical order.
A7.7	Activity 2: What's My Number?	
A7.11	Independent Worksheet 1: What's Missing? 901–1,000	
A7.13	Independent Worksheet 2: What's Missing? 10–1,000	

Activities & Indiana Academic Standards for Mathematics (cont.)

SET A8 NUMBER & OPERATIONS: ORDINAL NUMBERS		
Page	**Name**	**Indiana Academic Standards for Mathematics**
A8.1	Activity 1: Introducing the Language of Ordinal Numbers	2.1.6 Match the number names (first, second, third, etc.) with an ordered set of up to 100 items. 2.6.1 Choose the approach, materials, and strategies to use in solving problems.
A8.7	Activity 2: Grid Pictures	
A8.13	Independent Worksheet 1: Alphabet Line-Up	
A8.15	Independent Worksheet 2: Ordinal Numbers on the Calendar	
A8.17	Independent Worksheet 3: Another Grid Picture	

SET A9 NUMBER & OPERATIONS: MORE MULTI-DIGIT ADDITION & SUBTRACTION		
Page	**Name**	**Indiana Academic Standards for Mathematics**
A9.1	Activity 1: Modeling the Standard Algorithm for Double-Digit Addition	2.1.1 Count by ones, twos, fives, and tens to 100. 2.1.5 Compare whole numbers up to 100 and arrange them in numerical order. 2.2.1 Model addition of numbers less than 100 with objects and pictures. 2.2.2 Add two whole numbers less than 100 with and without regrouping. 2.2.3 Subtract two whole numbers less than 100 without regrouping. 2.2.4 Understand and use the inverse relationship between addition and subtraction. 2.2.5 Use estimation to decide whether answers are reasonable in addition problems. 2.3.2 Use the commutative and associative properties for addition to simplify mental calculations and to check results.
A9.11	Activity 2: Recording the Standard Algorithm for Double-Digit Addition	
A9.19	Activity 3: Introducing the Open Number Line	
A9.25	Activity 4: Height and Length Problems	
A9.31	Activity 5: Greatest Difference Wins	
A9.35	Activity 6: Modeling the Standard Algorithm for Double-Digit Subtraction	
A9.43	Activity 7: Recording the Standard Algorithm for Double-Digit Subtraction	
A9.51	Independent Worksheet 1: PJ Panda's Regrouping Method for Addition	
A9.53	Independent Worksheet 2: Adding with PJ Panda	
A9.55	Independent Worksheet 3: More Panda Problems	
A9.57	Independent Worksheet 4: PJ Panda's Regrouping Method for Subtraction	
A9.59	Independent Worksheet 5: Subtracting with PJ Panda	
A9.61	Independent Worksheet 6: Check Your Answers with PJ	
A9.63	Independent Worksheet 7: Addition & Subtraction Practice	
A9.65	Independent Worksheet 8: Equations & Expressions	
A9.67	Independent Worksheet 9: Combining Numbers to Make 100	

SET D1 MEASUREMENT: DURATION		
Page	**Name**	**Indiana Academic Standards for Mathematics**
D1.1	Activity 1: Time Tests (OPTIONAL)	2.5.5 Estimate and measure capacity using cups and pints. 2.5.6 Estimate weight and use a given object to measure the weight of other objects. 2.5.7 Recognize the need for a fixed unit of weight. 2.5.10 Know relationships of time: seconds in a minute; minutes in an hour; hours in a day; days in a week; and days, weeks, and months in a year.
D1.5	Activity 2: Second, Minute, or Hour? (OPTIONAL)	
D1.7	Activity 3: How Long Does It Take? (OPTIONAL)	
D1.11	Activity 4: The Water Experiment	
D1.15	Activity 5: Two Pounds of Apples	
D1.19	Activity 6: A Quart of Ice Cubes	

Activities & Indiana Academic Standards for Mathematics (cont.)

SET D2 MEASUREMENT: LENGTH IN U.S. CUSTOMARY UNITS		
Page	**Name**	**Indiana Academic Standards for Mathematics**
D2.1	Activity 1: Measuring Length in Teacher Feet	2.5.1 Measure and estimate length to the nearest inch, foot, yard, centimeter, and meter. 2.5.2 Describe the relationships among inch, foot, and yard. Describe the relationship between centimeter and meter. 2.5.3 Decide which unit of length is most appropriate in a given situation.
D2.5	Activity 2: Measuring Length in Giant Feet	
D2.9	Activity 3: Head Strings	
D2.13	Activity 4: Making Inchworm Rulers	
D2.19	Activity 5: Estimate & Measure Inches	
D2.25	Activity 6: From Feet to Yards	
D2.29	Activity 7: Measuring in Yards	
D2.33	Activity 8: How Long? How Tall?	

SET D3 MEASUREMENT: LENGTH IN METRIC UNITS		
Page	**Name**	**Indiana Academic Standards for Mathematics**
D3.1	Activity 1: How Long is an Army Ant?	2.5.1 Measure and estimate length to the nearest inch, foot, yard, centimeter, and meter. 2.5.2 Describe the relationships among inch, foot, and yard. Describe the relationship between centimeter and meter. 2.6.3 Explain the reasoning used and justify the procedures selected in solving a problem.
D3.11	Activity 2: Estimate & Measure Centimeters	
D3.17	Activity 3: 100 Army Ants and More	

SET D5 MEASUREMENT: TELLING TIME		
Page	**Name**	**Indiana Academic Standards for Mathematics**
D5.1	Activity 1: Shake, Tell & Record the Time	2.5.9 Tell time to the nearest quarter hour, be able to tell five-minute intervals, and know the difference between a.m. and p.m.
D5.5	Activity 2: Telling Time Concentration	
D5.11	Independent Worksheet 1: Telling Time on Two Kinds of Clocks	
D5.13	Independent Worksheet 2: Writing Time in Different Ways	
D5.15	Independent Worksheet 3: A.M. or P.M.?	
D5.17	Independent Worksheet 4: Willy Worm's School Day	
D5.19	Independent Worksheet 5: How Many?	

SET D6 MEASUREMENT: TEMPERATURE		
Page	**Name**	**Indiana Academic Standards for Mathematics**
D6.1	Activity 1: What's the Temperature	Set D6 Measurement: Temperature, Activities 1–3
D6.5	Activity 2: How Does the Temperature Change During the Day?	
D6.9	Activity 3: Forecast & Actual Temperatures on a Thermometer	

Activities & Recommended Timings

(Activities Listed in Recommended Teaching Order)

REPLACE SELECTED SESSIONS IN BRIDGES, UNIT 1			
Page	**Set, Strand & Topic**	**Name**	**Recommended Timing**
D2.1	Set D2 Measurement: Length in U.S. Customary Units	Activity 1: Measuring Length in Teacher Feet	Replaces Unit 1, Session 13 (Placed at the end of Unit 1)
D2.5	Set D2 Measurement: Length in U.S. Customary Units	Activity 2: Measuring Length in Giant Feet	Replaces Unit 1, Session 14 (Placed at the end of Unit 1)
D2.9	Set D2 Measurement: Length in U.S. Customary Units	Activity 3: Head Strings	Replaces Unit 1, Session 19 (Placed at the end of Unit 1)
D2.13	Set D2 Measurement: Length in U.S. Customary Units	Activity 4: Making Inchworm Rulers	Replaces Unit 1, Session 20 (Placed at the end of Unit 1)
D2.19	Set D2 Measurement: Length in U.S. Customary Units	Activity 5: Estimate & Measure Inches	Replaces Unit 1, Session 21 (Placed at the end of Unit 1)
D2.25	Set D2 Measurement: Length in U.S. Customary Units	Activity 6: From Feet to Yards	Replaces Unit 1, Session 22 (Placed at the end of Unit 1)
D2.29	Set D2 Measurement: Length in U.S. Customary Units	Activity 7: Measuring in Yards	Appears at the end of Unit 1 after Set D2 Activity 6
D2.33	Set D2 Measurement: Length in U.S. Customary Units	Activity 8: How Long? How Tall?	Appears at the end of Unit 1 after Set D2 Activity 7

REPLACE SELECTED SESSIONS IN BRIDGES, UNIT 2			
Page	**Set, Strand & Topic**	**Name**	**Recommended Timing**
D3.1	Set D3 Measurement: Length in Metric Units	Activity 1: How Long is an Army Ant?	Replaces Unit 2, Session 2
D3.11	Set D3 Measurement: Length in Metric Units	Activity 2: Estimate & Measure Centimeters	Replaces Unit 2, Session 3
D3.17	Set D3 Measurement: Length in Metric Units	Activity 3: 100 Army Ants and More	Replaces Unit 2, Session 4
A4.1	Set A4 Number & Operations: Place Value	Activity 1: Hundreds of Seeds	Replaces Unit 2, Session 5

REPLACE SELECTED NUMBER CORNER SESSIONS IN NOVEMBER			
Page	**Set, Strand & Topic**	**Name**	**Recommended Timing**
D1.11	Set D1 Measurement: Duration	Activity 4: The Water Experiment	Replaces November Number Corner Daily Measure Workouts

INSERT AT THE END OF BRIDGES, UNIT 3			
Page	**Set, Strand & Topic**	**Name**	**Recommended Timing**
A2.1	Set A2 Number & Operations: Solving Equations	Activity 1: The Blue Square Game, Part 1	Inserted after Unit 3, Session 22
A2.9	Set A2 Number & Operations: Solving Equations	Activity 2: The Blue Square Game, Part 2	Inserted after Set A2, Activity 1
A2.15	Set A2 Number & Operations: Solving Equations	Independent Worksheet 1: Addition & Subtraction Puzzles	Inserted as homework after Set A2, Activity 2
A2.17	Set A2 Number & Operations: Solving Equations	Independent Worksheet 2: Missing Numbers	Inserted as homework after Unit 3, Ses-sion 24

Activities & Recommended Timings (cont.)

REPLACE SELECTED NUMBER CORNER SESSIONS IN JANUARY & FEBRUARY			
Page	**Set, Strand & Topic**	**Name**	**Recommended Timing**
D1.15	Set D1 Measurement: Duration	Activity 5: Two Pounds of Apples	Replaces January Number Corner Daily Measure Workouts
D1.19	Set D1 Measurement: Duration	Activity 6: A Quart of Ice Cubes	Replaces February Number Corner Daily Measure Workouts
D6.1	Set D6 Measurement: Temperature	Activity 1: What's the Temperature	Replaces part or all of 3 Number Corner sessions in a single week in the first half of January
D6.5	Set D6 Measurement: Temperature	Activity 2: How Does the Temperature Change During the Day?	Replaces part or all of 3 Number Corner sessions in a single week in the second half of January
D6.9	Set D6 Measurement: Temperature	Activity 3: Forecast & Actual Tempera-tures on a Thermometer	Replaces part or all of 3 Number Corner sessions in a single week in the first half of February

REPLACE SELECTED SESSIONS IN BRIDGES, UNIT 5			
Page	**Set, Strand & Topic**	**Name**	**Recommended Timing**
A5.1	Set A5 Number & Operations: Multi-Digit Addition & Subtraction	Activity 1: 52 Weeks, 365 Days	Inserted between Sessions 11 and 12
A5.5	Set A5 Number & Operations: Multi-Digit Addition & Subtraction	Activity 2: Jump-a-Ten	Inserted between Sessions 11 and 12, after Set A5, Activity 1
A5.11	Set A5 Number & Operations: Multi-Digit Addition & Subtraction	Activity 3: Jump-a-Hundred	Inserted between Sessions 11 and 12, after Set A5, Activity 2
A5.33	Set A5 Number & Operations: Multi-Digit Addition & Subtraction	Independent Worksheet 1: Different Ways to Tell about the Same Numbers	Inserted as homework after Session 12
A9.1	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Activity 1: Modeling the Standard Algo-rithm for Double-Digit Addition	Replaces Unit 5, Session 27 (Placed directly after Session 24)
A9.11	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Activity 2: Recording the Standard Algo-rithm for Double-Digit Addition	Replaces Unit 5, Session 28 (Placed directly after Set A9, Activity 1)
A9.19	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Activity 3: Introducing the Open Number Line	Replaces Unit 5, Session 30 (Placed directly after Set A9, Activity 2)
A9.51	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Independent Worksheet 1: PJ Panda's Regrouping Method for Addition	Inserted as homework after Set A9, Activity 3
A9.25	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Activity 4: Height and Length Problems	Replaces Unit 5, Session 29 (Placed directly after Set A9, Activity 3)
A9.31	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Activity 5: Greatest Difference Wins	Replaces Unit 5, Session 30 (Placed directly after Set A9, Activity 4)
A9.53	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Independent Worksheet 2: Adding with PJ Panda	Inserted as homework after Set A9, Activity 5
A9.35	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Activity 6: Modeling the Standard Algo-rithm for Double-Digit Subtraction	Replaces Unit 5, Session 31 (Placed directly after Set A9, Activity 5)
A9.43	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Activity 7: Recording the Standard Algo-rithm for Double-Digit Subtraction	Replaces Unit 5, Session 32 (Placed directly after Set A9, Activity 6)
A9.55	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Independent Worksheet 3: More Panda Problems	Inserted as homework after Set A9, Activity 7
A9.57	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Independent Worksheet 4: PJ Panda's Regrouping Method for Subtraction	Inserted as homework after Session 33

Activities & Recommended Timings (cont.)

REPLACE SELECTED SESSIONS IN BRIDGES, UNIT 5			
Page	**Set, Strand & Topic**	**Name**	**Recommended Timing**
A9.59	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Independent Worksheet 5: Subtracting with PJ Panda	Inserted as homework after Session 35

REPLACES SELECTED WORKOUTS IN MARCH–MAY NUMBER CORNER			
Page	**Set, Strand & Topic**	**Name**	**Recommended Timing**
A5.17	Set A5 Number & Operations: Multi-Digit Addition & Subtraction	Activity 4: Modifying the Base Ten Bank	Replaces March–May Number Corner Base Ten Bank

REPLACE SELECTED SESSIONS IN BRIDGES, UNIT 7			
Page	**Set, Strand & Topic**	**Name**	**Recommended Timing**
D5.1	Set D5 Measurement: Telling Time	Activity 1: Shake, Tell & Record the Time	Inserted prior to Session 1
D5.11	Set D5 Measurement: Telling Time	Independent Worksheet 1: Telling Time on Two Kinds of Clocks	Inserted as homework after Set D5, Activity 1
D5.5	Set D5 Measurement: Telling Time	Activity 2: Telling Time Concentration	Replaces Unit 7, Session 24
D5.13	Set D5 Measurement: Telling Time	Independent Worksheet 2: Writing Time in Different Ways	Inserted as homework after Set D5, Activity 2
A6.1	Set A6 Number & Operations: Money	Activity 1: Dollars & Cents	Appears between Session 1 and Session 2 in Unit 7
A6.9	Set A6 Number & Operations: Money	Activity 2: Three Spins to Win	Appears between Session 1 and Session 2 in Unit 7, directly after Set A6, Activity 1
A6.14	Set A6 Number & Operations: Money	Independent Worksheet 1: Mr. Mole's Money	Inserted as homework after Set A6, Activity 2
D5.15	Set D5 Measurement: Telling Time	Independent Worksheet 3: A.M. or P.M.?	Inserted as homework after Session 2
D5.17	Set D5 Measurement: Telling Time	Independent Worksheet 4: Willy Worm's School Day	Inserted as homework after Session 4
D5.19	Set D5 Measurement: Telling Time	Independent Worksheet 5: How Many?	Inserted as homework after Session 6
A9.61	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Independent Worksheet 6: Check Your Answers with PJ	Inserted as homework after Session 7
A9.63	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Independent Worksheet 7: Addition & Subtraction Practice	Inserted as homework after Session 9
A9.65	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Independent Worksheet 8: Equations & Expressions	Inserted as homework after Session 11
A9.67	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction	Independent Worksheet 9: Combining Numbers to Make 100	Inserted as homework after Session 12
A4.21	Set A4 Number & Operations: Place Value	Activity 4: Target 700	Inserted between Sessions 13 and 14
A4.25	Set A4 Number & Operations: Place Value	Activity 5: Four-Digit Shuffle	Inserted between Sessions 13 and 14, after Set A4, Activity 4
A4.33	Set A4 Number & Operations: Place Value	Independent Worksheet 1: Large Numbers	Inserted as homework after Set A4, Activity 5
A4.29	Set A4 Number & Operations: Place Value	Activity 6: Will the Real Value Please Stand Up?	Inserted between Sessions 13 and 14, after Set A4, Activity 5
A7.1	Set A7 Number & Operations: Numbers to 1,000 on a Line or Grid	Activity 1: Mystery Numbers on a 101–200 Grid	Replaces Unit 7, Session 24
A4.35	Set A4 Number & Operations: Place Value	Independent Worksheet 2: Thinking about Place Value	Inserted as homework after Set A7, Activity 1

Activities & Recommended Timings (cont.)

REPLACE SELECTED SESSIONS IN BRIDGES, UNIT 7			
Page	**Set, Strand & Topic**	**Name**	**Recommended Timing**
A7.7	Set A7 Number & Operations: Numbers to 1,000 on a Line or Grid	Activity 2: What's My Number?	Replaces Unit 7, Session 25
A7.11	Set A7 Number & Operations: Numbers to 1,000 on a Line or Grid	Independent Worksheet 1: What's Missing? 901–1,000	Inserted as homework after Set A7, Activity 2
A7.13	Set A7 Number & Operations: Numbers to 1,000 on a Line or Grid	Independent Worksheet 2: What's Missing? 10–1,000	Replaces Unit 7, Session 26

Unit One Planner (Bridges & IN Grade 2 Supplement Set D2)

SESSION 1	SESSION 2	SESSION 3	SESSION 4	SESSION 5
Problems & Investigations People Sorting: Alike & Different, p. 9 **Assessment** What is a Pattern? p. 11	**Problems & Investigations** People Sorting: Guess My Rule, p. 14 **Introduce Work Places 1**	**Problems & Investigations** Beetle Glyphs, p. 21 **Work Places 1**	**Problems & Investigations** Beetle Glyph Sorting: Finding Many Ways, p. 24 **Work Places 1**	**Problems & Investigations** Beetle Glyph Sorting: Venn Diagrams **Work Places 1**
SESSION 6	**SESSION 7**	**SESSION 8**	**SESSION 9**	**SESSION 10**
Problems & Investigations Unifix Cube Growing Patterns, p. 30 **Work Places 1** **Home Connection 1**	**Problems & Investigations** Race You to 25¢, p. 34 **Work Places 1**	**Work Places** Introduce Work Places 2, p. 37	**Work Sample** Unifix Cube Growing Patterns: Another Look, p. 49 **Work Places 2**	**Problems & Investigations** Growing Patterns: Making a Chart of 2's, p. 53 **Assessment** Start Individual Interviews, p. 55 **Work Places 2**
SESSION 11	**SESSION 12**	**SESSION 15**	**SESSION 16**	**SESSION 17**
Work Sample Growing Patterns: What Do You Notice About the 2's Chart? p. 62 **Work Places 2** Continue Individual Interviews **Home Connection 2**	**Work Sample** Growing Patterns: Extending the 2's Chart, p. 66 **Work Places 2** Continue Individual Interviews **Note** Sessions 13 and 14 have been omitted to make room at the end of Unit 1 for Supp. Set D2.	**Problems & Investigations** Which One Doesn't Belong? p. 76 **Work Places 2** Continue Individual Interviews	**Problems & Investigations** Pattern Block Growing Patterns, p. 79 **Work Places 2**	**Problems & Investigations** An Hour or Bust!, p. 84 **Introduce Work Places 3** Continue Individual Interviews
SESSION 18	**SESSION 23**	**SUPPLEMENT**	**SUPPLEMENT**	**SUPPLEMENT**
Work Places Getting Started with Work Places 3, p. 99 Continue Individual Interviews **Home Connection 3** **Note** Sessions 19–22 have been omitted to make room for Supplement Activities.	**Assessment** What is a Pattern? Revisited, p. 116 **Work Places 3** Continue Individual Interviews	**Supplement Set D2 Measurement: Measuring Length in U.S. Standard Units,** Activity 1: Measuring Length in Teacher Feet **Work Places 3** Continue Individual Interviews	**Supplement Set D2 Measurement: Measuring Length in U.S. Standard Units,** Activity 2: Measuring Length in Giant Feet **Work Places 3** Continue Individual Interviews	**Supplement Set D2 Measurement: Measuring Length in U.S. Standard Units,** Activity 3: Head Strings **Work Places 3** **Home Connection 4**

Unit One Planner (Bridges & IN Grade 2 Supplement Set D2) (cont.)

SUPPLEMENT	SUPPLEMENT	SUPPLEMENT	SUPPLEMENT	SUPPLEMENT
Supplement Set D2 Measurement: Measuring Length in U.S. Standard Units, Activity 4: Making Inchworm Rulers **Work Places 3** Continue Individual Interviews	**Supplement Set D2 Measurement: Measuring Length in U.S. Standard Units** Activity 5: Estimate & Measure Inches **Work Places 3** Continue Individual Interviews	**Supplement Set D2 Measurement: Measuring Length in U.S. Standard Units** Activity 6: From Feet to Yards **Work Places 3** Continue Individual Interviews	**Supplement Set D2 Measurement: Length in U.S. Customary Units** Activity 7: Measuring in Yards **Work Places 3** Continue Individual Interviews	**Supplement Set D2 Measurement: Length in U.S. Customary Units** Activity 8: How Long? How Tall? **Work Places 3** Continue Individual Interview

Unit Two Planner (Bridges & IN Grade 2 Supp. Sets A4, A8 & D3)

SESSION 1	SUPPLEMENT	SUPPLEMENT	SUPPLEMENT	SUPPLEMENT
Problems & Investigations One Hundred Hungry Ants: Can You Line Them Up? p. 129	**Supplement Set D3 Measurement: Length in Metric Units** Activity 1: How Long is an Army Ant?	**Supplement Set D3 Measurement: Length in Metric Units** Activity 2: Estimate & Measure Centimeters **Home Connection 5**	**Supplement Set D3 Measurement: Length in Metric Units** Activity 3: 100 Army Ants & More	**Supplement Set A4 Number & Operations: Place Value** Activity 1: Hundreds of Seeds
SESSION 6	**SESSION 7**	**SESSION 8**	**SESSION 9**	**SESSION 10**
Problems & Investigations Hungry Ant Story Problems: What Do You Notice? What Do You See? p. 149 **Work Places 3**	**Problems & Investigations** Hungry Ant Story Problems: Looking at Picture Problems, p. 152	**Problems & Investigations** Creating Hungry Ant Story Problems, Part 1, p. 157 **Home Connection 6**	**Problems & Investigations** Creating Hungry Ant Story Problems, Part 2, p. 162	**Work Sample** Solving Hungry Ant Story Problems Together, p. 169
SESSION 11	**SESSION 12**	**SESSION 13**	**SUPPLEMENT**	**SUPPLEMENT**
Work Sample Shopping for Hungry Ant Story Problems, Part 1, p. 174	**Work Sample** Shopping for Hungry Ant Story Problems, Part 2, p. 178	**Problems & Investigations** Looking Back at Our Solutions, p. 180 **Work Places 3** Review & Revisit **Home Connection 7**	**Supplement Set A8 Number & Operations: Ordinal Numbers** Activity 1: Introducing the Language of Ordinal Numbers	**Supplement Set A8 Number & Operations: Ordinal Numbers** Activity 2: Grid Pictures

Unit Three Planner (Bridges & IN Grade 2 Supp. Sets A2, A8 & D1)

Reminder Supplement Set D1, Activity 4, The Water Experiment, replaces the November Number Corner Daily Measure Workouts.

SESSION 1	SESSION 2	SESSION 3	SESSION 4	SESSION 5
Problems & Investigations 12 Ways to Make 11 (Reviewing standard notation for addition and subtraction) p. 195 **Homework Supplement Set A8 Number & Operations: Ordinal Numbers** Ind. Worksheet 1, Alphabet Line Up	**Problems & Investigations** Get the Facts: Addition (Developing a chart of addition facts) p. 198	**Assessment** Which Addition Combinations Are Easiest For You? p. 203 Roll & Add: A Probability Game (Counting on to add) p. 208	**Problems & Investigations** Shake, Reach & Record (Exploring addition fact families and probability) p. 211 **Homework Supplement Set A8 Number & Operations: Ordinal Numbers** Ind. Worksheet 2, Ordinal Numbers on the Calendar	**Problems & Investigations** Get the Facts: Subtraction (Developing a chart of subtraction facts) p. 214
SESSION 6	**SESSION 7**	**SESSION 8**	**SESSION 9**	**SESSION 10**
Assessment Which Subtraction Combinations Are Easiest For You? p. 219 Roll & Subtract: A Probability Game, p. 221 **Home Connection 8**	**Problems & Investigations** Make the Sum (Exploring addition fact families) p. 224 **Introduce Work Places 4**	**Work Places** Getting Started with Work Places 4, p. 243 Introduction to Cats & Mice p. 243	**Problems & Investigations** Fall/Winter Character Quilt—Making the Quilt Blocks (Spatial problem solving) p. 247 **Homework Supplement Set A8 Number & Operations: Ordinal Numbers** Ind. Worksheet 3, Another Grid Picture	**Problems & Investigations** Fall/Winter Character Quilt—Designing the Quilt Layout (Exploring symmetry) p. 252 **Work Places 4**
SESSION 11	**SESSION 12**	**SESSION 13**	**SESSION 14**	**SESSION 15**
Problems & Investigations Fall/Winter Character Quilt —Choosing the Quilt Layout, p. 255 **Work Places 4** **Home Connection 9**	**Problems & Investigations** Cover Up, Part 1 (Exploring sums of doubles and neighbors) p. 258 **Work Places 4**	**Problems & Investigations** Cover Up, Part 2 (Exploring sums of doubles and neighbors) p. 261 **Work Places 4**	**Problems & Investigations** Battling Bugs (Exploring subtraction as a process of finding the difference) p. 266 **Work Places 4**	**Problems & Investigations** Kids in the House (Searching for addition combinations to 16) p. 268 **Work Places 4**
SESSION 16	**SESSION 17**	**SESSION 18**	**SESSION 19**	**SESSION 20**
Problems & Investigations Crossing the Pond: A Probability Game (Practicing subtraction facts to 12) p. 272 **Work Places 4**	**Problems & Investigations** Scout Them Out 1: Adding & Subtracting 0's & 1's, p. 277 **Introduce Work Places 5**	**Work Places** Getting Started with Work Places 5, p. 297	**Problems & Investigations** Scout Them Out 2: Adding & Subtracting 2's & 10's, p. 299 **Work Places 5** **Home Connection 10**	**Problems & Investigations** Scout Them Out 3 Adding & Subtracting Doubles & Neighbors p. 302 **Work Places**

Unit Three Planner (Bridges & IN Grade 2 Supplement Sets A2, A8 & D1) (cont.)

SESSION 21	SESSION 22	SUPPLEMENT	SUPPLEMENT	SESSION 23
Problems & Investigations Scout Them Out 4: Adding Doubles & Neighbors; Subtracting Halves, p. 308 **Work Places 5**	**Problems & Investigations** Scout Them Out 5: Adding 10's & 9's; Subtracting 10's & Run Away 1's, p. 312 **Work Places 5**	**Supplement Set A2 Number & Operations: Solving Equations** Activity 1: The Blue Square Game, Part 1 **Work Places 5**	**Supplement Set A2 Number & Operations: Solving Equations** Activity 2: The Blue Square Game, Part 2 **Work Places 5** **Homework Supplement Set A2 Number & Operations: Solving Equations** Ind. Worksheet 1, Addition & Subtraction Puzzles	**Assessment** Which Addition Combinations Are Easiest For You Now? p. 318 **Work Places 5**

SESSION 24				
Assessment Which Subtraction Combinations Are Easiest For You Now? p. 318 **Work Places 5**				
Homework Supplement Set A2 Number & Operations: Solving Equations Ind. Worksheet 2, Missing Numbers				

Unit Four

Reminder Use Set D1, Activities 5 and 6, Two Pounds of Apples and A Quart of Ice Cubes to replace the Daily Measure Workouts in January and February Number Corner. Also, use Set D6, Activities 1–3 (Temperature) to replace part or all of your Number Corner workouts early in January, later in January, and early in February.

Unit Five Planner (Bridges & IN Grade 2 Supp. Sets A5 & A9)

Reminder Supplement Set A5, Activity 4: Modifying the Base Ten Bank, replaces selected Number Corner Workouts in March through May.

SESSION 1	SESSION 2	SESSION 3	SESSION 4	SESSION 5
Assessment Thinking about Coins & Numbers, p. 481 **Work Places 7**	**Problems & Investigations** Presents & Parcels: What Do You Notice? What Do You See? p. 488 **Work Places 7**	**Problems & Investigations** Presents & Parcels: Looking at Picture Problems, p. 492 **Home Connection 17**	**Problems & Investigations** Presents & Parcels: Creating Story Problems, Part 1, p. 498	**Problems & Investigations** Presents & Parcels: Creating Story Problems, Part 2, p. 501
SESSION 6	**SESSION 7**	**SESSION 8**	**SESSION 9**	**SESSION 10**
Problems & Investigations Presents & Parcels: Solving Story Problems Together, p. 507	**Work Sample** Presents & Parcels: Shopping for Story Problems, Part 1, p. 511	**Work Sample** Presents & Parcels: Shopping for Story Problems, Part 2, p. 516 **Home Connection 18**	**Problems & Investigations** Looking Back & Thinking Ahead: Establishing Class Guidelines for Sharing Solutions, p. 518 **Work Places 7**	**Problems & Investigations** The Final Problem: Applying the Guidelines, p. 522 **Work Places 7**
SESSION 11	**SUPPLEMENT**	**SUPPLEMENT**	**SUPPLEMENT**	**SESSION 12**
Assessment Each One Teach One: How Well Did We Follow the Guidelines? p. 525 **Work Places 7**	**Supplement Set A5 Number & Operations: Multi-Digit Addition & Subtraction** Activity 1: 52 Weeks, 365 Days **Work Places**	**Supplement Set A5 Number & Operations: Multi-Digit Addition & Subtraction** Activity 2: Jump-a-Ten **Work Places 7**	**Supplement Set A5 Number & Operations: Multi-Digit Addition & Subtraction** Activity 3: Jump-a-Hundred **Work Places 7**	**Problems & Investigations** 25¢ or Bust! p. 529 **Work Places 7** **Homework Supplement Set A5 Number & Operations: Multi-Digit Addition & Subtraction** Ind. Worksheet 1: Different Ways to Tell about the Same Numbers
SESSION 13	**SESSION 14**	**SESSION 15**	**SESSION 16**	**SESSION 17**
Problems & Investigations Handfuls of Treasure, p. 533 **Work Places 7** **Home Connection 19**	**Problems & Investigations** Beat You to $1.00: A Probability Investigation, p. 539 **Work Places 7**	**Problems & Investigations** Scoop 100 & Find the Mass, p. 542 **Work Places 7**	**Problems & Investigations** Base Ten Triple Spin, p. 549 **Introduce Work Places 8**	**Work Places** Getting Started with Work Places 8, p. 573
SESSION 18	**SESSION 19**	**SESSION 20**	**SESSION 21**	**SESSION 22**
Problems & Investigations The Candy Colors Project, Part 1: Predicting Color Frequency, p. 575 **Work Places 8** **Home Connection 20**	**Problems & Investigations** The Candy Colors Project, Part 2: Graphing Color Frequency, p. 579 **Work Places 8**	**Problems & Investigations** The Candy Colors Project, Part 3: Analyzing the Data, p. 583 **Work Places 8**	**Problems & Investigations** Make 100! Under or Over? p. 587 **Work Places 8**	**Problems & Investigations** Which Makes the Most Sense? p. 591 **Work Places 8**

Unit Five Planner (Bridges & IN Grade 2 Supp. Sets A5 & A9) (cont.)

SESSION 23	SESSION 24	SUPPLEMENT	SUPPLEMENT	SUPPLEMENT
Problems & Investigations Pick 2, p. 594 **Work Places 8** **Home Connection 21**	**Problems & Investigations** Race to 100 & Back, p. 598	**Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction** Activity 1: Modeling the Standard Algorithm for Double-Digit Addition **Work Places 8**	**Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction** Activity 2: Recording the Standard Algorithm for Double-Digit Addition **Home Connection 22**	**Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction** Activity 3: Introducing the Open Number Line **Homework** **Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction** Ind. Worksheet 1: PJ Panda's Regrouping Method for Addition
SUPPLEMENT	**SUPPLEMENT**	**SUPPLEMENT**	**SUPPLEMENT**	**SESSION 25**
Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Activity 4: Height and Length Problems	**Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction** Activity 5: Greatest Difference Wins **Homework** **Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction** Ind. Worksheet 2: Adding with PJ Panda	**Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction** Activity 6: Modeling the Standard Algorithm for Subtraction	**Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction** Activity 7: Recording the Standard Algorithm for Subtraction **Homework** **Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction** Ind. Worksheet 3: More Panda Problems	**Problems & Investigations** Shopping for Key Chain Charms: A Savings Game, p. 604 **Work Places 8**
SESSION 26	**SESSION 29**	**SESSION 33**	**SESSION 34**	**SESSION 35**
Problems & Investigations Hawaiian Dream Vacation, p. 608 **Work Places 8** **Note** Sessions 27 & 28 have been omitted to make room for the activities in Supplement Set A9	**Work Places** Getting Started with Work Places 9, p. 635 **Note** Sessions 30, 31, and 32 have been omitted to make room for the activities in Supplement Set A9	**Work Places** Work Places 9, p. 651 **Homework** **Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction** Ind. Worksheet 4: PJ Panda's Regrouping Method for Subtraction	**Work Places** Work Places 9, p. 651 **Home Connection 23**	**Assessment** Thinking about Coins & Numbers, Revisited, p. 653 **Homework** **Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction** Ind. Worksheet 5: Subtracting with PJ Panda

Unit Seven Planner (Bridges & IN Grade 2 Supp. Sets A4, A6, A7, A9, D5)

SUPPLEMENT	SUPPLEMENT	SESSION 1	SUPPLEMENT	SUPPLEMENT
Supplement Set D5 Measurement: Telling Time Activity 1: Shake, Tell & Record the Time **Work Places 9** **Homework Supplement Set D5 Measurement: Telling Time**, Independent Worksheet 1: Telling Time on Two Kinds of Clocks	**Supplement Set D5 Measurement: Telling Time** Activity 2: Telling Time Concentration **Work Places 9** **Homework Supplement Set D5 Measurement: Telling Time**, Independent Worksheet 2: Writing Time in Different Ways	**Problems & Investigations** Arthur's Funny Money, p.733 **Work Places 9**	**Supplement Set A6 Number & Operations: Money** Activity 1: Dollars & Cents **Work Places 9** **Home Connection 27**	**Supplement Set A6 Number & Operations: Money** Activity 2: Three Spins to Win **Work Places 9** **Homework Supplement Set A6 Number & Operations: Money** Ind. Worksheet 1: Mr. Mole's Money
SESSION 2	**SESSION 3**	**SESSION 4**	**SESSION 5**	**SESSION 6**
Assessment Shopping with Arthur & Violet, p. 739 **Work Places 9**	**Problems & Investigations** Robot Glyphs, p. 747 **Work Places 9**	**Problems & Investigations** Graphing the Glyphs, p. 754 **Work Places 9**	**Problems & Investigations** Fair Shares: An Activity with Fractions, p.762 **Work Places 9**	**Problems & Investigations** Bug Spinner Experiments, p. 769 **Work Places 9**
Homework Supplement Set D5 Measurement: Telling Time, Independent Worksheet 3: A.M. or P.M.?		**Homework Supplement Set D5 Measurement: Telling Time**, Independent Worksheet 4: Willy Worm's School Day		**Homework Supplement Set D5 Measurement: Telling Time**, Independent Worksheet 5: How Many?
SESSION 7	**SESSION 8**	**SESSION 9**	**SESSION 10**	**SESSION 11**
Problems & Investigations Pick & Peek: A Probability Experiment, p. 776 **Work Places 9**	**Problems & Investigations** Anything But 1! Collecting Data, p. 781 **Work Places 9** **Home Connection 28**	**Problems & Investigations** The Indy 500, p. 787 Introduce Work Places 10	**Work Places** Getting Started with Work Places 10, p. 809	**Work Places** Work Places 10, p. 813
Homework Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Ind. Worksheet 6: Check Your Answers with PJ		**Homework Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction** Ind. Worksheet 7: Addition & Subtraction Practice		**Homework Supplement Set A9 Number & Operations: More Multi-Digit Addition & Subtraction** Ind. Worksheet 8: Equations & Expressions
SESSION 12	**SESSION 13**	**SUPPLEMENT**	**SUPPLEMENT**	**SUPPLEMENT**
Work Places Work Places 10, p. 813	**Work Places** Work Places 10 Looking at the Data Collected So Far, p. 814 **Home Connection 29**	**Supplement Set A4 Number & Operations: Place Value** Activity 4: Target 700 **Work Places 10**	**Supplement Set A4 Number & Ops: Place Value** Activity 5: Four-Digit Shuffle **Work Places 10** **Homework Supp Set A4: Place Value** Ind. Worksheet 1: Large Numbers	**Supplement Set A4 Number & Ops: Place Value** Activity 6: Will the Real Value Please Stand Up? **Work Places 10** **Home Connection 30**
Homework Supplement Set A9 More Multi-Digit Addition & Sub Ind. Worksheet 9: Combining Numbers to Make 100				

Unit Seven Planner (Bridges & IN Grade 2 Supp. Sets A4, A6, A7, A9, D5) (cont.)

SESSION 14	SESSION 15	SESSION 16	SESSION 17	SESSION 18
Problems & Investigations The Toy Store: What Do You Notice? What Do You See? p. 820	**Problems & Investigations** Introducing Toy Store Shopping Problems p. 824	**Problems & Investigations** The Toy Store: Looking at Picture Problems, p. 827	**Problems & Investigations** Toy Surveys: Which Do You Like Best? p. 831	**Problems & Investigations** Creating Toy Store Problems, Part 1, p. 835
SESSION 19	**SESSION 20**	**SESSION 21**	**SESSION 22**	**SESSION 23**
Problems & Investigations Work Sample Creating Toy Store Problems, Part 2, p. 839 **Work Places 10**	**Problems & Investigations** The First Problem, p. 845 **Work Places 10**	**Assessments** Solving Toy Store Problems: Looking Back & Thinking Ahead, p. 850	**Problems & Investigations** Work Sample Shopping for Story Problems, Part 1, p. 855	**Problems & Investigations** Work Sample Shopping for Story Problems, Part 2, p. 857 **Home Connection 31** **Note** Sessions 24–28 have been omitted to make room for Supplement activities
SUPPLEMENT	**SUPPLEMENT**	**SUPPLEMENT**	**SESSION 29**	
Supplement Set A7 Number & Operations: Numbers to 1,000 on a Line or a Grid Activity 1: Mystery Numbers on a 101–200 Grid **Work Places 10** **Homework Supplement Set A4 Number & Operations: Place Value** Ind. Worksheet 2: Thinking about Place Value	**Supplement Set A7 Number & Operations: Numbers to 1,000 on a Line or a Grid** Activity 2: What's My Number? **Work Places 10** **Homework Supplement Set A7 Number & Operations: Numbers to 1,000 on a Line or a Grid** Ind. Worksheet 1: What's Missing? 901–1,000	**Supplement Set A7 Number & Operations: Numbers to 1,000 on a Line or a Grid** Ind. Worksheet 2: What's Missing? 10–1,000 **Work Sample**	**Assessment** Shopping with Arthur & Violet, Revisited, p. 873	

Grade 2 Indiana Supplement Materials List

MANIPULATIVES	ITEM #	A2	A4	A5	A6	A7	A8	A9	D1	D2	D3	D5	D6
Large base 10 area pieces (15 sets)*	USM		√	√			√	√					
Overhead Large Base 10 Pieces*	USMO						√	√					
1" square color tile (1 set)*	T400T									√			
Game markers (100)*	M100			√									
Buttons (several hundred or more)*	BTN		√										
Portion Cups (250 1-ounce cups)	PPC1		√										
Overhead coins (1 set)*	COH				√								
3/4" wooden cubes (100)*	CW75		√**	√**									
Craft sticks (1000)*	S1000		√										
Rulers, inches & centimeters (Class set; 10 included in Grade 2 Bridges Grade Level Pkg.)*	RLC									√			
Balance Scale (1)*	BAL								√				
Cloth measuring tapes (3)*	MTC						√	√		√	Opt		
Standard pocket chart	SPC	√	√		√								
Hundreds Grid pocket chart & cards*	HC			√									
Base 10 Bank pocket chart*	BTPC			√									
Real or plastic coins (4 sets)	CPL				√								
Individual chalkboards (or whiteboards), class set	MB10S		√				√	√	√				
Chalk (or markers), class set	CK		√				√	√	√				
Erasers, class set	ERA		√				√	√	√				
Outdoor Thermometer													√

All manipulatives available from Math Learning Center. Those items marked with an asterisk are included in the Grade 2 Bridges Grade Level Package.
** Teachers will use a few of the wooden cubes to create numbered dice.

GENERAL MATERIALS (PROVIDED BY THE TEACHER)	A2	A4	A5	A6	A7	A8	A9	D1	D2	D3	D5	D6
Overhead or document camera			√	√	√	√	√					
Blank overhead transparencies if you are using an overhead projector rather than a doc camera			2	2	2	13	12					
8.5" x 11" copy paper, sheets per student	6	7	5	4	7	16	4	1	7	4	12	3
Lined writing paper, sheets per student						2	2					
8.5" x 11" cardstock, individual sheets	16			5					2		8	
1 ½" x 2" sticky notes					√							
3" x 5" index cards		√		√								
5" x 8" index cards		√										
Chart paper			√					√				
Construction paper in a variety of colors	√	√	√	√		√	√		√	√		
12" x 18" drawing paper						√			Opt	Opt		
Butcher paper									√			
Poster Board									√	√		
Regular envelopes									√			
Dry-wipe pens	√	√	√	√	√				√	√	√	
Overhead pens (black, blue, red)			√	√	√	√						
Marking pens		√		√				√				
Red, blue, green, and yellow colored pencils or fine-tipped felt pens for student use			√						√	√		√

Grade 2 Indiana Supplement Materials List (cont.)

GENERAL MATERIALS (PROVIDED BY THE TEACHER)	A2	A4	A5	A6	A7	A8	A9	D1	D2	D3	D5	D6
Crayons	√	√							√	√		
Glue sticks, class set							√		√	√		
Scissors, class set									√	√		
Blue masking tape		√							√	√		
Rubber bands (100 or more)		√										
String									√			
Adding machine tape									√			
Plastic aquarium or other clear or translucent open container that holds a gallon								√				
2 empty, clean 1-gallon milk jugs								√				
1-cup measuring cup								√				
Clear or translucent 1-quart container								√				
Small bottle of blue or green food coloring								√				
Towel								√				
Funnel								√				
1-quart plastic pitcher								√				
12 medium sized apples								√				
12 adhesive dots								√				
Standard pound and ounce weights or several 1-pound boxes of modeling clay								√				
A carrot peeler								√				
Several paper plates								√				
2–3 trays of ice cubes								√				
Celsius and Fahrenheit thermometers								Opt				
1-gallon resealable plastic bags (several)		√										
10–15 small margarine tubs or paper soup cups		√										
Clipboards, class set		Opt										
Cafeteria trays		2						√				
Yardstick (1)									√			
Meter Stick (1)										√		
One empty 12-egg carton with the lid on											√	
1 large red button and 1 small white button											√	

CHILDREN'S BOOKS (PROVIDED BY THE TEACHER)	A2	A4	A5	A6	A7	A8	A9	D1	D2	D3	D5	D6
Pigs Will be Pigs, by Amy Axelrod				Opt								
The Apple Doll, by Elisa Kleven								Opt				
How Big is a Foot, by Rolf Myller									Opt			
Jim and the Beanstalk, by Raymond Briggs									Opt			
Twelve Snails to One Lizard, by Susan Hightower									Opt			
Is a Blue Whale the Biggest Thing There Is?, by Robert E. Wells									Opt			
Books or videos about animals									Opt			
Book or video about army ants										Opt		
Telling Time: How to Tell Time on Digital and Analog Clocks, by Jules Older											Opt	

BRIDGES IN MATHEMATICS 2

GRADE 2 SUPPLEMENT

Set A2 Number & Operations: Solving Equations

Includes

Skills & Concepts

★ generate addition and subtraction strategies to find missing addends and subtrahends in number combinations through 20

★ solve equations in which the unknown number appears in a variety of positions

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Set A2 Numbers & Operations: Solving Equations

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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at www.mathlearningcenter.org.

Set A2 ★ Activity 1

ACTIVITY

The Blue Square Game, Part 1

Overview
Students each build a train of either 10 or 11 Unifix cubes in 2 or 3 different colors. Next, they color in a paper strip and write an addition expression to match their train. The class then works with the paper strips and the expressions to explore the idea of solving equations in which an unknown number appears in a variety of positions.

Skills & Concepts
★ generate addition and subtraction strategies to find missing addends and subtrahends in number combinations through 20

★ solve equations in which the unknown number appears in a variety of positions

You'll need
★ Ten Strips (page A2.5, several copies, cut apart along heavy lines)

★ Eleven Strips (page A2.6, several copies, cut apart along heavy lines)

★ Expression Cards (page A2.7, 8–10 copies, cut apart along heavy lines)

★ Numerals & Symbols Cards (page A2.8, 2 copies on cardstock, cut the cards apart)

★ Unifix cubes (see Advance Preparation)

★ eight 2" × 2" squares of blue construction paper

★ crayons and pencils

★ pocket chart

★ Work Places currently in use

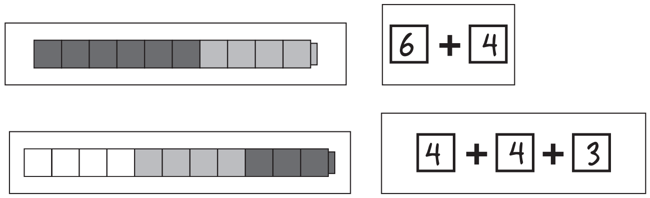
Advance Preparation Have students help you set up a container of cubes for each table or group of 4 students. Each container should have about 100 cubes in 4–5 different colors.

Instructions for The Blue Square Game, Part 1
1. Gather students to your discussion circle. Explain that they are going to use Unifix cubes today to solve some addition equations. Tell them that in a minute, each of them is going to make a train of 10 or 11 Unifix cubes using 2 or 3 different colors. Demonstrate by making a train of 6 blue and 4 green cubes. Group the like colors so all the blues are together, and all the greens are together.

2. Next, make a train of 11 cubes using 3 different colors, but don't tell students what your total is beforehand. When you're finished, give them a moment to examine your train carefully and share with the person next to them what they believe the total is. Then ask several volunteers to share their answer and their reasoning with the class.

3. Show the children a Ten Strip, an Eleven Strip, and two expression cards. Explain that when they have finished building, they are going to color in a strip and write an addition expression to match their train. Demonstrate the process with the two trains you have built. Let students know that they need to use very large, neat printing because their strips and cards are going to be posted on the pocket chart.

Activity 1 The Blue Square Game, Part 1 (cont.)

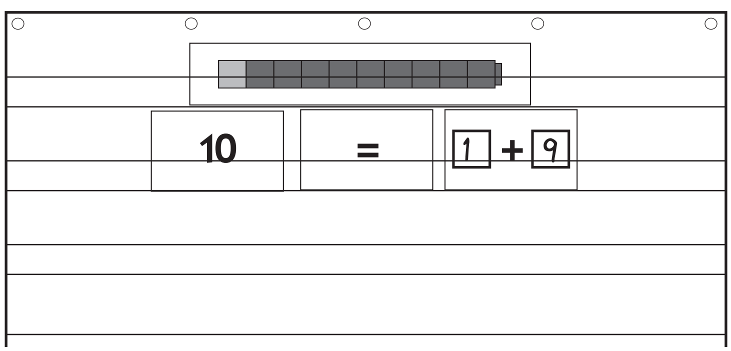


4. Send students back to their tables. Assign the students seated at half the tables to each make a train of 10 cubes. Have the students at the rest of the tables each make a train of 11 cubes. Encourage them to make their trains different than yours and different from anyone sitting near them. Remind them that they can only use 2 or 3 colors, and cubes of the same color need to be grouped together.

5. As students are building their trains, pass out Ten Strips to the students building trains of 10 and Eleven Strips to the students building trains of 11. Give them expression cards with boxes for 2 or 3 addends depending on whether they have used 2 or 3 different colors for their train.

6. As students finish coloring their strip and writing their expression, ask them to write their names on the back of each and read a book quietly at their seats until their classmates are done. When most everyone has finished, have students gather in your discussion area, and ask them to set their strips and cards down in front of them.

7. Ask a student who has a strip and an expression for 10 to bring her cards up for you to post in the pocket chart. Use the strip, the expression, and two of the Numerals & Symbols cards you have prepared to build a display similar to the one shown below.

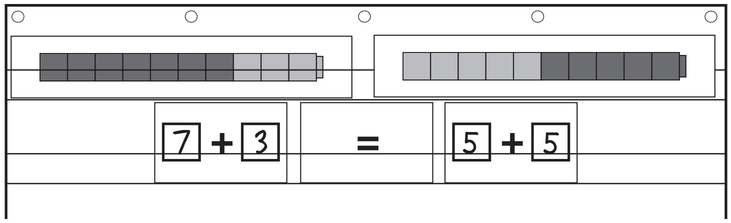


Have students read the equation with you. Invite their comments and observations. Some may feel that you've inserted the cards backwards, and that the equation should end with the total, rather than starting with it. Remind students that the equals sign means "the same as", and read the sentence that way with the class (i.e., 10 is the same as 1 + 9).

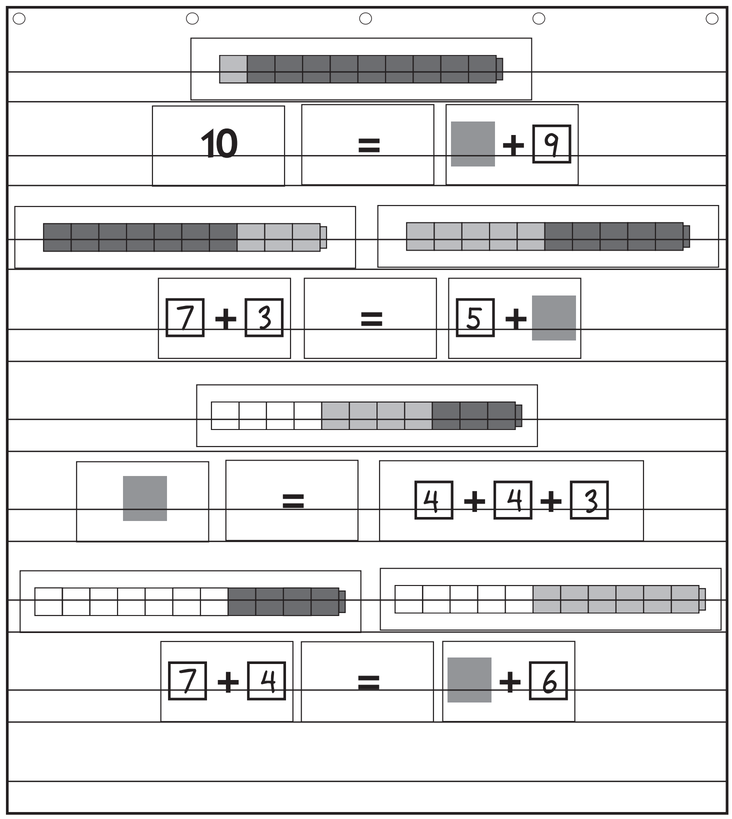
8. Now ask two students with strips and expressions for 10 to bring their cards to you. Use an equals card from your collection to set up an equation similar to the one shown at the top of the next page. Read the equation with your students and ask volunteers to explain it to the class.

> ***Teacher*** *Is this true? Is 7 + 3 really the same as 5 + 5? Talk with the person next to you for a moment, and then let's have some volunteers share their thinking with the class.*
>
> ***Students*** *They're both 10, so they're kind of the same.*
> *The numbers look kind of weird that way, but they both make 10.*

Activity 1 The Blue Square Game, Part 1 (cont.)



9. Repeat steps 7 and 8 until you have four different equations posted in the chart, two for 10 and two for 11. Now show students one of the blue squares you cut. Tell them that you are going to cover some of the numbers in the pocket chart with squares like this. Ask them to cover their eyes while you cover the numbers so it will be a surprise to them. When you have covered 4 numbers, have them open their eyes.



10. Ask students to pair-share ideas about the numbers you have hidden under the blue squares. Can they use all the clues on the pocket chart to figure out what each hidden number is? Call on several volunteers to share what they believe the hidden number in the first row is and why.

> ***Students*** *I think it's 1 because I know that 1 + 9 is 10.*
> *I think it's 1 because I can see it on the colored cubes. It's 1 green and 9 blues.*
> *9 and 1 makes 10. It has to be 1.*

Then remove the blue square to reveal the hidden number.

11. Repeat step 10 until all the hidden numbers have been revealed. Pull all the strips and expressions out of the pocket chart and put them aside for now. Call on 6 more students to bring their strips and ex-

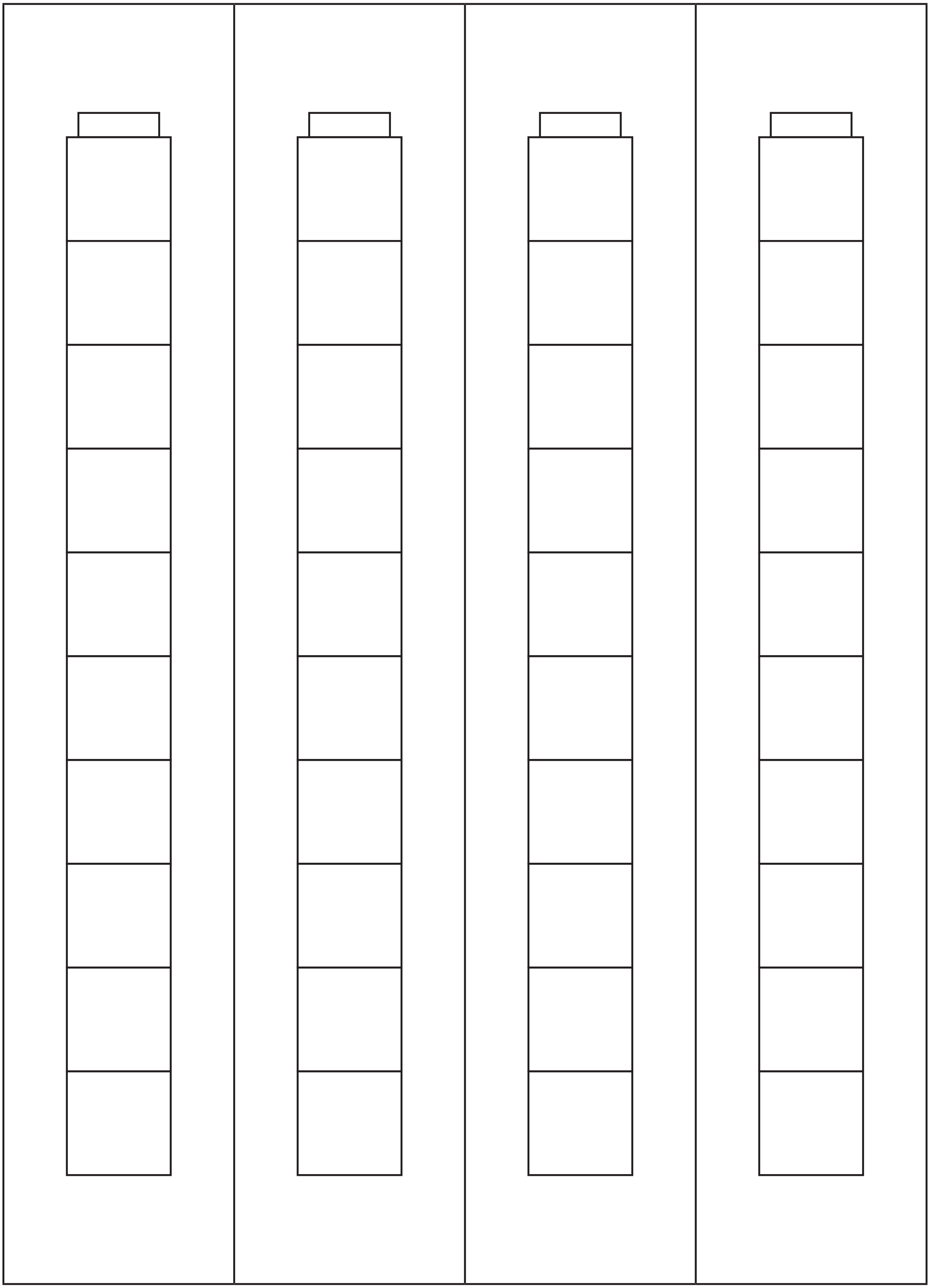
Activity 1 The Blue Square Game, Part 1 (cont.)

pressions up to the chart and help you build equations in quick succession. When 4 new equations have been posted, give the class a few moments to examine them.

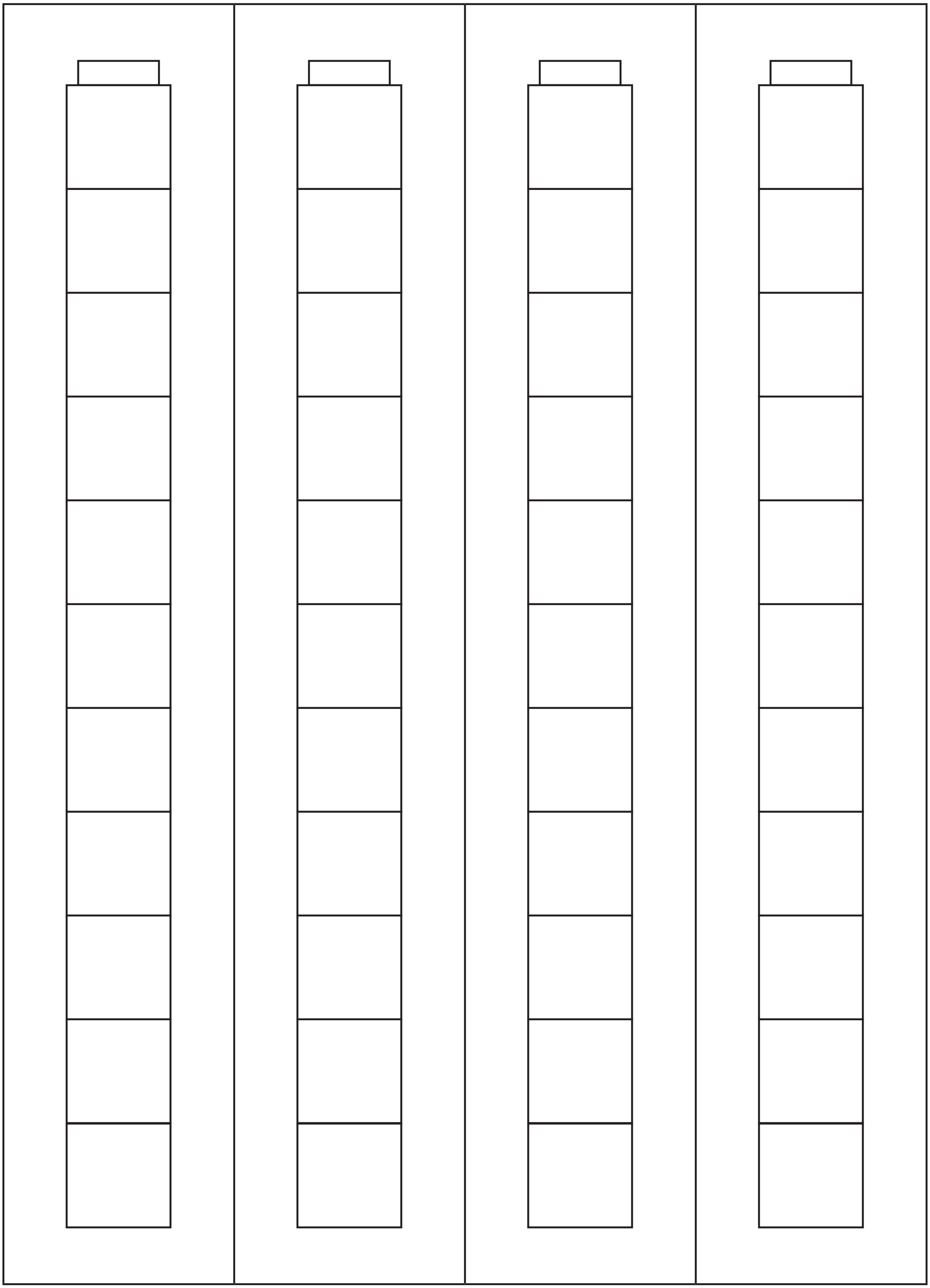
12. Cover 4 of the numbers in the equations with blue squares. Have students pair-share ideas about the numbers that have been hidden. Then point to the first blue square and ask students to show what they believe the hidden number is by holding up the corresponding number of fingers. Then pull out the square to reveal the hidden number. Call on one of the students to explain how he figured it out. Continue in this fashion until all 4 numbers have been revealed.

13. Send students out to Work Places. As they leave the discussion area, collect the unused strips and expression cards from students. Promise to use them during the next activity. Pull all the strips and cards out of the pocket chart and save them to return to the children later.

Ten Strips



Eleven Strips



Expression Cards

$\square + \square$ Expression Card	$\square + \square$ Expression Card
$\square + \square$ Expression Card	$\square + \square$ Expression Card

$\square + \square + \square$

Expression Card

$\square + \square + \square$

Expression Card

Numerals & Symbols Cards

10 Numerals & Symbols Card	10 Numerals & Symbols Card
11 Numerals & Symbols Card	11 Numerals & Symbols Card
= Numerals & Symbols Card	= Numerals & Symbols Card
= Numerals & Symbols Card	= Numerals & Symbols Card

Set A2 ★ Activity 2

ACTIVITY

The Blue Square Game, Part 2

Overview

The teacher plays another round of the Blue Square Game with the class, and has students solve a few equations at the board together. Then students solve some equations independently.

Skills & Concepts

★ generate addition and subtraction strategies to find missing addends and subtrahends in number combinations through 20

★ solve equations in which the unknown number appears in a variety of positions

You'll need

★ Solving Equations pages 1 and 2 (pages A2.12 and A2.13, class set of each)

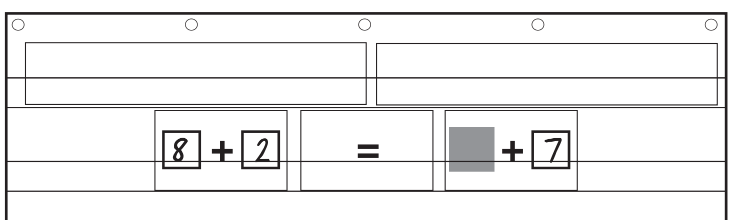
★ Blue Square game materials from Set A2, Activity 1 (see Advance Preparation)

★ pocket chart

Advance Preparation Use your Numeral & Symbol cards and any strips and expression cards left over from the previous activity to build equations in the pocket chart before you conduct this activity. Cover one number in each equation with a blue square.

Instructions for The Black Square Game, Part 2

1. Gather students to your discussion area. Give them a minute to examine the equations in the pocket chart and pair-share ideas about the numbers that are hidden. Then turn the unifix strips over so only the equations are showing. Point to the first blue square and ask students to indicate what number they think is hidden by holding up that number of fingers. Then ask several volunteers to explain their reasoning.



> ***Students*** *8 + 2 is 10. Then you have to think how to get the other side to be 10 because I'm pretty sure both of those strips have 10 on them. I counted 8, 9, 10. I think it's 3.*
> *I know 8 + 2 is 10. Then I know 7 + 3 is 10, so it has to be 3.*
> *7 is just 1 away from 8, so I moved 1 over from the 2 and made it 3 on that side.*

2. Reveal the hidden number. Continue in this fashion until students have solved all of the equations.

3. Now explain that you are going to write some equations on the board for students to solve. Record the following equation. Ask students to pair-share what they think belongs in the box. Give them a few moments to talk and then ask them to indicate the answer by holding up that number of fingers. Ask a couple of volunteers to explain their reasoning.

$$8 - \square = 4$$

Activity 2 The Blue Square Game, Part 2 (cont.)

> ***Students*** *It's 4 because I know 8 minus 4 is 4. 4 + 4 is 8, so the missing number must be 4.*

4. Repeat step 3 with the equations shown below.

4 + 5 = 6 + □

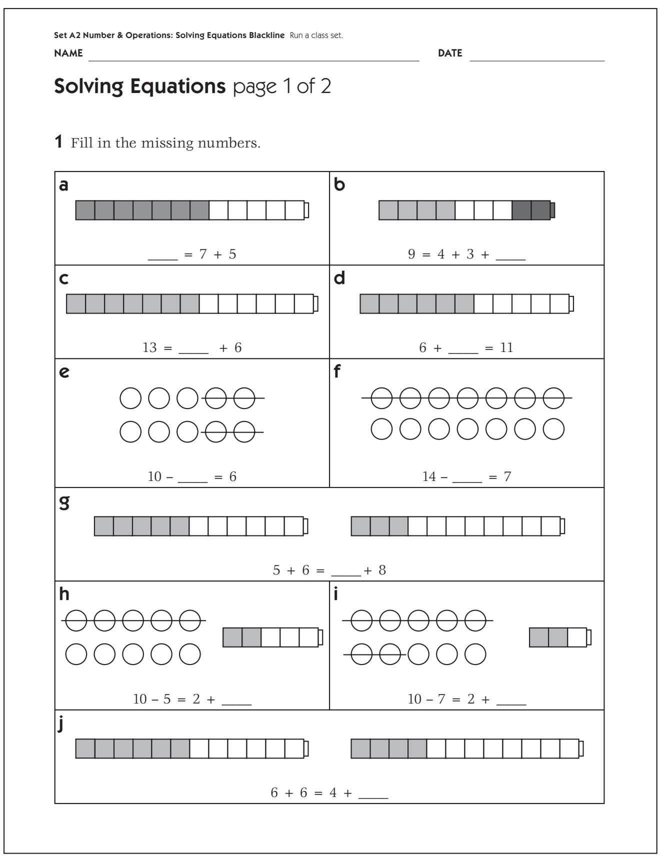
□ = 10 + 4

10– 5 = 2 + □

□ = 2 + 4 + 6

12 – 4 = 10 – □

5. Give students each a copy of Solving Equations page 1. Read over the sheet with them and clarify as needed. Then give them the rest of the math period to work on the sheet. Consider assigning page 2 as extra work for early finishers, homework, or seatwork the following day.



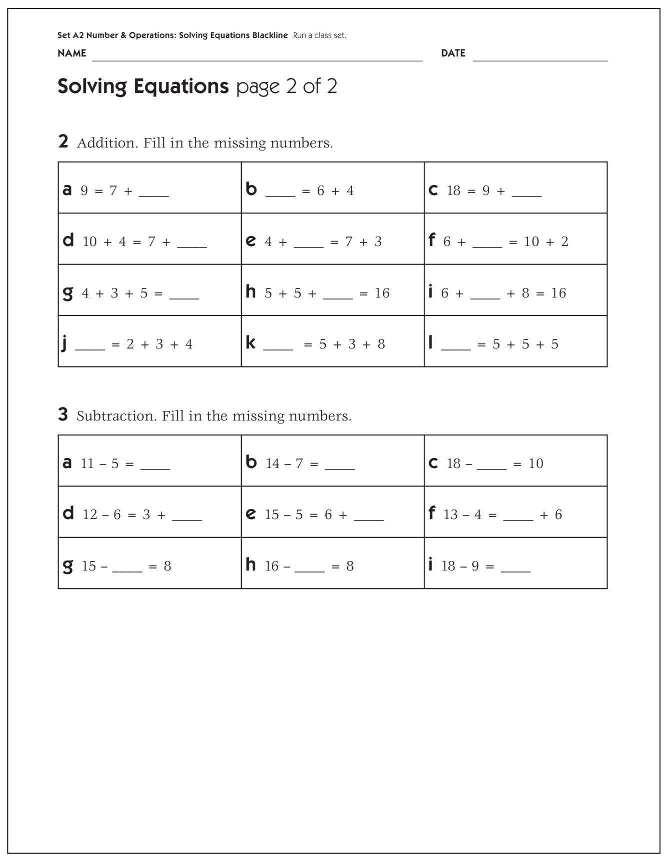
Set A2 Number & Operations: Solving Equations Blackline Run a class set.

NAME ____ DATE ____

Solving Equations page 1 of 2

1 Fill in the missing numbers.

a ____ = 7 + 5	b 9 = 4 + 3 + ____
c 13 = ____ + 6	d 6 + ____ = 11
e 10 – ____ = 6	f 14 – ____ = 7
g 5 + 6 = ____ + 8	
h 10 – 5 = 2 + ____	i 10 – 7 = 2 + ____
j 6 + 6 = 4 + ____	



Set A2 Number & Operations: Solving Equations Blackline Run a class set.

NAME ____ DATE ____

Solving Equations page 2 of 2

2 Addition. Fill in the missing numbers.

a 9 = 7 + ____	b ____ = 6 + 4	c 18 = 9 + ____
d 10 + 4 = 7 + ____	e 4 + ____ = 7 + 3	f 6 + ____ = 10 + 2
g 4 + 3 + 5 = ____	h 5 + 5 + ____ = 16	i 6 + ____ + 8 = 16
j ____ = 2 + 3 + 4	k ____ = 5 + 3 + 8	l ____ = 5 + 5 + 5

3 Subtraction. Fill in the missing numbers.

a 11 – 5 = ____	b 14 – 7 = ____	c 18 – ____ = 10
d 12 – 6 = 3 + ____	e 15 – 5 = 6 + ____	f 13 – 4 = ____ + 6
g 15 – ____ = 8	h 16 – ____ = 8	i 18 – 9 = ____

Extensions

- Make the Numerals & Symbols cards and blue squares, along with students' strips and expression cards available during Work Places. Encourage students to set up equations in the pocket chart for their classmates to solve.

Activity 2 The Blue Square Game, Part 2 (cont.)

- Every week or so through the rest of the school year, post a few equations on the board for students to solve. Depending on the needs and strengths of your students, you can increase the challenge level by using higher numbers and/or longer sequences of operations.

INDEPENDENT WORKSHEETS

See Set A2 Independent Worksheets 1 and 2 for more practice solving equations in which the unknown number appears in a variety of positions.

NAME ______________________________ **DATE** ______________

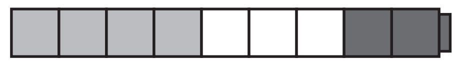
Solving Equations page 1 of 2

1 Fill in the missing numbers.

a

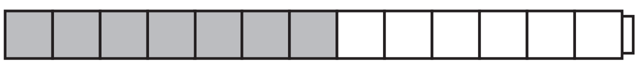
____ = 7 + 5

b



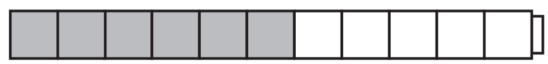
9 = 4 + 3 + ____

c



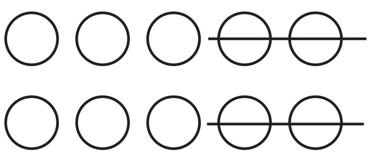
13 = ____ + 6

d



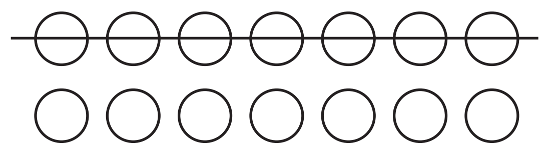
6 + ____ = 11

e



10 – ____ = 6

f

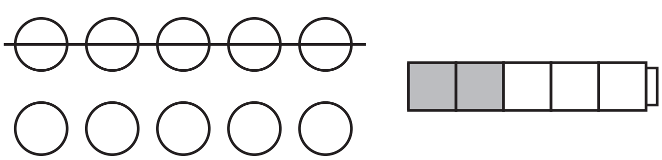


14 – ____ = 7

g

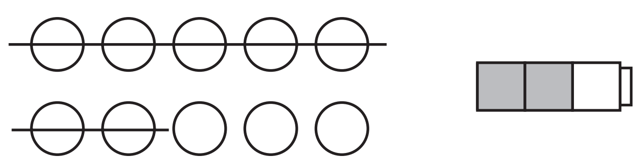
5 + 6 = ____ + 8

h



10 – 5 = 2 + ____

i



10 – 7 = 2 + ____

j

6 + 6 = 4 + ____

NAME ______________________________ DATE ______________

Solving Equations page 2 of 2

2 Addition. Fill in the missing numbers.

a 9 = 7 + ____	**b** ____ = 6 + 4	**c** 18 = 9 + ____
d 10 + 4 = 7 + ____	**e** 4 + ____ = 7 + 3	**f** 6 + ____ = 10 + 2
g 4 + 3 + 5 = ____	**h** 5 + 5 + ____ = 16	**i** 6 + ____ + 8 = 16
j ____ = 2 + 3 + 4	**k** ____ = 5 + 3 + 8	**l** ____ = 5 + 5 + 5

3 Subtraction. Fill in the missing numbers.

a 11 – 5 = ____	**b** 14 – 7 = ____	**c** 18 – ____ = 10
d 12 – 6 = 3 + ____	**e** 15 – 5 = 6 + ____	**f** 13 – 4 = ____ + 6
g 15 – ____ = 8	**h** 16 – ____ = 8	**i** 18 – 9 = ____

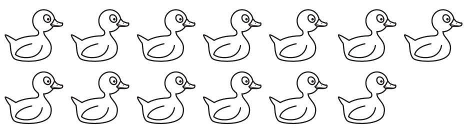
NAME ______________________________ **DATE** ______________

Set A2 ★ Independent Worksheet 1

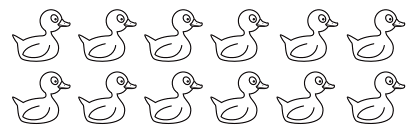
INDEPENDENT WORKSHEET

Addition & Subtraction Puzzles

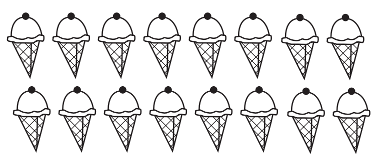
1 Fill in the missing numbers to solve these equations.



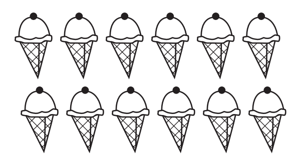
a ____ = 7 + 6



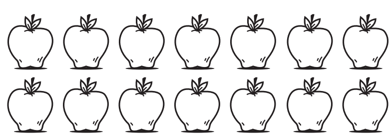
b 12 = 4 + 5 + ____



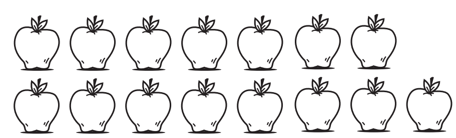
c 16 = ____ + 9



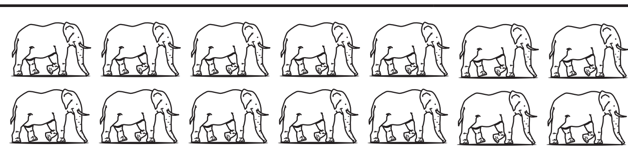
d 8 + ____ = 12



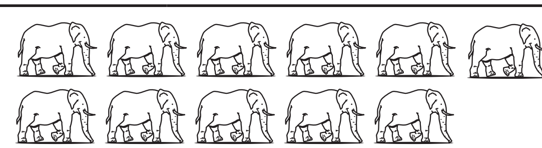
e 14 – ____ = 8



f 15 – ____ = 7



g 9 + 5 = ____ + 7



h 11 – 5 = 4 + ____

i 5 + 4 + 2 = ____	**j** 6 + 4 + ____ = 17	**k** 5 + ____ + 9 = 15
l 16 – ____ = 9	**m** 15 – ____ = 7	**n** 17 – 9 = ____
o 11 – 3 = 5 + ____	**p** 14 – 6 = 6 + ____	**q** 12 – 8 = ____ + 1

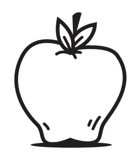
Independent Worksheet 1 Addition & Subtraction Puzzles (cont.)

2 Use numbers, pictures, and/or words to solve these problems. Show your work.

a James has 8 dollars. How many more dollars does he need to have 15 dollars altogether?

b Emily had some stickers. Her mom gave her 8 more stickers. Now she has 15 stickers. How many stickers did Emily have to start with?

c There were 17 apples in the bowl. The kids ate some. Now there are only 8 apples in the bowl. How many apples did the kids eat?



CHALLENGE

d Katy has 8 dollars. How many more quarters does she need to have 12 dollars altogether?

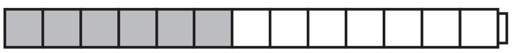
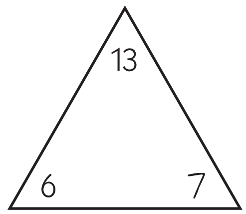
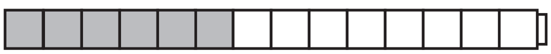
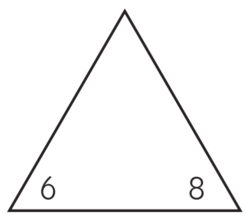
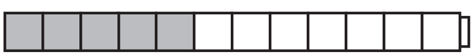
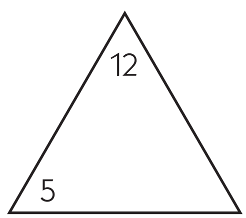
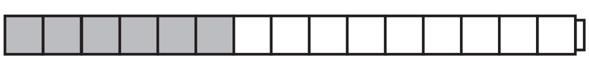
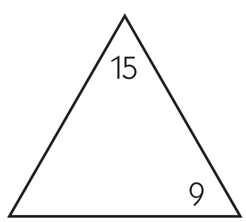
NAME ______________________________ **DATE** ______________

Set A2 ★ Independent Worksheet 2

INDEPENDENT WORKSHEET

Missing Numbers

1 One number from each family is lost! Write the missing number in the triangle. Use the pictures to help. Then write 2 addition and 2 subtraction sentences to match.

Unifix Train	Triangle Fact Family	Fact Family
example 		6 + 7 = 13 7 + 6 = 13 13 – 6 = 7 13 – 7 = 6
a 		
b 		
c 		

2 Fill in the missing numbers to solve these equations

a 6 + 5 + 3 = ____	**b** 7 + 3 + ____ = 18	**c** 6 + ____ + 2 = 14
d 13 – ____ = 8	**e** 14 – ____ = 8	**f** 13 – 4 = ____

Independent Worksheet 2 Missing Numbers (cont.)

3 Draw a line to match each problem with its equation. Then find the answers.

a Sara had 15 marbles. She gave 6 marbles to her brother. Then she gave 3 marbles to her sister. How many marbles does Sara have left?	17 – _____ = 9
b There were 13 kids on the bus. Some kids got off. Now there are 8 kids on the bus. How many got off?	15 – 12 = _____
c Lin got a t-shirt for 12 dollars. He gave the clerk 15 dollars. How much money did he get back?	8 + _____ = 14
d There were 17 cookies on the plate. The dog ate some of them. Now there are only 9 cookies on the plate. Howmany did the dog get?	15 – 6 – 3 = _____
e Max had 8 toy cars. He got some more toy cars for his birthday. Now Max has 14 toy cars. How many toy cars did he get for his birthday?	13 – _____ = 8

CHALLLENGE

4 Solve these equations.

a 4 + 5 – 2 + 7 = _____

b 40 – 20 + _____ = 25

c 6 + 14 + 23 = _____

d _____ + 4 = 10

e 10 + 20 + _____ = 30 + 5

f 8 – 3 + 5 – 10 + 439 = _____

BRIDGES IN MATHEMATICS 2

GRADE 2 SUPPLEMENT

Set A4 Number & Operations: Place Value

Includes

Skills & Concepts

★ read and write whole numbers to 1,000

★ connect place value models with their numerical equivalents to 1,000

★ identify the ones, tens, and hundreds place in a number and the digits occupying them

★ compare whole-number quantities through 999 by using the terms is less than, is greater than, and is equal to, and the symbols <, >, and =

★ write three-digit numbers in expanded form

★ analyze the magnitude of digits in numerals through 9,999 on the basis of their place values

★ generate estimation strategies to determine the approximate number of objects in a set of no more than 1,000

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P0709

Bridges in Mathematics Grade 2 Supplement
Set A4 Numbers & Operations: Place Value

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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at www.mathlearningcenter.org.

Set A4 ★ Activity 1

ACTIVITY

Hundreds of Seeds

Overview

Students learn that harvester ants gather seeds and store them in their chambers to make a special "ant bread". This information serves as a point of departure for a counting project in which students work together to count a large collection of buttons.

Skills & Concepts

★ generate estimation strategies to determine the approximate number of objects in a set of no more than 1,000

★ connect place value models with their numerical equivalents to 1,000

★ identify the ones, tens, and hundreds place in a number and the digits occupying them

★ compare whole-number quantities through 999 by using the terms is *less than*, is *greater than*, and *is equal to* and the symbols <, >, and =

You'll need

★ Harvester Ants (pages A4.7–A4.9, run 1 copy of each, see Advance Preparation)

★ bucket of buttons from your Bridges kit (see Advance Preparation)

★ 1 gallon-size resealable plastic bag (see Advance Preparation)

★ 10 portion cups for each group of 3–4 children (see note)

★ small margarine tubs or paper soup cups, 1 per group plus several extra

★ 3 sheets of 9″ × 12″ construction paper, 1 white, 1 blue, and 1 yellow (see Advance Preparation)

★ six 3″ × 5″ index cards or pieces of white construction paper

Advance Preparation Pour all the buttons into the re-sealable plastic bag. Write "Hundreds" on the yellow sheet of construction paper, "Tens" on the blue sheet, and "Ones" on the white sheet. Find Harvester Ants on pages A4.7–A4.9. Make one copy of each sheet and mount them on construction paper or butcher paper, or simply hang the three sheets on the board near your discussion area.

Note If your entire school is using Bridges, the first and the third grade kits each come with 250 plastic 1-ounce portion cups. Borrow a supply of these cups from either a first or third grade teacher if you don't have any of your own.

Instructions for Hundreds of Seeds

1. Invite students to your discussion area. Tell them that you have a new ant song to share with them. Explain that you're going to read (or sing) it, while they listen carefully to find out what these ants eat and how they prepare their food. Read (or sing) the song to your class, and then ask the students to read or sing it with you a second time. Then discuss the fact that harvester ants gather seeds, store them, and later crush the seeds to make a special "ant's bread".

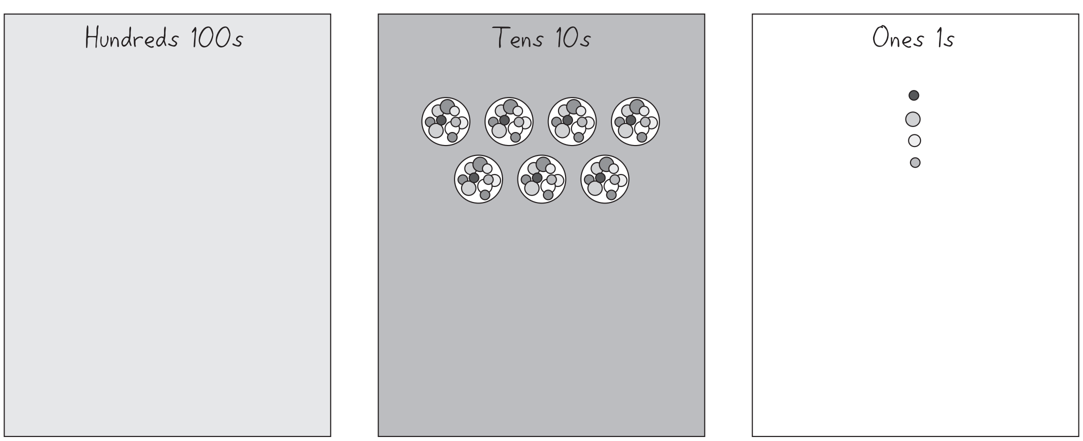
Activity 1 Hundreds of Seeds (cont.)

2. Ask the children to take a careful look at the picture of the ants on the second page of the song. How many seeds have the two ants collected, counting the seeds they are carrying?

3. When students have counted to determine that there are 10 seeds in all, explain that they are going to pretend to be harvester ants today, gathering seeds to store in their nest. They will work in groups of 3 or 4, and like the ants, they will count their "seeds" into sets of 10.

4. Now show students the bag of buttons they'll be using for pretend seeds. Ask students to estimate how many "seeds" are in the bag. Record their estimates on the board. If two or more children have the same estimate, underline the number as many times as necessary. Then ask students to form a circle in your discussion area. Set out a margarine tub (or similar container) for each group of 3–4 children as the students watch from where they are sitting in the circle. Pour some of the buttons from the bag into each tub until you've used them all. The buttons do not have to be divided evenly; you want each group to have a slightly different quantity.

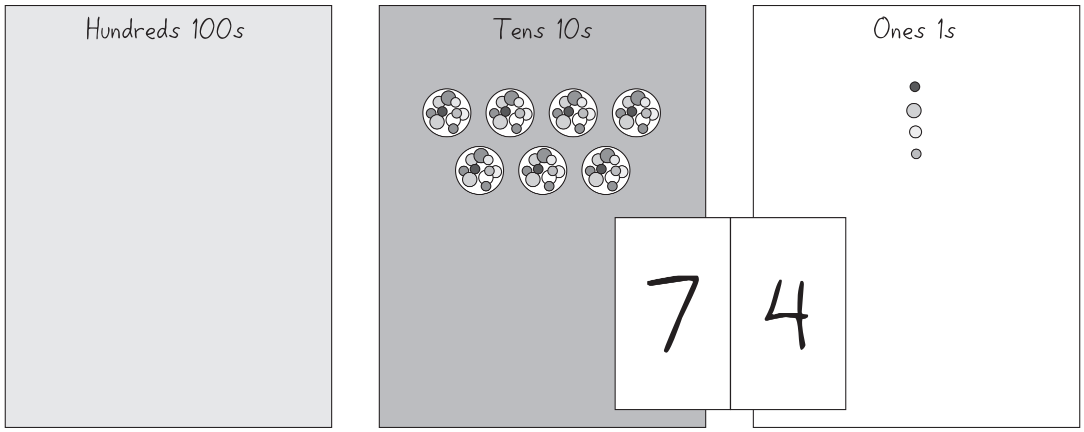
5. Move all the tubs aside except one. Dump the buttons out of this tub, and ask the students sitting on either side of you to help count them into sets of 10. Have your helpers place each set of 10 buttons into a portion cup. If there are extra buttons left at the end, leave them loose. Set out your construction paper counting mats, and have these students help you move the cups of tens onto the blue mat, and the loose ones onto the white mat.



6. Discuss the total with the class. Here are some questions to pose:
- How many buttons are there on the mat right now?
- How do you know?
- How many tens are there?
- How many ones are there?
- Why aren't there any buttons on the mat that says "Hundreds"?

Activity 1 Hundreds of Seeds (cont.)

7. Count the buttons on the mats by tens and ones with the class to confirm the quantity with them. Write a numeral on each of two index cards to match the number of tens and ones. Place the two cards side by side below the mats, and ask students to read the 2-digit number. Then discuss the place values and meanings of the digits.



Teacher *What does the 7 in 74 mean?*

Students *It means 7 tens.*
It's for the 7 cups of buttons, I mean seeds!
It's on the tens mat because it means the tens.

Teacher *What does the 4 in 74 mean?*

Students *It's for the 4 ones.*
That's why it's mostly on the ones mat.

8. Pick up both index cards and place them back on the mats in reverse order. Ask students to comment. Is this okay? Does the number mean the same amount? Why or why not?

Jade *You can't do it that way.*

Teacher *Why not? This number still has a 4 and a 7 in it.*

Students *But it says 47. There are more than 47 on the mats.*
The 7 has to go on the tens mat. There are 7 tens, not 4 tens.
And the 4 has to go on the ones side because there are 4 ones.
There are 74 buttons on there, not 47. You're trying to fool us.

Activity 1 Hundreds of Seeds (cont.)

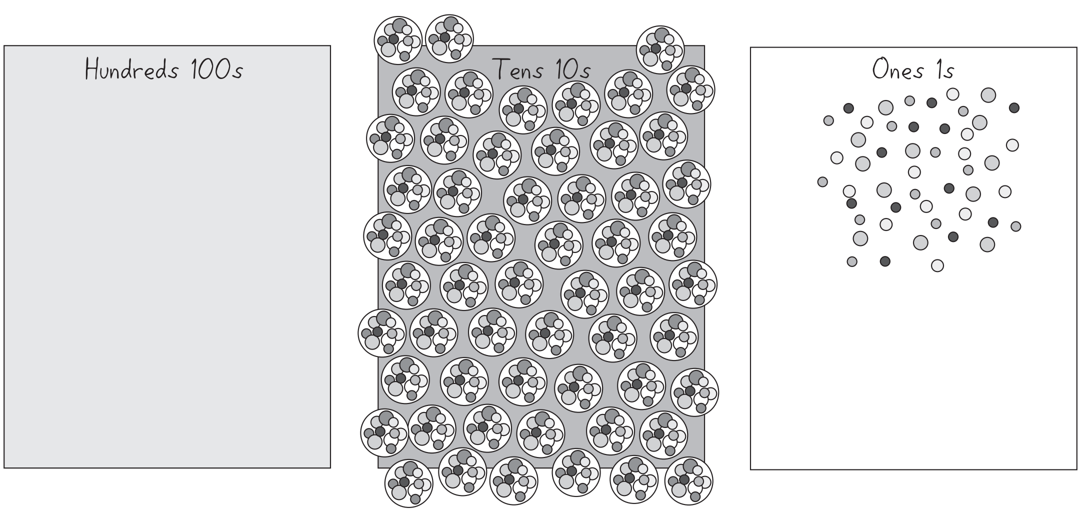
9. Move all the other tubs of buttons back into view of the class. Now that they know how many buttons are in one of the tubs, does anyone want to change his or her estimate? Are there any estimates that can be eliminated from the chart? Why? Add revised estimates to the chart in a different color, and discuss the possibility of crossing out some of the original estimates. Model the language of "greater than" and "less than" as you work with the children, and ask them to use the terms as they are able.

How many "seeds" are in the bag?

~~100~~	300	450
~~62~~	~~120~~	700
~~75~~	175	500
900	208	~~50~~
400	600	550
1,000	2,000	

10. Assign students to groups of 3 or 4 (or have them gather in their table groups). Give each group one of the tubs of "seeds" and some portion cups. Have them work in or near the discussion area, or at their table to count the buttons in their bowl into sets of tens. When they are finished, have them set the cups of ten on the tens mat, and any loose ones on the ones mat, and return to their places in the discussion circle.

11. When all the groups have placed their buttons on the mats and taken their place in the circle, examine the results with the class. How might you organize the buttons so they are easier to count?

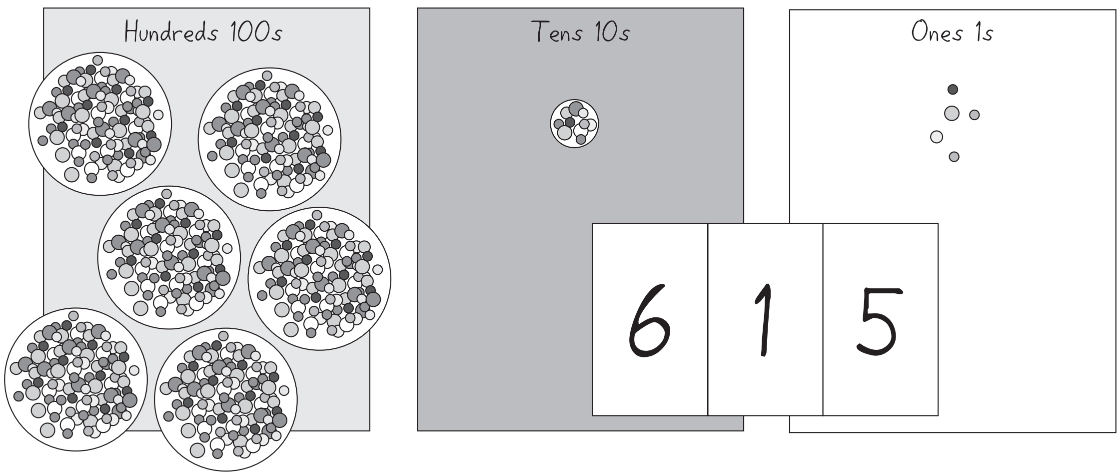


Students *There are too many tens!*
Put some of the tens into hundreds. Get the bowls we used before.
Make some of the ones into cups of 10. There are too many on the ones mat!

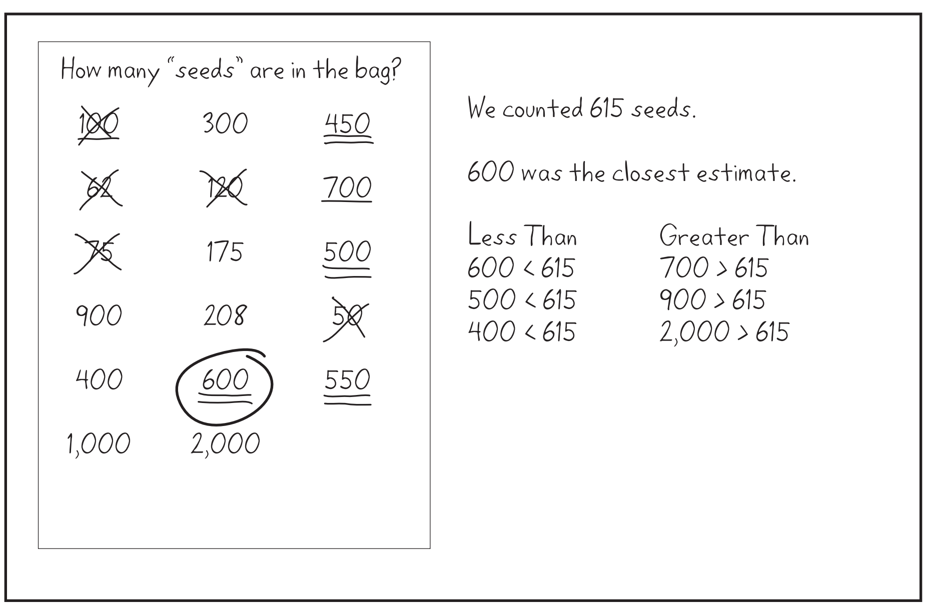
Activity 1 Hundreds of Seeds (cont.)

12. Work with input from the class to regroup the buttons. Create groups of 100 by dumping 10 tens into each empty margarine tub. Have the students count with you by tens each time you create a new group of 100. Ask a couple of students to group the ones into cups of 10 and move them over to the tens mat so they are available to be dumped into bowls of 100.

13. When the buttons have been completely regrouped, ask students to pair-share ideas about the total. Then count the buttons by hundreds, tens, and ones with the class to confirm the total. Record a numeral on each of 3 index cards to match the numbers of hundreds, tens, and ones. Place the cards side by side and ask the children to read the number. Discuss the place value and meaning of each digit. Does the number make sense if you change the order of the digits? Why not?



14. Ask students to find the number on the estimate chart that comes closest to the actual total. Circle that number in red. Is that number less than or greater than the actual total? Write a comparison statement on the board using the greater than or less than sign, taking the opportunity to introduce or review these signs with students. Have children find 3 numbers on the chart that are greater than the actual total, and 3 that are less than the total. Write comparison statements on the board for these numbers as well.



Activity 1 Hundreds of Seeds (cont.)

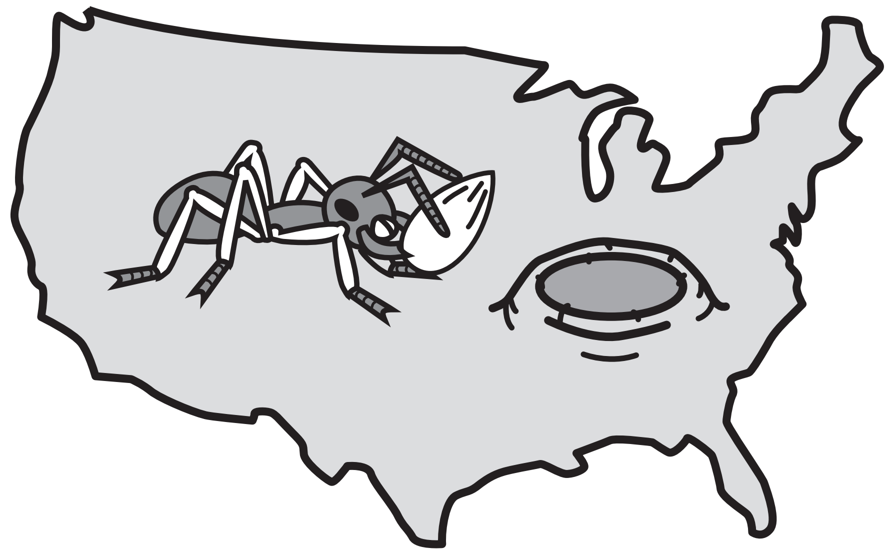
Extension

- Leave the estimate chart and at least one example of each type of comparison statement on the board. Assign students to write a collection of 8–10 comparison statements based on the total number of buttons and the numbers on the estimate chart.

Note *Save the Hundreds, Tens, and Ones mats for use in Set A4, Activity 5. You may want to laminate them.*

Harvester Ants

(to the tune of "She'll Be Comin' Round the Mountain")

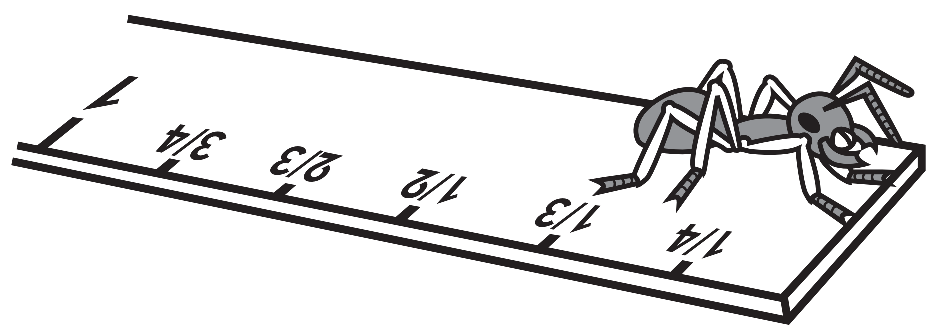


They live in dry, warm, sandy U.S.A.
They harvest seeds to feed the colony.
They pick them up or cut them off,
Then haul them to their "granaries."
These harvesters make special "ant's bread."

They store the seeds in chambers in their nests,
They throw the husks outside the entrances,
They crush the seeds to make a mash,
Then add saliva—mix it up,
These harvesters make special “ant’s bread.”

Harvesters have quite a painful sting.
Their legs are long and they're either red or black.
Their nests are mounds with tunnels deep.
They're ants who are one third inch long.
These harvesters make special "ant's bread."

by Donna Burk
illustrated by Tyson Smith



Set A4 ★ Activity 2

ACTIVITY

Pick Up Sticks

Overview

Students estimate the total number of craft sticks you've placed in 6 containers. Then they work in groups of 4–6 to count the sticks in one of the containers and reconvene to record, compare, and order the number of sticks in each container. Finally, they find the total number of sticks and compare it to their original estimates.

Skills & Concepts

- ★ read and write whole numbers to 1,000
- ★ connect place value models with their numerical equivalents to 1,000
- ★ identify the ones, tens, and hundreds place in a number and the digits occupying them
- ★ compare whole-number quantities through 999 by using the terms is *less than*, is *greater than*, and *is equal to* and the symbols <, >, and =
- ★ write 3-digit numbers in expanded form
- ★ generate estimation strategies to determine the approximate number of objects in a set of no more than 1,000

You'll need

- ★ Pick Up Sticks Record Sheet (page A4.10, run a class set)
- ★ craft sticks (see Advance Preparation)
- ★ rubber bands (100+)
- ★ three 3″ × 5″ index cards, one labeled "100s", one "10s", and one "1s"
- ★ clipboards or other hard writing surfaces

Advance Preparation Find the craft sticks that came with your Number Corner materials. (There were originally 1,000 in the box, but if you've lost a few since, that's okay.) Divide them into 6 baskets or plastic containers, varying the number in each.

Instructions for Pick Up Sticks

1. Place the 6 containers of craft sticks in the center of your discussion circle and invite the students to join you. Explain that you're going to use these sticks to play a game, but you need the students to help you count them today. Ask students to estimate how many sticks there are in all the containers put together. Record their estimates at the board.

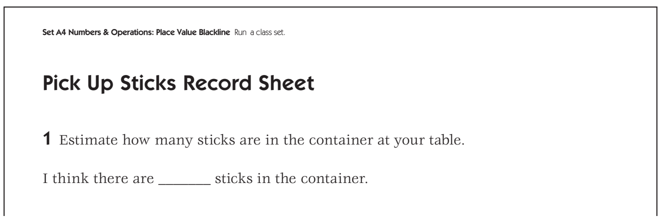
How many sticks do you think we have in all?

600	1,000	6,000	900
450	2,000	1,000,000	470
500	390	1,500	750

Activity 2 Pick Up Sticks (cont.)

2. Let students know that they'll be working at their tables in groups of 4–6 to count the sticks. Rather than counting the sticks one by one, they'll need to group them by 10s. Take 10 sticks out of one of the containers and show the students how to wrap a rubber band around the bundle. When they get back to their tables, they'll need to dump the sticks out of the container into a pile they can all reach, give everyone some rubber bands, and start bundling. Every time they collect 10 groups of 10, they'll need to use a rubber band to bundle those together to make a set of 100.

3. Then distribute copies of the Pick Up Sticks Record Sheet and review the instructions at the top. Be sure students understand that they need to put their name and date on the sheet and estimate how many sticks are in their container before they start counting. It's okay if they dump the sticks out on the table to get a better view. They may even want to pull off a benchmark of 10, but the idea is to record a quick estimate and get to work counting the sticks. Let them know that they'll complete the rest of the sheet after all the groups have counted their sticks and the class meets back at the discussion circle.



Set A4 Numbers & Operations: Place Value Blackline Run a class set.

Pick Up Sticks Record Sheet

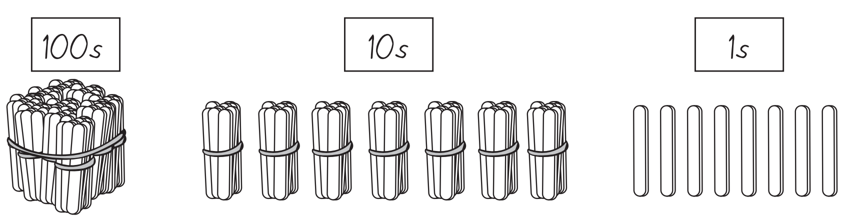
1 Estimate how many sticks are in the container at your table.

I think there are _______ sticks in the container.

4. Send students back to their tables. Give each group a container of sticks and a good supply of rubber bands, and let them go to work. Circulate to provide guidance as needed, and encourage the children to count carefully and work together. You'll know when they're ready to return to the circle because they'll have their sticks laid out in bundles of 100s and 10s, with any extra 1s in a row to the side. Ask early finishers to read quietly until all the groups are ready. (You may also want to have some of these students help at other tables where things are going more slowly.)

5. When all the groups have finished, ask a helper at each table to carefully place the bundles and single sticks back in the container. Have students return to the discussion circle with their container of sticks, pencils, record sheets, and clipboards or other hard writing surfaces (e.g., picture books).

6. Set the 3 index cards you've prepared in the middle of the circle. Invite a helper from one of the groups (it doesn't really matter which) to set the bundles and single sticks from his or her container under the appropriate labels.



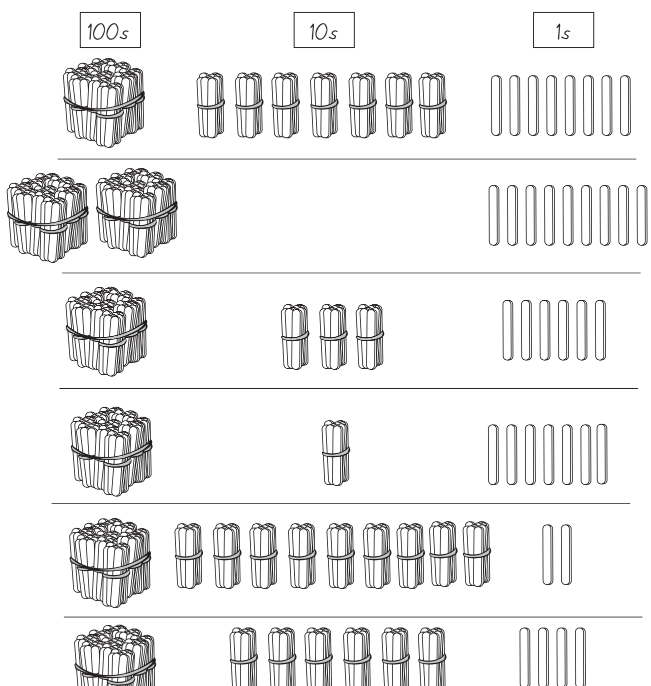
Activity 2 Pick Up Sticks (cont.)

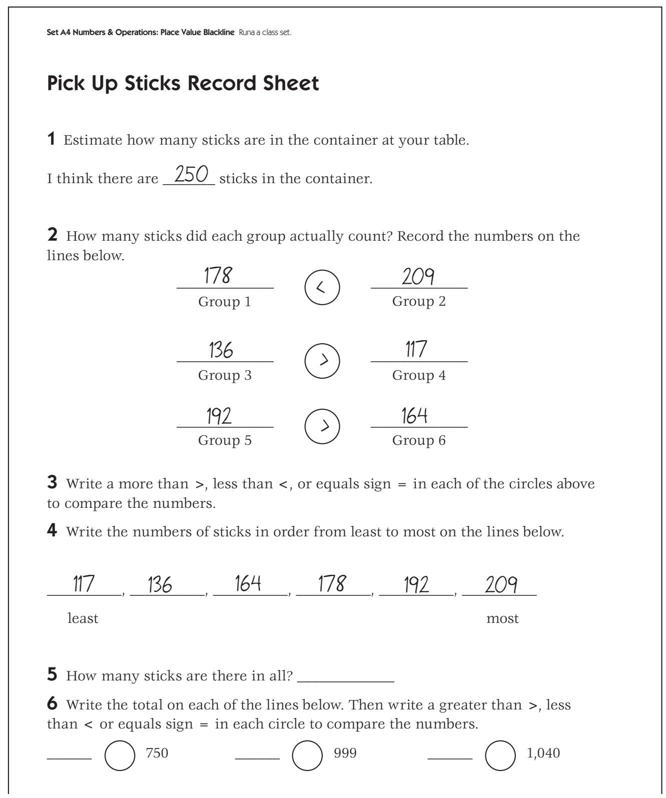
7. Ask students to count the sticks silently and give the thumbs-up sign when they've determined the total. Then invite a couple of volunteers to share and explain their answers.

> ***Alesha*** *It's 178 because there's 1 hundred, 7 tens, and 8 ones.*
>
> ***Eduardo*** *I knew there was 100. Then I went 10, 20, 30, 40, 50, 60, 70. That made 170. Then I counted 8 of the 1s, so that made 178.*

8. Have students record the number in the appropriate location on their sheets.

9. Repeat steps 6–8 until each group has had a turn and all the sticks are on display in the center of the circle. (Have each group lay their sticks in a row below the previous group's.) Then work with the students to complete items 3 and 4 on their sheets. Encourage them to help one another. Model how to use the greater than, less than, and equals signs if necessary.





Set A4 Numbers & Operations: Place Value Blackline *Run a class set.*

Pick Up Sticks Record Sheet

1 Estimate how many sticks are in the container at your table.

I think there are 250 sticks in the container.

2 How many sticks did each group actually count? Record the numbers on the lines below.

178 (<) 209
Group 1 Group 2

136 (>) 117
Group 3 Group 4

192 (>) 164
Group 5 Group 6

3 Write a more than >, less than <, or equals sign = in each of the circles above to compare the numbers.

4 Write the numbers of sticks in order from least to most on the lines below.

117, 136, 164, 178, 192, 209
least most

5 How many sticks are there in all? ______

6 Write the total on each of the lines below. Then write a greater than >, less than < or equals sign = in each circle to compare the numbers.

_____ ◯ 750 _____ ◯ 999 _____ ◯ 1,040

10. Have students determine how many sticks there are in all. In order to do this, they'll need to regroup some of the 1s into bundles of 10, and some of the 10s into bundles of 100. Depending on the needs and strengths of your class, you may want to have them record this transaction in the form of a column addition problem on the back of their sheet. (This is an opportunity to share the standard algorithm for addition, although the total can also be found simply by regrouping and counting the sticks.)

11. Once the total has been determined, ask students how it compares with their original estimates. Then have them use the information to complete the rest of the sheet. Place all the sticks, still bundled into 100s, 10s, and 1s into one of the containers for use in Set A4 Activity 3.

NAME ______________________________ **DATE** ______________

Pick Up Sticks Record Sheet

1 Estimate how many sticks are in the container at your table.

I think there are _______ sticks in the container.

2 How many sticks did each group actually count? Record the numbers on the lines below.

____________ Group 1	◯	____________ Group 2
____________ Group 3	◯	____________ Group 4
____________ Group 5	◯	____________ Group 6

3 Write a greater than >, less than <, or equals sign = in each of the circles above to compare the numbers.

4 Write the numbers of sticks in order from least to greatest on the lines below.

__________, __________, __________, __________, __________, __________

least greatest

5 How many sticks are there in all? ____________

6 Write the total on each of the lines below. Then write a greater than >, less than < or equals sign = in each circle to compare the numbers.

______ ◯ 750 ______ ◯ 999 ______ ◯ 1,040

Set A4 ★ Activity 3

ACTIVITY

Place Value Triple Roll

Overview

Students play a variation of Base 10 Triple Spin, in which they build, record, compare, and order numbers to 999. If you have not already played Base 10 Triple Spin with your class, you'll find it helpful to read Bridges, Volume Two, pages 549–552 before you conduct this activity.

Skills & Concepts

★ read and write whole numbers to 1,000

★ connect place value models with their numerical equivalents to 1,000

★ identify the ones, tens, and hundreds place in a number and the digits occupying them

★ compare whole-number quantities through 999 by using the terms is *less than*, is *greater than*, and *is equal to* and the symbols <, >, and =

★ write three-digit numbers in expanded form

Recommended Timing

Anytime after Set A4 Activity 2

You'll need

★ Place Value Triple Roll Record Sheets 1 and 2 (pages A4.14 and A4.15 back-to-back class set plus 1 for yourself)

★ craft sticks bundled into 100s, 10s, and 1s from Set A4 Activity 2 (9 hundreds, 9 tens, and 9 single sticks)

★ base 10 pieces (9 mats, 9 strips, and 9 units)

★ 2 cafeteria trays (see Advance Preparation)

★ seven 3″ × 5″ index cards (see Advance Preparation)

★ blue masking tape (see Advance Preparation)

★ two pieces of 3″ × 5″ construction paper, one red and the other blue

★ a die numbered 4–9

★ clipboards or other hard writing surfaces

Advance Preparation Use 6 of the index cards to prepare 100s, 10s, and 1s labels, two of each. Write the word "More" on the front of the seventh card, and the word "Less" on the back. Place the collection of sticks on one tray and the base 10 pieces on the other. Divide the floor area in the middle of your discussion circle with a 3´–4´ length of blue masking tape.

Instructions for Place Value Triple Roll

1. Lay out the 100s, 10s, and 1s cards you've prepared, one set on either side of the blue tape line. Have students join you in the circle. They'll need to bring their pencils and clipboards or other hard writing surfaces with them.

2. Explain that you're going to play a game with the sticks they counted and bundled during the previous activity. Divide the group into 2 teams, the Reds and the Blues. Roll the die to see which team will go first, and give that team their choice of collecting bundled sticks or base 10 pieces during the game. Place the blue pieces of construction paper on the Blue team's side and the red pieces on the Red team's side.

3. Next, show students your "More/Less" card. Hold it above your head and let it fall to the floor. Whichever side lands up determines whether the teams will play for more or less in the first round. After that's been determined, hand out copies of the Place Value Triple Roll Record Sheet. Ask students to

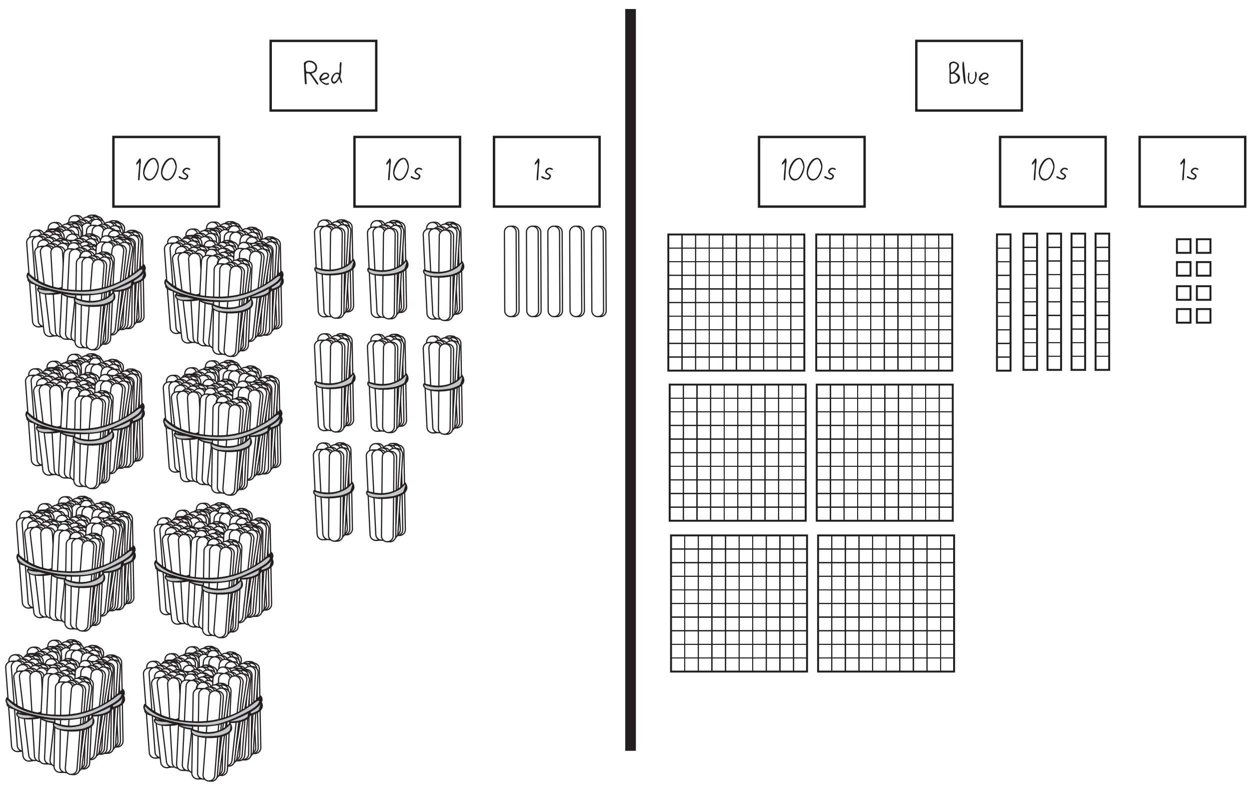
Activity 3 Place Value Triple Roll (cont.)

label the sheet with their name and date, and circle whether they're playing for more or less in Round 1. (Tape a copy of the record sheet nearby so you can track the game along with the children.)

4. Now have a member of the first team roll the 4–9 die and report the number rolled. Ask the team to decide whether they want to take that number in 100s, 10s, or 1s, and give them a minute to discuss the issue. Their choice will be influenced by whether the teams are playing for more or less. Once they've made a decision, they can't change their minds. Let them know that they'll get 3 rolls. They have to take one of the numbers rolled in 100s, one in 10s, and one in 1s, but they can take them in any order.

5. Once they've decided, have a member of the team use the sticks or pieces to set out the designated number of 100s, 10s, or 1s on their side of the blue line.

6. Give the other team a turn. Then have the two teams take turns until both have taken 3 rolls.



> ***Jose*** *Oh no! I told you we should have taken the 6 in 1s instead of 100s just in case we rolled a higher number later. Now the Reds won!*
>
> ***Abby*** *They would have won anyway because they got two 8s. The highest number we could have made was 865, and they got 885.*

7. Record the results for both teams on your record sheet as students do so on theirs. Ask them to draw boxes to show the 100s, lines to show the 10s, and dots to show the 1s. Have them compare the teams' scores at the bottom of the Round 1 box. (The order in which they write the scores doesn't matter as long as they place a sign between the two that shows the correct relationship.)

Activity 3 Place Value Triple Roll (cont.)

Set A4 Numbers & Operations: Place Value Blackline Run a class set.

NAME Cole DATE April 2

Place Value Triple Roll Record Sheet 1

Round 1	Are you playing for more or less?		
100s	10s	1s	Blue team total 658
100s	10s	1s	Red team total 885
Use the more than >, less than <, or equals sign = to compare the scores.			
658 < 885			

8. Ask helpers to clear the floor area, placing the sticks and pieces back on their trays. Play 2 more rounds of the game, repeating steps 3–7 each time. Be sure to drop the "More/Less" card at the beginning of each new round so students know whether they're playing for more or less. The team that wins the most rounds wins the game.

9. At the end of the third round, have students complete the lower half of the second page of the record sheet. Encourage them to help each other, and provide modeling and guidance as needed. The last task on the sheet is an optional challenge in which students find each team's "grand total" and flip the "More/Less" card to see who wins the game.

Put the 6 scores in order from least to most.

________, ________, ________, ________, ________, ________

least most

CHALLENGE

Add the 3 scores for each team below. Then flip the More/Less card to see who wins the entire game. Circle the winning team.

Blue Team			
	100s	10s	1s
Round 1			
Round 2			
Round 3			
Total			

Red Team			
	100s	10s	1s
Round 1			
Round 2			
Round 3			
Total			

NAME ______________________________ **DATE** ______________

Place Value Triple Roll Record Sheet 1

Round 1	**Are you playing for more or less?**		
100s	10s	1s	Blue team total
100s	10s	1s	Red team total
Use the greater than >, less than <, or equals sign = to compare the scores.			

Round 2	**Are you playing for more or less?**		
100s	10s	1s	Blue team total
100s	10s	1s	Red team total
Use the greater than >, less than <, or equals sign = to compare the scores.			

NAME ______________________________ **DATE** ______________

Place Value Triple Roll Record Sheet 2

Round 3	**Are you playing for more or less?**		
100s	10s	1s	Blue team total
100s	10s	1s	Red team total
Use the greater than >, less than <, or equals sign = to compare the scores.			

________ ◯ ________

Put the 6 scores in order from least to most.

________, ________, ________, ________, ________, ________

least greatest

CHALLENGE

Add the 3 scores for each team below. Then flip the More/Less card to see who wins the entire game. Circle the winning team.

Blue Team			
	100s	10s	1s
Round 1			
Round 2			
Round 3			
Total			

Red Team			
	100s	10s	1s
Round 1			
Round 2			
Round 3			
Total			

Set A4 ★ Activity 4

ACTIVITY

Target 700

Overview
Target 700 is another game designed to provide students with opportunities to develop deep understandings of numbers to 999.

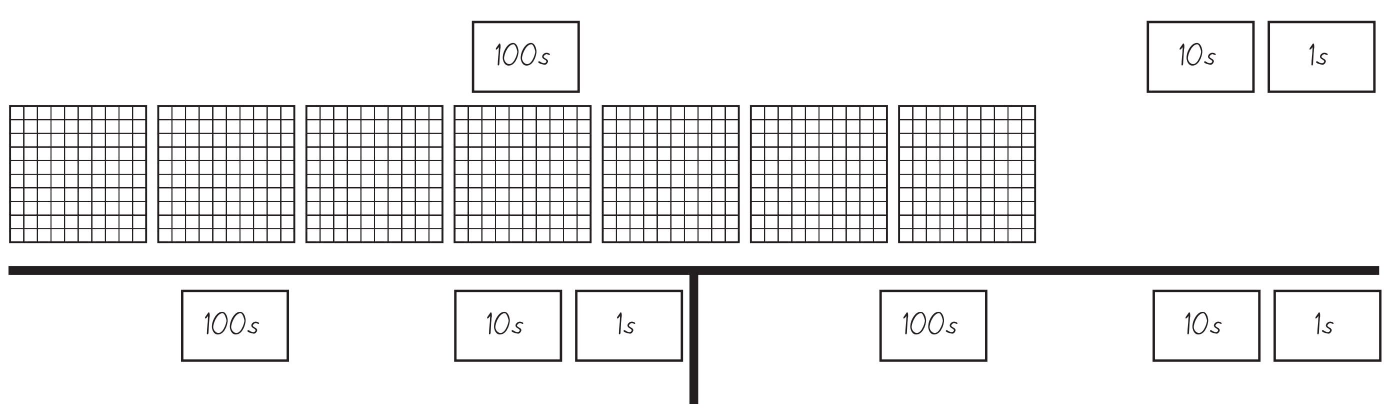
Skills & Concepts
- ★ read and write whole numbers to 1,000
- ★ connect place value models with their numerical equivalents to 1,000
- ★ identify the ones, tens, and hundreds place in a number and the digits occupying them
- ★ compare whole-number quantities through 999 by using the terms is *less than*, is *greater than*, and *is equal to* and the symbols <, >, and =
- ★ write three-digit numbers in expanded form

Recommended Timing
Anytime after Set A4 Activity 3

You'll need
- ★ Target 700 Record Sheet (page A4.24 class set plus 1 for yourself)
- ★ base 10 pieces (25 mats, 18 strips, and 18 units; have extras available)
- ★ 2 cafeteria trays (see Advance Preparation)
- ★ nine 3″ × 5″ index cards (see Advance Preparation)
- ★ blue masking tape (see Advance Preparation)
- ★ two pieces of 3″ × 5″ construction paper, one red and the other blue
- ★ a die numbered 4–9
- ★ clipboards or other hard writing surfaces

Advance Preparation Use the index cards to prepare 100s, 10s, and 1s labels, three of each. Keeping 7 mats in reserve, divide the rest of the base 10 pieces into 2 equal sets of 9 mats, 9 strips, and 9 units, and place one set on each tray. Divide the floor area in the middle of your discussion circle with a 3′–4′ length of blue masking tape, and add another 3′–4′ length across the top to form a "T".

Instructions for Target 700
1. Lay out the 100s, 10s, and 1s cards you've prepared, one set on either side of the blue tape line. Lay the third set of place value labels, along with 7 mats at the top of the blue line. Have students join you in the circle. They'll need to bring their pencils and clipboards or other hard writing surfaces with them.



Activity 4 Target 700 (cont.)

2. Explain that you're going to play another place value game today. Divide the group into 2 teams, the Reds and the Blues. Roll the die to see which team will go first. Place the blue pieces of construction paper on the Blue team's side and the red pieces on the Red team's side.

3. Call students' attention to the collection of base 10 pieces above the blue line. How many are there in all? Ask them to count silently and give the thumbs up sign when they know. Ask a couple of volunteers to share and explain their answers.

4. Explain that this game is a lot like Place Value Triple Roll. Each team will get 3 turns to roll a die numbered 4–9. Each time they roll, they have to take the number of rolls in 100s, 10s, or 1s. They can choose the order in which they take the 100s, 10s, and 1s, but they have to take each denomination once in the course of three rolls. The goal in this game is to make a number as close to 700 as possible. The team that gets closest wins the round, and you're going to play 3 rounds. This time, both teams will take their rolls in base 10 pieces.

5. Now have a member of the first team roll the 4–9 die and report the number rolled. Ask the team to decide whether they want to take their first roll in 100s, 10s, or 1s, and give them a minute to discuss the issue. Once they've decided, have a member of the team use the pieces from one of the trays to set out the designated number of 100s, 10s, or 1s on their side of the blue line.

6. Give the other team a turn. Then have the two teams take turns until both have taken 3 rolls.

7. Record the results for both teams on your Target 700 Record Sheet as students do so on theirs. Tell the students, that instead of sketching the 100s, 10s, and 1s, they are to record their results in expanded notation and show the totals. After the totals have been determined, students are asked to record 700 and the two scores in order from least to greatest. Use your record sheet to model these processes as necessary.

Set A4 Numbers & Operations: Place Value Blackline Run a class set plus 1 extra.

Target 700 Record Sheet

Round 1	100s	10s	1s	Total
Blue Team	800 +	40 +	5 =	845
Red Team	600 +	80 +	4 =	684

Write 700 and both teams' scores in order from least to most. Circle the score that is closer to 700.

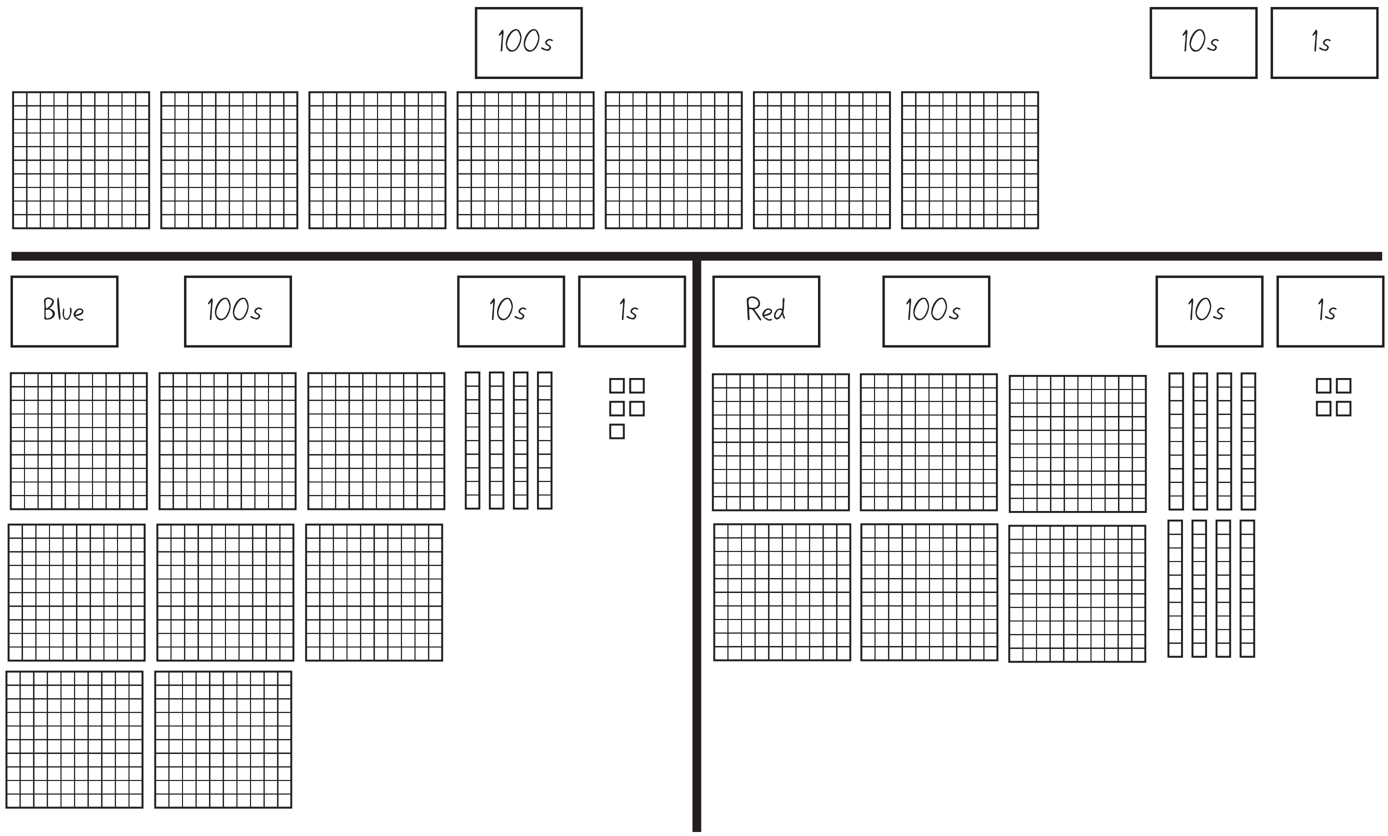
684 < 700 < 845

Round 2	100s	10s	1s	Total
Blue Team	____ +	____ +	____ =	
Red Team	____ +	____ +	____ =	

Write 700 and both teams' scores in order from least to most. Circle the score that is closer to 700.

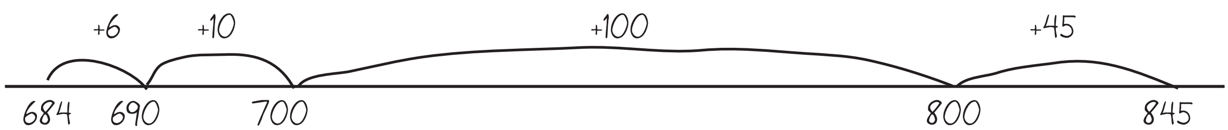
____ < ____ < ____

Activity 4 Target 700 (cont.)



8. Before you move on to the next round, ask students to determine which of the 2 scores is closer to 700, and circle it. Some children may want to use base 10 pieces to compare each of the scores to 700, or do some figuring on their record sheet. Counting up from the lower to the higher number is another strategy we've seen students use. After they've had some time to work with the problem, ask volunteers to share their solutions and strategies with the class. Record some of their ideas on the board. Using an open number line to illustrate counting upward is particularly helpful. If this strategy doesn't emerge from your group, share it yourself and encourage students to use it as you play the rest of the game. It's more accessible to some second graders than subtracting to find the differences and encourages good mental math.

> ***Alesha*** *684 is way closer to 700. I counted up. 84 up to 90 is 6, and then 10 more gets you up to 700, so it's only 16 away.*
>
> ***Shelby*** *845 is way more than 700 because you have to go 100 up to 800, and then 45 more.*



9. Play 2 more rounds of Target 700. The team that scores closer to 700 more times wins.

Extension

- Revisit this game several times with your class. Change the target from 700 to 750 or 775 for a more challenging version.

NAME ______________________ **DATE** ______________

Target 700 Record Sheet

Round 1	100s	10s	1s	Total
Blue Team	_______ +	_______ +	_______ =	
Red Team	_______ +	_______ +	_______ =	

Write 700 and both teams' scores in order from least to greatest. Circle the score that is closer to 700.

_______ < _______ < _______

Round 2	100s	10s	1s	Total
Blue Team	_______ +	_______ +	_______ =	
Red Team	_______ +	_______ +	_______ =	

Write 700 and both teams' scores in order from least to greatest. Circle the score that is closer to 700.

_______ < _______ < _______

Round 3	100s	10s	1s	Total
Blue Team	_______ +	_______ +	_______ =	
Red Team	_______ +	_______ +	_______ =	

Write 700 and both teams' scores in order from least to greatest. Circle the score that is closer to 700.

_______ < _______ < _______

Set A4 ★ Activity 5

ACTIVITY

4-Digit Shuffle

Overview

Students draw numbered index cards from a deck and place them in a pocket chart to form and read 1-, 2-, 3-digit numbers. Each time they form a 3-digit number, they work together to build it with place value pieces and record it using expanded notation. After the class has built several 3-digit numbers, a fourth place is added, and children form, read, and discuss the place values of 4-digit numbers.

Skills & Concepts

★ connect place value models with their numerical equivalents to 1,000

★ identify the ones, tens, and hundreds place in a number and the digits occupying them

★ write 3-digit numbers in expanded form

★ analyze the magnitude of digits in numerals through 9,999 on the basis of their place values

You'll need

★ 24 3″ × 5″ index cards (see Advance Preparation)

★ a 9″ × 12″ piece of green construction paper (see Advance Preparation)

★ Hundreds, Tens, and Ones mats from Set A4, Activity 1

★ base 10 pieces (11 mats, 10 strips, 10 units)

★ a pocket chart

★ individual chalkboards/whiteboards, chalk/dry wipe pens, erasers

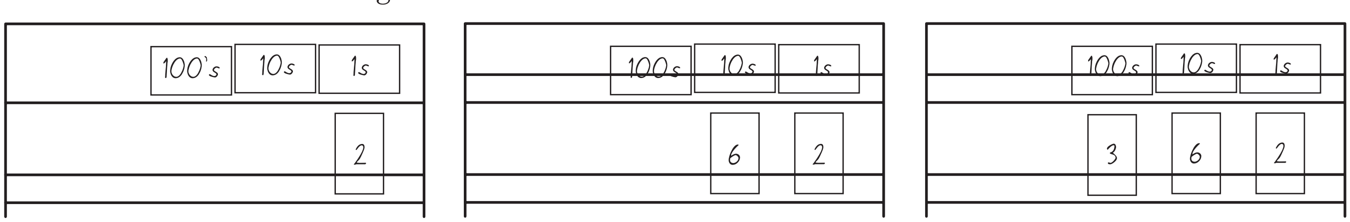
Advance Preparation Use a wide-tipped permanent marker to write a numeral on each of 20 cards. Make two cards for each numeral, 0 through 9. Use the other 4 cards to make place value labels: ones, tens, hundreds, and thousands. Write "Thousands" on the green construction paper. You may want to laminate the paper and the cards.

Instructions for 4-Digit Shuffle

1. Ask students to pick up chalkboards/whiteboards, chalk/dry wipe pens, and erasers, and meet you in the discussion area. Have them form a semi-circle where they can see the pocket chart. As they watch, post the ones, tens, and hundreds labels across the top row of the pocket chart. Hold the thousands label in reserve for now. Then show students the 20 numeral cards. Shuffle these cards and fan them out in your hand in such a way that students cannot see the writing on them.

2. Invite a volunteer to pick a card from your hand and post it in the second row of the pocket chart below the ones label. Have the class read the numeral together, and then choose another volunteer to select a second card from your hand. Ask him or her to post it in the pocket chart below the tens label. Work with the class to read the 2-digit number that results.

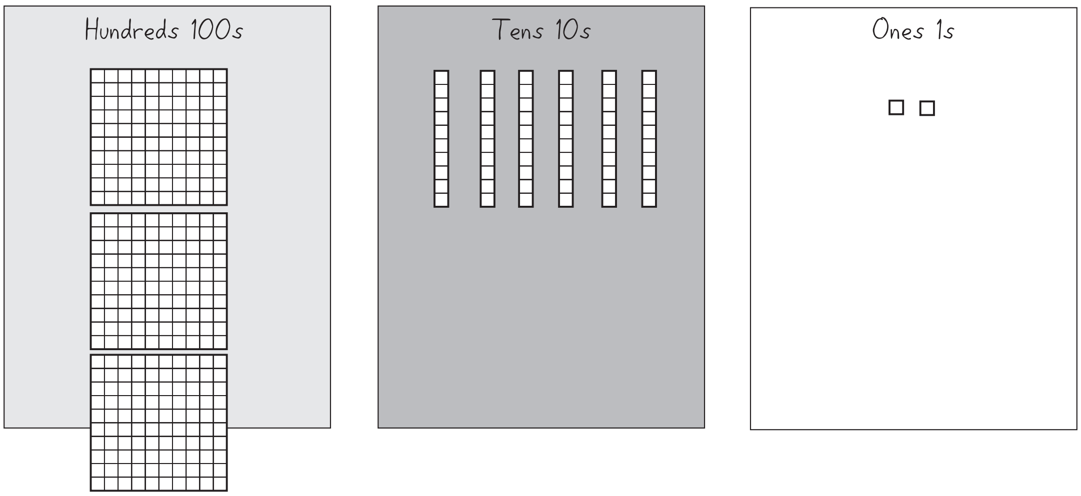
3. Ask a third volunteer to choose a card and post it in the pocket chart below the hundreds label. Work with the class to read the 3-digit number that results.



Activity 5 4-Digit Shuffle (cont.)

> ***Students*** *First it was 2. Then it was 62 because Marco got a 6.*
> *Then Denice got a 3, and that put on some hundreds, so it's 362 now.*

4. Set out the Hundreds, Tens, and Ones mats in the middle of the semi-circle. Choose several helpers to build the number with place value pieces, setting the mats, strips, and units in the appropriate locations. Have the class count the pieces to make sure they match the number in the pocket chart.



> ***Students*** *100, 200, 300, 310, 320, 330, 340, 350, 350, 360, 361, 362 – yep, it's 362!*

5. Write two equations to match the number as students do so on their chalkboards or whiteboards. Press students to explain how and why the two equations mean the same thing.

$$300 + 60 + 2 = 362$$
$$362 = 300 + 60 + 2$$

> ***Students*** *You can write it both ways. It doesn't matter.*
> *Equals is like saying the same as. 362 is the same as 300 + 60 + 2.*
> *They are kind of like the opposite of each other, but they both work.*

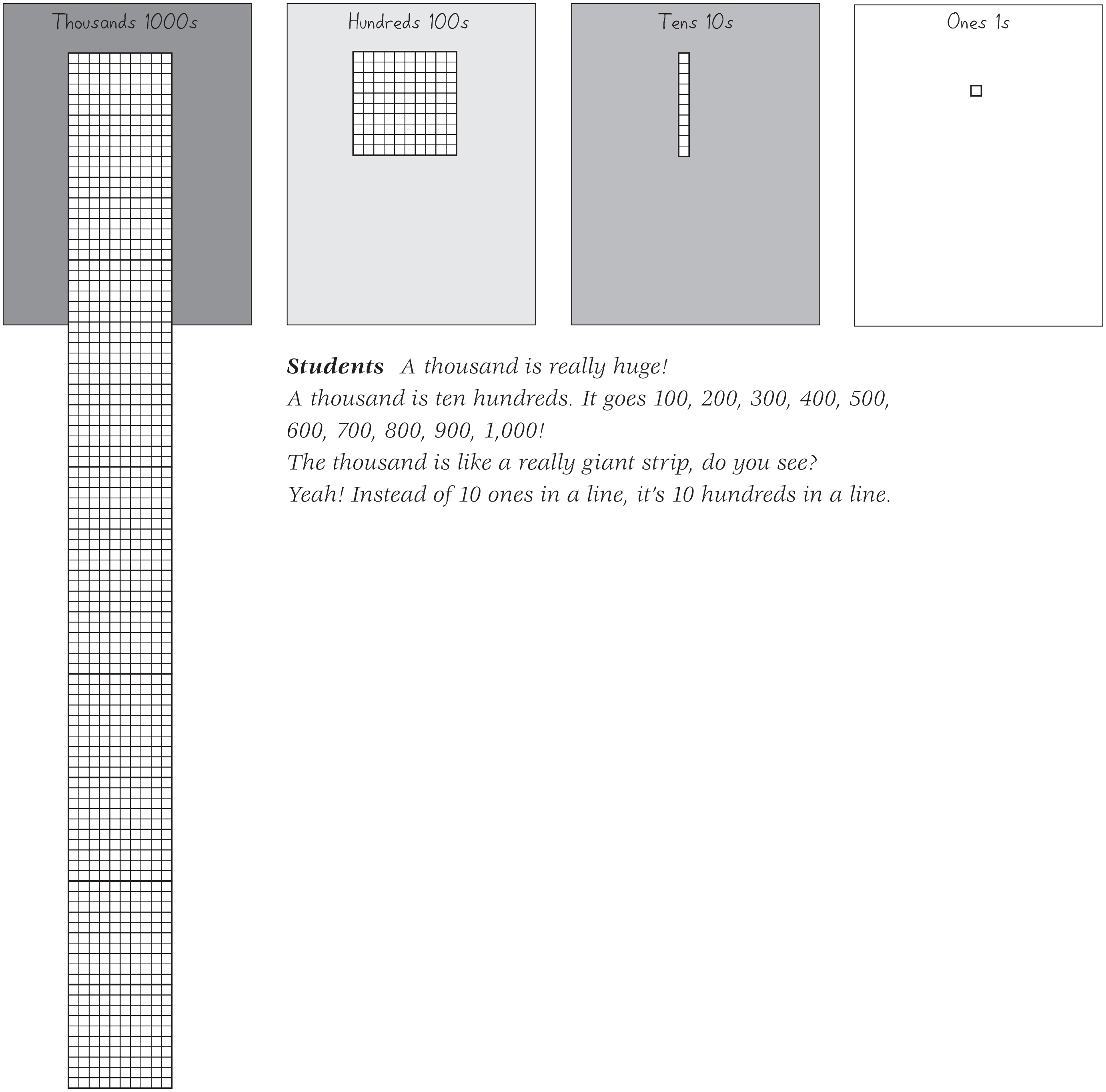
6. Repeat steps 2–5 several times. Clear the cards out of the pocket chart, and have students remove the base ten pieces from the mats and erase their boards each time. After the second repetition, ask students to record the equations on their own, and call on volunteers to share their work with the class.

7. After the class has built and recorded four or five 3-digit numbers, place the thousands card in the pocket chart, and set the green Thousands mat to the left of the Hundreds mat on the floor. Ask students to share what they know about 1,000. How does it relate to 100? How much is 1,000? Have they ever seen a thousand of anything? Would a thousand children fit into your classroom? Would the cafeteria or the gym hold that many students? Can they think of a place large enough to hold a thousand second graders?

8. As students watch, set 10 units on the Ones mat. Can these be traded for a single piece? Yes, so invite one of the children to move the collection of 10 units to the Tens mat and replace them with a single strip. Place 9 more strips on the Tens mat as students count with you by tens. Invite another student to move the 10 strips over to the Hundreds mat and replace them with a single mat. Place 9 more mats on

Activity 5 4-Digit Shuffle (cont.)

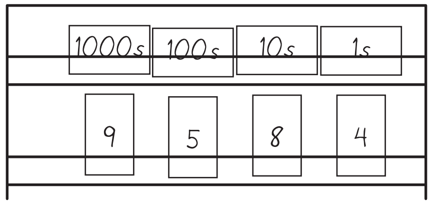
the Hundreds mat as students count with you by hundreds to one thousand. Can the 10 mats be traded for a single piece? Discuss this briefly, and then have students help you lay the mats out in a line. Then set out 1 mat, 1 strip, and 1 unit. Ask students to pair-share observations, and then invite volunteers to share their thinking with the class.



Students *A thousand is really huge!*
A thousand is ten hundreds. It goes 100, 200, 300, 400, 500, 600, 700, 800, 900, 1,000!
The thousand is like a really giant strip, do you see?
Yeah! Instead of 10 ones in a line, it's 10 hundreds in a line.

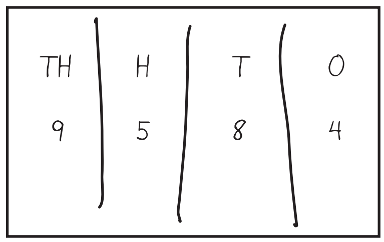
9. Ask students to help you clear the base ten pieces away for now. Then call up 4 volunteers in turn to choose numeral cards from your hand and place them in the pocket chart. Read each number as it is formed, first the 1-digit number, then the 2-digit number, then the 3-digit number, and finally, the 4-digit number.

Activity 5 4-Digit Shuffle (cont.)

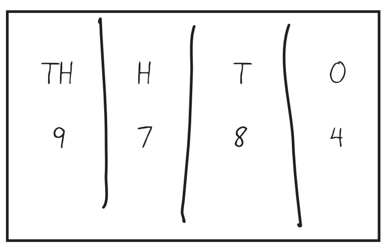


Students *Nine thousand, five hundred eighty-four.*
That's huge! One thousand is big enough. That number has 9 thousand in it!

10. Now have students draw 4 columns on their boards and label each with an abbreviation for the place value word: TH, H, T, O. Then have them copy the number on the pocket chart, placing each digit in the appropriate column.



11. Finally, play a few rounds of a digit-switching game, in which you ask students to replace the number in one of the columns with a different number. For instance, you might say, "Change the digit in the hundreds place to a 7." Each time they change a digit, do so in the pocket chart to confirm their work, and have them read the new number. You can also ask them to decide whether the new number is greater than or less than the last one they had on their boards.



Students *Nine thousand, seven hundred eighty-four.*
That number is bigger. There are more hundreds in it.
It was a 5 in the hundreds place. Now it's a 7. It has to be bigger.

Extension

- Repeat part or all of this activity more than once to give students more practice with expanded notation and place value. The digit switching game described in steps 9–11 is fast, easy, requires little in the way of materials, and can be played more than a few times during Number Corner the last month or two of school.

INDEPENDENT WORKSHEET

Use Set A4 Independent Worksheets 1 and 2 to provide students with more practice connecting place value models with their numerical equivalents to 1,000, identifying the ones, tens, and hundreds place in a number and the digits occupying them, writing three-digit numbers in expanded form, and analyzing the magnitude of digits in numerals through 9,999 on the basis of their place values.

Set A4 ★ Activity 6

ACTIVITY

Will the Real Value Please Stand Up?

Overview
Students work in groups of four to create sets of place value cards and use them to play a whole group game.

Skills & Concepts
★ connect place value models with their numerical equivalents to 1,000

★ identify the ones, tens, and hundreds place in a number and the digits occupying them

★ write 3-digit or 4-digit numbers in expanded form

★ analyze magnitude of digits in numerals through 9,999 on the basis of their place values (see Extensions)

You'll need
★ 5″ × 8″ index cards or pieces of white construction paper, class set, plus 8 extra

★ pencils, black crayons or felt markers

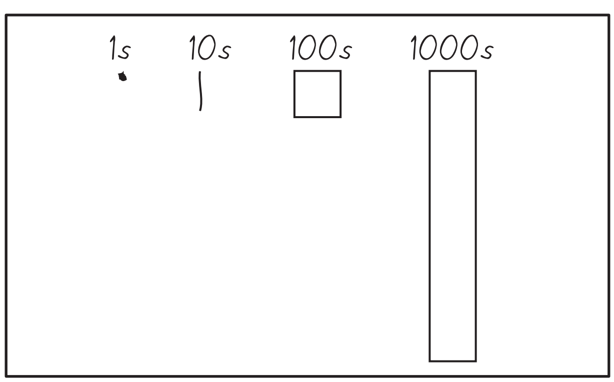
★ individual chalkboards/whiteboards, chalk/dry wipe pens, erasers

★ several small slips of scratch paper

Instructions for Will the Real Value Please Stand Up?
1. Assign students to work in groups of 4, and assign each student within a group the letter A, B, C, or D. Explain that they are going to work in their teams to create cards for a new place value game. Write the following instructions on the board as students watch:

A: Ones
B: Tens
C: Hundreds
D: Thousands

2. Remind students of the conventions you have developed this year for quickly sketching units (1s), strips (10s), and 100s (100s). Introduce a way to sketch thousands right now.



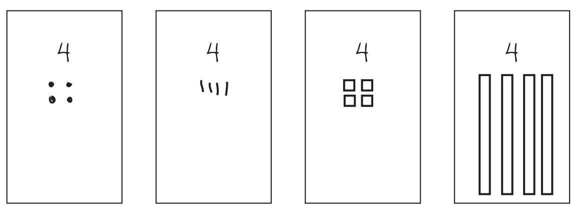
Teacher *We're going to use dots for ones, lines for tens, squares for hundreds, and long rectangles for thousands.*

Activity 6 Will the Real Value Please Stand Up? (cont.)

3. Show students the 5˝ × 8˝ cards or pieces of construction paper and explain that you are going to come around in a minute and give out the cards. When you do, you will assign each group its own number. If you assign a group the number 4, for instance, each person in that group will write the numeral 4 at the top of the card, large enough to see easily. Then Student A will draw 4 dots, Student B will draw 4 lines, Student C 4 squares, and Student D 4 long rectangles.

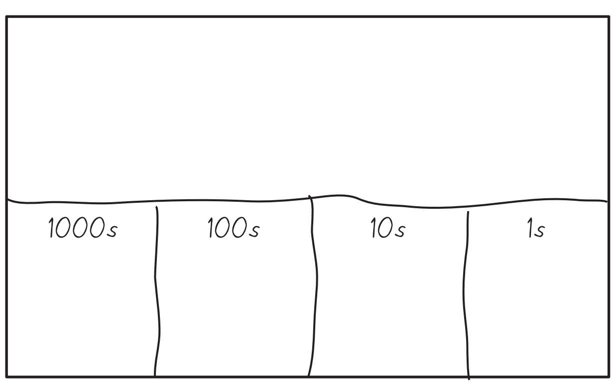
Note *It is important that each student in a group work with the same number. If you have a small class, you may only be able to assign the numbers 1 through 6, or perhaps you'll choose to assign 2 through 7, or 3 through 8 instead. If you prefer to stick with 3-digit numbers, assign students to groups of three instead of four. In classes with over 27 students, one group of three can be assigned 0. These students can write the numeral 0 at the top of their cards and decorate them with colorful designs. In classes of over 30, include the thousands place, or ask a few of the children to be game helpers.*

4. Make a quick set of four cards to demonstrate as students watch. Work in black crayon or felt marker. Acknowledge that students assigned higher numbers may have to make the thousands a little smaller to fit them on the card.



5. Ask students to each get out a pencil and a black crayon or felt marker. As they do so, circulate from one group to the next to distribute cards, and assign each group its own number. Ask them to go to work as soon as they get their cards.

6. As students finish making their cards, label your whiteboard as shown below. Write the place values high enough to show over the tops of children's heads, but leave room up above to do some other recording. Distribute chalkboards/whiteboards, chalk/dry-wipe pens, and erasers, and ask students to replicate your drawing on one half of their board, leaving the other half free for now.



7. When most students have finished making their cards and preparing their whiteboards, reconvene the class and start the game. Show them one of your small slips of scratch paper. Then write a 4-digit number on the slip in such a way that they cannot see what you are writing. Explain that you will tell

Activity 6 Will the Real Value Please Stand Up? (cont.)

them which digit goes in each place. As you do, the student holding the correct card will come and stand where he or she belongs, turn around, and hold up his or her card for everyone to see. If they listen carefully enough, they will be able to figure out what number you have written on the paper.

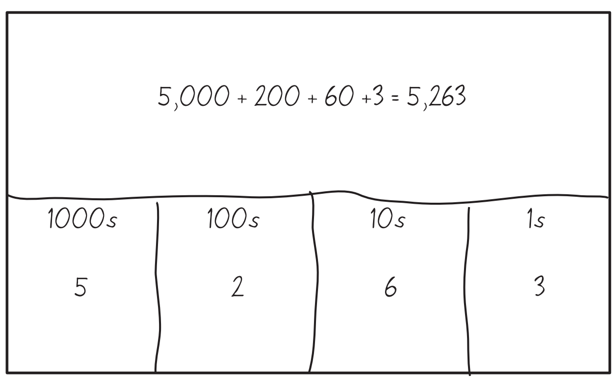
8. Before you start playing, pose a few hypothetical situations.

> ***Teacher*** *What if I say my number has a 6 in the tens place? Who should come up to the whiteboard?*
>
> ***Lin*** *Me! I have a 6 on my card!*
>
> ***David*** *But you have 6 hundreds on your card. I have 6 tens on my card. I would go up there, right?*
>
> ***Lin*** *Oh, I get it. But if Ms. Nolan said 6 hundreds, that would be me.*

9. When most students understand what to do, tell them to pay very close attention, and give them 4 clues. Have the student holding the correct card come up to the whiteboard as you give each clue. Here is an example:

- My number has a 6 in the tens place.
- My number has a 2 in the hundreds place.
- My number has a 3 in the ones place.
- My number has a 5 in the thousands place.

10. When all four students are standing, have the rest of the class read the number they have formed. Then have each of the students write their numeral on the whiteboard in the appropriate place. Have them return to their seats and ask the whole class to write the number on their boards, locating each numeral in the correct column. Ask them to read the number again, and then write an equation to match. Demonstrate at the board so they can follow along if they need to.



11. Finally, show students the number you wrote on your slip of paper at the beginning of the game. Does their number match?

12. Play more rounds of the game as time allows. Then ask students to put their name on the back of their card. Collect the cards and save them to play the game again. Once students get comfortable with the game, they can take turns writing the mystery numbers on slips of paper and giving the clues to their classmates.

NAME ______________________ **DATE** ______________

Set A4 ★ Independent Worksheet 1

INDEPENDENT WORKSHEET

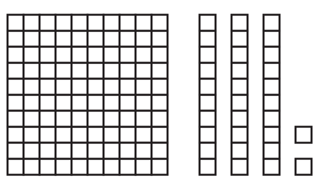
Large Numbers

1 Trace the numerals and the words.

1 one 2 two 3 three 4 four 5 five
6 six 7 seven 8 eight 9 nine 10 ten
20 twenty 30 thirty 40 forty
50 fifty 60 sixty 70 seventy
80 eighty 90 ninety 100 one hundred

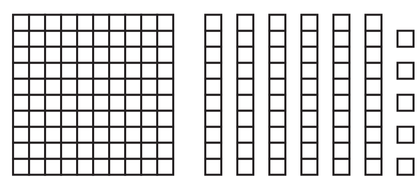
2 Label each set of base 10 pieces with the correct number name.

example



one hundred thirty two

a



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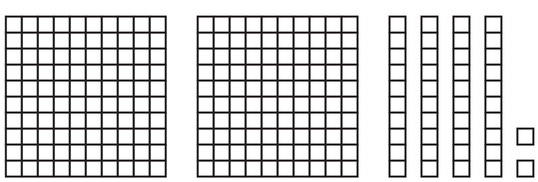

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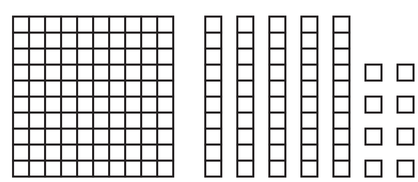

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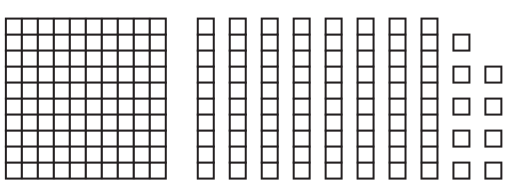

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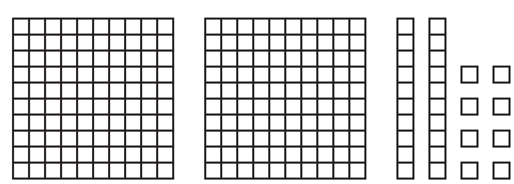


Independent Worksheet 1 Large Numbers (cont.)

3 Read each number. Then write it in expanded form.

example three hundred twenty-nine 329 = 300 + 20 + 9	**a** four hundred thirty-eight
b two hundred sixteen	**c** five hundred seventy-three
d one hundred ninety-eight	**e** six hundred three
f nine hundred sixty-seven	**g** eight hundred seventeen

4 Add the numbers.

a 300 + 60 + 5 = ______ **b** 500 + 40 + 5 = ______ **c** 200 + 10 + 6 = ______

d 400 + 90 + 9 = ______ **e** 100 + 10 + 8 = ______ **f** 600 + 7 = ______

g $\begin{array}{r} 300 \\ 40 \\ +\ 5 \\ \hline \end{array}$ **h** $\begin{array}{r} 400 \\ 20 \\ +\ 6 \\ \hline \end{array}$ **i** $\begin{array}{r} 600 \\ 30 \\ +\ 7 \\ \hline \end{array}$ **j** $\begin{array}{r} 800 \\ 70 \\ +\ 8 \\ \hline \end{array}$ **k** $\begin{array}{r} 700 \\ 80 \\ +\ 9 \\ \hline \end{array}$ **l** $\begin{array}{r} 100 \\ 10 \\ +\ 5 \\ \hline \end{array}$ **m** $\begin{array}{r} 900 \\ 30 \\ +\ 6 \\ \hline \end{array}$

5 Circle One

a The 4 in 574 is in the	ones place tens place hundreds place.
b The 4 in 493 is in the	ones place tens place hundreds place.
c The 4 in 114 is in the	ones place tens place hundreds place.
d The 4 in 5,348 is in the	ones place tens place hundreds place.

NAME ______________________________ DATE ______________

Set A4 ★ Independent Worksheet 2

INDEPENDENT WORKSHEET

Thinking about Place Value

1 Trace the numerals and the words.

1 one 2 two 3 three 4 four 5 five

6 six 7 seven 8 eight 9 nine 10 ten

11 eleven 12 twelve 13 thirteen

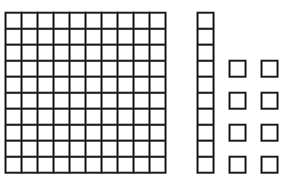
14 fourteen 15 fifteen 16 sixteen

17 seventeen 18 eighteen 19 nineteen

100 one hundred

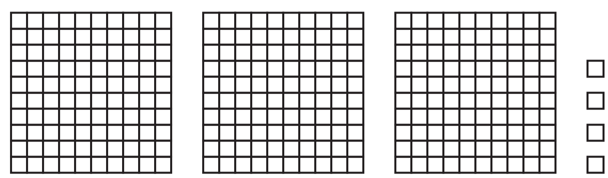
2 Label each set of base 10 pieces with the correct number name.

example



one hundred eighteen

a



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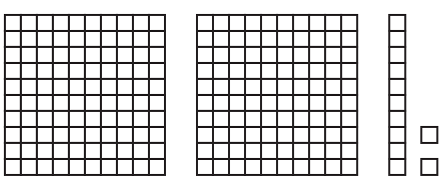

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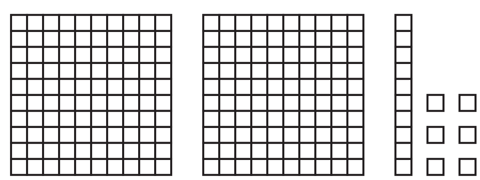

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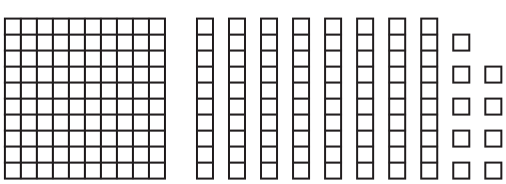

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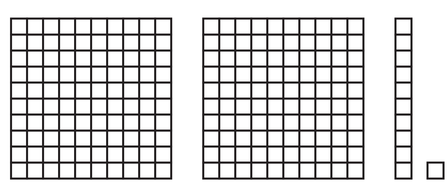

Independent Worksheet 2 Thinking about Place Value (cont.)

3 Tell what digit is in each place.

a 643 ____ is in the tens place. ____ is in the ones place. ____ is in the hundreds place	**b** 286 ____ is in the ones place. ____ is in the hundreds place. ____ is in the tens place.
c 119 ____ is in the tens place. ____ is in the hundreds place. ____ is in the ones place.	**d** 903 ____ is in the tens place. ____ is in the ones place. ____ is in the hundreds place
e 2,643 ____ is in the tens place. ____ is in the ones place. ____ is in the hundreds place	**f** 5,502 ____ is in the tens place. ____ is in the ones place. ____ is in the hundreds place

CHALLENGE

4 Solve these number riddles.

a I have a 9 in the tens place. I have a 4 in the hundreds place. The number in my ones place is less than 3. I am an even number. What number am I? __________	**b** I have a 7 in the thousands place. I have a 0 in the hundreds place. I have a 3 in the tens place. The number in my ones place is greater than 7. I am an odd number. What number am I? ____________

BRIDGES IN MATHEMATICS 2

GRADE 2 SUPPLEMENT

Set A5 Number & Operations: Multi-Digit Addition & Subtraction

Includes

Skills & Concepts

★ group three-digit numbers into hundreds, tens, and ones in more than one way

★ count by tens or hundreds forward and backward from 1 to 1,000 starting at any number

★ adding and subtracting tens and hundreds

★ comparing and ordering numbers from 0 to 1,000

★ add and subtract two-digit numbers efficiently and accurately using a procedure that works with all two-digit numbers and explain why the procedure works

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P0709

Bridges in Mathematics Grade 2 Supplement
Set A5 Number & Operations: Multi-Digit Addition & Subtraction

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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

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Set A5 ★ Activity 1

ACTIVITY

52 Weeks; 365 Days

Overview
Student pairs use base ten pieces to represent 52 in a variety of ways. Then the class works together to consider some of the different ways to represent 365. This activity may be repeated many times with different numbers.

Skills & Concepts
★ group three-digit numbers into hundreds, tens, and ones in more than one way

★ describe the relative size among hours, days, weeks, months, and years

You'll need
★ set of base ten pieces for each pair of students

★ chart paper or space on the whiteboard

★ markers

★ 3 sheets of 9″ × 12″ construction paper, 1 white, 1 blue, and 1 yellow (see Advance Preparation)

Advance Preparation Write "Hundreds" on the yellow sheet of construction paper, "Tens" on the blue sheet, and "Ones" on the white sheet. (If you made mats like these for Set A4, Activity 1, and saved them, reuse them for this activity.)

Note The day before you conduct this activity, assign students to find out how many weeks and how many days there are in a year. If some of the children already know, ask them to keep the information secret until math time the following day.

Instructions for 52 Weeks; 365 Days
1. Gather students to your discussion area. Have them sit in a semi-circle where they can all see the whiteboard or chart paper you've posted. Ask them to share what they learned about how many weeks there are, and how many days there are in a year. As they share, press them to explain why there are so many more days than weeks in a year.

> ***Students*** *My dad told me there are 52 weeks in a year.*
> *I found out there are 365 days in a year.*
> *I got the same answers, 52 and 365.*
> *My mom said some years have an extra day in them, but most have 365.*
>
> ***Teacher*** *I'm going to record these two numbers up here on the whiteboard. Why are there so many more days than weeks in a year?*
>
> ***Students*** *It takes 7 days to make a week.*
> *A week is way longer than a day.*
> *There are lots of days in a year, but not so many weeks.*
> *It goes days, weeks, then months, because there are only 12 months in a year.*

Activity 1 52 Weeks; 365 Days (cont.)

2. As students watch, set out a base ten unit, strip, and mat in the middle of the circle. Review the name of each piece with the class, and make sure children understand that the unit is worth one. Then ask them the following questions:
- How many units are there in a strip? How do you know?
- How many strips are there in a mat? How do you know?
- How many units are there in a mat? Explain your thinking.

3. Now pass out a set of base ten pieces to each pair of students and ask them to display 52 units in any way they can. They can use any combination of strips and units, as long as there are 52 units total in their collection. Encourage students who are working quickly to see how many different combinations of pieces they can make that have a total of 52 units. As they work, write the headings shown below on the whiteboard or a piece of paper.

strips (10s) units (1s) total number of pieces

4. When they have had a few minutes to work, ask students to report how many strips and units are in their collections. Record the collections on the class chart as they share. Ask students to identify which collection used the most pieces and which used the fewest. Explain that the collection with the fewest pieces is called the *minimal* collection, and mark that collection with a star. Which collection is the fastest and easiest to build? Why?

52

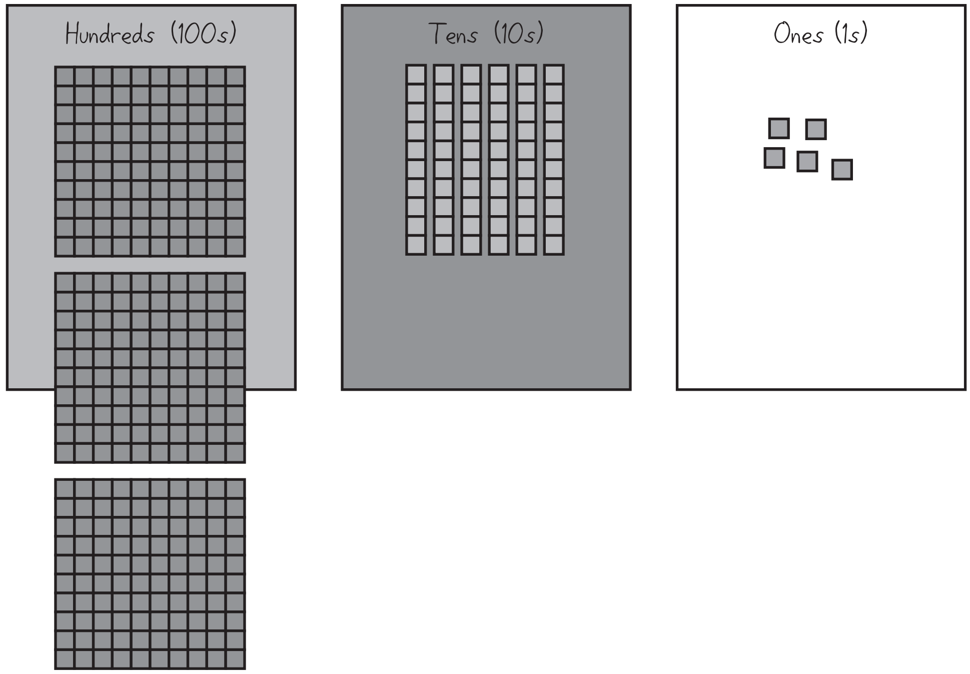
strips (10s)	units (1s)	total number of pieces
0	52	52
1	42	43
2	32	34
3	22	25
4	12	16
5	2	7 ★

5. Next, ask students to consider the number 365. How could they build this number using the fewest possible pieces? What would be the minimal collection for 365? Have the children pair-share their ideas, and then call on volunteers to share their thinking with the class.

> ***Students*** *It would be 3 mats for the hundreds, but I'm not sure about the rest.*
> *Three mats for the hundreds, then 6 strips for the tens – that makes 9 pieces.*
> *I think 14 pieces because 3 mats, 6 strips, and 5 units. Three and 6 is 9, then 5 more is 14 in all.*

6. After some discussion, lay out the yellow, blue and white pieces of construction paper. Work with help from the students to build 365 with 3 mats, 6 strips, and 5 units. Discuss the resulting display with the class. Pose the following questions:
- Is this the minimal collection? How do you know?
- Is there any way you could build the number with fewer pieces?
- How many hundreds are there in 365?
- How many tens?
- How many ones?

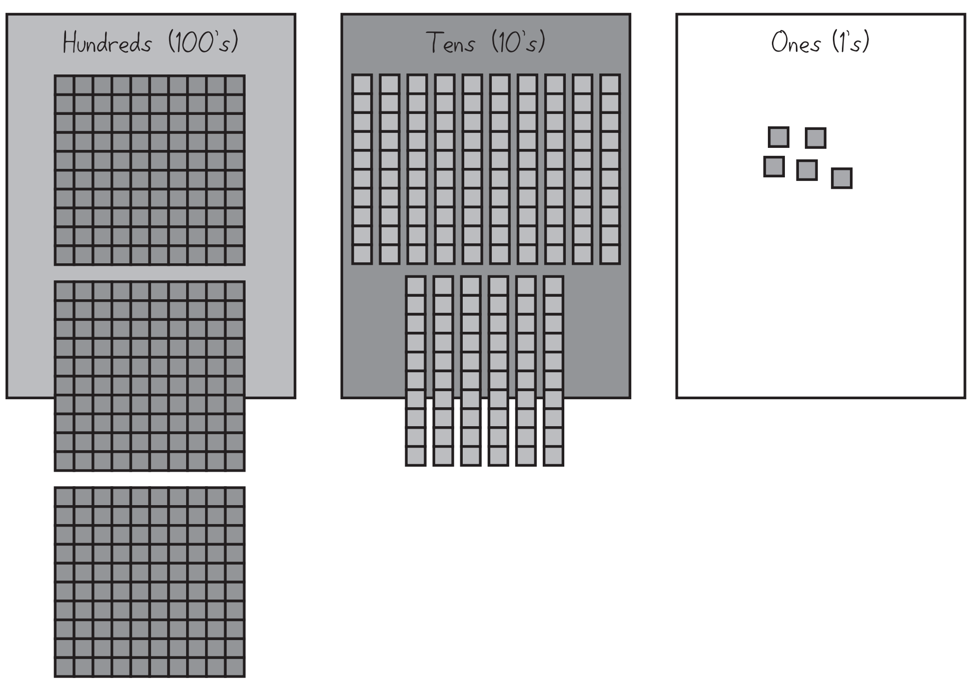
Activity 1 52 Weeks; 365 Days (cont.)



7. Chances are, many students will report that there are 6 tens and 5 ones in 365. Press them to consider some of the other possibilities. What would happen if you traded in one of the mats for 10 strips? Work with help from students, and then record the results on the whiteboard or another piece of chart paper.

$\boxed{365}$

mats (100's)	strips (10's)	units (1's)	total number of pieces
3	6	5	14
2	16	5	23



Activity 1 52 Weeks; 365 Days (cont.)

8. Repeat step 7 twice more, until all the mats have been traded for strips. Record the results on the chart each time.

$\boxed{365}$

mats (100s)	strips (10s)	units (1s)	total number of pieces
3	6	5	14
2	16	5	23
1	26	5	32
0	36	5	41

9. Ask students to share observations about the numbers on the chart. Can they spot any patterns?

> ***Students*** *The mats go down every time: 3, 2, 1, then 0.*
> *There are more strips every time. It goes 6, 16, 26, and then 36.*
> *It's 10 more strips every time.*
> *The units keep being the same every time. It's always 5 units.*
> *I know why it gets 10 more strips each time! It's because we get more 10 strips every time we trade in a mat!*

Here are some additional questions to pose during the discussion.

- Which collection took the fewest pieces to build? Why?
- Could there be a smaller collection of pieces for 365? Why or why not?
- When you trade all the mats of 100 in for strips of 10, how many tens are there in 365?
- If you traded in all the strips for units, how many ones would there be in 365?
- Which collection is the quickest and easiest to build? Why?

Extension

- Repeat this activity, steps 5–9 only, with other 3-digit numbers. You may want to have your students investigate a different 3-digit number each week during Number Corner for a couple of months running. You might choose even multiples of 100, such as 400 or 600, and/or 3-digit numbers that have some significance to students, such as the number of children in your school, the number of people that can be seated in the cafeteria, the number of people who bought tickets to the school play, and so on.

INDEPENDENT WORKSHEET

Use Set A5 Independent Worksheet 1 to provide students with more practice grouping three-digit numbers into hundreds, tens, and ones in more than one way.

Set A5 ★ Activity 2

ACTIVITY

Jump-a-Ten

Overview

Students count by tens starting from 10, and then from a variety of other numbers on a 1–100 and a 1–200 chart. Then they play a whole-group game on the 1–200 chart. Jump-a-Ten may be added to your set of Work Places once students have been introduced to the game.

Skills & Concepts

- ★ count by tens or hundreds forward and backward from 1 to 1,000 starting at any number
- ★ adding and subtracting tens
- ★ comparing and ordering numbers from 0 to 1,000

You'll need

- ★ 1–200 Chart (page A5.9, run a class set plus one copy on a transparency)
- ★ Jump-a-Ten Record Sheet (optional, page A5.10, run a class set)
- ★ Hundreds Grid pocket chart
- ★ Hundreds Grid Number Cards 1–100 (see Advance Preparation)
- ★ 3 yellow game markers
- ★ 1 red game marker for each student, plus one extra
- ★ 3 *pennies
- ★ 6 dice marked 1–6
- ★ whiteboard space and markers (see Advance Preparation)

Advance Preparation Fill the Hundreds Grid pocket chart on your Number Corner display board with all the number cards, 1–100. Draw 2 copies of the recording form shown below on the whiteboard or a piece of chart paper.

	Yellow	Red
Starting Number		

Activity 2 Jump-a-Ten (cont.)

Instructions for Jump-a-Ten

1. Ask students to join you in the Number Corner area. Explain that you are going to play a new game with them today, but first you're going to practice counting by tens. Point to the 10 on the Hundreds Grid pocket chart and ask the students to count by tens to 100 with you. Point to each multiple of 10 as the students count.

2. Now point to the 6. Ask students if it is possible to count by tens starting from 6 instead of 10. Give them a minute to pair-share their ideas and then call on volunteers to share their thinking with the class.

> ***Students*** *Nope, you have to start on 10 to count by tens.*
> *Counting by tens goes 10, 20, 30, 40, 50, 60, and like that. You have to start on 10.*
> *You could start on 0, and then go up to 10, but you can't start on 6.*
> *You could sort of count by tens if you started on 6 and then added 10. That would be 16.*

3. After some discussion, explain that today, the class is going to learn to count by tens starting with any number on the chart. Point to the 6 again, and ask students to add ten. What is 6 + 10? When they have had a moment to think and respond, point to the 16. Ask them to add ten again. What is 16 + 10? Give them a moment to think and respond, and point to the 26. Repeat this sequence through 96. Explain that moving forward or backward by adding or subtracting ten from any number is another way to count by tens.

4. Now point to 94 on the chart. If the children count backwards by tens from 94, where will they land at the end of the sequence? Give students a moment to discuss their ideas, and then point to each number as you count backwards by tens with the class.

> ***Students*** *94, 84, 74, 64, 54, 44, 34, 24, 14, 4.*
> *Four is the last number, just like I thought.*
> *You can't go any farther backwards.*

5. Next, point to the 3. If the children count forward by tens from 3, where will they land at the end of the sequence? Give students a moment to discuss their ideas, and then point to each number as you count forwards by tens with the class. When you get to 93, ask students what the next number in the sequence would be. What is 93 + 10? What would come after 103? What would come after 113? Count with the class by tens up to 193.

6. Ask students to return to their tables. Give them each a copy of the 1–200 Chart, and display your own copy at the overhead. Ask the children to study the chart quietly for a moment and then pair-share some of their observations. Can they find and describe any patterns?

7. After they have had a minute or two to share their ideas, ask them to point to the 7 on the chart as you circle the number on the overhead. Have them count forward by tens, pointing to each number on their chart, while you circle the numbers at the overhead. When you have reached 197, ask them what would come next in the sequence. Then have them share observations about the numbers you have circled.

> ***Students*** *It would be 207 next because that's 10 more.*
> *All those numbers have 7's at the end.*
> *It goes 7, 17, 27, 37, and when it gets to 107, it starts all over, like 117, 127, 137, and on and on.*
> *If we had more numbers on our chart, it would start over again at 207, then 307, and up and up.*

Activity 2 Jump-a-Ten (cont.)

8. Erase the overhead and tell the class that you are going to play a new game with them called Jump-a-Ten. Briefly explain the game rules outlined below and then take your turn so students can see how the game works.

- Each team places their marker anywhere on the 1–200 chart except the number 100. Each team has to choose a different column, but may start in the same row. (133 and 136 are okay starting places; 128 and 108 are not.)
- The two teams take turns to toss a die marked 1–6, and at the same time, a penny. The die tells how many jumps of 10 to make, and the penny tells whether to jump forward (heads) or backward (tails). For instance, if a team tosses a 5 and heads, they jump their marker ahead 5 tens. If a team tosses a 3 and tails, they jump their marker backwards 3 tens.
- Each team gets 5 turns to toss and jump. Each new turn starts from where the marker landed on the previous turn. If a team cannot take the designated number of jumps forward or backward, they lose that turn. (For instance, if their marker is on 27 and the team tosses 5 and tails, they cannot take 5 jumps of ten backwards, and must wait until their next turn.) The team that lands closest to 100 on their last turn wins. Teams have the option of using two dice marked 1–6 instead of one die on their last turn.

> ***Teacher*** *I'm going to put my marker on 105 to start. Then I'll toss the die and the penny at the same time. Let's see. I got heads and 4. If I jump my marker ahead 4 tens, where will I land?* (Gives students a moment to think and respond.) *Here I go. Please count with me.*
>
> ***Students*** *115, 125, 135, 145. You landed on 145. It's our turn.*

9. Give students each a red game marker. Choose a volunteer to decide where to place the red marker for the class. Have students each place their marker on that number on their own charts. Then ask a second volunteer to toss the penny and the die for the class, and a third to move the marker at the overhead as all the students move their markers on their own charts and count forward or backwards by tens.

10. Record the starting numbers and the results of the first turn on the board for both teams.

	Yellow	Red
Starting Number	105	99
	145	69

11. Continue taking turns with the class and recording the results on the board until both teams have had 5 turns. Then ask the students to determine which team landed closest to 100, and circle the winning team on the board.

Activity 2 Jump-a-Ten (cont.)

Students *We did! We landed on 89 right at the end, and you're only on 85.*
89 is closer to 100 because it's only 11 away. 85 is 15 away. We won!
I was worried when we got all the way back to 9, but then we got heads two times.

Set A5 Number & Operations: Multi-Digit Addition & Subtraction Blackline Run a class set and one copy on a transparency.
NAME ______________________ DATE ____________

1–120 Chart

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

	Yellow	Red
Starting Number	105	99
	145	69
	175	9
	115	59
	75	49
	85	89

12. If time allows, play the game a second time. This time, let the class be first to place their marker and take their turn.

Extensions

- Repeat this activity several more times with the whole class. Once students learn to play, it makes a good sponge activity.
- If you want to add Jump-a-Ten to your collection of Work Places, laminate three of the 1-200 charts, or place them in protective plastic sleeves. Place the charts, along with 3 pennies, 6 dice marked 1-6, 3 yellow and 3 red game markers, and a class set of Jump-a-Ten record sheets in a Work Place tub.

NAME ______________________________ **DATE** ______________

1–200 Chart

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

NAME ______________________________ **DATE** ______________

Jump-a-Ten Record Sheet

Game 1			Game 2		
	Yellow	Red		Yellow	Red
Starting Number			Starting Number		
1			1		
2			2		
3			3		
4			4		
5			5		

Game 3			Game 4		
	Yellow	Red		Yellow	Red
Starting Number			Starting Number		
1			1		
2			2		
3			3		
4			4		
5			5		

Set A5 ★ Activity 3

ACTIVITY

Jump-a-Hundred

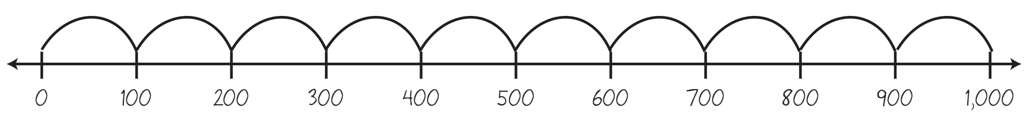
Overview
Students count by hundreds starting from 0, and then from a variety of other numbers on an open number line. Then they play a whole-group game on the number line. Jump-a-Hundred may be added to your set of Work Places once students have been introduced to the game.

Skills & Concepts
- ★ count by tens or hundreds forward and backward from 1 to 1,000 starting at any number
- ★ adding and subtracting hundreds
- ★ comparing and ordering numbers from 0 to 1,000

You'll need
- ★ Jump-a-Hundred Record Sheet (page A5.15, run one copy on a transparency; class set optional)
- ★ 3 pennies
- ★ 3 dice marked 1–6
- ★ blue and red overhead pens
- ★ 3 blue and 3 red colored pencils (optional)
- ★ whiteboard space and markers (see Advance Preparation)

Advance Preparation Draw an open number line on the whiteboard. Label it at one end with 0 and the other with 1,000.

Instructions for Jump-a-Hundred
1. Draw students' attention to the number line on the whiteboard. Explain that you are going to play a new game with them today, but first you're going to practice counting by hundreds. Point to the 0 on the number line and ask the students to count by hundreds to 1,000 as you draw "jumps" along the line. When you reach 1,000, go back and work with student input to label the jumps with numbers.

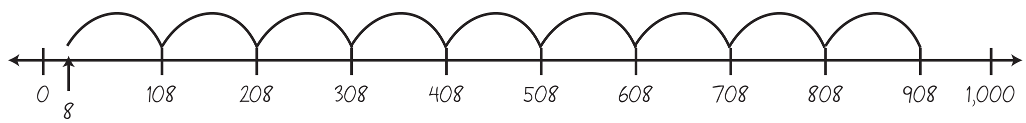


2. Erase the line and quickly draw another, labeled with 0 at one end and 1,000 at the other. Make a mark a short distance from the 0 and label it with 8. Ask students if it is possible to count by hundreds starting from 8 instead of 0. Give them a minute to pair-share their ideas and then call on volunteers to share their thinking with the class.

> ***Students*** *I think it's like those tens on the chart. You can start with any number if you just add 100 every time.*
> *I don't. I think you have to start with zero to count by hundreds.*
> *If you start with 8 and add 100, you get 108. Then if you add another hundred, you get 208. You can keep going, but you won't land on 1,000.*

Activity 3 Jump-a-Hundred (cont.)

3. After some discussion, ask students to add 100 to 8 as you draw a "jump" on the line. What is the total? Add hundreds one by one, marking and labeling the line each time. Explain that moving forward or backward by adding or subtracting one hundred from any number is another way to count by hundreds.



4. Erase the line again and draw a new one, labeled with 0 at one end and 1,000 at the other. Make a mark a short distance before the 1,000 and label it 983. If the children count backwards by hundreds from 983 toward 0, where will they land at the end of the sequence? Give students a moment to discuss their ideas, and then draw jumps and work with student input to label them as you count backwards by hundreds from 983 with the class.

5. Repeat steps 2–4 several times, erasing the line each time, starting with a new number between 0 and 100 or 900 and 1,000, and counting by hundreds forwards or backwards as far as the line allows.

6. Display the record sheet at the overhead and tell the class that you are going to play a new game with them called Jump-a-Hundred. Briefly explain the game rules outlined below and then take your turn so students can see how the game works.

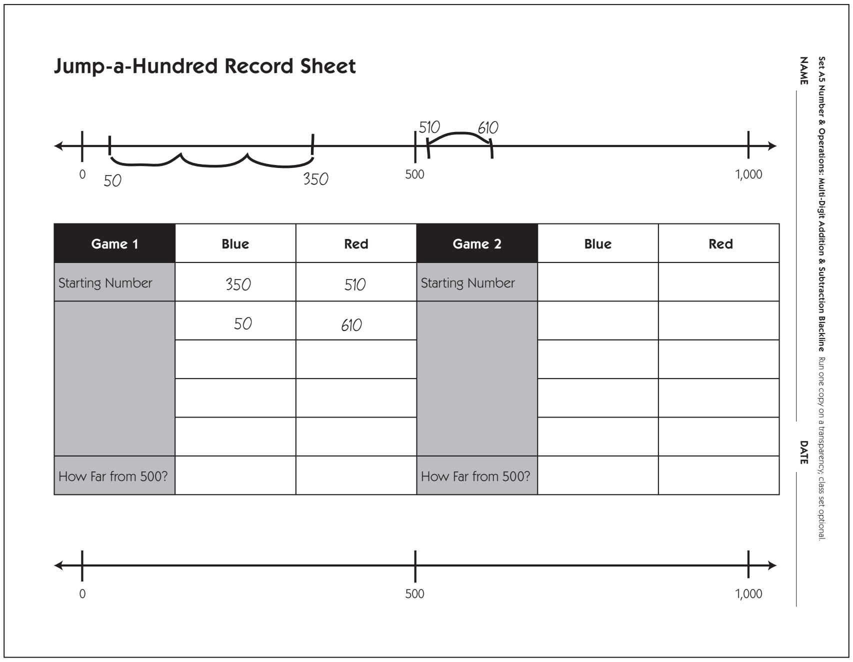
- Each team marks and labels a number anywhere along the line except the number 500. Each team uses its own pen color. One team marks and labels above the line, the other below.
- The two teams take turns to toss a die marked 1–6, and at the same time, a penny. The die tells how many jumps of 100 to make, and the penny tells whether to jump forward (heads) or backward (tails). For instance, if a team tosses a 5 and heads, they make 5 jumps of 100 forward along the line and label their end point. If a team tosses a 3 and tails, they make 3 jumps of 100 backward along the line and label their end point.
- Each team gets 5 turns to toss and jump. Each new turn starts from where they landed along the line on the previous turn. If a team cannot take the designated number of jumps forward or backward, they lose that turn. (For instance, if they landed on 228 the previous turn and happen to toss a 5 and a tails, they cannot take 5 jumps of one hundred backwards, and must wait until their next turn.) Each team circles their final number on the line. The team that lands closest to 500 on their last turn wins.

> ***Teacher*** *I'm going to be the blue team, and you're going to be the red. I'm going to make a mark in blue at 350 to start. Then I'll toss the die and the penny at the same time. Let's see. I got tails and 3. If I jump backwards 3 hundreds from 350, where will I land? (*Gives students a moment to think and respond.*) Here I go. Please count with me as I mark the line.*
>
> ***Students*** *250, 150, 50. You landed on 50. It's our turn.*

7. Ask students to pair-share where they would like to start along the line. When they have had a minute to discuss their options, choose a volunteer to decide where the class will start. Make a mark in red at that location along the line. Then ask a second volunteer to toss the penny and the die for the class, and report the results. Have students predict where they will land along the line. Then draw the jumps and label the endpoint as they count forwards or backward by hundreds.

8. Record the starting numbers and the results of the first turn on the overhead for both teams.

Activity 3 Jump-a-Hundred (cont.)



Set A5 Number & Operations: Multi-Digit Addition & Subtraction Blackline Run one copy on a transparency, class set optional.

NAME

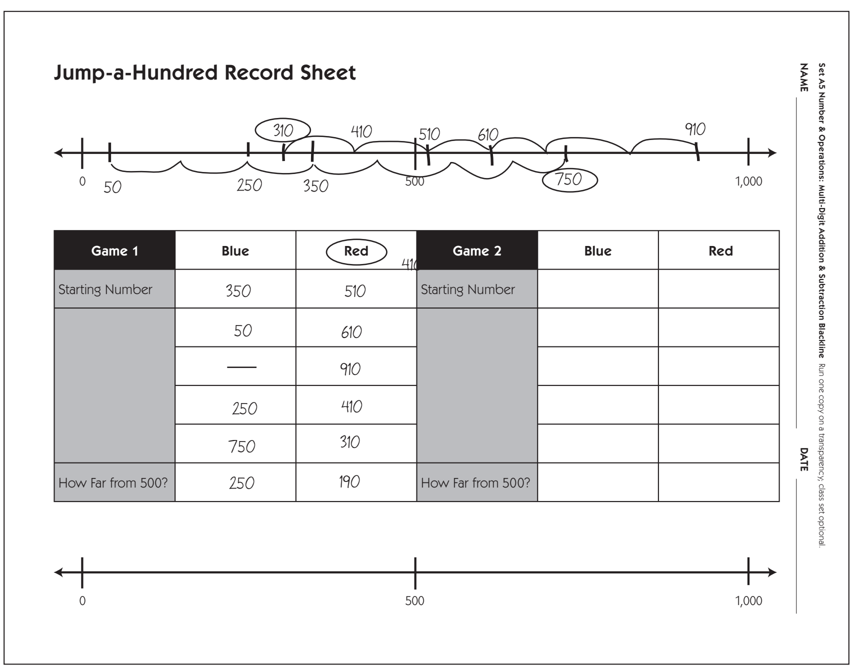
DATE

Jump-a-Hundred Record Sheet

Game 1	Blue	Red	Game 2	Blue	Red
Starting Number	350	510	Starting Number		
	50	610			
How Far from 500?			How Far from 500?		

9. Continue taking turns with the class and recording the results on the board until both teams have had 5 turns. Then ask the students to determine which team landed closest to 500, and circle the winning team on the board.

> ***Students*** *I think we won this time.*
> *You landed on 750 for your last turn. That's up 200 and then 50 more from 500.*
> *We got 310. It's 90 up to 400, and then 100 more.*
> *We're only 190 away, but you're 250 away. We won!*



Set A5 Number & Operations: Multi-Digit Addition & Subtraction Blackline Run one copy on a transparency, class set optional.

NAME

DATE

Jump-a-Hundred Record Sheet

Game 1	Blue	Red	Game 2	Blue	Red
Starting Number	350	510	Starting Number		
	50	610			
	—	910			
	250	410			
	750	310			
How Far from 500?	250	190	How Far from 500?		

Activity 3 Jump-a-Hundred (cont.)

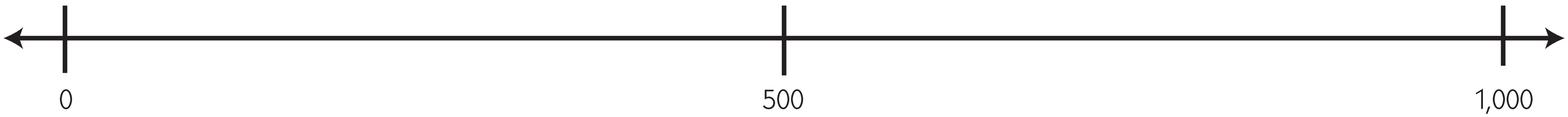
10. The Jump-a-Hundred record sheet has a second number line at the bottom, and space to record a second game. Play again with the class if time allows. Let them choose their number and start first this time. You may want to continue to record at the overhead for them.

Extensions

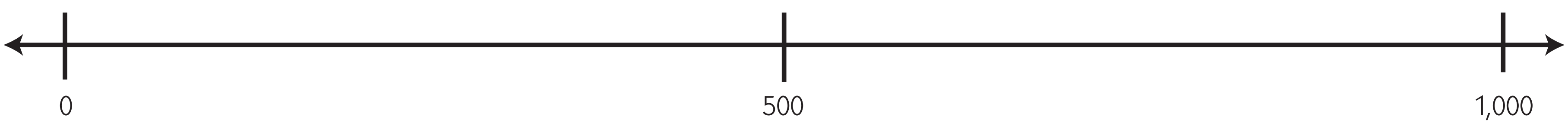
- Repeat this activity several more times with the whole class. Once students learn to play, it makes a good sponge activity.
- If you want to add Jump-a-Hundred to your collection of Work Places, run a class set of the Jump-a-Hundred record sheets. Place the sheets, along with 3 pennies, 3 dice marked 1–6, 3 blue pencils, and 3 red pencils in a Work Place tub.

NAME ______________________ **DATE** ______________

Jump-a-Hundred Record Sheet



Game 1	Blue	Red	Game 2	Blue	Red
Starting Number			Starting Number		
How Far from 500?			How Far from 500?		



Set A5 ★ Activity 4

ACTIVITY

Modifying the Base Ten Bank

Overview
The Base Ten Bank is a Number Corner component introduced in January to help second graders develop place value understandings, as well as generate strategies for adding and subtracting 2- and 3-digit numbers. This component is revisited in the Number Corner each month through April. The text below suggests modifications you can make to the Base Ten Bank starting in March to teach a regrouping strategy for multi-digit addition and subtraction.

Skills & Concepts
★ add and subtract two-digit numbers efficiently and accurately using a procedure that works with all two-digit numbers and explain why the procedure works

You'll need
★ the Base Ten Bank pocket chart

★ base ten pieces (mats, strips, and units)

★ Base Ten Bank Ten Strips (page A5.29, see Advance Preparation)

★ Base Ten Bank Addition blacklines (pages A5.30 and A5.31, run as needed

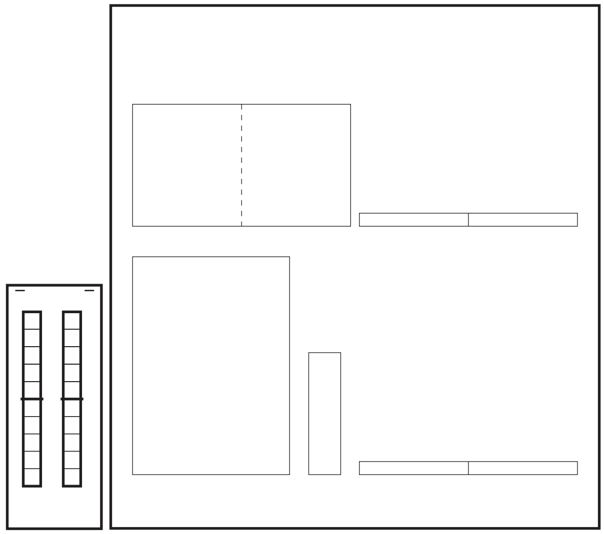
★ 5 dice, one marked 1–6, two marked 4–9 and two marked 10, 10, 20, 20, 30, 40

Advance Preparation Prepare this component by posting the Base Ten Bank pocket chart where all the students can see it. In addition, run 10 copies of Blackline A5.29. Cut these sheets in half lengthwise. Staple the 20 half-sheets together to form a pad of ten-strips. If you don't already have 2 dice numbered 4–9 and 5–10, label 2 of your wooden cubes with the appropriate numbers. Keep your collection of base ten pieces close at hand.

January Base Ten Bank Overview
The Base Ten Bank is a specially-designed pocket chart that holds a growing collection of base ten pieces. While it has nothing to do with the day's date or the number of school days that have passed, it provides important opportunities for children to develop place value understandings. Each time this component is featured, the students roll 2 dice, total the numbers, and add that many base ten pieces to the collection in the "bank." After the first day, they are asked to add the new deposit to the standing collection. Some do so by mentally combining the pieces. Others use mental arithmetic, usually adding the 10's first and then the 1's. Still others use base ten pieces from the class supply or make sketches to arrive at the total. Solutions and strategies are shared, all the pieces are moved to the top row of pockets, and the new total is posted.

Introducing the Base Ten Bank in January
When you first introduce this component, the Base Ten Bank will be empty, as shown on the next page:

Activity 4 Modifying the Base Ten Bank (cont.)

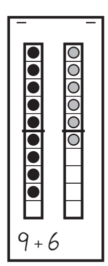


Take a minute for student observations, and then explain that this is a wall bank. Each time you do the Number Corner this month and next, you'll make a deposit of base ten pieces. The amount deposited will be determined by rolling the dice and adding the 2 numbers, and will have nothing to do with the day's date or the number of days you've been in school. Today you'll have a student volunteer roll the 2 dice. The children will work together to determine the total, using dots on the ten-strips to help, and you'll place that many base ten pieces in the top row of pockets.

> ***Teacher*** *Anna, you're the Helping Hand for today. Would you please roll the 2 dice to determine our first deposit?*
>
> ***Anna*** *Sure! The 2 numbers are 9 and 6.*
>
> ***Hayden*** *That's 15!*

(Some of your students will probably be able to total any combination that comes up on the dice instantly. Others will need a minute to figure the answer. In order to encourage children to use strategies other than counting on (or counting from 1 in some cases), we recommend that you show the combination with dots on a pair of ten-strips. The fact that the ten-strips are placed side-by-side and subdivided into fives tends to help students think in chunks and mentally move dots around to form easier combinations.)

> ***Teacher*** *Even though some of you already know the total, let's have a look at 9 + 6 on our ten-strips here. I'm going to stick 9 dots on one strip and 6 dots on the other. Will you help me count as I go?*
>
> ***Children*** *1, 2, 3, 4, 5, 6, 7, 8, 9—1, 2, 3, 4, 5, 6!*



Activity 4 Modifying the Base Ten Bank (cont.)

Teacher *If you didn't already know the total, how could you use the dots on these 2 ten-strips to help?*

Nicholas *I'd count on: 9—10, 11, 12, 13, 14, 15.*

Teacher *Well sure—counting on always works, but it can take a little time. Can anyone think of a different way?*

(While we want to acknowledge the idea of counting on, we also want to nudge children in the direction of applying more efficient strategies.)

Caroline *You could pretend to move a dot over from the 6 to the 9. That would make it 10 plus 5, and that's 15.*

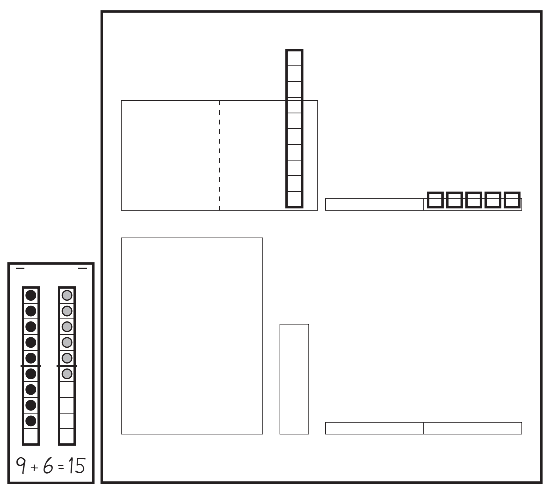
Teacher *Any other methods?*

Jensen *I'd count the 5's above the lines, and then see that there were 5 more below the lines—5, 10, 15.*

Teacher *Do we all agree that the total is 15?*

Children *Yes!*

Teacher *Let's record the answer using base ten pieces and post 15 in the top row of our bank then.*



Continuing Through January and February with the Base Ten Bank

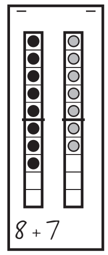
Each time you conduct a Number Corner session for the rest of this month and the next, your class will make a deposit to the Base Ten Bank. Just as they did for the first deposit, children will roll the 2 dice, calculate the sum using dots on the ten-strips as a visual aid, deposit that number of base ten pieces in the bank, and figure the new bank total. Your focus will be on helping children develop a variety of strategies for adding 2- and 3-digit numbers. Although you could certainly use the Base Ten Bank as a way to teach "carrying," we strongly urge you to let children develop their own methods right now. You can introduce the traditional method later, as one of several options, but if you hold off for now, you'll find that your students' place value understandings will be greatly enhanced.

Activity 4 Modifying the Base Ten Bank (cont.)

Teacher *Taylor, you're the helper for today. Will you please roll the 2 dice and report the numbers that come up?*

Taylor *I got 8 and 7.*

Teacher *Let's have a look at that by putting dots on the ten-strips.*



Natalie *It's 15 because 7 plus 7 makes 14, and 1 more is 15.*

Laura *8 + 7 is a neighbor because the 2 numbers live next door.*

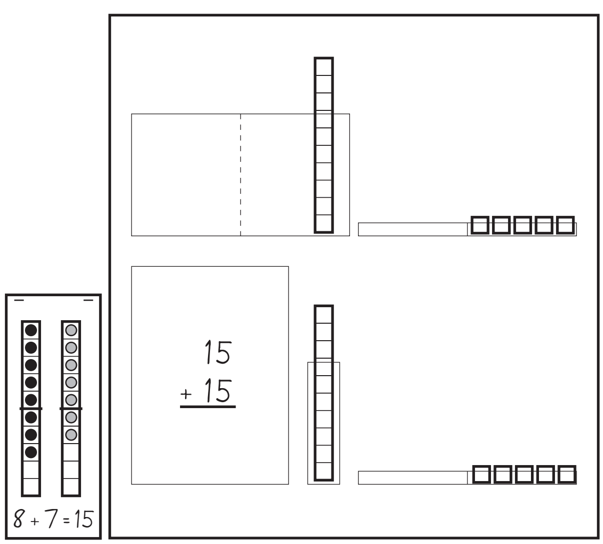
Teacher *That's right, and Natalie used the strategy of figuring the double and adding 1 more. Can anyone think of a different way?*

Brittany *You can look at the 5's. There are two 5's above the line, and if you add the 3 and the 2 below the line, that's another 5. Three 5's is 15.*

Vincent *Look! You can move 2 dots over from the 7 to the 8. Then it's like 10 plus 5—15!*

Teacher *Wow! There certainly are lots of ways to add 8 and 7! So we're going to make a deposit of 15 base ten pieces to our bank today? Let's go ahead and put those pieces in the second row of pockets. I'm also going to write a number sentence to show what we're adding. What should I write?*

Nicholas *15 + 15, 'cause you have 15 on top and you're adding 15.*



Activity 4 Modifying the Base Ten Bank (cont.)

Teacher *Now the question is, when we add today's deposit to the amount we already have in the bank, how much will we have in all? I'm going to ask you to take a minute to look at the base ten pieces, look at the numbers, and figure out the total.*

Megan *I already know what it is!*

Teacher *That's great! Let's take a minute for other people to think about it. I see kids really thinking hard about this one.*

(We generally ask children to think about the problem quietly for a minute and raise their hands when they have an idea. After having students share their solutions, we go back and ask several of them to explain their strategies.)

Teacher *Is anyone willing to share their solution to this problem?*

Ele Tasia *It's 30.*

Zachary *I got 30 too.*

Teacher *Did anyone get a different solution? No? Who would like to share how they got 30?*

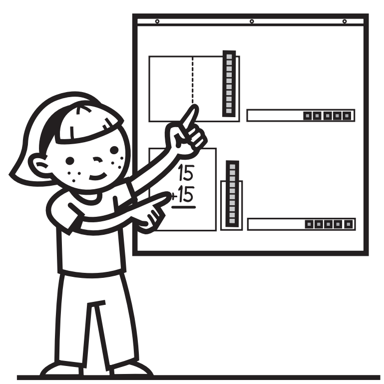
Zaavosh *I already knew it. I just know that 15 and 15 is 30.*

Hayden *Me too.*

Sarah *Can I show?*

Teacher *Sure!*

Sarah *I looked and saw 10 and 10 was 20. Then I just counted on the little ones.*



Anna *I kind of did it like Sarah. I looked at the sticks and saw 2 tens. Then I knew that 5 plus 5 is 10, so I knew the whole thing was 30.*

Things may not always go as smoothly as in the discussion above. There will be days when students arrive at several different solutions. In a way, this makes things far more interesting in that children have more reason to listen to one another, and more reason to present their thinking as clearly as possible. There will be days when nearly everyone seems to be able to calculate a total in his or her head and other days when some of your students may choose to get out base ten kits and work with the pieces directly.

Activity 4 Modifying the Base Ten Bank (cont.)

It won't be more than about 7 or 8 sessions until you've reached 100. At that point, you'll need to trade the ten strips in for a mat and pin the mat up beside the Base Ten Bank. In the space of 2 months, we usually reach 300 to 400. No matter how far we have or haven't gotten, though, we start "withdrawing" base ten pieces from the bank at the beginning of March. (This process will be described in the March Number Corner.)

One of the reasons we like the Base Ten Bank so well as a method of introducing double- and triple-digit addition is that it necessitates regrouping some days and not others. Children are very quick to distinguish the 2 situations: 53 + 15 brings cries of "Oh, easy!" while 69 + 18 produces thoughtful silence as some children reach for scratch paper or base ten pieces. *Allowing children to invent and share their own solution methods is central to this activity.* Even students who are still one-by-one counters at heart quickly see the wisdom of working in 10's and 1's and learn readily from one another. Those who aren't ready to think about adding double digits in the abstract are usually able to do so using base ten pieces. These students are literally able to *see* the strategies described by your more abstract thinkers.

> ***Justin*** *When I do 69 + 18, I just think 60 plus 10 is 70. Then I know that 9 plus 8 is 17 and 70 plus 17 is 87.*

> ***Laura*** *I see what you mean. 60 plus 10 is 70. Then I have 9 more. That's 79, 8 more would be* 79—*80, 81, 82, 83, 84, 85, 86, 87.*

If no one proposes the traditional method of carrying, you might want to offer it as another possibility toward the end of the month. You'll find that if you present it as the "real" or "best" method, though, you may shut down some of the mathematical thinking your students have been doing. If you remain open to the children's inventions, you'll find that as a group, they'll head in the direction of efficiency while demonstrating some great number sense and math power.

Base Ten Bank Addition

There may come a point this month when you'd like to have students work a couple of the Base Ten Bank problems on their own. After several weeks of group work, it can be useful to know how individual students in your class are handling these problems. Although most may appear to follow the strategies proposed by classmates during group discussion, it's entirely possible that some don't really understand what's going on, or haven't yet moved beyond counting by 1's. On the other hand, you may have some very quiet students who haven't really demonstrated what they can do in front of the group. Finally, there are children who just do better when they're able to work through problems using paper and pencil to track their work with manipulatives or numbers. For some of these children, it's harder to think and work in the pressure cooker of a whole-group discussion, and easier to share their ideas once they've had a little time to think things through on their own.

The Base Ten Bank Addition blacklines simply give students a place to record and work the problem of the day on paper. Children are encouraged to use Unifix cubes, base ten pieces, pictures, or numbers, and to show as much of their thinking and work on the page as possible using words, pictures, and/or numbers. You will almost certainly have to nudge some of them into showing more than the answer, especially if they've used Unifix cubes or base ten pieces to solve the problem. Sketches labeled with numbers, written descriptions, or number sentences, no matter how rough, will be instrumental in helping you understand their methods.

Activity 4 Modifying the Base Ten Bank (cont.)

It's important for students to understand that there's no one right way to do these problems, and that what you're most interested in is their current thinking. It's important for you to accept all levels of work, understanding that even children who need to solve the problem by drawing two sets of tally marks, and then counting them all one by one (or do the equivalent in Unifix cubes) will grow and change over the next few months.

Once children have solved the problem in their books, be sure to take a minute to discuss their solutions and post the new base ten pieces in the pocket chart.

February Base Ten Bank

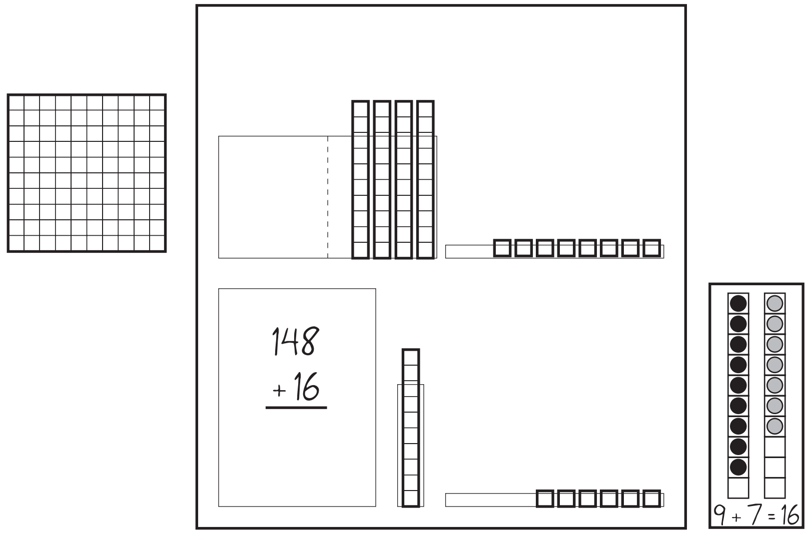
Each time you conduct a Number Corner session this month, your class will make a deposit to the Base Ten Bank. Just as they did for their January deposits, children will roll the two dice, calculate the sum using dots on the ten-strips as a visual aid, deposit that number of base ten pieces to the bank, and figure the new bank total. Your focus will be on helping children continue to develop a variety of strategies for adding 2- and 3-digit numbers.

> ***Teacher*** *Justin, you're the helper for today. Will you please roll the 2 dice and report the numbers that come up?*
>
> ***Justin*** *I got 9 and 7.*
>
> ***Children*** *It's 16!*
>
> ***Teacher*** *How do you know?*
>
> ***Children*** *I've been practicing. I just know that one now.*
> ***It's*** *like 10 and 7, but it's 1 less. That's 16.*
> ***If*** *you level off the 2 numbers, it's like 8 and 8—16!*

By now, you'll probably find that you don't need to post the combination on the ten-strips with adhesive dots every day.

> ***Teacher*** *Now the question is, when we add today's deposit to the amount we already have in the bank, how much will we have in all? I'm going to ask you to take a minute to look at the base ten pieces, look at the numbers, and figure out the total.*

Activity 4 Modifying the Base Ten Bank (cont.)



Once the problem has been posted, ask children to think about the problem quietly for a minute and raise their hands when they have an idea. After having students share their solutions, go back and ask several of them to explain their strategies.

Teacher *Is anyone willing to share their solution to this problem?*

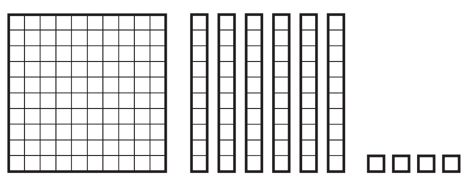
Brittany *It's 164.*

Sarah *That's what I got too.*

Laura *Not me. I got 166.*

Teacher *It sounds like we have two different ideas. Would anyone be willing to share their strategy with us? Perhaps we'll understand your answers better if we see what you were thinking.*

Ian *I got 164. What I did is I knew there was 100 already. Then I saw that 40 and 10 more would be 50. Then I added the 1's. I moved 2 up to the 8 to make 10 and traded it in for a ten-strip. Then I had 60 with 4 more left over, like this:*



Teacher *What do you think of Ian's method? Do you understand what he did here?*

Children *Yes!*
That's *what I thought—164!*
I *see what I did wrong. I thought 8 plus 6 was 16 instead of 14.*

Teacher *Did anyone have a different method?*

Activity 4 Modifying the Base Ten Bank (cont.)

Hayden *I did. I worked with the numbers. I looked and saw 8 plus 6 was 14. I carried the 10 over to the 10's like my mom showed me, so I had 10 plus 40 plus 10, and that was 60. And then I had the 100.*

$$\begin{array}{r} {}^{1}\\ 148 \\ +\ 16 \\ \hline 164 \end{array}$$

Teacher *Anyone else?*

Zachary *I did it the other way from Hayden. I started with the hundred. Then I added the 10's. That was 50. Then the 1's were 14, and I knew that 50 plus 14 was 64. So I had 164.*

Teacher *If I write Zachary's method out in numbers, it could look like this:*

$$\begin{array}{r} 148 \\ +\ 16 \\ \hline 100 \\ 50 \\ 14 \\ \hline 164 \end{array}$$

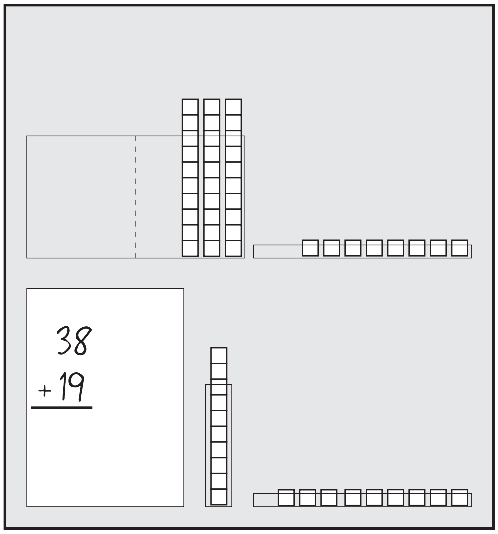
By the end of this month, you will probably have collected somewhere between 200 to 300 units. Children will have had many opportunities to explore strategies for adding 2- and 3-digit numbers. Starting in March, you will formally introduce the standard algorithm for adding multi-digit numbers. In April, you'll introduce the standard algorithm for subtracting multi-digit numbers.

March Base Ten Bank

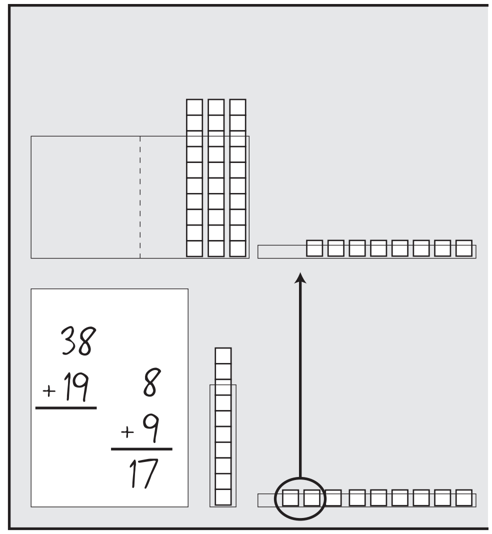
Instead of starting from the total number of base 10 pieces you have accumulated by the end of February and going backwards in March as described in the Number Corner guide (pages 197–201), clear all the pieces out of the Base 10 Bank pocket chart. Then roll two dice, one numbered 4–9 and the other 10, 10, 20, 20, 30, 40 once, and then once again to generate problems such as 38 + 19. Work with students to model and solve a couple of double-digit problems each day during Number Corner using the Base Ten Bank pocket chart and base ten pieces. Clear out the pieces after each problem rather than keeping a cumulative collection. You may want to use dice or find other ways to make up 3-digit, as well as 2-digit addition problems.

Invite many different strategies the first few days. If a student volunteers a regrouping strategy, work with the class to model it with the base ten pieces. If not, introduce it yourself, adding the units first, and regrouping as necessary. Record the process with numbers and symbols on the pocket chart, whiteboard, or a piece of chart paper. One way of handling this on the Base Ten Bank pocket chart is shown below.

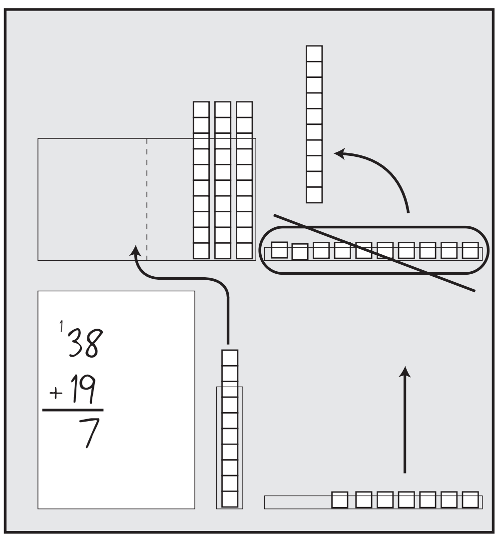
Activity 4 Modifying the Base Ten Bank (cont.)



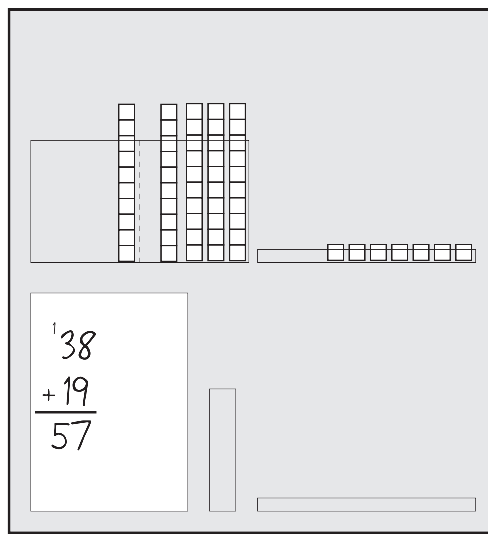
Step 1: Set up the problem



Step 2: Add the 1's



Step 3: Regroup if necessary



Step 4: Find the total

Over the course of the month, have students use their own base 10 pieces, sketches, and numbers to practice the regrouping strategy.

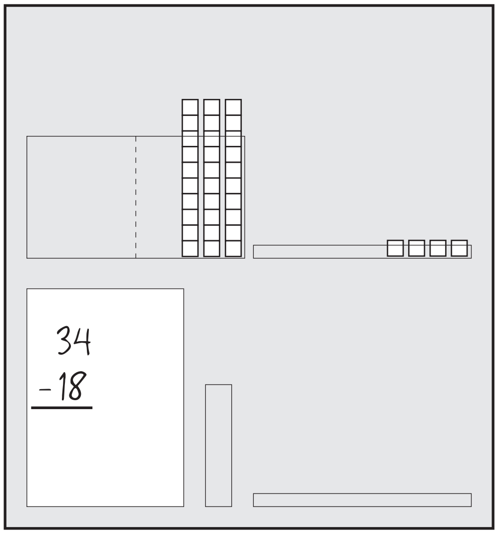
Do your students need to be completely proficient with the regrouping strategy for addition by the end of the school year, or do they just need to understand it and be able to explain how it works? If the goal is complete proficiency, you will need to provide practice several times a week during Number Corner, as well as giving students short problem sets during seatwork and/or homework throughout the entire spring.

April Base Ten Bank

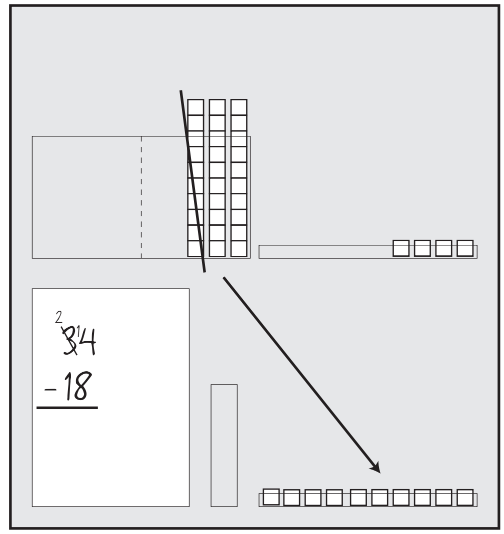
Begin with an empty Base Ten Bank pocket chart. Roll two dice numbered 10, 10, 20, 20, 30, 40, along with one die numbered 1–6. Set up that quantity with base 10 pieces in the Bank Ten Bank pocket chart. Then roll two dice numbered 4–9, or some other combination of dice that seems reasonable to generate a subtrahend. Do a couple of subtraction problems generated in this way each day, clearing out the pocket chart between each problem. Solicit students' invented strategies for the first several days of the

Activity 4 Modifying the Base Ten Bank (cont.)

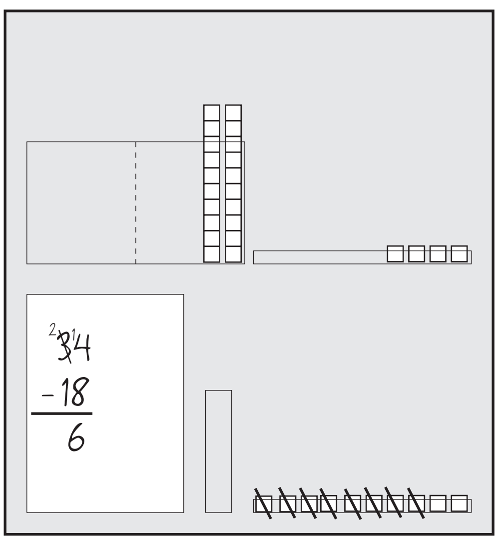
month, and then either model a regrouping strategy for subtraction as described by a student, or volunteer it yourself, as another option. One way of handling this on the Base Ten Bank pocket chart is shown below.



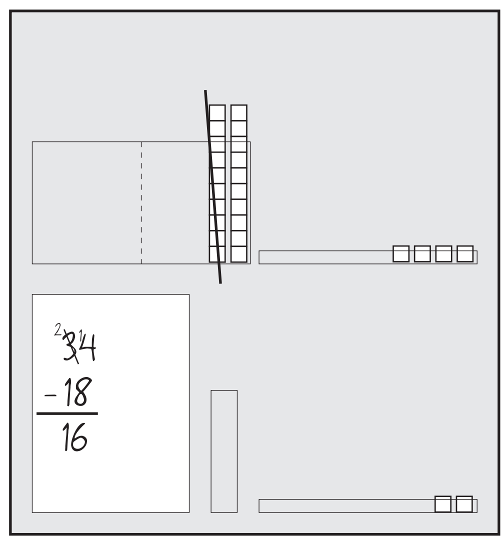
Step 1: Set up the problem



Step 2: Regroup if necessary



Step 3: Subtract the 1's



Step 4: Subtract the 10's

Over the course of the month, have students use their own base 10 pieces, sketches, and numbers to practice this strategy. It is important that students understand how and why the strategy works, and that you allow the children to continue using the base 10 pieces to perform the regrouping or "trading" for as long as they're needed. We find that unless students model the process of regrouping, using this strategy may compromise their sense of place value because they tend to think about the digits in isolation instead of thinking about tens and ones.

May Base Ten Bank

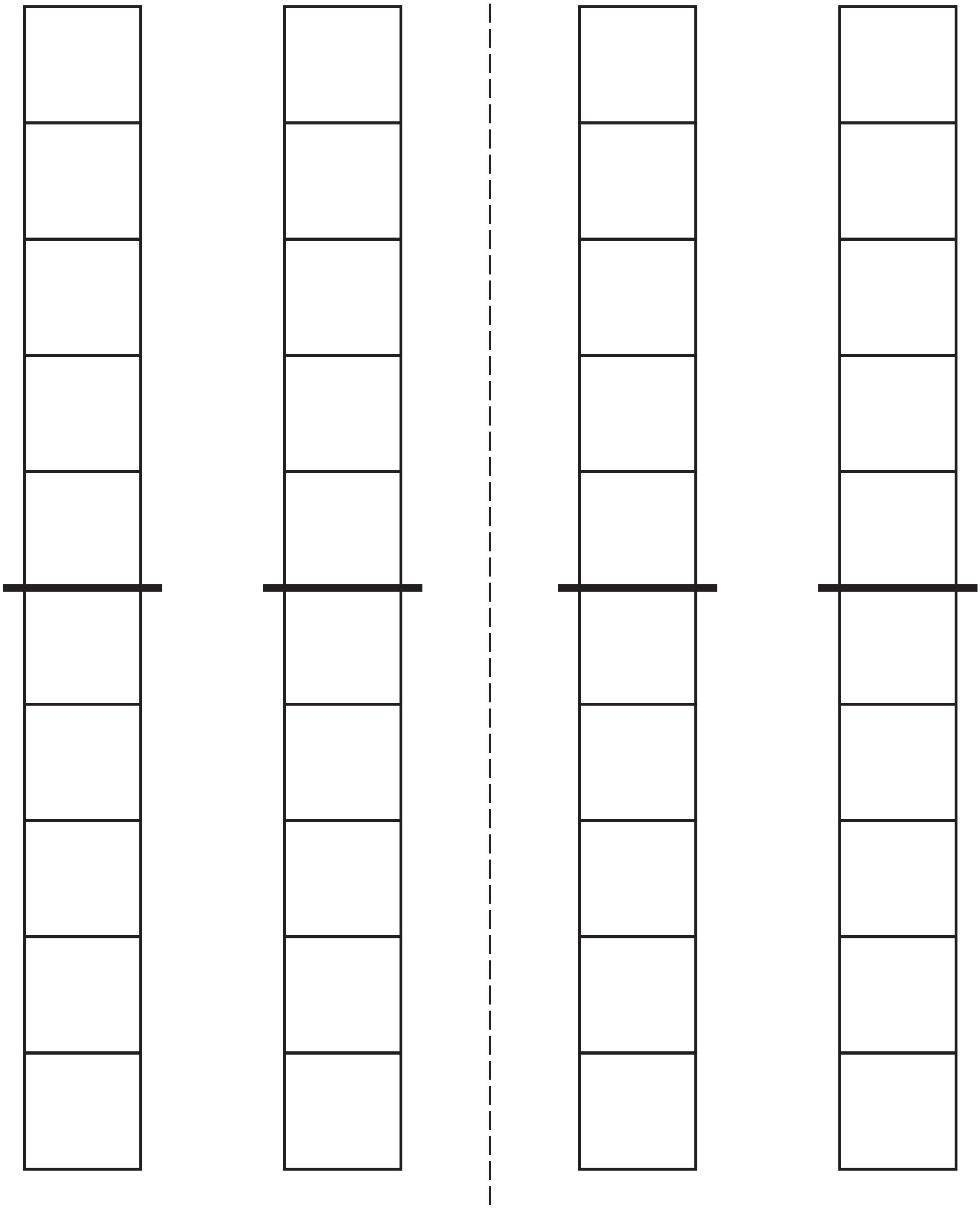
Use the Base Ten Bank pocket chart to pose and solve several 3-digit addition and subtraction problems each week. Solicit student-invented strategies, but use the opportunity to keep working on the regroup-

Activity 4 Modifying the Base Ten Bank (cont.)

ing strategies you have introduced as well. You may want to have your class develop a list of multi-digit addition strategies and another of multi-digit subtraction strategies, including the regrouping strategies. Students can then be asked every so often to evaluate which strategies are most effective to handle the numbers involved in a particular problem. For instance, they might decide that starting with the 1's and regrouping is best for a problem like 589 + 327 but adding the tens and then the ones is more efficient for a problem like 53 + 29.

> ***Dontrelle*** *On 53 + 29, I like to go 3 + 9 is 12, move the ten over so it's 50 + 20 + 10. That makes 82 in all.*
>
> ***Sara*** *I think it's easier to just go 50 + 20 is 70 and 3 + 9 is 12. 70 + 12 makes 82. It's the same answer, but I like doing the tens first.*

Base Ten Bank Ten Strips



NAME ______________________ DATE ____________

Base Ten Bank Addition

The problem on our Base Ten Bank today is:

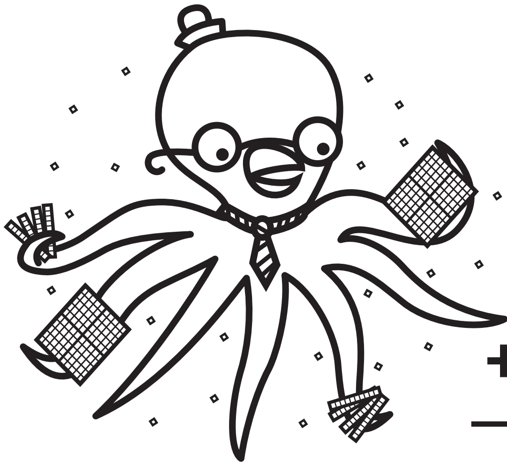
10's	1's
+	

You can use Unifix cubes, base ten pieces, pictures, or numbers to figure out what the answer is. Please show all your work in this box:

NAME ______________________ **DATE** ____________

Base Ten Bank Addition

The problem on our Base Ten Bank today is:



100's	10's	1's
+		

You can use Unifix cubes, base ten pieces, pictures, or numbers to figure out what the answer is. Please show all your work in this box:

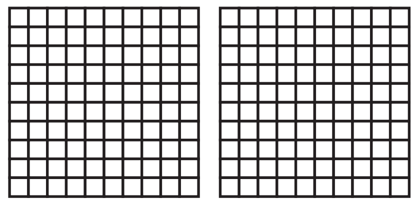
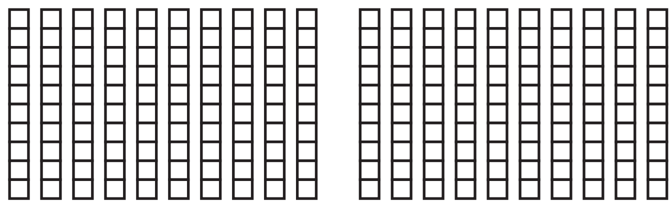
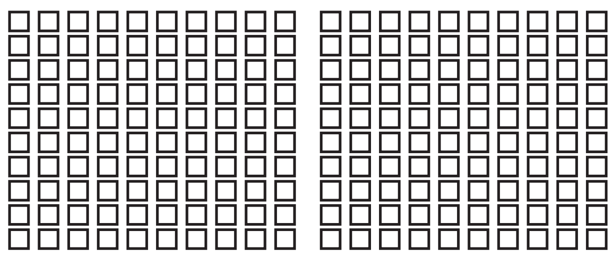
NAME ______________________________ **DATE** ______________

Set A5 ★ Independent Worksheet 1

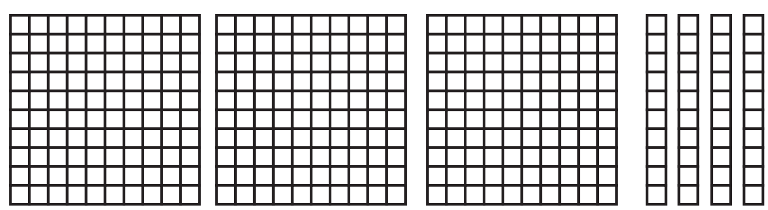
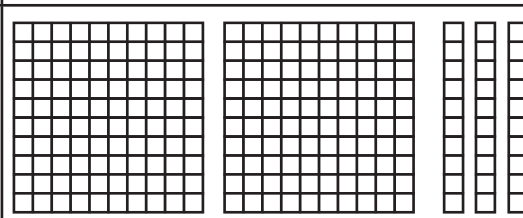
INDEPENDENT WORKSHEET

Different Ways to Look at the Same Number

1 Solve the problems below, use the pictures to help.

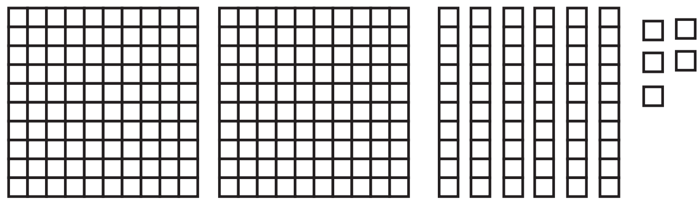
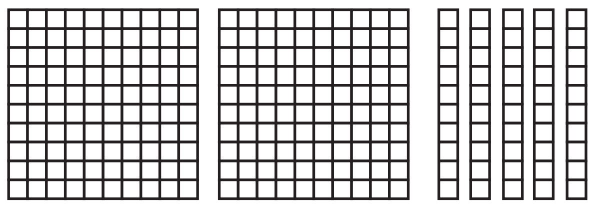
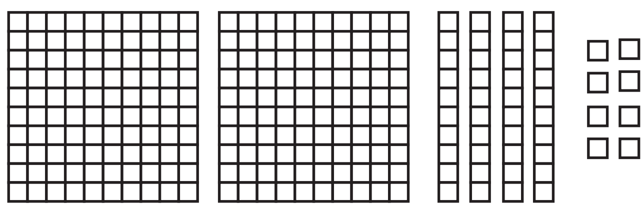
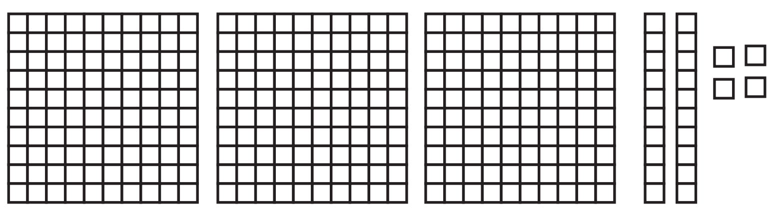
Problem	Picture
a James built 200 with mats. How many hundreds are there in 200? __________	
b His sister traded in both mats for ten strips. How many tens are there in 200? __________	
c If you traded in all the strips for units, how many ones would that be? There are __________ ones in 200.	

2 Tell how many hundreds, tens, and ones there are in each number. Use the pictures to help.

Problem	Picture
example There are 3 hundreds in 340. There are 34 tens in 340. There are 340 ones in 340.	
a There are __________ hundreds in 230. There are __________ tens in 230. There are __________ ones in 230.	

Independent Worksheet 1 Different Ways to Look at the Same Number (cont.)

3. Tell how many hundreds, tens, and ones there are in each number. Use the pictures to help

Problem	Picture
example There are 2 hundreds in 265. There are 26 tens in 265. There are 265 ones in 265.	
a There are ________ hundreds in 250. There are ________ tens in 250. There are ________ ones in 250.	
b There are ________ hundreds in 248. There are ________ tens in 248. There are ________ ones in 248.	
c There are ________ hundreds in 324. There are ________ tens in 324. There are ________ ones in 324.	

CHALLENGE

4 Find the number on the right that matches the number on the left. Draw a line to show.

a 4 hundreds + 6 tens + 3 ones	640 ones
b 64 tens	61 tens + 8 ones
c 40 tens + 5 ones	3 hundreds + 16 tens + 3 ones
d 2 hundreds + 29 ones	1 hundred + 12 tens + 9 ones
e 618 ones	2 hundreds + 20 tens + 5 ones

BRIDGES IN MATHEMATICS 2

GRADE 2 SUPPLEMENT

Set A6 Number & Operations: Money

Includes

Skills & Concepts

★ determine the value of mixed collections of coins up to $1.00

★ describe how the cent symbol, dollar symbol, and decimal point are used to name the value of coin and bill collections

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Bridges in Mathematics Grade 2 Supplement
Set A6 Numbers & Operations: Money

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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

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Set A6 ★ Activity 1

ACTIVITY

Dollars & Cents

Overview
Students use the cent and dollar symbols, as well as the decimal point, to label different amounts of money in the context of a new game, Dollars and Cents.

Skills & Concepts
★ determine the value of mixed collections of coins up to $1.00

★ describe how the cent symbol, dollar symbol, and decimal point are used to name the value of coin and bill collections

You'll need
★ Coin & Bill Cards (pages A6.4–A6.7, see Advance Preparation)

★ Symbol Cards (page A6.8, see Advance Preparation)

★ two 3" × 5" pieces of construction paper, one red and the other blue

★ 20–25 3" × 5" index cards

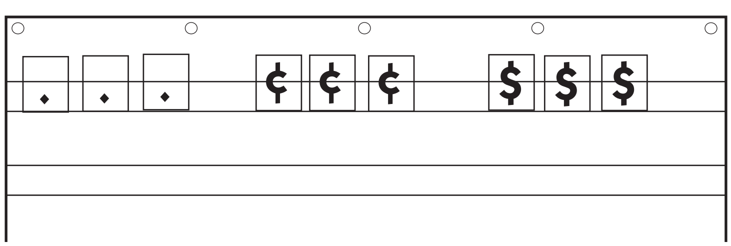
★ wide-tipped felt marker

★ pocket chart

★ *Pigs Will Be Pigs* by Amy Axelrod (optional)

Advance Preparation Follow the instructions at the top of the Coin & Bill and Symbol Cards (pages A6.4–A6.8) to prepare the cards for this game. It's not necessary to laminate these cards, but the students will handle them, and they'll hold up longer if you do. Mix the Coin & Bill Cards thoroughly and place them in a stack face-down on a desk or small table near the discussion circle. Place the Symbol Cards in the top row of your pocket chart, which should also be near the discussion circle and easily visible to all the students.

Instructions for Dollars & Cents
1. Gather the children to your discussion circle and explain that you're going to play a new game today. Some of the playing cards are already up on the pocket chart. Ask the children to share anything they already know about these symbols.



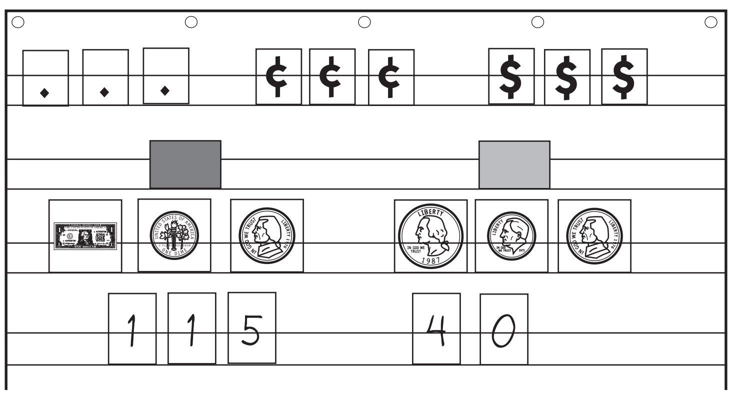
Activity 1 Dollars & Cents (cont.)

> ***Students*** *The big ones are dollar signs.*
> *Those ones that look like little c's mean cents.*
> *Those others are dots. I think sometimes people use dots when they write money, but I'm not sure.*
> *My mom told me those dots are called decimal points. You need them with dollars, I think.*

2. Acknowledge students' comments and explain that they'll be learning more about these symbols as they play the game today. Then divide the class into 2 teams, the Reds and the Blues, and show them the red and blue construction paper team markers you've prepared. Use any method you want to decide which team will start first. Place the color marker for that team on the left-hand side of the pocket chart in the second row, and the color marker for the other team on the right-hand side.

3. Call a volunteer from the starting team to come up and take the top card from the stack of Coin and Bill Cards you've placed near the discussion circle. Ask her to post it in the third row, below her team's color marker. Work with the class to identify the name and value of the coin or bill. Now ask a volunteer from the other team to do the same.

4. Repeat step 3 two more times. Each time a team adds a new coin or bill to their side, ask students to count the amount of money they've collected so far. If students on one or both teams want to shift their cards so the bills and coins are ordered by denomination, that's fine. When each team has drawn 3 cards and determined their total, record the amounts on index cards, 1 card per digit, as shown below.



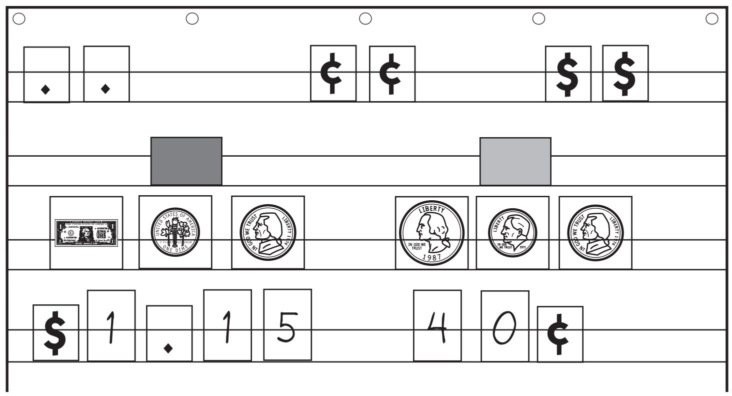
5. Then call on each team to label their winnings with the proper symbols, inserting dollar signs, cent signs, and/or decimal points in the appropriate locations. Let them experiment until the display "looks right." If none of them know how to use the symbols correctly, provide guidance to do so.

> ***Teacher*** *What does the number below the blue team's money say?*
>
> ***Paulina*** *It says one hundred and fifteen.*
>
> ***David*** *But we didn't get one hundred and fifteen. We got a dollar and 15 cents.*
>
> ***Teacher*** *True. How could you use the symbols from the top of the pocket chart to label the amount you got?*
>
> ***Hunter*** *Put a dollar sign before the 1 and a cent sign after the 5! Can I try it?*

Activity 1 Dollars & Cents (cont.)

Erin *That doesn't look right. It doesn't look like the signs at the store. Can I do it over? I think we need to take off the cents sign and put one of these dots here.*

Students *Yeah!*
That looks better.
Now it really says 1 dollar and 15 cents.
Can I put a cent sign after our money? We don't need a dollar sign or a dot, just one of those ones that looks like a c with a line through it.

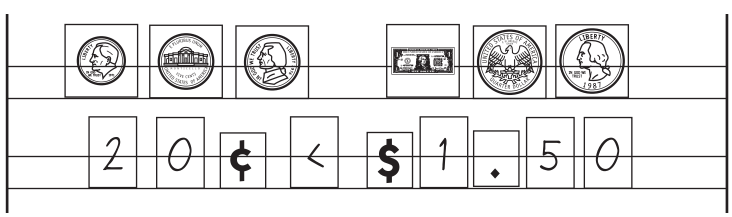


6. Once both teams' winnings have been properly labeled, discuss the symbols with the class. Some of your students may already be familiar with the dollar and cent signs. Work with their input to explain that people use the decimal point to separate dollars and cents. The decimal point is usually read as "and", so $1.15 is read as, "One dollar and 15 cents." Amounts less than a dollar are sometimes just labeled with a cents sign, but they can also be labeled using the dollar sign and the decimal point. For example, 40 cents can be expressed as $0.40, or, "Zero dollars and forty cents".

7. If time allows, play two more rounds of the game. Have the teams take turns to go first. At the end of all 3 rounds, have the teams total their winnings. The team with the most money wins.

Extensions

- Write a greater than/less than symbol on an index card and position it correctly to show which team collected more money each time you play a new round.



- Play Dollars and Cents with your class again and/or leave the cards and the pocket chart out for students to use during Work Places. You might also have an instructional aide play the game with students who need additional help learning to count money.
- Read *Pigs Will be Pigs* by Amy Axelrod, to your class before or after this activity. Our second graders love the book, and it provides great opportunities to practice counting money.

Coin & Bill Cards page 1 of 4

Coin & Bill Card

Coin & Bill Card

Coin & Bill Card

Coin & Bill Card

Coin & Bill Cards page 2 of 4

Coin & Bill Card

Coin & Bill Card

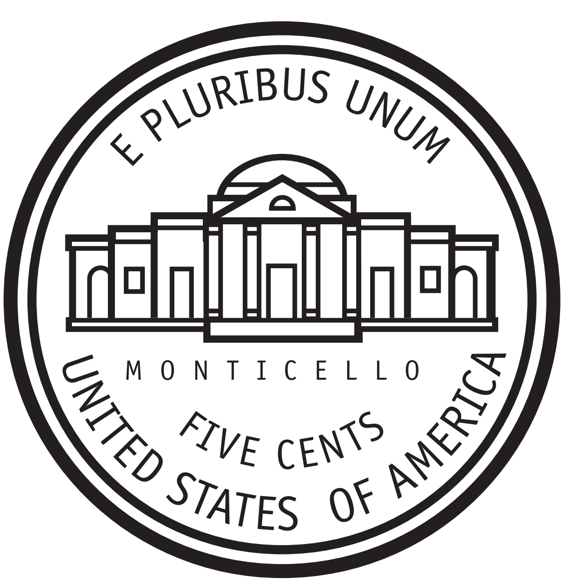
Coin & Bill Card

Coin & Bill Card

Coin & Bill Cards page 3 of 4

Coin & Bill Card

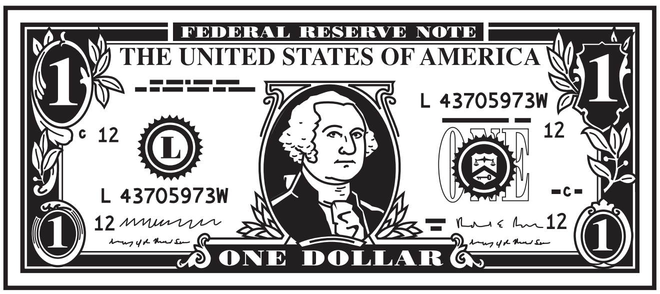
Coin & Bill Card



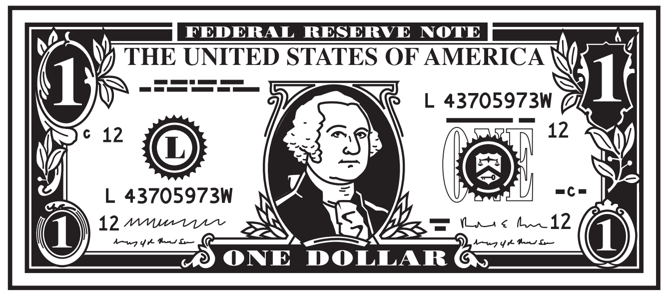
Coin & Bill Card

Coin & Bill Card

Coin & Bill Cards page 4 of 4



Coin & Bill Card



Coin & Bill Card

Coin & Bill Card

Coin & Bill Card

Symbol Cards

. Symbol Card	. Symbol Card	. Symbol Card	. Symbol Card
. Symbol Card	¢ Symbol Card	¢ Symbol Card	¢ Symbol Card
¢ Symbol Card	$ Symbol Card	$ Symbol Card	$ Symbol Card
$ Symbol Card	$ Symbol Card	$ Symbol Card	$ Symbol Card

Set A6 ★ Activity 2

ACTIVITY

Three Spins to Win

Overview

The teacher plays a whole-group game at the overhead to provide students with practice counting money and using the correct notation to record various collections of money.

Skills & Concepts

★ determine the value of mixed collections of coins up to $1.00

★ describe how the cent symbol, dollar symbol, and decimal point are used to name the value of coin and bill collections

You'll need

★ Three Spins to Win Gameboard (page A6.12, see Advance Preparation)

★ Overhead Dollar Bills (page A6.13, see Advance Preparation)

★ Three Spins to Win Record Sheet (page A6.14, run a class set double-sided)

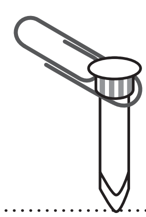
★ overhead marking pen

★ overhead coins

★ real or plastic coins and pretend dollar bills

★ pencils

Advance Preparation Use pages A6.12 and A6.13 to make overhead transparencies of the gameboard and small transparent dollar bills. Cut the bills apart and store in an envelope. Use ¼″ sections of drinking straw, regular paperclips, and brass fasteners as shown below to create an arrow for each spinner on the gameboard. Poke a small hole through the center of each spinner. Keeping the straw and the paperclip on the brass fastener, insert it into the hole. Once it has been pushed through to the back, bend each side of the fastener flat against the underside of the transparency.



Instructions for Three Spins to Win

1. Ask children to sit where they can see the screen and show them the Three Spins to Win Gameboard at the overhead. Give them a moment to examine the display. Tell them that you'll play for Team 1 today and they'll work together to play for Team 2. You'll take turns spinning both spinners to collect various amount of money, and the team that collects the most after 3 turns will win.

Activity 2 Three Spins to Win (cont.)

2. Give each student a copy of the Three Spins to Win Record Sheet. Let them know that they're going to keep track of both teams' winnings on their sheets as you do so at the overhead.

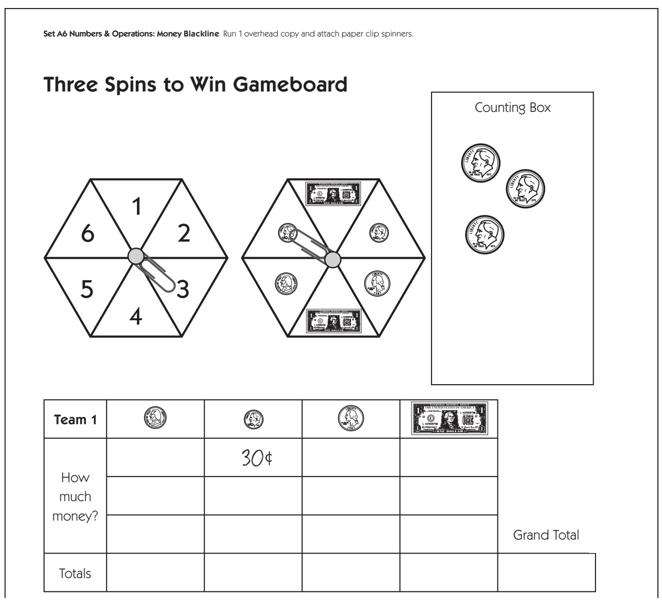
3. Spin both spinners. Use the overhead coins (or bills if you spin dollars) to show the results of your spin in the Counting Box. How much money did you get?

> ***Eduardo*** *You got 3 dimes. That's 10, 20, 30 cents.*

4. Record the amount of money you spun in the appropriate box as students do so on their record sheets. What symbols do you need to write the amount properly—the cent sign or the dollar sign and a decimal point? Why?

> ***Alesha*** *You got 30 cents. That's just cents, so you need to write a cents sign after the 30.*

> ***Peter*** *But you could also write it with the dollar sign and the dot because it's no dollars and 30 cents, right?*



5. Remove any overhead coins you've placed in the Counting Box, and call on a helper to spin both spinners for the class. Have the helper place the designated number and type of coins or bills in the Counting Box. Ask the children to count the money and record the amount correctly on their sheets as you do so at the overhead.

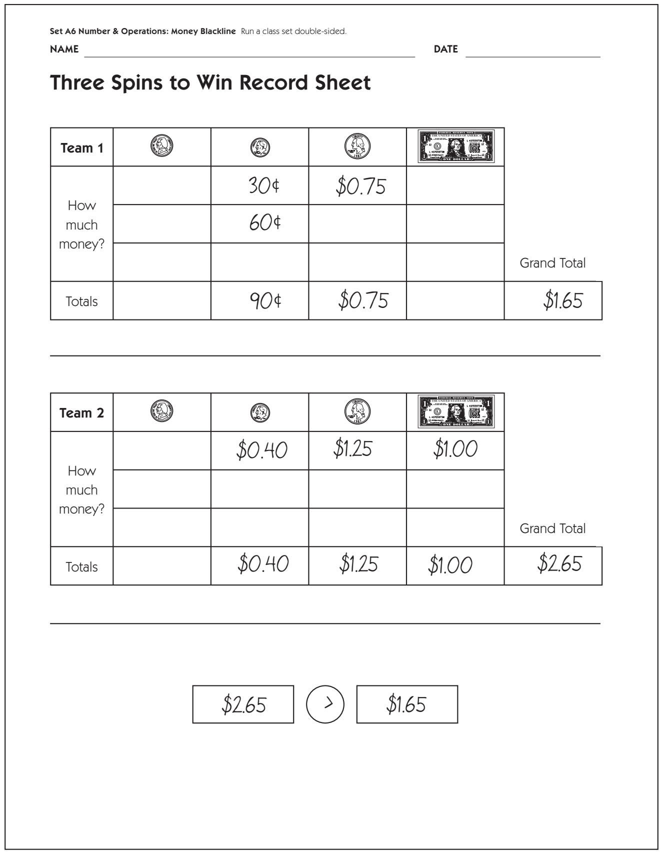
6. Take turns until both teams have had three turns. After each spin, show the amount in the Counting Box and ask students to explain the notation needed to record it correctly. Continue to reinforce the fact that the decimal point is used to separate dollars and cents, and that any amount less than a dollar can be written in two different ways.

7. At the end of the game, have the students add the money in each column and then add the totals to arrive at a "grand total" for each team. Some students may need to use real or plastic coins and pretend dollar bills to do this, while others may not. Help them count and add the amounts at the overhead if necessary.

Activity 2 Three Spins to Win (cont.)

8. Ask students to use the greater than/less than sign to compare the teams' winnings at the bottom of their record sheets.

9. Have students turn their record sheets over while you erase the overhead and play the game again if time allows.



Set A6 Number & Operations: Money Blackline Run a class set double-sided.

NAME DATE

Three Spins to Win Record Sheet

Team 1					
How much money?		30¢	$0.75		
		60¢			
					Grand Total
Totals		90¢	$0.75		$1.65

Team 2					
How much money?		$0.40	$1.25	$1.00	
					Grand Total
Totals		$0.40	$1.25	$1.00	$2.65

$2.65 > $1.65

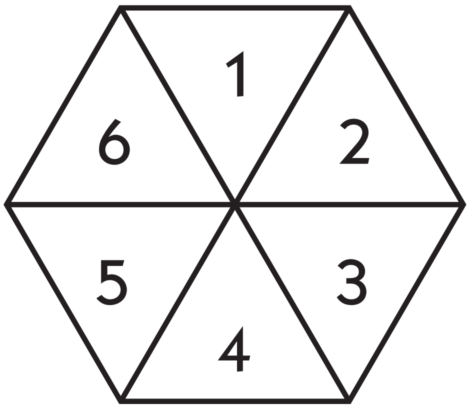
Extensions

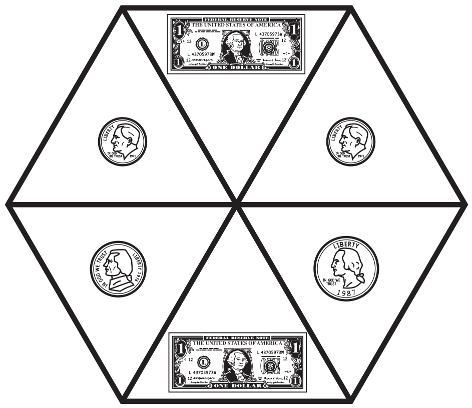
- There are 3 boxes under each coin on the record sheet to provide for the possibility that a team might get the same denomination on all 3 turns (e.g., 3 dimes, 5 dimes, and 4 dimes). This is unlikely, but you may want to take advantage of the extra boxes by playing until one team has filled all 3 boxes under one of the coins. This might involve considerably more than 3 turns for each team, and more money as well.
- Play Three Spins to Win with your class again another day and/or leave the materials and extra record sheets out for students to use during Work Places. You might also have an instructional aide play the game with students who need additional help learning to count money or write money amounts correctly.

INDEPENDENT WORKSHEET

See Set A6 Independent Worksheet 1 for more practice counting and recording amounts of money using the correct symbols.

Three Spins to Win Gameboard



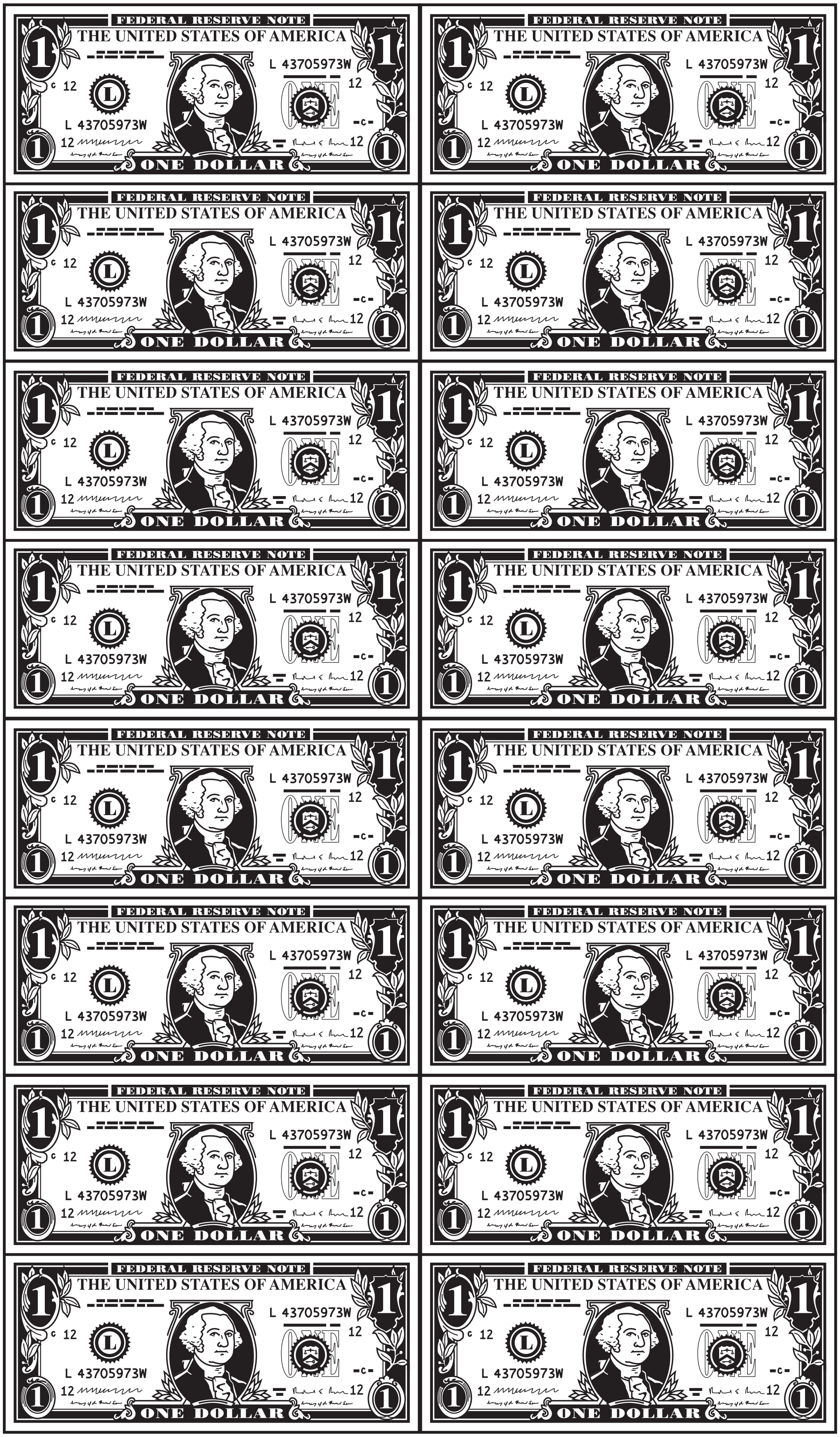


Counting Box

Team 1					
How much money?					
					Grand Total
Totals					

Team 2					
How much money?					
					Grand Total
Totals					

Overhead Dollar Bills



NAME ______________________________ **DATE** ________________

Three Spins to Win Record Sheet

Team 1					
How much money?					
					Grand Total
Totals					

Team 2					
How much money?					
					Grand Total
Totals					

NAME ______________________ **DATE** ______________

Set A6 ★ Independent Worksheet 1

INDEPENDENT WORKSHEET

Mr. Mole's Money

1 Mr. Mole digs tunnels every day. Sometimes he finds money buried in the ground. Count the money he found on Monday, Tuesday, and Wednesday. Circle the correct amount in each box.

example

$125

$1.25

12.5¢

$12.5

a Monday

$0.60

$6.00

$0.06

$0.75

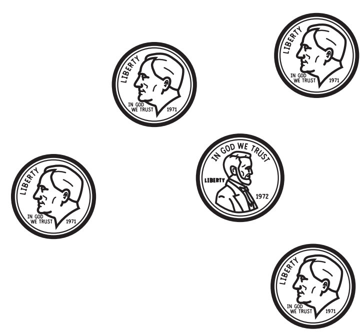
b Tuesday

$3.51

$41.00

5¢

41¢



c Wednesday

$3.31

$35.0

$347

$3.47

Independent Worksheet 1 Mr. Mole's Money (cont.)

2 Mr. Mole needs help! He is still a little mixed up about how to use the dollar sign, the cent sign, and the decimal point. Count the money in each box and write the amount correctly.

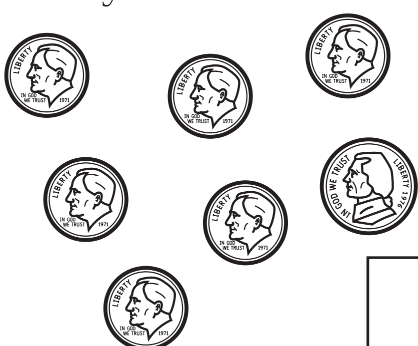
example

$1.20

a Thursday

______ ¢

b Friday



$ __.______

c Saturday

3 Circle the day Mr. Mole found the most money.

Monday   Tuesday   Wednesday   Thursday   Friday   Saturday

4 Put the amounts of money in order from least to greatest on the 6 lines below. Don't forget to use the dollar sign, the decimal point, and the cents sign wherever you need them.

__________, __________, __________, __________, __________, __________

least   greatest

(Continued on next page.)

Independent Worksheet 1 Mr. Mole's Money (cont.)

5 On Sunday, Mr. Mole found 25¢. Draw 3 different collections of coins worth $0.25 in the boxes below. (Hint: Use real or plastic coins to help.)

CHALLENGE

6 There are more than 3 different ways to make $0.25 using pennies, nickels, dimes and quarters. See how many you can find and use pictures, numbers, and/or words to show each below.

BRIDGES IN MATHEMATICS 2

GRADE 2 SUPPLEMENT

Set A7 Number & Operations: Numbers to 1,000 on a Line or Grid

Includes

Skills & Concepts

★ locate numbers to 1,000 on a hundreds grid or number line

★ use patterns in place value to compare and order whole numbers

Published by The MATH LEARNING CENTER Salem, Oregon

P0709

Bridges in Mathematics Grade 2 Supplement
Set A7 Numbers & Operations: Numbers to 1,000 on a Line or Grid

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P0709

Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

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Set A7 ★ Activity 1

ACTIVITY

Mystery Numbers on a 101–200 Grid

Overview

Students work together to identify some mystery numbers on a 101–200 grid and then complete two related worksheets. In order to find the identities of the mystery numbers, students have to discover for and use number patterns.

Skills & Concepts

★ locate numbers to 1,000 on a hundreds grid or number line

★ use patterns in place value to compare and order whole numbers

You'll need

★ 101–200 Grid (page A7.6, see Advance Preparation)

★ What's Missing? 101–200 (pages A7.4 and A7.5, class set)

★ overhead pens in several different colors

★ sticky notes

Advance Preparation Run 1 copy of the 101-200 Grid on a transparency. Cover the following numbers on the grid with sticky notes trimmed to roughly ¾" × ¾": 125, 140, 172, and 196.

Instructions for Mystery Numbers on a 101–200 Grid

1. Ask students to sit where they can see the screen. Place the 101–200 Grid on display at the overhead and give students a minute to pair-share observations. What do they notice about the display? Then invite volunteers to share their observations with the class.

Set A7 Numbers & Operations: Numbers to 100 on a Line or Grid Blackline Run 1 copy on a transparency.

101–200 Grid

101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124		126	127	128	129	130
131	132	133	134	135	136	137	138	139	
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171		173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195		197	198	199	200

Activity 1 Mystery Numbers on a 101–200 Grid (cont.)

> ***Students*** *Some of the numbers are covered up!*
> *It starts with 101 and goes up to 200.*
> *It's like the number chart on our calendar board, but the numbers are higher.*
>
> ***Alesha*** *I know what the first number is that's covered up—it's 125!*

2. When the identity of one of the secret numbers comes up, ask students to talk with their neighbors about the conjecture. Do they agree? Why or why not? As they share with the class, press them to explain their answers. (If no one volunteers a guess about any of the mystery numbers, direct their attention to the first one and ask a volunteer to guess its identity.)

> ***Teacher*** *Talk with your partners for a minute. Do you agree with Alesha that the mystery number in the third row is 125?* (Gives students time to talk.) *Who'd like to tell us whether or not they agree with Alesha and explain why? Sam?*
>
> ***Sam*** *I think it's 125 because it's in the same row with all the other numbers that end in 5.*
>
> ***Paulina*** *I think it's 125 because it's in the 20's row.*
>
> ***Drexler*** *It's 125 because it comes right after 124. 125 comes after 124.*

3. When there's general agreement about the identity of the first secret number, remove the sticky note so students can see that it is 125. Draw their attention to each of the other secret numbers one by one. For each, ask students to pair-share conjectures, and then have volunteers share and explain their thinking.

4. Once all the mystery numbers have been identified and uncovered, ask students to think about what helped them solve the mysteries. What kinds of clues did they use to guess the identity of each number?

> ***Students*** *You can just look at what number comes before it.*
> *You can look at the number that comes after, too.*
> *I look at the row going up and down to see what all the other numbers have at the end.*
>
> ***Teacher*** *So you look at the column to see what the other numbers have in the 1's place?*
>
> ***Students*** *Yep!*
> *I also look at what they have in the 10's place.*
> *Every row has a different number in the 10's place up 'til the end. Like it's all 20's in the 125 row, except when you get to 130.*

5. Chances are, students relied heavily on place value patterns to identify the mystery numbers. Now that they can see all the numbers, ask them to find and describe other place value patterns they can find.

6. Distribute copies of the What's Missing? 101–200 worksheets. Review both sheets with the class. Once students understand what to do, have them go to work. Circulate to provide guidance as needed, and encourage them to help one another as well. Ask them to share and compare their answers with at least one other person when they're finished. If they don't agree on some of the answers, ask them to work together to find the correct solution.

Activity 1 Mystery Numbers on a 101–200 Grid (cont.)

Set A7 Operations & Numbers: Numbers to 1000 on a Line or Grid Blackline Run a class set. Do not run back-to-back.

NAME ______________________ DATE ____________

What's Missing? 101–200 page 1 of 2

1 Fill in the missing numbers on the grid below. Use what you know about number patterns to help.

101	102		104	105	106	107	108	109	110
	112	113	114	115	116		118	119	120
121	122	123		125	126	127	128		130
131		133	134	135		137	138	139	140
141	142	143		145	146	147	148	149	
151	152	153	154		156	157		159	160
161	162		164	165	166	167	168	169	170
171	172	173	174		176	177		179	180
	182	183	184	185	186		188	189	190
191	192	193	194	195		197	198		200

2 Describe at least 3 different patterns you see on the grid.

Set A7 Operations & Numbers: Numbers to 1000 on a Line or Grid Blackline Run a class set. Do not run back-to-back.

NAME ______________________ DATE ____________

What's Missing? 101–200 page 2 of 2

3a Which is greater, 180 or 108? _________

b How do you know?

4a Which is less, 122 or 127? _________

b How do you know?

5. Paul's family found 112 shells on the beach on Monday, 143 shells on Tuesday, and 104 shells on Wednesday.

a Which day did they find the most shells? _________________

b Which day did they find the least shells? ________________

6. On Thursday, Paul's family found 182 shells. On Friday, they found 140 shells. Here's a list of how many shells they found each day.

112, 143, 104, 182, 140

Put the numbers of shells in order from least to most.

__________, __________, __________, __________, __________

least most

CHALLENGE

7. What number is 28 more than 131? How could you write a number sentence to show that?

8. What number is 16 less than 159? How could you write a number sentence to show that?

INDEPENDENT WORKSHEET

See Set 7A Independent Worksheets 1 and 2 for more practice using place value patterns to compare and order whole numbers.

NAME ______________________________ **DATE** ______________

What's Missing? 101–200 page 1 of 2

1 Fill in the missing numbers on the grid below. Use what you know about number patterns to help.

101	102		104	105	106	107	108	109	110
	112	113	114	115	116		118	119	120
121	122	123		125	126	127	128		130
131		133	134	135		137	138	139	140
141	142	143		145	146	147	148	149	
151	152	153	154		156	157		159	160
161	162		164	165	166	167	168	169	170
171	172	173	174		176	177		179	180
	182	183	184	185	186		188	189	190
191	192	193	194	195		197	198		200

2 Describe at least 3 different patterns you see on the grid.

NAME ______________________ DATE ______________

What's Missing? 101–200 page 2 of 2

3a Which is greater, 180 or 108? ____________

b How do you know?

4a Which is less, 122 or 127? ____________

b How do you know?

5 Paul's family found 112 shells on the beach on Monday, 143 shells on Tuesday, and 104 shells on Wednesday.

a Which day did they find the most shells? ______________

b Which day did they find the least shells? ______________

6 On Thursday, Paul's family found 182 shells. On Friday, they found 140 shells. Here's a list of how many shells they found each day.

112, 143, 104, 182, 140

Put the numbers of shells in order from least to most.

__________, __________, __________, __________, __________

least most

CHALLENGE

7 What number is 28 more than 131? How could you write a number sentence to show that?

8 What number is 16 less than 153? How could you write a number sentence to show that?

101–200 Grid

101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

Set A7 ★ Activity 2

ACTIVITY

What's My Number?

Overview
Students use the number line to guess a secret number you've written on a slip of paper before the game. Although the game is quite simple, you can modify the numbers to challenge nearly any group of second graders.

Skills & Concepts
★ locate numbers to 1,000 on a hundreds grid or number line

★ use patterns in place value to compare and order whole numbers

You'll need
★ What's My Number? Gameboard (page A7.10, 1 copy run on a transparency)

★ black overhead pen

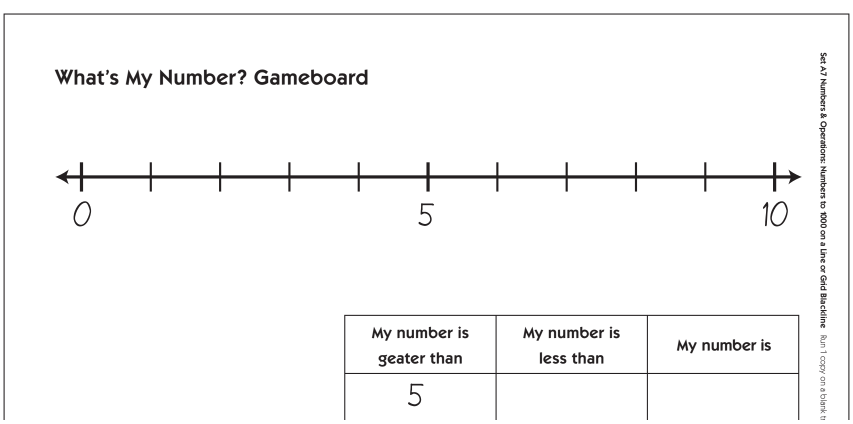
★ whiteboard and markers

★ 6 or 7 small slips of scratch paper (see Advance Preparation)

Advance Preparation Write the number 7 on one of the slips of paper and the number 43 on another. Fold both and put them in 2 different pockets. Keep the other slips close at hand; this game goes very quickly.

Instructions for What's My Number?
1. Ask children to sit where they can see the screen. Place the What's My Number? Gameboard on display. Label one end of the number line 0 and the other end 10. Explain that you have a number between 0 and 10 written on a piece of paper in your pocket, and you're going to give the class a chance to guess what it is.

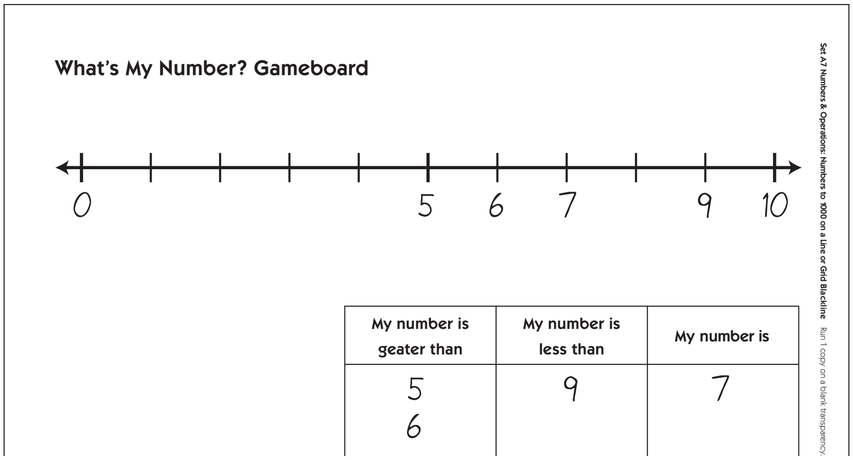
2. Ask students to raise their hand if they have a guess, and call one of them up to write his or her guess where it belongs on the number line. Respond by writing the number the child just guessed in the appropriate column on the chart below the number line.



3. Repeat step 2, calling on a different child each time, until someone guesses your secret number correctly. It won't take students long to realize that they can use the information on the number line and

Activity 2 What's My Number? (cont.)

the chart to narrow the range of possibilities so they can "zero in" on the number. When they do, pull the slip of paper with 7 written on it out of your pocket and show it to the class.



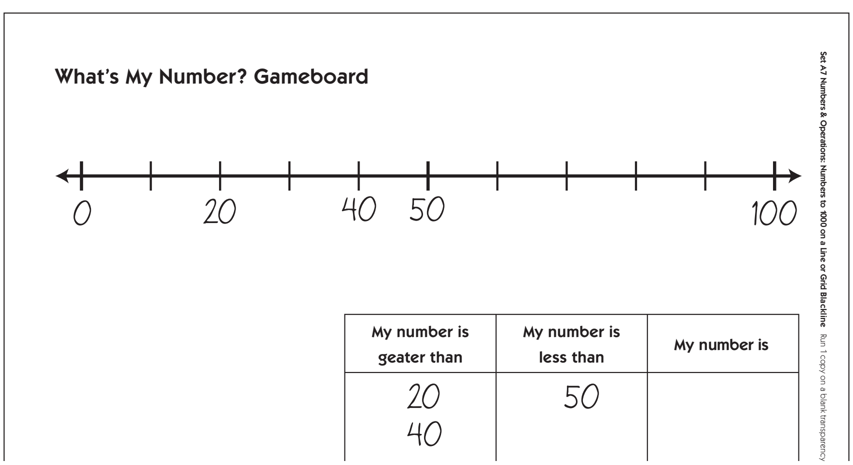
4. Erase the overhead, and write 0 at one end of the line and 100 at the other. Tell students you have a number between 0 and 100 in your other pocket. Ask them to pair-share guesses and then call on a volunteer to share his or her guess with the class.

> ***Marcus*** *I think it's 50 because that's right in the middle.*

5. Talk with students about where the guess should be entered on the number line, and invite the student who made the guess to come up and record it on the overhead, working with support from the class if necessary.

6. Respond by writing the number the child just guessed in the appropriate column on the chart below the number line.

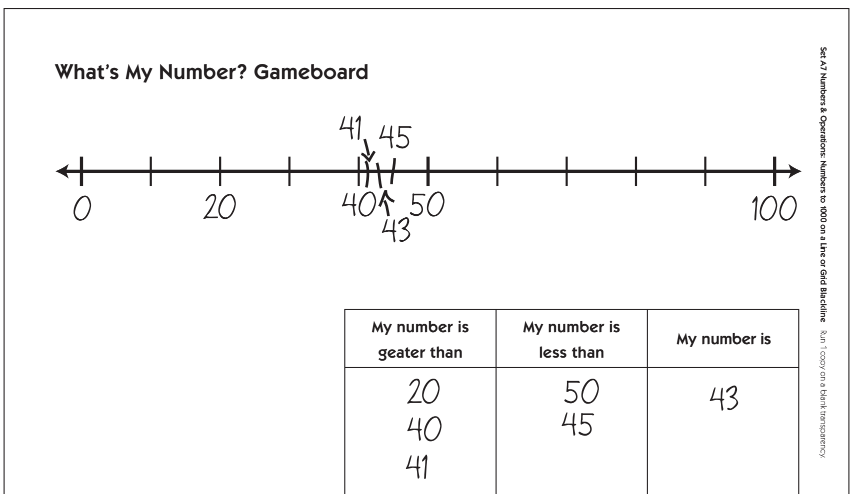
7. Repeat steps 5 and 6 until the class has narrowed the range to 40 and 50. Then let students know that it's okay to guess numbers that don't correspond to marks already on the line, if that hasn't already come up.



Activity 2 What's My Number? (cont.)

> ***Students*** *I don't get it!*
> *There aren't any other marks!*
> *How can your number be more than 40 but less than 50?*
>
> ***Teacher*** *You've done a great job of narrowing the range really quickly. My number is between 40 and 50.*
>
> ***David*** *But there aren't any more marks between 40 and 50.*
>
> ***Teacher*** *It's okay to make some marks of your own on this line. Do you have a guess?*
>
> ***David*** *I think it's 45.*
>
> ***Teacher*** *Come on up and make a mark where you think it belongs and label it with your guess.*

8. Continue in this fashion until someone identifies your number exactly. Then show students the slip of paper. If the number line gets crowded, encourage students to write their guesses above and below the line and draw arrows to the marks they've made if necessary.



My number is geater than	My number is less than	My number is
20 40 41	50 45	43

9. Play several more rounds of the game, as time allows. Erase the overhead each time and write a new number on a slip of paper. You may want to stick with numbers between 0 and 100. If that's very easy for your class, try labeling one end of the number line with 100 and the other with 200 and choosing a secret number in that range.

Extensions

- Play the game many times with your class. This is a great "sponge activity."
- Let students lead the game. (If you decide to do this, have them whisper their secret number in your ear before they start.)
- Experiment with other ranges of numbers, like 200–300, 300–400, 400–500, and so on. The overhead number line doesn't accommodate much more than a range of 100, so if your students are ready for more, draw a giant number line on the whiteboard, along with a greater than and less than chart, and work with a range of 0–500, or even 0–1,000.

What's My Number? Gameboard

My number is geater than	My number is less than	My number is

NAME ______________________ **DATE** ______________

Set A7 ★ Independent Worksheet 1

INDEPENDENT WORKSHEET

Number & Operations What's Missing? 901–1,000

1 Fill in the missing numbers on the grid below. Use the patterns you know to help.

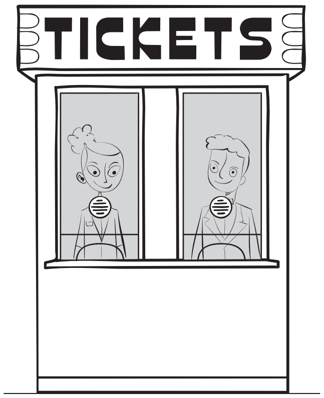
901		903		905	906	907		909	910
911	912	913	914	915		917	918	919	920
	922	923	924	925	926			929	930
931	932	933		935	936		938	939	940
941		943	944		946	947	948	949	950
951	952	953	954	955		957	958	959	960
961	962	963		965	966	967	968		970
	972	973	974		976	977		979	980
981	982		984	985	986	987	988	989	
991	992	993	994	995		997	998	999	1000

2 Describe at least 3 different patterns you see on the grid.

(Continued on next page.)

Independent Worksheet 1 What's Missing? 901–1,000 (cont.)

3 The carnival in our town started last week. The chart below shows how many tickets they sold each day.



Day	Number of Tickets
Saturday	978 tickets
Sunday	995 tickets
Monday	932 tickets
Tuesday	905 tickets
Wednesday	937 tickets

a Which day did they sell the most tickets? ________________

b Which day did they sell the least tickets? ________________

c Put the number of tickets they sold each day in order from least to greatest.

____________, ____________, ____________, ____________, ____________

least greatest

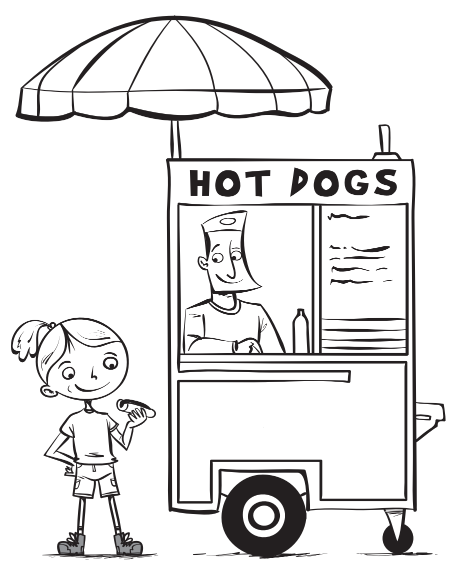
4 The people who came to the carnival bought 909 hot dogs on Saturday, 990 hot dogs on Sunday, 943 hot dogs on Monday, and 934 hot dogs on Tuesday.

a Which is greater, 909 or 990? _________

b How do you know?

c Which is less, 943 or 934? _________

d How do you know?



NAME ______________________ **DATE** ______________

Set A7 ★ Independent Worksheet 2

INDEPENDENT WORKSHEET

Number & Operations What's Missing? 10–1,000

1 Fill in the missing numbers on the grid below. Use the patterns you know to help.

10	20		40	50	60		80	90	100
	120	130	140		160	170	180	190	
210		230	240	250		270	280		300
310	320	330		350	360		380	390	400
	420	430	440		460	470	480	490	
510	520		540	550		570		590	600
610		630	640	650		670	680	690	700
710	720	730		750	760	770	780		800
810		830	840		860		880	890	900
910	920		940	950	960	970	980		1000

2 Describe at least 3 different patterns you see on the grid.

(Continued on next page.)

Independent Worksheet 2 What's Missing? 10–1,000 (cont.)

3 Have you ever wondered how much a tiger weighs? Have you ever thought about how heavy a grizzly bear is compared to an alligator? The chart below shows the weights of 7 different mammals in kilograms. (A kilogram is a little more than 2 pounds.) Use the information to answer the questions below.

Animal	**Weight**
Siberian Tiger	230 kilograms
Alligator	270 kilograms
Harbor Seal	170 kilograms
Camel	725 kilograms
Grizzly Bear	680 kilograms
Emperor Penguin	30 kilograms
Gray Wolf	36 kilograms

a Put the weights of these animals in order from least to greatest.

__________, __________, __________, __________, __________, __________, __________

least greatest

b Which animal on the chart weighs the most? __________________

c Which animal on the chart weighs the least? __________________

d Which animal weighs more, a Siberian tiger or an alligator?__________________

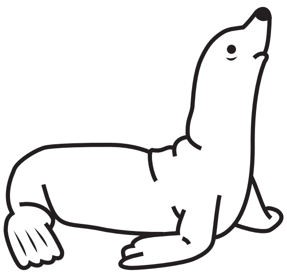
e Which animal weighs less, a grizzly bear or a camel? ______________________

(Continued on next page.)

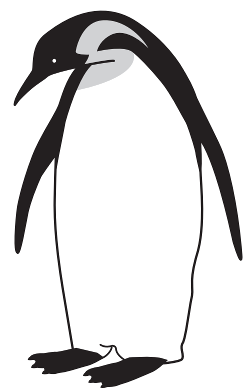
Independent Worksheet 2 What's Missing? 10–1,000 (cont.)

4 Use numbers, pictures, and/or words to show how you got the answer.

a Which would weigh more, 3 harbor seals or 2 Siberian tigers?



b Which would weigh less, 5 Emperor penguins or 1 harbor seal?



5 Which animal on the chart would you most like to have for a pet? Why?

BRIDGES IN MATHEMATICS 2

GRADE 2 SUPPLEMENT

Set A8 Number & Operations: Ordinal Numbers

Includes

Skills & Concepts

★ identify ordinal positions, 1st to 20th

★ match the ordinal numbers with an ordered set of at least 100 items

★ create, extend, and give a rule for number patterns using addition

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P0310

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Set A8 Numbers & Operations: Ordinal Numbers

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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at www.mathlearningcenter.org.

Set A8 ★ Activity 1

ACTIVITY

Introducing the Language of Ordinal Numbers

Overview

This is the first of two activities and several independent worksheets that introduce and reinforce the language of ordinal numbers.

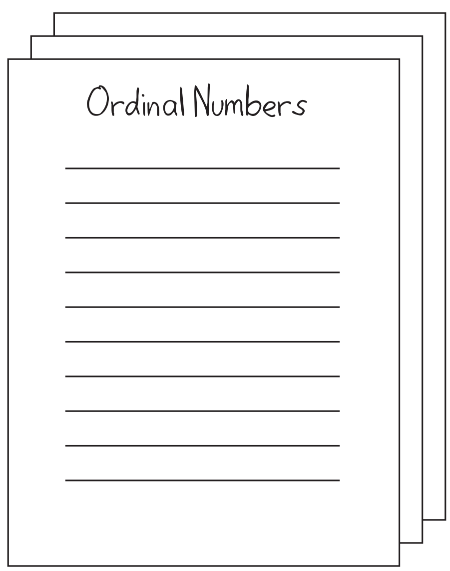
Skills & Concepts

- ★ identify ordinal positions, 1st to 20th
- ★ match the ordinal numbers, first, second, third, etc. with an ordered set to 100

You'll need

- ★ the Hundreds Grid Chart from Number Corner (see Advance Preparation)
- ★ the Hundreds Grid Number Cards (see Advance Preparation)
- ★ 3 sheets of chart paper posted near your discussion area (see Advance Preparation)

Advance Preparation Before you conduct the lesson, take all the cards out of the Hundreds Grid chart, and add or subtract to the collection as needed so you have one card for every child, from 1 through the number that matches your student count. (If you have 24 students, for instance, you will need cards 1 through 24.) Set any other cards aside for now. Draw 10 lines on each of three pieces of chart paper, as shown below. Write the term ordinal numbers at the top of the first sheet. Post the three sheets on an easel or board near your discussion area.



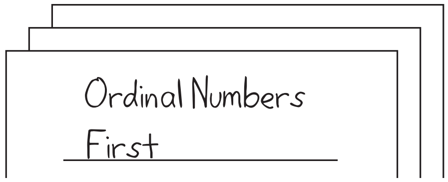
Instructions for Introducing the Language of Ordinal Numbers

1. Ask your students to join you in the discussion area, and seat themselves so they can see the empty Hundreds Grid Chart. Explain that you are going to do some work with ordinal numbers today, using the grid and the number cards. Draw students' attention to the chart paper you have prepared, and read the term *ordinal numbers* with the class. If this term is unfamiliar to most of students, reassure them that they will know more about it by the end of today's math lesson.

Activity 1 Introducing the Language of Ordinal Numbers (cont.)

2. Give students each one number card. Hand the numbers out in random order, so that the child holding the card with a 1 on it might be sitting beside the child holding the card with a 24 on it. Ask students to think privately about where their card belongs on the Hundreds Grid chart.

3. Now write the word *first* on the chart paper, and read it with the class.

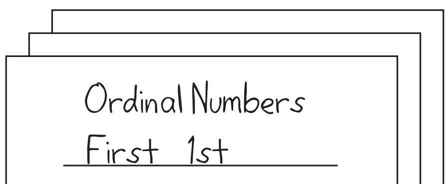


> ***Teacher*** *Who has the card that belongs in the first pocket on the chart?*

Invite that child up to place his or her card in the first pocket as the others watch. What is the number? Does everyone agree that 1 belongs in the first pocket? How do they know?

> ***Students*** *Because 1 is first.*
> *We always put 1 first. It's the first number when you count.*

4. Write *1st* on the chart paper next to the word *first*, and explain that sometimes people write the term this way. Has anyone seen or heard either of these words before today? If so, where or when?



> ***Students*** *Like if you run a race and come in first, you're number 1, so 1st has a 1 in it.*
> *We get ribbons in swim team that have those numbers, like 1st, 2nd, and 3rd.*
> *Kids always say they want to be first in line, or get the first turn.*

5. Now write the terms *second* and *2nd* on the chart paper. Who has the card that goes in the second pocket on the chart? Invite that child up to place his or her card in the second pocket as the others watch. What is the number? Does everyone agree that 2 belongs in the second pocket? How do they know?

6. Skip ahead to the seventh line on the chart paper and write the terms *seventh* and *7th*. Who has the card that goes in the seventh pocket on the chart? Ask children to pair-share their ideas, and then call on a couple of volunteers to share their thinking with the class.

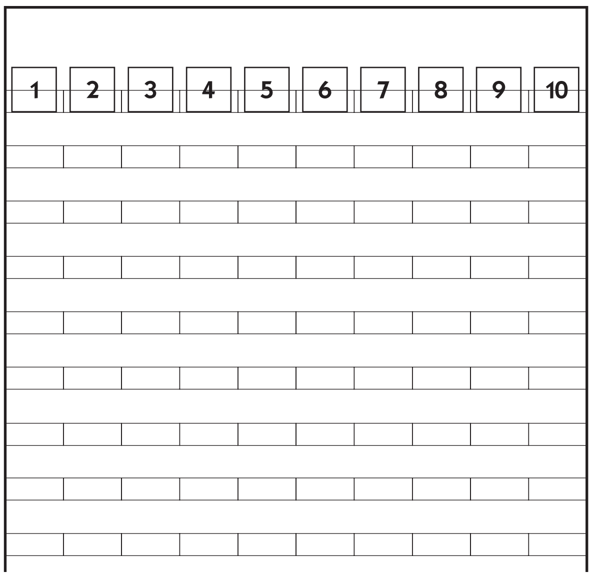
> ***Students*** *It's my card! I have the 7!*
> *I think the number matches the pocket. Like 1 goes in the first pocket, 2 goes in the second pocket, so 7 should go in the seventh pocket.*

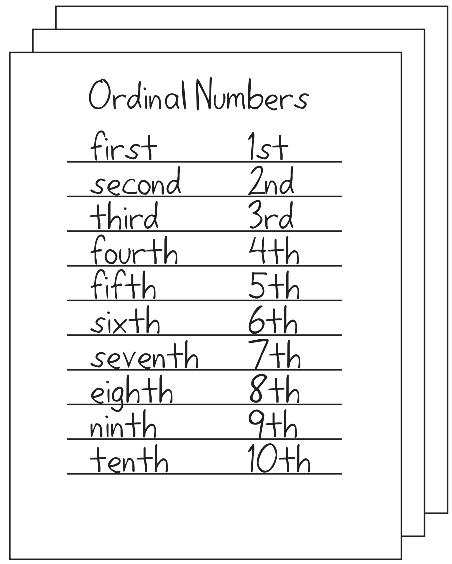
7. Invite the student with the card that belongs in the seventh pocket to come and place it correctly. Ask the class to watch carefully. What did that student have to do to make sure he or she placed it in the correct pocket?

Activity 1 Introducing the Language of Ordinal Numbers (cont.)

Students *Maya had to find the seventh pocket.*
You could go 1, 2, 3, 4, 5, 6, 7, and put it in pocket 7.
I would go backwards because I know the 10 goes at the end of the row.

8. Now write each of the remaining ordinals through tenth (10th) on their respective lines on the chart paper. Each time you record an ordinal number, read it with the class and invite the student holding the card that belongs in that pocket on the Hundreds Grid to bring it up and place it correctly. Work out of order, perhaps writing *fifth* (*5th*), then *third* (*3rd*), then *eighth* (*8th*), and so on until all the lines on the first sheet of chart paper are filled, and all the pockets in the top row of the Hundreds Grid are filled.





9. Read the ordinal numbers on the chart with the class in order, from first to tenth. Then ask children to pair-share any observations they can make. How are the words alike? How are they different? Can students spot any patterns? After a minute or so, have volunteers share their ideas with the class.

Students *Almost all of them end with th.*
The number goes with the word, like 1 is first, and 6 is sixth, and 10 is tenth.
If you're the number 3, you're in the third pocket, like third place.
First ends with st. Second ends with nd. Third ends with rd, and after that, they all end with th.

10. Move the first, and now filled, piece of chart paper to one side, to reveal the other two sheets. Ask all the students who are still holding number cards to raise their hands. Call on them one at a time to say the number on their card loud and clear. As each states his or her number, ask the entire class to respond by naming the pocket in which that card belongs on the Hundreds Grid. Have the student place his or her card in the correct pocket, as you record the ordinal number where it belongs on the remaining two pieces of chart paper. Encourage children to listen carefully and respond quickly to keep the pace lively.

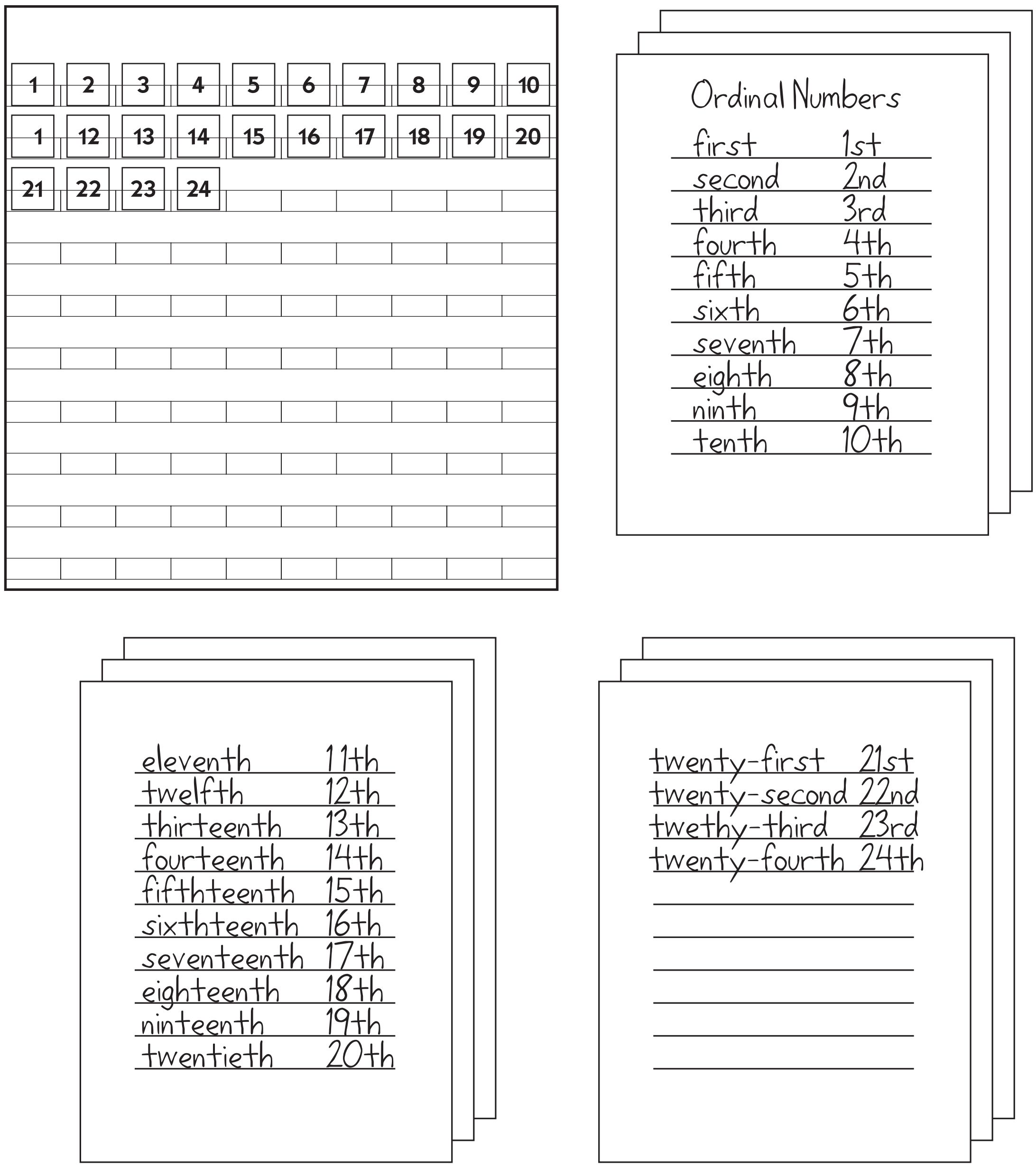
Marco *I have 13 on my card.*

Students *13 goes in the 13th pocket.*

Teacher *Okay, Marco! Please put your card in the 13th pocket.*

Activity 1 Introducing the Language of Ordinal Numbers (cont.)

11. When all the cards have been placed, ask a student to point to each of the terms on the charts as the class reads them together.



12. Conclude the activity by asking children to share observations about the charts. Finally, ask them to give examples of ordinal numbers and explain what these numbers tell us.

> ***Students*** *All the numbers for the second row, like 11th, 12th, 13th, end with th.*
> *Then on the next row, it goes back to the beginning, like first, second, third, but there's a twenty in front, like twenty-first, twenty-second.*
> *An ordinal number tells you what place something is in, like first place, or second place.*
> *It kind of tells the order of the numbers.*

Activity 1 Introducing the Language of Ordinal Numbers (cont.)

Extensions

- Following the lesson, invite volunteers to fill in the remaining lines on the third piece of chart paper as time allows.
- After you have taught this lesson, ask children to re-set the cards in the Hundreds Grid so they reflect the number of days you have been in school. Each day during Number Corner, ask students to report the number of days of school in both cardinal and ordinal form (e.g., We have been in school for 36 days. Today is the 36th day of school).
- Reinforce the language of ordinal numbers whenever you discuss the calendar grid with students (e.g., We just turned over card 28 on our calendar grid. That means it is November 28th.)
- Have children form a circle in your discussion area and count off, starting with 1 (e.g., 1, 2, 3, 4, 5, 6, 7, and so on). Then have them count off a second time, this time reporting their ordinal position in the circle (e.g., first, second, third, fourth, fifth, sixth, seventh, and so on). Ask the third person in the circle to stand up, the seventh to raise his or her hand, the twentieth to walk to the door and back, and so on.

Set A8 ★ Activity 2

ACTIVITY

Grid Pictures

Overview

In this activity, students practice identifying the ordinal positions of various numbers on a hundreds grid. Then they follow a set of instructions to color in selected boxes on a blank grid.

Skills & Concepts

★ identify ordinal positions, 1st to 20th

★ match the ordinal numbers, first, second, third, etc. with an ordered set to 100

★ create, extend, and give a rule for number patterns using addition

You'll need

★ Filled Hundreds Grid (page A8.10, run a class set and 1 copy on a transparency)

★ Blank Hundreds Grid (page A8.11, run a class set and 1 copy on a transparency.)

★ Grid Instructions (page A8.12, run 1 copy on a transparency)

★ a piece of copy paper to mask portions of the overhead

★ crayons (class set)

Instructions for Grid Pictures

1. Place the Filled Hundreds Grid transparency on display at the overhead as helpers give each student a copy of the sheet. Give students a minute or two to pair-share observations about the numbers on the sheet. Can they find and describe any patterns? Can they identify the counting by 2's, 5's, or 10's numbers on the sheet?

2. Now ask children to get out their pencils and circle the first number on the grid. What number is it? Why is it in the first box? Have them circle the hundredth number on the grid. What number is it? Why is it in the hundredth box?

3. Now write the following ordinal numbers on the board: 4th, 8th, 12th, 16th, 20th, 24th, 28th. After you write each ordinal number, ask children to find and circle the number occupying that position on the grid.

4. Ask children to pair-share any observations about the numbers they have circled so far. After a minute or so, have volunteers share their observations with the class. Here are some questions you can pose to spark discussion:

- Do you notice any patterns?
- How do you know which number to circle each time?
- Can you predict what ordinal number I will write on the board next?
- How do you know?

5. Call on a volunteer to name the next ordinal number in your pattern. If he or she is correct, write it on the board, and ask students to find and circle the corresponding number on their grid. (If the student is incorrect, call on another volunteer.) Continue in this fashion through 60, working with input from the children to list the following ordinal numbers on the board as students circle the numbers that occupy those positions on their grids: 32nd, 36th, 40th, 44th, 48th, 52nd, 56th, 60th.

Activity 2 Grid Pictures (cont.)

6. Ask students to share any further observations they have about the pattern. Then have them turn to their neighbors and explain how they know which number to circle each time you write an ordinal number on the board.

> ***Ethan*** *It's easy. You just find the number. Like when Mrs. Thomas writes 52nd, you just find the 52.*

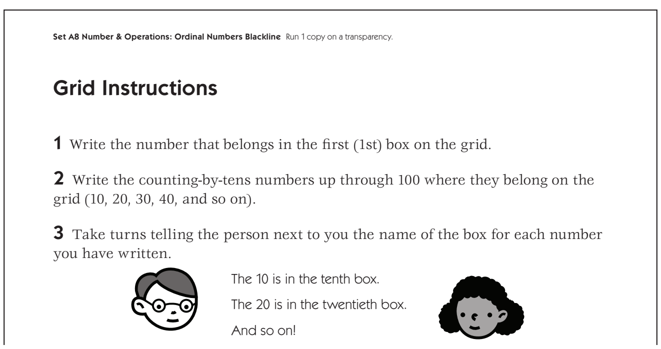
> ***Kim*** *Yeah, like 16 is in the 16th box, and 44 is in the forty-fourth box.*

7. Ask students to move their filled grids to one side for now. Then place the blank grid on display at the overhead as helpers give a copy to each student. After they have entered their name and date on the sheet, give students a few moments to examine the blank grid quietly. Then ask them how many boxes there are on this grid. How do they know?

> ***Students*** *It's 100. I can just tell, because it looks like the other grid, but no numbers. There's 10 in the top row, so I just counted by 10's. It's 100.*

8. Now place the Grid Instructions on display at the overhead, with all but the first line hidden under a sheet of paper. Read the first instruction together and give students a few moments to write the number that belongs in the first box.

9. Move the sheet of paper down to reveal one new instruction at a time. Read each with the class and ask students to complete the task before moving on to the next instruction.


Set A8 Number & Operations: Ordinal Numbers Blackline Run 1 copy on a transparency.

Grid Instructions

1 Write the number that belongs in the first (1st) box on the grid.

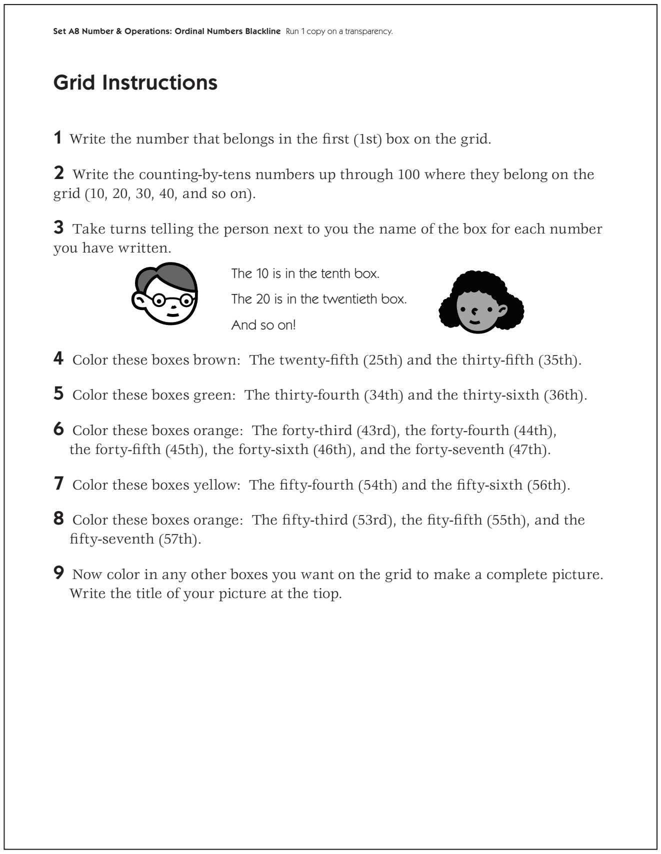
2 Write the counting-by-tens numbers up through 100 where they belong on the grid (10, 20, 30, 40, and so on).

3 Take turns telling the person next to you the name of the box for each number you have written.

10. When you have completed the third instruction on the transparency with the class, ask students to get out their crayons. From here on out, they will be coloring certain boxes on the grid to start a picture. Tell them to circle each box in pencil and check with the person next to them to be sure they agree on the location before coloring their sheets. Encourage them to use the numbers they have written on the grid to help locate the boxes they need, and to refer to their filled Hundreds Grid sheets if they need to.

11. Reveal instructions 4 through 8, giving students time to complete each before moving on to the next. When they have finished, their sheets will look like this.

Activity 2 Grid Pictures (cont.)



Set A8 Number & Operations: Ordinal Numbers Blackline Run 1 copy on a transparency.

Grid Instructions

1 Write the number that belongs in the first (1st) box on the grid.

2 Write the counting-by-tens numbers up through 100 where they belong on the grid (10, 20, 30, 40, and so on).

3 Take turns telling the person next to you the name of the box for each number you have written.

4 Color these boxes brown: The twenty-fifth (25th) and the thirty-fifth (35th).

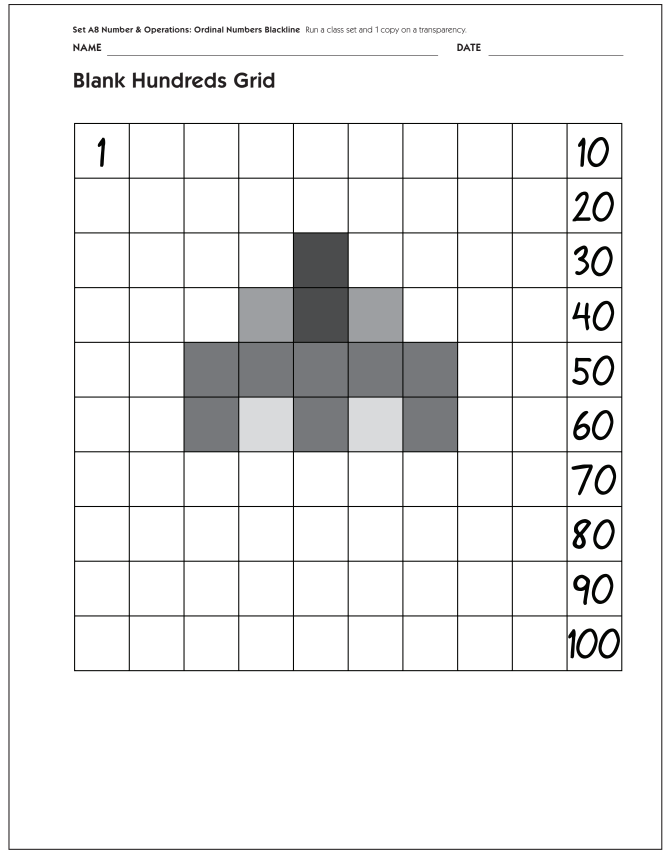
5 Color these boxes green: The thirty-fourth (34th) and the thirty-sixth (36th).

6 Color these boxes orange: The forty-third (43rd), the forty-fourth (44th), the forty-fifth (45th), the forty-sixth (46th), and the forty-seventh (47th).

7 Color these boxes yellow: The fifty-fourth (54th) and the fifty-sixth (56th).

8 Color these boxes orange: The fifty-third (53rd), the fity-fifth (55th), and the fifty-seventh (57th).

9 Now color in any other boxes you want on the grid to make a complete picture. Write the title of your picture at the tiop.



Set A8 Number & Operations: Ordinal Numbers Blackline Run a class set and 1 copy on a transparency.

NAME ______________________ DATE ____________

Blank Hundreds Grid

1									10
									20
									30
									40
									50
									60
									70
									80
									90
									100

12. Finally, show instruction 9, which prompts children to color in any other boxes they want to on the grid to complete the picture. Responses will vary from one child to the next; while some may see the top half of a jack-o-lantern, others may see the beginnings of a house, an armored vehicle, a robot, an apartment building, and so on. If you run out of time, have children complete and title their grid pictures at home, and bring them back to school to share with their classmates.

Extensions

- Some children may enjoy circling the counting-by-fours numbers from 60 through 100 on the first Hundreds Grid, and then coloring in those boxes to highlight the pattern.
- To find a web-based source of practice, go to Jenny Eather's Math Dictionary for Kids (http://www.amathsdictionaryforkids.com/). Once you have entered the site, go to the O page and click on the word *ordinal*. Here, you will find a simple definition of the term, as well as two different animated activities designed to reinforce skills with ordinal numbers.

INDEPENDENT WORKSHEET

See Set A8 Independent Worksheets 1–3 for more practice with ordinal numbers.

NAME ______________________ **DATE** ______________

Filled Hundreds Grid

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

NAME ______________________________ **DATE** ____________________

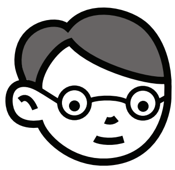
Blank Hundreds Grid

Grid Instructions

1 Write the number that belongs in the first (1st) box on the grid.

2 Write the counting-by-tens numbers up through 100 where they belong on the grid (10, 20, 30, 40, and so on).

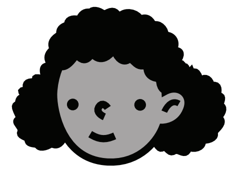
3 Take turns telling the person next to you the name of the box for each number you have written.



The 10 is in the tenth box.

The 20 is in the twentieth box.

And so on!



4 Color these boxes brown: The twenty-fifth (25th) and the thirty-fifth (35th).

5 Color these boxes green: The thirty-fourth (34th) and the thirty-sixth (36th).

6 Color these boxes orange: The forty-third (43rd), the forty-fourth (44th), the forty-fifth (45th), the forty-sixth (46th), and the forty-seventh (47th).

7 Color these boxes yellow: The fifty-fourth (54th) and the fifty-sixth (56th).

8 Color these boxes orange: The fifty-third (53rd), the fifty-fifth (55th), and the fifty-seventh (57th).

9 Now color in any other boxes you want on the grid to make a complete picture. Write the title of your picture at the top.

NAME ______________________________ **DATE** ______________

Set A8 ★ Independent Worksheet 1

INDEPENDENT WORKSHEET

Alphabet Line-Up

The alphabet letters are standing in line. The A is first in line. The Z is last in line.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

1 How many letters are standing in line? ____________.

2 Draw a circle around the fifth letter in line. Which letter is it? ____________

3 Draw a square around the twelfth letter in line. Which letter is it? ____________

4 Draw a star above the twenty-first letter in line. Which letter is it? ____________

5 Circle the word you need to fill in the blank.

Example J is the _________ letter in line.	seventh (7th)	tenth (10th)	thirteenth (13th)
a O is the _________ letter in line.	fourteenth (14th)	fifteenth (15th)	twentieth (20th)
b U is the _________ letter in line.	nineteenth (19th)	twentieth (20th)	twenty-first (21st)
c Y is the _________ letter in line.	seventeenth (17th)	twenty-third (23rd)	twenty-fifth (25th)

6 What is the first letter of your name? _______ What is its place in line? ________

NAME ____ **DATE** ____________________

Set A8 ★ Independent Worksheet 2

INDEPENDENT WORKSHEET

Ordinal Numbers on the Calendar

1 November has 30 days. The first three numbers are filled in. Fill in the rest.

NOVEMBER						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	

2 Draw a circle around the number 7 on the calendar. That is Jon's birthday. Jon's birthday is on the 7th of November.

3 Draw a line under the number 11 on the calendar. That is Veteran's Day. Veteran's Day is on the 11th of November.

4 Draw a triangle around the number 23 on the calendar. That is Thanksgiving.

Thanksgiving is on the ________________ of ________________________________.

5 Draw a star by the number 30 on the calendar. That is Maria's birthday.

Maria's birthday is on the ________________ of ________________________________.

NAME ______________________________ **DATE** ______________

Set A8 ★ Independent Worksheet 3

INDEPENDENT WORKSHEET

Another Grid Picture

Follow the instructions to start a picture on the grid below.

1 Write the number that belongs in the first (1st) box on the grid.

2 Write the counting-by-tens numbers up through 100 where they belong on the grid (10, 20, 30, 40, and so on).

3 Color these boxes blue: 25th, 26th, 34th, and 37th.

4 Color these boxes red: 43rd, 48th, 53rd, 58th, 63rd, and 68th.

5 Color these boxes yellow: 54th and 57th.

6 Now color in any other boxes you want on the grid to make a complete picture.

BRIDGES IN MATHEMATICS 2

GRADE 2 SUPPLEMENT

Set A9 Number & Operations: More Multi-Digit Addition & Subtraction

Includes

Skills & Concepts

★ develop fluency with two-digit addition and subtraction using efficient, accurate, and generalizable strategies, and describe why the procedures work
★ add and subtract whole numbers accurately using the traditional regrouping algorithm
★ use the mathematical relationship between addition and subtraction and properties of addition to model and solve problems
★ solve contextual problems involving adding and subtracting of whole numbers and justify the solutions
★ estimate sums to predict solutions to problems or determine reasonableness of answers
★ solve simple word problems involving length
★ find the distance between numbers on the number line
★ find missing values in open sentences

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P0310

Bridges in Mathematics Grade 2 Supplement
Set A9 Numbers & Operations: More Multi-Digit Addition & Subtraction

The Math Learning Center, PO Box 12929, Salem, Oregon 97309. Tel. 1 800 575–8130.

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P0310

Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at www.mathlearningcenter.org.

Set A9 ★ Activity 1

ACTIVITY

Modeling the Traditional Algorithm for Double-Digit Addition

Overview
Students work in pairs to solve a double-digit addition story problem. They share their strategies with the entire class while the teacher records each method on a poster. The teacher then presents the traditional algorithm and has the whole class practice using it to solve several more 2-digit addition problems.

Skills & Concepts
★ add whole numbers accurately using a regrouping algorithm

★ solve contextual problems involving adding of whole numbers and justify the solutions

★ estimate sums to predict solutions to problems or determine reasonableness of answers

★ solve simple word problems involving length

You'll need
★ The Ribbon Problem (page A9.7, run 1 copy on a transparency)

★ Addition Board (page A9.8, run 1 copy on a transparency)

★ Ten Frames (page A9.9, see Advance Preparation)

★ 12″ × 18″ light blue construction paper (1 sheet for each pair of students, see Advance Preparation)

★ copy or lined paper (1 sheet per student)

★ 3–4 pieces of 12″ × 18″ white drawing or construction paper

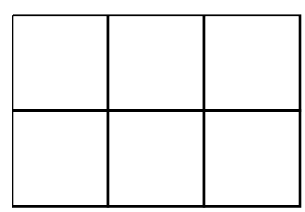
★ 3–4 blank overhead transparencies

★ overhead base ten pieces

★ set of base ten pieces for each pair of students

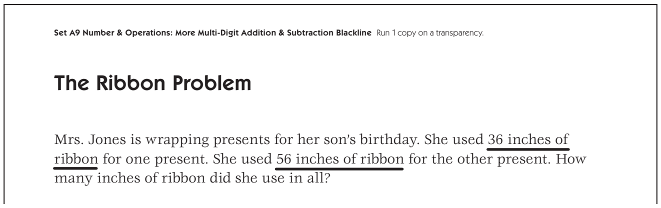
★ glue sticks (half-class set)

Advance Preparation Run a quarter class set of the Ten Frames sheet and cut the frames apart along the heavy lines. Each pair of students will need 3 ten frames. Fold the 12″ × 18″ light blue construction paper into sixths, as shown below. Crease the folds firmly so they show up well, and then set some heavy books on top of the sheets to smooth them out.



Instructions for Modeling the Traditional Algorithm for Double-Digit Addition
1. Display the Ribbon Problem on the overhead. Read the problem out loud with the class and ask students to restate the question in their own words. Work with their input to underline any information that will help solve the problem. Then ask students to pair-share estimates, and call on a few volunteers to share their thinking with the class.

Activity 1 Modeling the Traditional Algorithm for Double-Digit Addition (cont.)

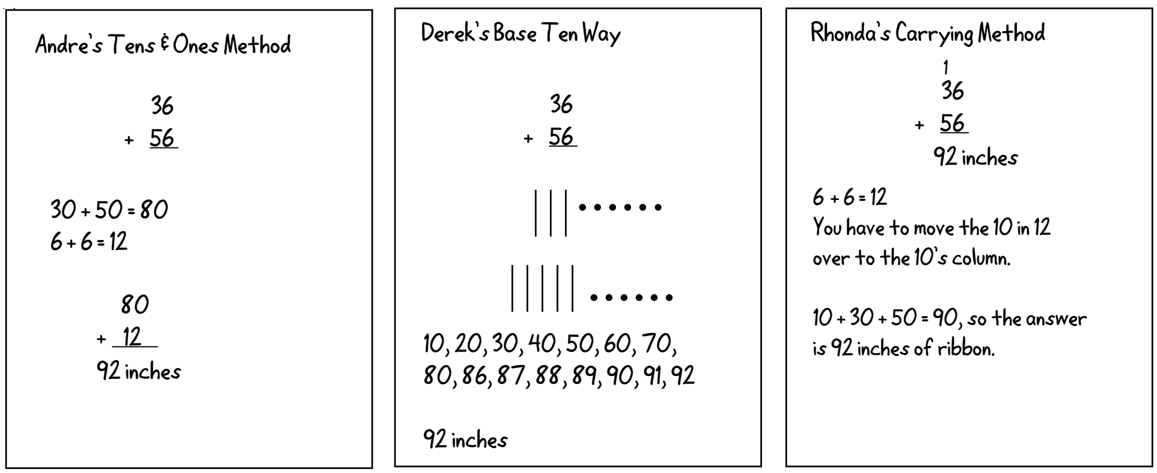

Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Blackline Run 1 copy on a transparency.

The Ribbon Problem

Mrs. Jones is wrapping presents for her son's birthday. She used 36 inches of ribbon for one present. She used 56 inches of ribbon for the other present. How many inches of ribbon did she use in all?

2. Give students each a blank piece of paper. Have them work in pairs to solve the problem. Ask them to record all of their work, along with the solution, on their own paper. Remind them that they can use sketches and numbers, and that the base 10 pieces are available as well. Circulate to observe and talk with students as they're working. Pass out blank transparencies to at least 3 students, each of whom has used a different strategy, and ask them to copy their work onto the transparency to share with the class.

3. When most pairs are finished, ask the students you selected to share their solutions and explain their strategies at the overhead. Record each strategy on a separate piece of 12″ × 18″ paper labeled with the student's name. Ask the contributing students to work with the rest of the class to name their strategies.

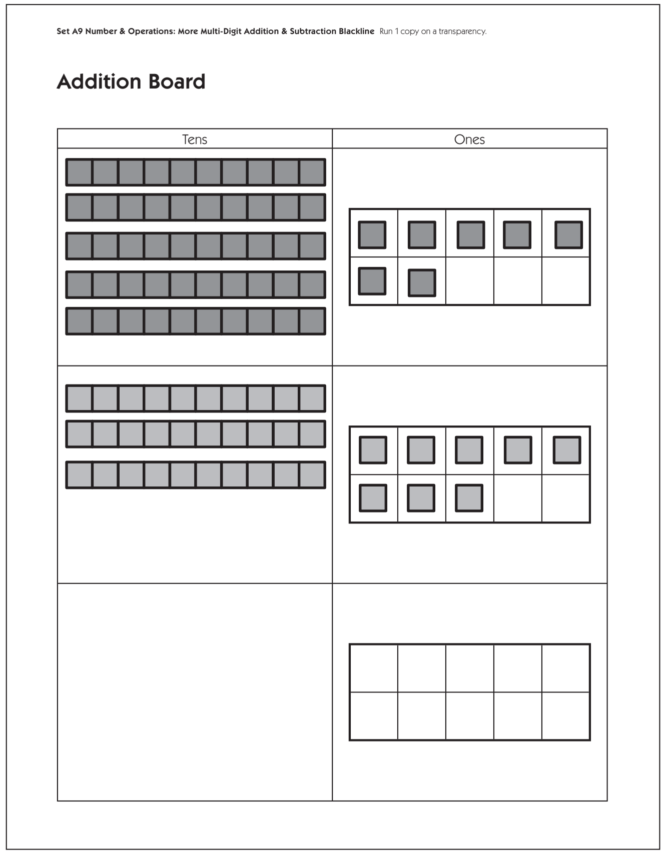


4. Acknowledge everyone's strategies. If none of the students shared the traditional algorithm, contribute one to the collection yourself by creating a poster similar to Rhonda's above as students watch. Explain that this strategy is called the regrouping method, and adults sometimes use it for solving multi-digit addition problems.

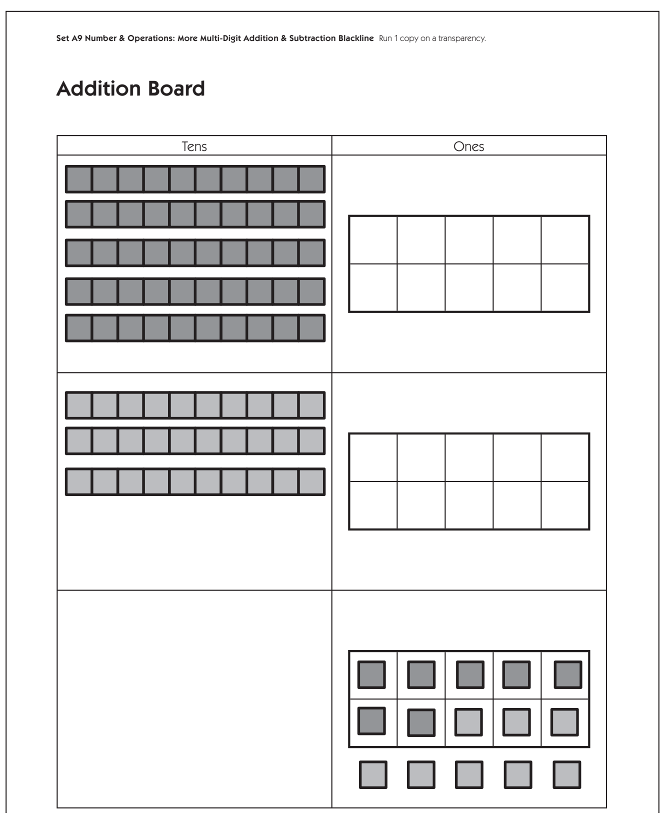
5. Now model the traditional algorithm step-by-step with a new combination, 57 + 38. First, record the combination on the board. Ask students to estimate the total and pair-share their ideas. Then have several volunteers share their estimates and reasoning with the class. Next, place the Addition Board on display at the overhead, and build both numbers with the base 10 pieces, as shown below.

Activity 1 Modeling the Traditional Algorithm for Double-Digit Addition (cont.)

$$\begin{array}{r} 57 \\ +38 \\ \hline \end{array}$$

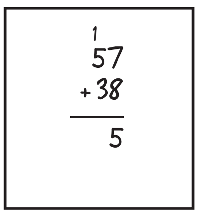


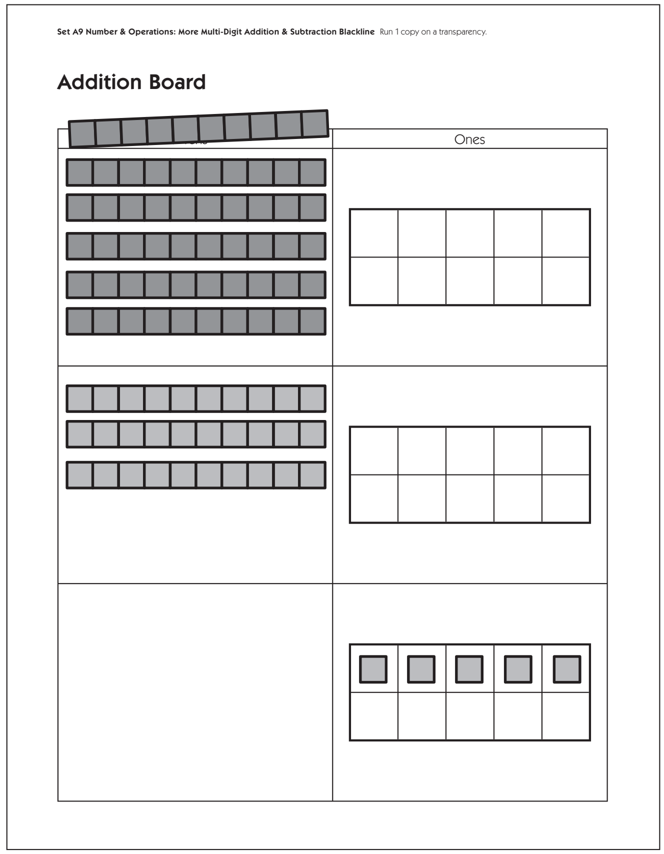
6. Explain when people use traditional methods, they usually start with the 1s instead of the 10s. Ask students to add 7 + 8 mentally. Next, move all the units down to the bottom row and count them with the class to confirm the total, 15.



Activity 1 Modeling the Traditional Algorithm for Double-Digit Addition (cont.)

7. Trade ten of the units in for a strip and move the strip over to the 10's column. Then record your action in numeric form at the board. Ask students to explain what you have done so far. Why did you trade some of the units for a strip and move it over? Why did you write a 5 in the one's place and then record a 1 above the 5 in the ten's place?





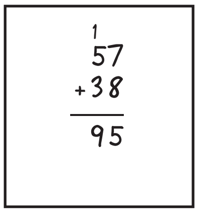
> ***Students*** *Every time you get 10 in the 1's place, you have to trade in for a strip, just like when we played that race game.*
> *You can't keep 15 in the 1's column.*
> *If you just write down 15 below the line and then add the tens, you'll get 815. That's silly! You can't add 57 plus 38 and get more than 100!*

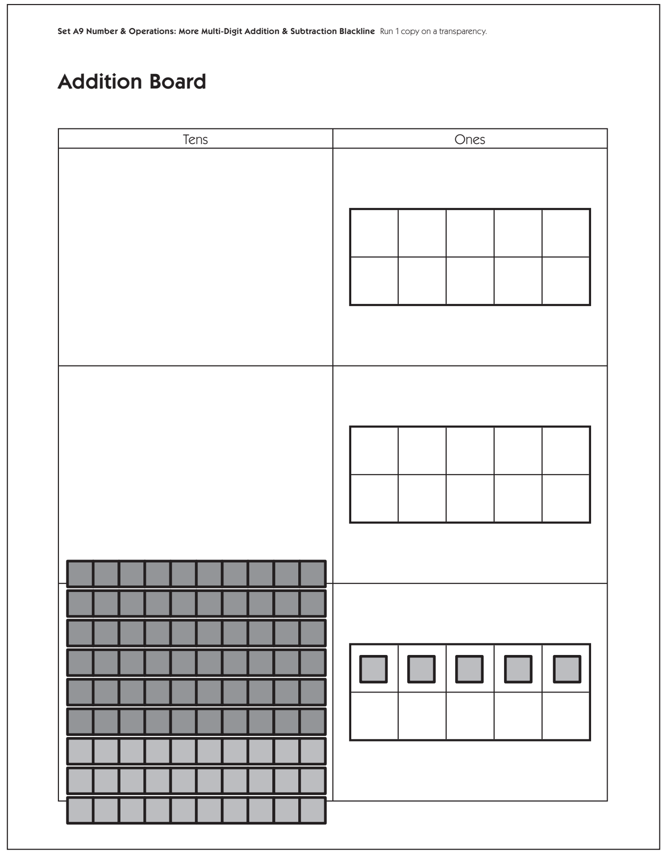
8. Ask students to take a careful look at the strips. What quantities do they see in each row? Then have them read the numbers in the ten's column. The digits are 1, 5, and 3. Is that really what is being added? Why or why not?

> ***Students*** *It looks like you're adding 1 + 5 + 3, but it's really 10 + 50 + 30.*
> *You can see what you're really adding if you look at the strips.*
> *You can also just tell if you look at where the numbers are. They're in the ten's place. They're tens, not ones.*

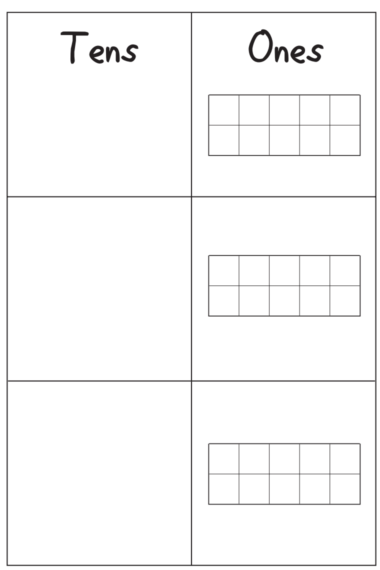
9. Ask students to add 10 + 50 + 30 mentally and report the results. Then combine the strips to confirm that the total is 90 and record the results on the board to complete the problem. Does the answer make sense? Why or why not?

Activity 1 Modeling the Traditional Algorithm for Double-Digit Addition (cont.)





10. Erase the problem and remove the pieces from the transparency. Then explain that the children will work in pairs to create their own addition boards. Give each pair of students a pre-folded piece of 12″ × 18″ light blue construction paper and 3 of the paper ten frames. Ask them to work together to write "Tens" at the top of the left-hand column and "Ones" at the top of the right-hand column. Then have them glue the 3 ten frames into place, 1 in each row on the right-hand side of the paper, so their addition board looks just like yours. Ask them to put their names on the back.



11. As students finish making their addition boards, have helpers distribute base 10 pieces to each pair. Repeat Steps 5 through 9 with the combinations below. As you record each combination at the board,

Activity 1 Modeling the Traditional Algorithm for Double-Digit Addition (cont.)

have children estimate a solution to the problem and explain their estimates. Then have them work in pairs on their addition boards to model each action with the base 10 pieces as you work with the overhead pieces and record each step with numbers at the board.

$$\begin{array}{r} 26 \\ +\ 37 \\ \hline \end{array} \qquad \begin{array}{r} 48 \\ +\ 32 \\ \hline \end{array} \qquad \begin{array}{r} 29 \\ +\ 50 \\ \hline \end{array} \qquad \begin{array}{r} 18 \\ +\ 38 \\ \hline \end{array}$$

12. Collect students' addition boards for use in the next activity, and have them put their base ten pieces away. Place the Ribbon Problem transparency on display at the overhead. Re-read the problem with the students. Then work with their input to solve the problem using a front-end strategy and the traditional algorithm. Ask the children to compare and contrast the two methods. How are they alike? How are they different?

Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Blackline Run 1 copy on a transparency.

The Ribbon Problem

Mrs. Jones is wrapping presents for her son's birthday. She used 36 inches of ribbon for one present. She used 56 inches of ribbon for the other present. How many inches of ribbon did she use in all?

$30 + 50 = 80 \quad 6 + 6 = 12$

$$\begin{array}{r} 36 \\ +\ 56 \\ \hline 80 \\ +\ 12 \\ \hline 92 \end{array} \qquad\qquad \begin{array}{r} {}^{1} \\ 36 \\ +\ 56 \\ \hline 92 \end{array}$$

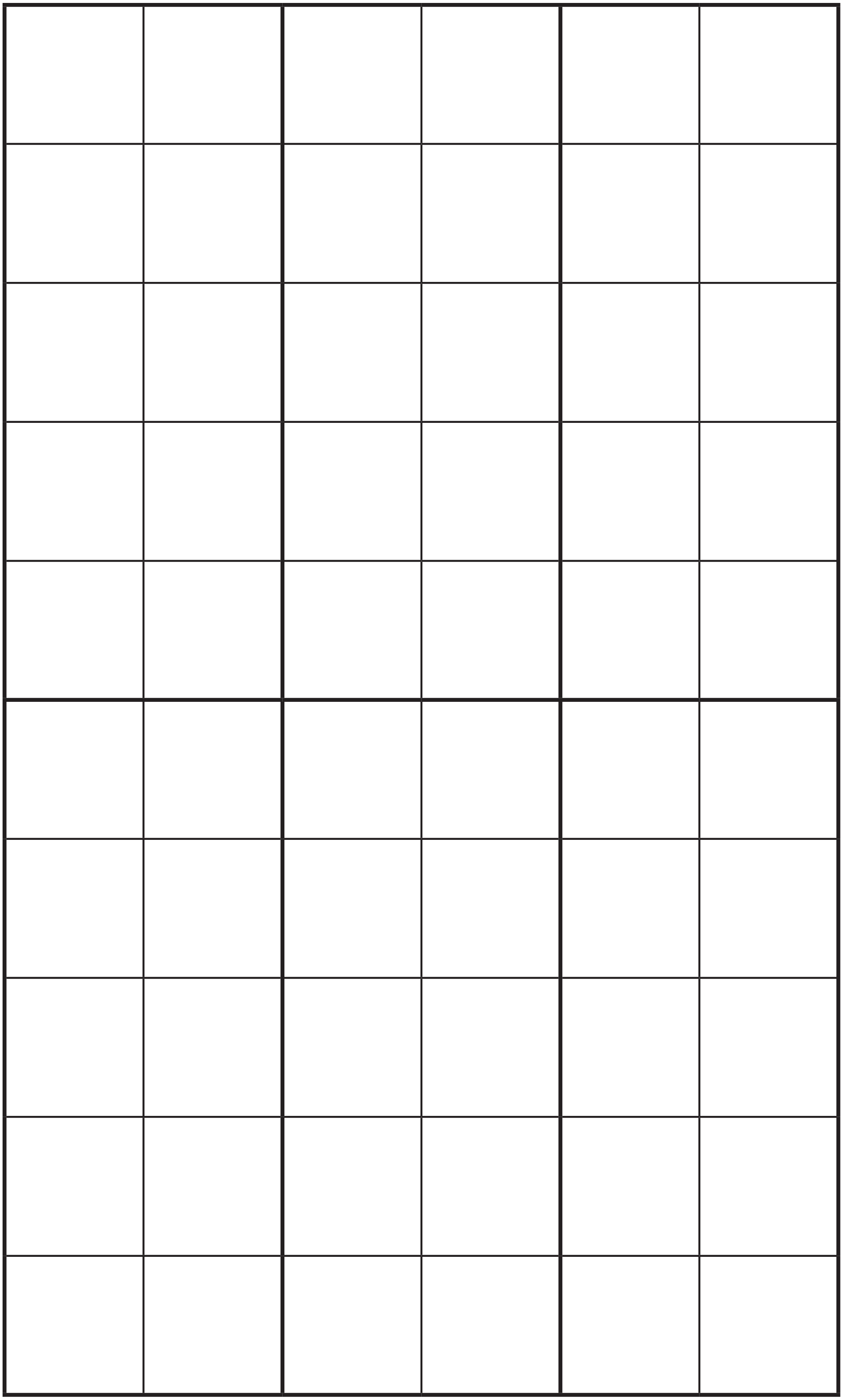
Students *With the first way, you have to do a lot more writing.*
I like the first way because you can really understand the numbers, but I like the new way because you don't have to write as much.
I think the new way is like a short cut.
It's not new for me. My dad showed me how to add that way.

The Ribbon Problem

Mrs. Jones is wrapping presents for her son's birthday. She used 36 inches of ribbon for one present. She used 56 inches of ribbon for the other present. How many inches of ribbon did she use in all?

Addition Board

Tens	Ones



Set A9 ★ Activity 2

ACTIVITY

Recording the Traditional Algorithm for Double-Digit Addition

Overview

Students solve several double-digit addition problems with base 10 pieces. Then they record the process numerically as the teacher continues to model with the pieces at the overhead. Finally, students write and solve a double-digit story problem of their own.

Skills & Concepts

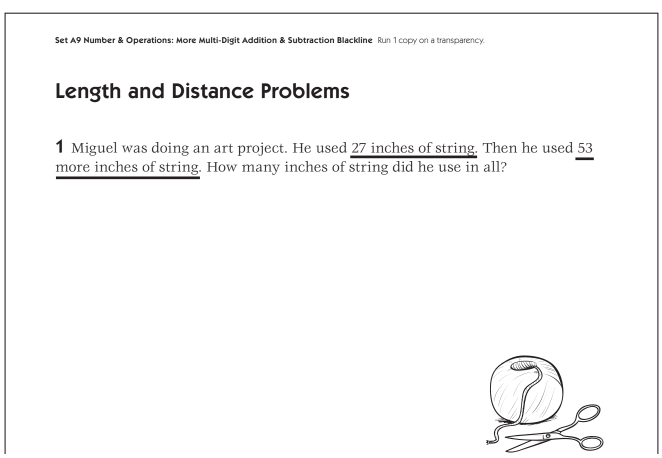
- ★ add whole numbers accurately using the traditional regrouping algorithm
- ★ solve contextual problems involving adding of whole numbers and justify the solutions
- ★ estimate sums to predict solutions to problems or determine reasonableness of answers
- ★ solve simple word problems involving length

You'll need

- ★ Addition Board transparency from Activity 1
- ★ Length and Distance Problems (page A9.17, run 1 copy on a transparency)
- ★ Addition Problems (page A9.18, run a class set)
- ★ students' addition boards from Activity 1
- ★ overhead base ten pieces
- ★ set of base ten pieces for each pair of students
- ★ a piece of paper for masking portions of the overhead

Instructions for Recording the Traditional Algorithm for Double-Digit Addition

1. Let students know that you are going to do some more work with the regrouping method for adding 2-digit numbers today. Then display the first of the Length and Distance Problems on the overhead. Read the problem out loud with the class and ask students to restate the question in their own words. Work with their input to underline any information that will help solve the problem. Ask students to pair-share estimates, and call on a few volunteers to share their thinking with the class.


Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Blackline Run 1 copy on a transparency.

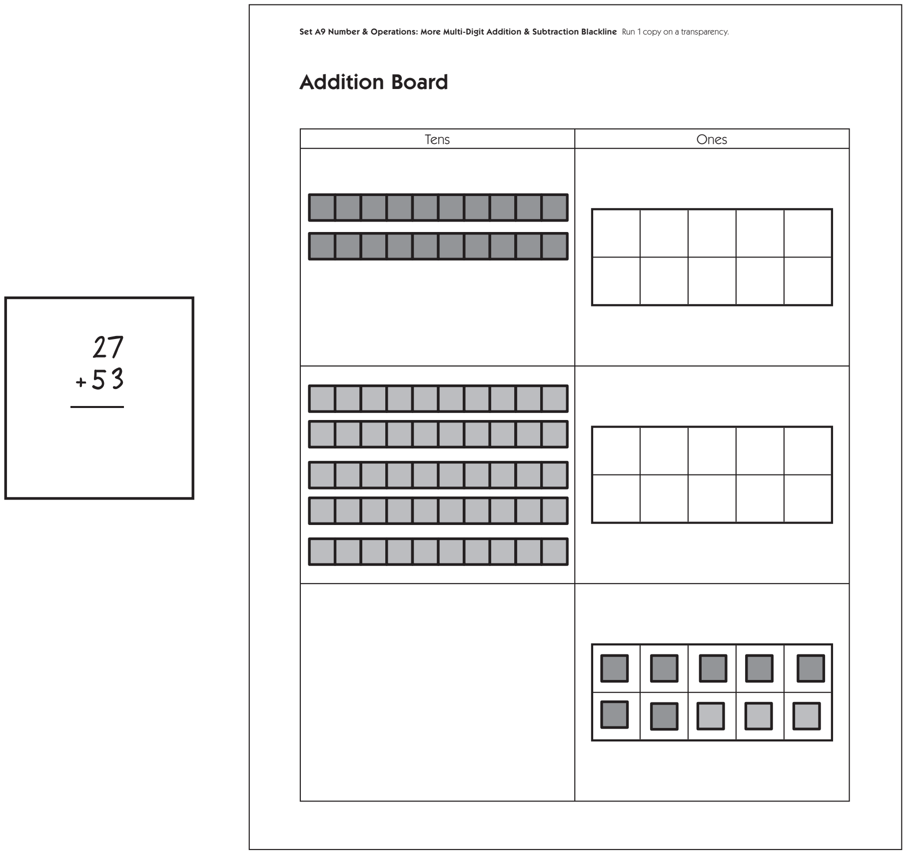
Length and Distance Problems

1 Miguel was doing an art project. He used 27 inches of string. Then he used 53 more inches of string. How many inches of string did he use in all?

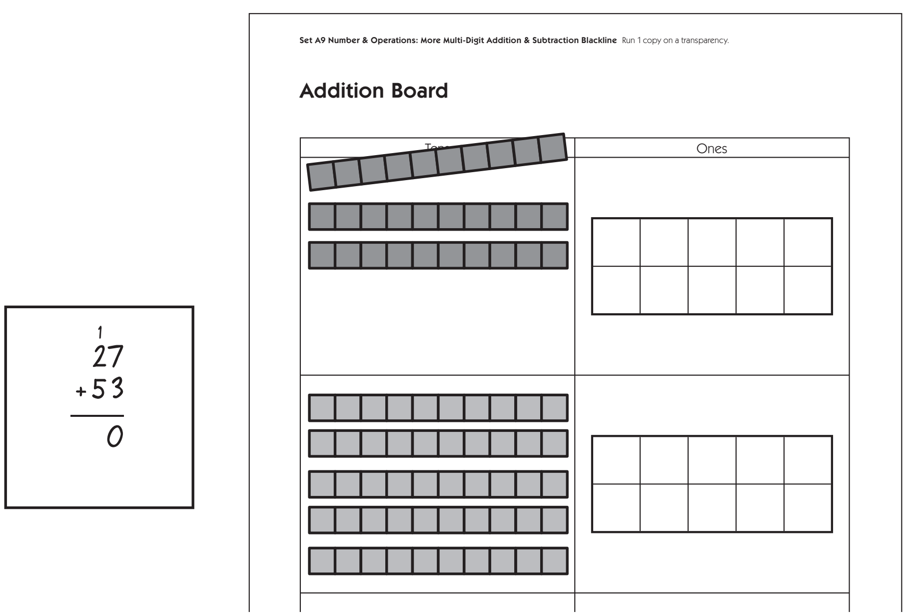
2. Work with input from the class to record an equation for the problem on the board. Then place the Addition Board on display at the overhead while helpers distribute boards and base ten pieces to pairs of students. Set out the two quantities (27 and 53) on your board as students do so on theirs.

Activity 2 Recording the Traditional Algorithm for Double-Digit Addition (cont.)

3. Remind students that when people use this method, they start with the 1s instead of the 10s. Ask students to add 7 + 3 mentally. Will there be enough units to trade in for a 10-strip? How do they know? Then ask students to move all the units down to the bottom row on their board as you do so on yours. Count the units with the children to confirm that the total is 10.



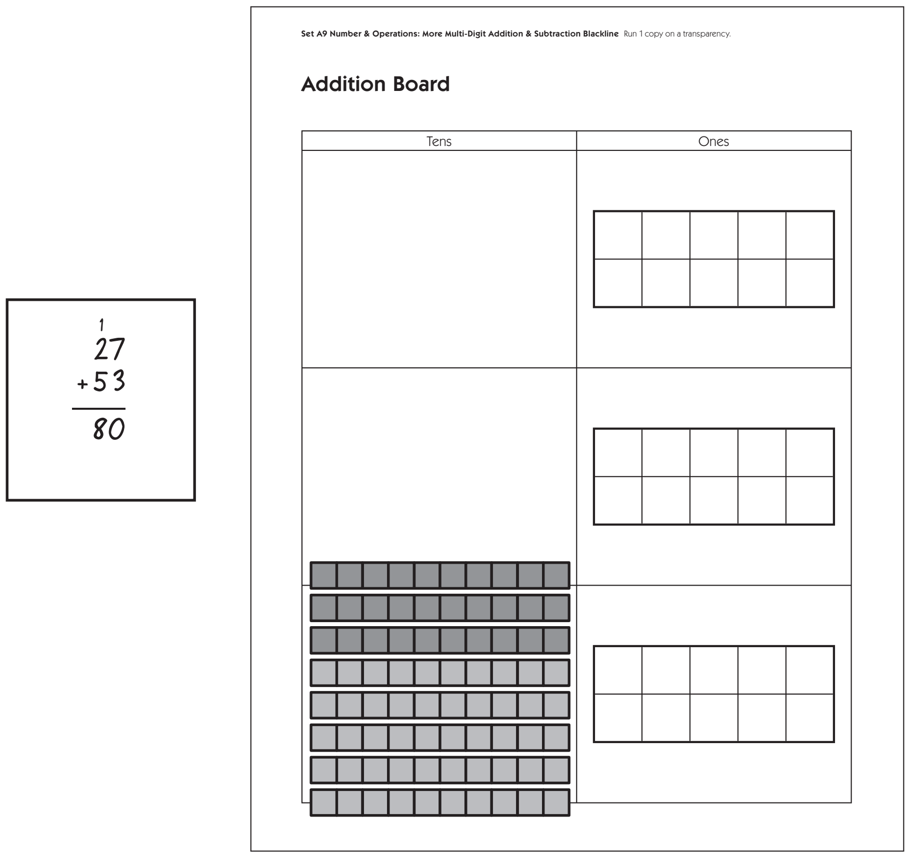
4. Ask students what to do next. Work with their input to trade the 10 units in for a strip. Move the strip over to the 10's column at the overhead as they do the same on their boards. Then record the action in numeric form at the board, and have students explain.



Activity 2 Recording the Traditional Algorithm for Double-Digit Addition (cont.)

> ***Students*** *We had to make a strip because all the boxes on the ones side were full.*
> *Every time you get 10, you have to trade them in and move them over.*
> *That little 1 really means 10.*

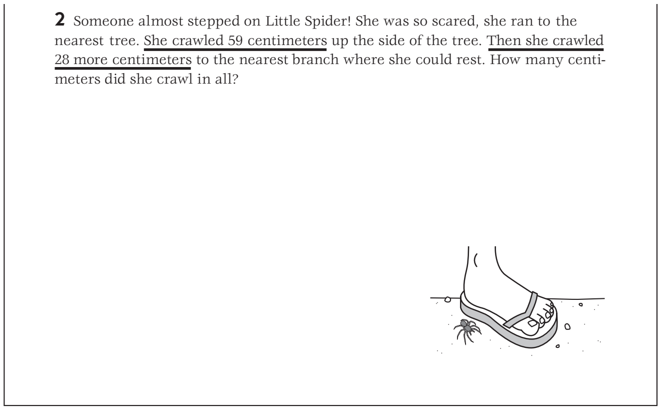
5. Ask students to add 10 + 20 + 50 mentally and report the results. Then combine the strips to confirm that the total is 80, and record the results to complete the problem. Does the answer make sense? Why or why not?



6. Ask children to clear their boards and get ready for a new problem. Then remove the Addition Board from the overhead and show the second story problem. Read the problem with the students, and work with them to underline the relevant information. Ask them to pair-share estimates, and call on a few volunteers to share and explain their thinking.

7. Work with input from the class to record an equation on the board. Then call a volunteer up to the overhead to lead the class in setting up the problem on their boards and working it, as you record each step with numbers at the board.

Activity 2 Recording the Traditional Algorithm for Double-Digit Addition (cont.)

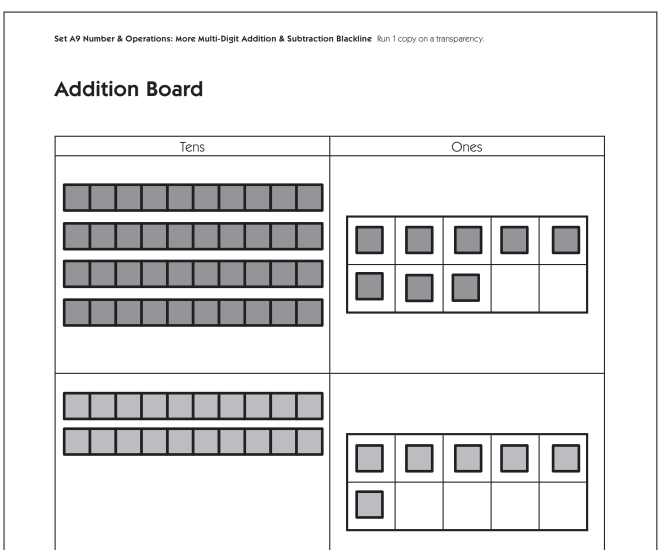

2 Someone almost stepped on Little Spider! She was so scared, she ran to the nearest tree. She crawled 59 centimeters up the side of the tree. Then she crawled 28 more centimeters to the nearest branch where she could rest. How many centimeters did she crawl in all?

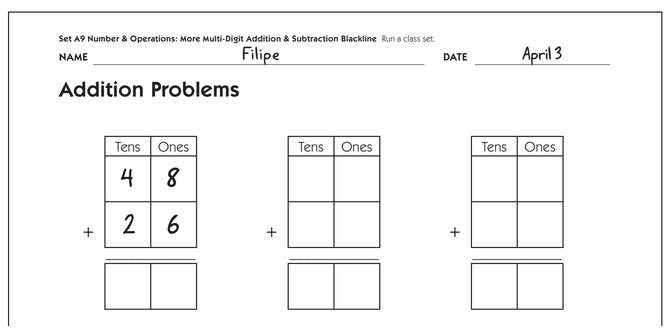
$$\begin{array}{r} {}^{1} \\ 59 \\ +\,28 \\ \hline 87 \end{array}$$

8. Write 65 + 16 on the board as children clear their addition boards. Ask students to pair-share story problems that match this equation. Then call on a volunteer to share his or her problem with the class. Have students estimate the solution. Then ask them to work the problem with base 10 pieces on their addition boards as a classmate leads at the overhead, and you record each step with numbers at the board.

9. Give students each a copy of the Addition Problems sheet. Explain that you are going to work some problems with the base ten pieces at the overhead while they record each step with numbers on their worksheet. Set 4 strips and 8 units into the first row of the Addition Board at the overhead and have students record that number on their worksheet. Then set 2 strips and 6 units into the second row as students record the number.

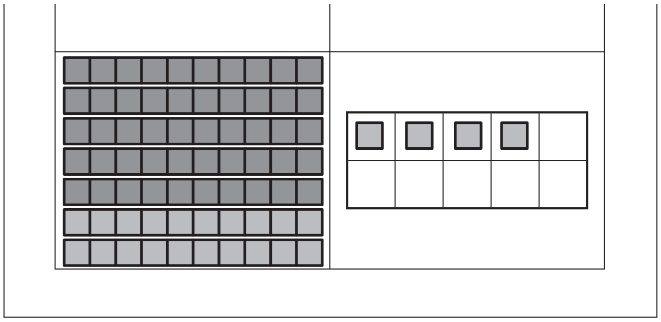
Ask:
- What two numbers are we adding?
- Will we need to trade in 10 ones for a strip to solve this problem? How do you know?
- What is your estimate of the total?

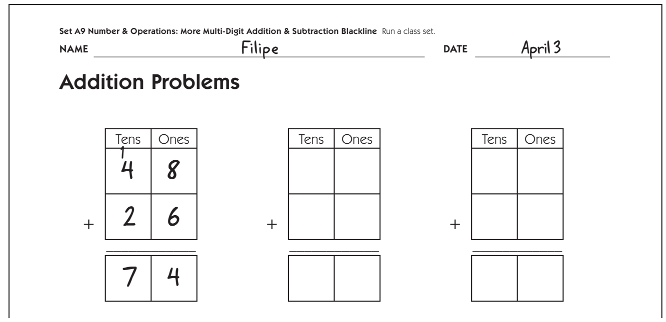




10. Move the units down to the bottom row and confirm that the total is 14. Work with input from the class to trade 10 units for a strip and move it to the tens column as students record the process with numbers on their worksheets. Move the strips down to the bottom row to complete the problem.

Activity 2 Recording the Traditional Algorithm for Double-Digit Addition (cont.)





Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Blackline Run a class set.

NAME Filipe DATE April 3

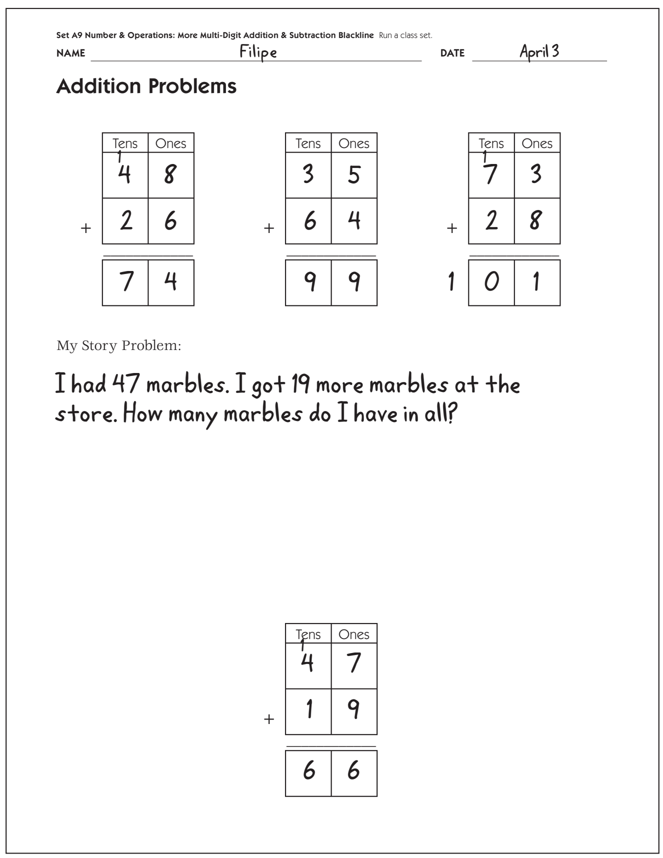
Addition Problems

	Tens	Ones
	4	8
+	2	6
	7	4

11. Repeat steps 9 and 10 with the following combinations:

$$\begin{array}{r} 35 \\ +\ 64 \\ \hline \end{array} \qquad \begin{array}{r} 73 \\ +\ 28 \\ \hline \end{array}$$

12. Finally, write the combination 47 + 19 on the board. Ask students to write their own story problem to match, and then record and solve the problem at the bottom of their worksheet. Encourage them to use their base 10 pieces and addition boards if necessary.



Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Blackline Run a class set.

NAME Filipe DATE April 3

Addition Problems

	Tens	Ones
	4	8
+	2	6
	7	4

	Tens	Ones
	3	5
+	6	4
	9	9

	Tens	Ones
	7	3
+	2	8
1	0	1

My Story Problem:

I had 47 marbles. I got 19 more marbles at the store. How many marbles do I have in all?

	Tens	Ones
	4	7
+	1	9
	6	6

Activity 2 Recording the Traditional Algorithm for Double-Digit Addition (cont.)

Extensions

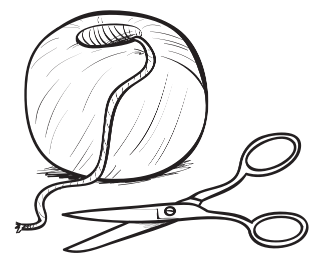
- In order to provide students additional opportunities to develop fluency with the traditional algorithm for multi-digit addition, see Supplement Set A5, Activity 4.
- Look for related work with multi-digit addition in the Grade 2 Bridges Practice Book.
- Encourage students to continue using their addition boards and base ten pieces to model double-digit addition problems until they gain confidence working with the numbers only.

Independent Worksheets

See Set A9 Independent Worksheets 1–3 and 7–9 for more practice with the traditional algorithm for 2-digit addition.

Length and Distance Problems

1 Miguel was doing an art project. He used 27 inches of string. Then he used 53 more inches of string. How many inches of string did he use in all?



2 Someone almost stepped on Little Spider! She was so scared, she ran to the nearest tree. She crawled 59 centimeters up the side of the tree. Then she crawled 28 more centimeters to the nearest branch where she could rest. How many centimeters did she crawl in all?

NAME ______________________ **DATE** ______________

Addition Problems

Tens	Ones
+	

Tens	Ones
+	

Tens	Ones
+	

My Story Problem:

____

____

____

____

____

____

____

____

Tens	Ones
+	

Set A9 ★ Activity 3

ACTIVITY

Introducing the Open Number Line

Overview

As a prelude to teaching the traditional algorithm for double-digit subtraction, the open number line is introduced and developed in Activities 3 through 5. The open number line gives students another informal strategy for dealing with multi-digit computation, and is especially useful in solving problems that involve missing addends and subtrahends. The open number line also helps children understand how addition and subtraction are related, and enables them to estimate the results of multi-digit subtraction more effectively than they might be able to otherwise.

Skills & Concepts

★ show the number that is ten more or ten less than any number 10 through 90

★ develop fluency with two-digit addition and subtraction

★ find the distance between numbers on the number line

★ use the mathematical relationship between addition and subtraction and properties of addition to model and solve problems

★ find missing values in open sentences

You'll need

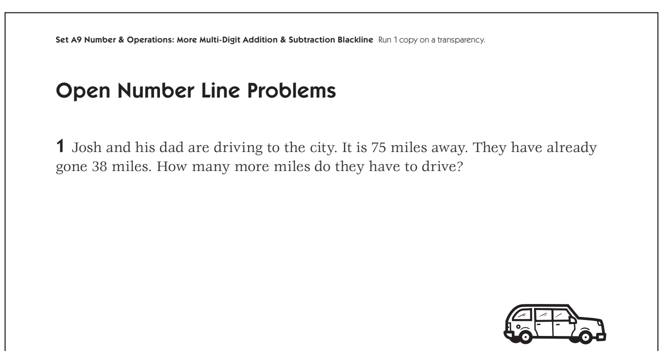
★ Open Number Line Problems (page A9.23, run 1 copy on a transparency)

★ Open Number Line Record Sheet (page A9.24, run a class set)

★ a piece of paper to mask portions of the overhead

Instructions for Introducing the Open Number Line

1. Display the first story problem from Open Number Line Problems on the overhead and read it out loud. Have students follow along with you. Ask them to pair-share ideas about what the problem is asking, and how they would go about solving it.


Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Blackline Run 1 copy on a transparency.

Open Number Line Problems

1 Josh and his dad are driving to the city. It is 75 miles away. They have already gone 38 miles. How many more miles do they have to drive?

2. After a minute or so, ask for a few volunteers to share with the class.

> ***Andre*** *You have to figure out how much farther they have to drive. You could keep going, like count up from 38 to 75.*

> ***Brianna*** *You could go maybe go backwards from 75 down to 38.*

Activity 3 Introducing the Open Number Line (cont.)

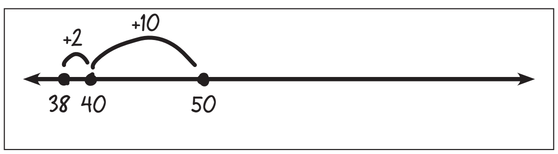
3. Students will probably have a variety of ideas for solving the problem, including counting on from, or adding to 38 to reach 75, or counting backwards from 75 to find out how many miles remain. Summarize both approaches by writing the following equations below the story problem at the overhead:

$$38 + \boxed{} = 75 \qquad\qquad 75 - \boxed{} = 38$$

> ***Teacher*** *Andre said we should just keep going from 38 up to 75, so I wrote 38 + box equals 75. What does the box mean in this equation?*
>
> ***Students*** *It means the part you have to figure out.*
> *It's where you write the answer.*
> *It's like the problem you have to solve. 38 plus how many more to get to 75?*
> *On that other one, it's like you're finding out how far you have to go backwards to get down to 38.*

4. Acknowledge students' ideas and explain that today you are going to share a new tool for solving problems like these. Then draw a horizontal line across the whiteboard. Include an arrow on either end to show that the number line continues indefinitely in both directions. Record the smaller number by marking and labeling a dot on the far left side. Then propose to move along the number line by hops greater than 1 to find the difference between 38 and 75.

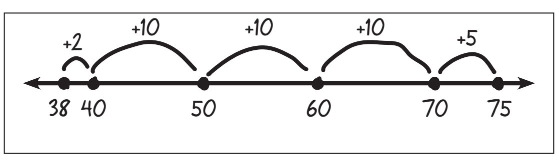
> ***Teacher*** *What if Josh and his dad drive 2 more miles? How far will they be then? I'm going to show it on our line like this. And then what if they drove 10 more miles after that? How far would they be?*



> ***Students*** *Now they're up to 50 miles!*
> *They have gone 12 miles after the 38 because 2 + 10 is 12.*
> *I know how many more miles they have to go to get to 75!*

5. Ask students to suggest additional hops you could take along the number line to get to 75.

> ***Students*** *You could keep going by tens, like 60 and then 70.*
> *And then you could take just one more little hop up to 75. It's just 5 away from 70.*



6. Work with students to summarize the information on the open number line. Ask:

- How much farther did Josh and his dad have to drive to get to the city?
- How do you know? Can you show us on the open number line?
- Does this give us the answer to the problem?
- Did we add or subtract to find the answer?

Activity 3 Introducing the Open Number Line (cont.)

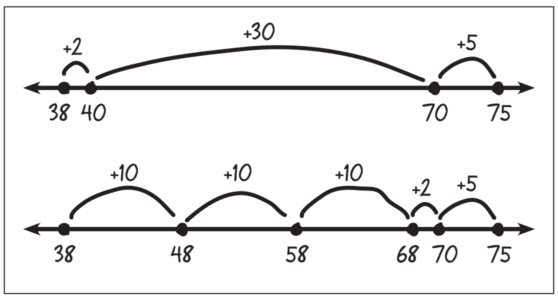
> ***Students*** *They had to go 37 more miles because if you add up all the hops, it's 10, 20, 30, then 32 plus 5, and that's 75.*
> *It's right because 38 and 37 really is 75, I checked it.*
> *But why are we adding when it should be take away?*
> *You can add to find the answer to a subtract problem, like 14 – 7 is 7 because 7 + 7 is 14.*

7. Draw two more lines on the board, and invite volunteers to share different ways to hop from 38 to 75. Draw and label the hops as they describe their ideas.

> ***Teacher*** *Who has another way? Are there different hops you can use to get from 38 to 75?*

> ***Dontrelle*** *I would just go from 38 to 40. Then I would just make one big hop up to 70 because 40 plus 30 is 70. Then it's 5 more to 75.*

> ***Sarah*** *I would do 10's right away, like 48, 58, 68, then it's 2 more to 70, and then 5 more to get up to 75.*



8. Discuss the different strategies with the class. Is the answer (37) the same each time? What does the number 37 tell you? (How many miles Josh and his dad had to drive to get to the city.) Where does 37 belong in the equations you wrote?

38 + <u>37</u> = 75   75 – <u>37</u> = 38

9. Give each student a copy of the Open Number Line record sheet. Ask them to record the two equations at the top of the first box, and then show how they would make hops to get from 38 to 75 on the number line. Tell them that they can copy one of the solutions on the board, or make up their own. Remind them to label their work.

10. Display the second word problem on the overhead and read it together. Ask students what the problem is asking, and then work with their input to record two different equations to match the situation.

2 Maria Jose wants to buy a bike that costs 72 dollars. So far, she has saved 26 dollars. How much more money does she need to save?

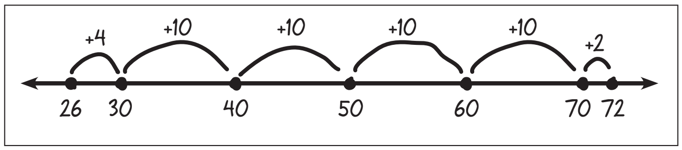
11. Erase the board and draw another horizontal line. Mark and label a dot at the far left-hand side for 26. Work with input from students to make labeled hops along the line from 26 to 72. Then ask them to

Activity 3 Introducing the Open Number Line (cont.)

record the equations at the top of the second box on their sheets, and work in pairs to solve the problem. Tell them that they can copy one of the solutions on the board, or make up their own. Remind them to label their work.

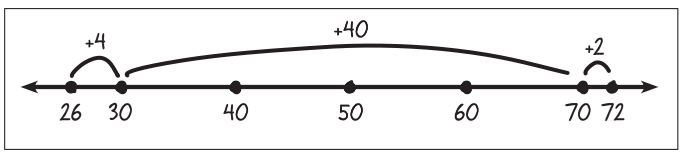
12. While students are working, draw several open number lines on the board, and ask three different pairs of students to come up to the board to share and explain their work.

> ***Juan and Joe*** *We started at 26 and went 4 up to 30. Then we hopped by tens to get up to 70. After that, it was just 2 more to get up to 72. It all added up to 46, so the girl needs to save 46 more dollars to get the bike.*



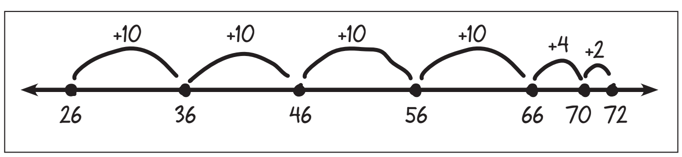
4 + 10 + 10 + 10 + 10 + 2 = 46

> ***Sara and Rob*** *We did it kind of the same, but we took one giant hop from 30 up to 70. We got the same answer, 46 more dollars.*



4 + 40 + 2 = 46

> ***Sophia and James*** *We just went by tens as far as we could and added on 4 more and then 2 more to get up to 72. It's 46.*

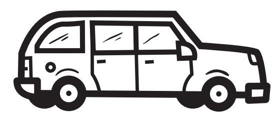


10 + 10 + 10 + 10 + 6 = 46

13. Repeat steps 10 through 12 with the last story problem on the overhead.

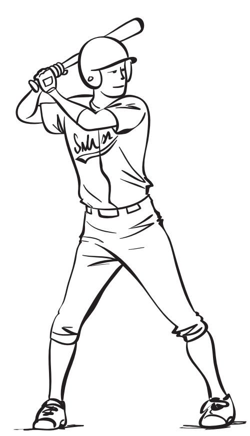
Open Number Line Problems

1 Josh and his dad are driving to the city. It is 75 miles away. They have already gone 38 miles. How many more miles do they have to drive?



2 Maria Jose wants to buy a bike that costs 72 dollars. So far, she has saved 26 dollars. How much more money does she need to save?

3 Pablo had 39 baseball cards. He got some more baseball cards for his birthday. Now Pablo has 63 baseball cards. How many baseball cards did Pablo get for his birthday?



NAME ______________________ **DATE** ______________

Open Number Line Problems

Show how you solve the story problems below.

Problem 1

Problem 2

Problem 3

Set A9 ★ Activity 4

ACTIVITY

Height & Length Problems

Overview

In this activity, students are shown a story problem involving length comparison, and asked to compare and contrast three different solutions. Students then work in pairs or individually to solve two related story problems using the open number line.

Skills & Concepts

★ show the number that is ten more or ten less than any number 10 through 90

★ develop fluency with two-digit addition and subtraction, using efficient, accurate, and generalizable strategies, and describe why the procedures work

★ find the distance between numbers on the number line

★ use the mathematical relationship between addition and subtraction and properties of addition to model and solve problems

★ find missing values in open sentences

★ solve simple word problems involving length

You'll need

★ David's Problem (page A9.28, run 1 copy on a transparency)

★ Length Problems on the Open Number Line (page A9.29, run 1 copy on a transparency and a class set)

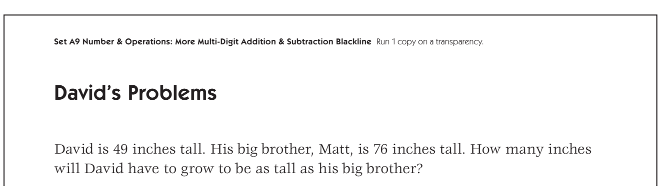
★ a piece of paper to mask portions of the overhead

★ a cloth measuring tape marked in inches from the Bridges kit

★ individual chalkboard/whiteboard, chalk/pen, and eraser for each student

Instructions for Height & Length Problems

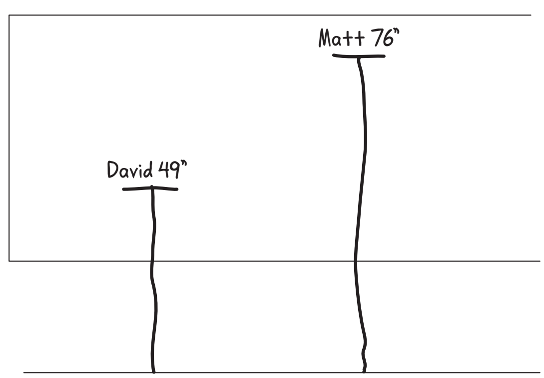
1. Tell students that you are going to share a story problem with them. Display the problem at the top of the first transparency, keeping the rest of the sheet covered for now. Read the problem with the students, and ask a volunteer to explain what the problem is asking them to figure out. Have students help you measure and mark both heights, 49 and 76 inches, on the board.



Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Blackline Run 1 copy on a transparency.

David's Problems

David is 49 inches tall. His big brother, Matt, is 76 inches tall. How many inches will David have to grow to be as tall as his big brother?



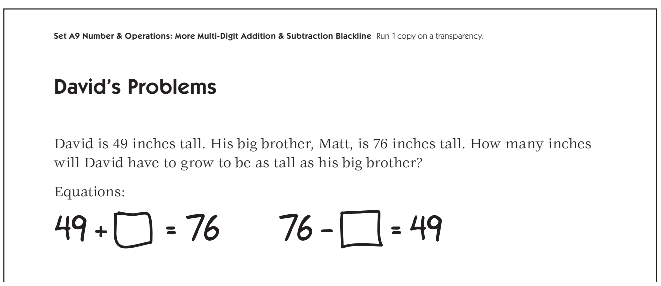
Activity 4 Height & Length Problems (cont.)

2. Ask students to pair-share estimates as to how many inches David will have to grow to catch up with his brother. Then have a few volunteers share their estimates with the class.

> ***Students*** *If David grew 10 inches, he would be up to 59.*
> *I think it's 26 because 50 plus 25 is 75, and one more is 76.*
> *It's more than 20 because 49 + 20 is only 69.*

3. Work with students' input to record two equations on the transparency that reflect the situation.

> ***Teacher*** *I think we all agree that this problem is asking us to figure out how many inches David has to grow to catch up with Matt. What equations can we write that will show what we have to do?*
>
> ***Anna*** *We have to go up from 49 to 76, so we could do one like 49 plus box equals 76.*
>
> ***Teacher*** *Any other ideas? Would it work if we went the other way? What about 76 minus box equals 49?*
>
> ***Jensen*** *I think it would be the same. You can jump up or jump down, it's still the same number of inches between David and Matt.*



Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Blackline Run 1 copy on a transparency.

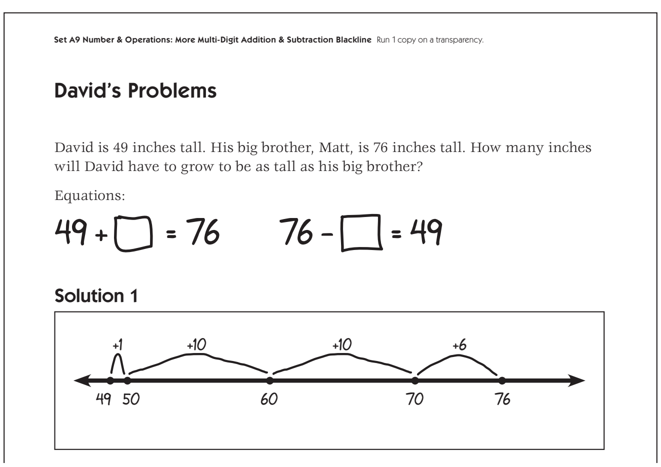
David's Problems

David is 49 inches tall. His big brother, Matt, is 76 inches tall. How many inches will David have to grow to be as tall as his big brother?

Equations:

$49 + \square = 76$ $76 - \square = 49$

4. Now explain that you are going to show some solutions to the problem from other second graders. Reveal the first solution. Give students a few moments to study it quietly, and then ask a volunteer to explain the work.



Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Blackline Run 1 copy on a transparency.

David's Problems

David is 49 inches tall. His big brother, Matt, is 76 inches tall. How many inches will David have to grow to be as tall as his big brother?

Equations:

$49 + \square = 76$ $76 - \square = 49$

Solution 1

> ***Marco*** *That kid hopped up to 50. Then he went 10 more and 10 more to get up to 70. Then he took one more hop. In all, it's 27 inches for David to get up to his brother.*

Activity 4 Height & Length Problems (cont.)

5. Give students each a whiteboard/chalkboard, pen/chalk, and an eraser. Have them copy the equation $1 + 10 + 10 + 6 = 27$ at the top of their boards. Then ask them why the second grader who solved the problem wrote this equation. (You have to add up the hops to get the answer.)

6. Reveal each of the other two solutions, one at a time. In each case, ask students to write an equation that shows the hops, and then add them to find the answer. Then have them compare and contrast the equations on their boards. How are the three equations alike? How are they different? Guide children to the observation that the order in which two numbers are added [commutative property] and how the numbers are grouped in addition [associative property] will not change the sum.

$$1 + 10 + 10 + 6 = 27$$

$$10 + 10 + 1 + 6 = 27$$

$$1 + 25 + 1 = 27$$

Students *They all make 27.*
David has to grow 27 more inches.
The one at the top and the next one have the same numbers, but they're mixed up.

Teacher *Is that okay?*

Students *It still turns out the same every time. You can switch numbers, like 2 + 3 is the same as 3 + 2.*
Sometimes it's easier to switch the numbers around. Like on the first one, you have to go 1 + 10 is 11. Then 11 + 10 is 21, and then plus 6 is 27. The other one is just 10 and 10 is 20, plus 7 is 27.

Teacher *What about the last equation?*

Juan *Well, it's weird, but it works. It's kind of like if you chop a 5 out of the 6, and give it over to the 2 tens, you have 25, and then 2 more. No matter how you add up the numbers, you still get the same answer.*

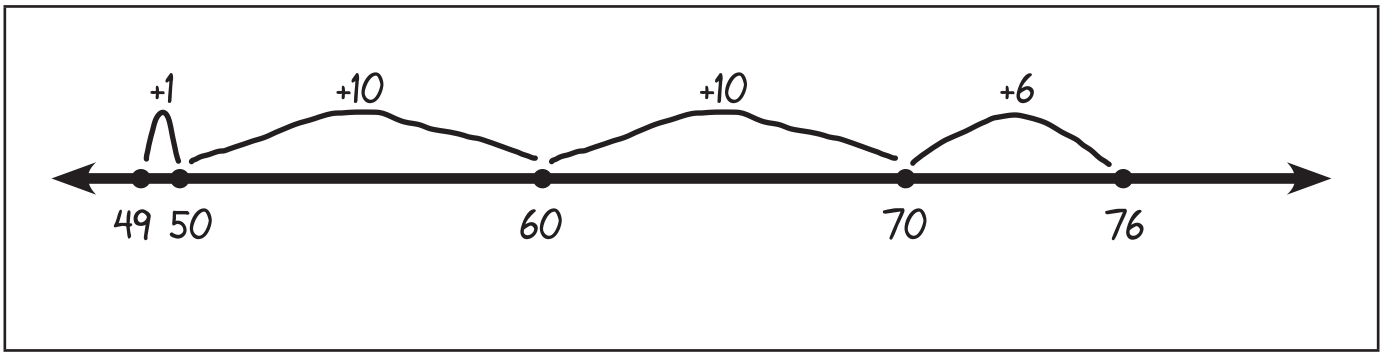
7. Collect the boards, chalk or pens, and erasers. Give students each a copy of Length Problems on the Open Number Line. Display the corresponding sheet at the overhead, and read both problems with the students. Give students the option of solving the problems individually or in pairs, and invite those children who need more support to work with you. Ask early finishers to share and compare their solutions with at least one other person, and then turn the sheet over to write their own open number line problem for a partner to solve.

David's Problems

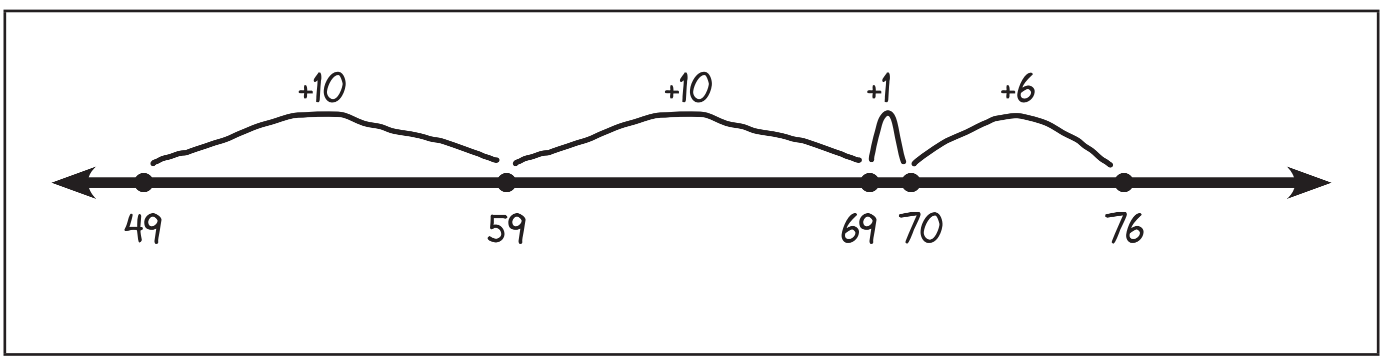
David is 49 inches tall. His big brother, Matt, is 76 inches tall. How many inches will David have to grow to be as tall as his big brother?

Equations:

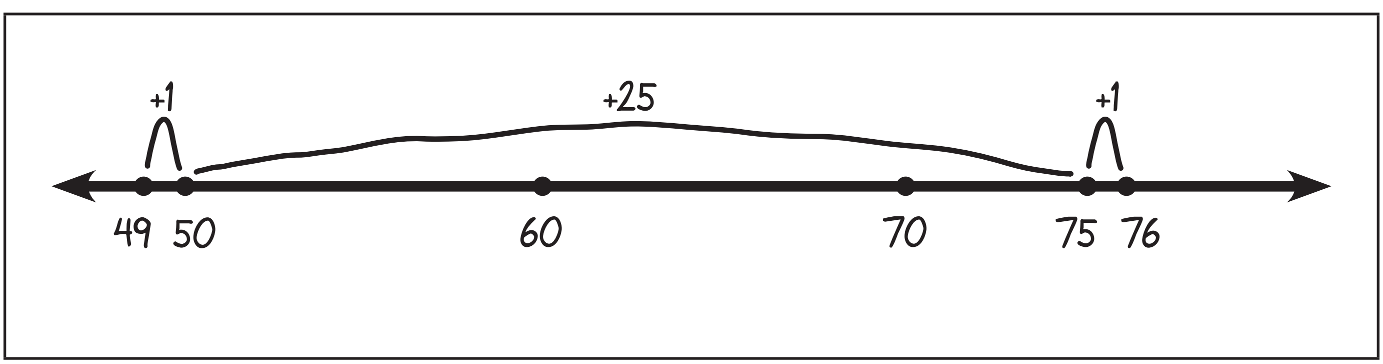
Solution 1



Solution 2



Solution 3



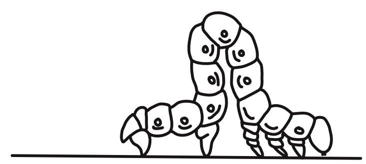
NAME ______________________________ **DATE** ________________

Length Problems on the Open Number Line

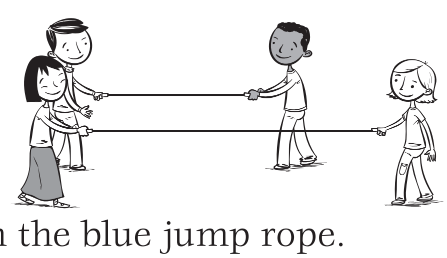
Use the open number line to solve each of these problems. Be sure to label your work and show the answer.

1 Little Inch Worm is going to visit her grandma. Her grandma lives 82 inches away. Little Inch Worm has already crawled 47 inches. How many more inches does she have to crawl?

Little Inchworm has to crawl ___________ more inches.



2 We have 2 jump ropes. The red one is 120 inches long. The blue one is only 84 inches long. How many inches longer is the red rope than the blue rope?



The red jump rope is ___________ inches longer than the blue jump rope.

Set A9 ★ Activity 5

ACTIVITY

Greatest Difference Wins

Overview
This activity features a game in which students practice finding the difference between double-digit numbers. Each team takes a turn to spin two double-digit numbers and find the difference between them. The team that gets the greatest difference wins.

Skills & Concepts
★ read, write, compare, and plot whole numbers on a number line

★ show the number that is ten more or ten less than any number 10 through 90

★ develop fluency with two-digit addition and subtraction, using efficient, accurate, and generalizable strategies, and describe why the procedures work

★ find the distance between numbers on the number line

★ use the mathematical relationship between addition and subtraction and properties of addition to model and solve problems

★ find missing values in open sentences

You'll need
★ Greatest Difference Wins (page A9.34, see Advance Preparation)

★ individual chalkboard/whiteboard, chalk/pen, and eraser for each student

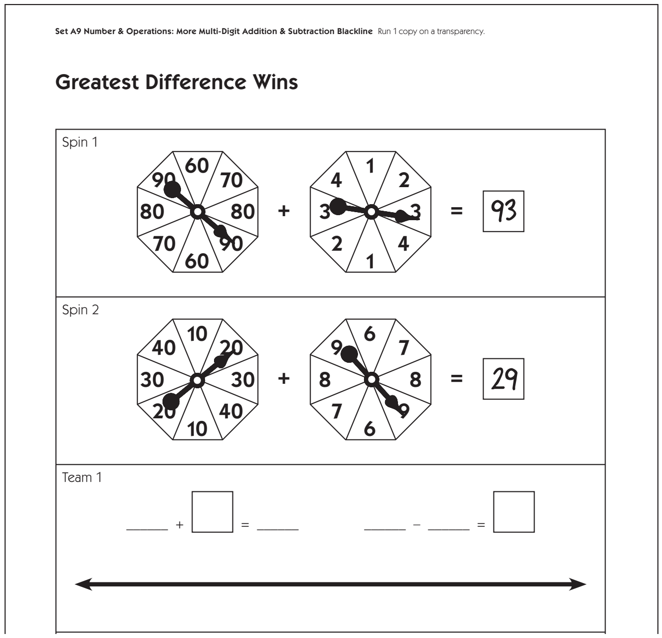
Advance Preparation Follow the instructions below to attach an "arrow" to each of the spinners on the transparency. (You can use a transparent double spinner overlay instead if you have one.)

1. Poke a brass fastener through a ¼″ length of drinking straw and a paperclip. Be sure to insert the brad and straw into the large end of the paperclip, as shown.
2. Keeping the straw and the paperclip on the brass fastener, insert it into the midpoint hole of the spinner. Once it has been pushed through to the backside, bend each side of the fastener flap against the underside of the transparency. The section of straw should serve as a spacer so the brad doesn't push the paperclip flat against the transparency and prevent it from spinning.
3. Give the paperclip a test spin to see if it works.

Instructions for Greatest Difference Wins
1. Tell students that they are going to play a game today that will give them more practice at finding the difference between 2 double-digit numbers. Place the game transparency on display at the overhead, and give students a few moments to examine it quietly.

2. Invite several volunteers to share observations about the transparency with the class. Then explain that you are going to play as Team 1, and the class is going to play against you as Team 2. Spin the top two spinners and work with students' input to record the total. Repeat this with the lower two spinners. Then explain that your job is to find the difference between the two numbers, but first you need to record two different equations to show the problem. Ask children's advice.

Activity 5 Great Difference Wins (cont.)



Students *Put the little number on the line and make hops to get to the big one.*
Go up from the smaller number. It's easy on that line.
It's like going 29 plus what equals 93.
Yeah, you can just hop up to 30, and then it's easy.

Teacher *So, I'm going to write 29 plus box equals 93 for my first equation. What should I write for the second equation? What two numbers am I finding the difference between?*

Hannah *93 and 29, so you should write 93 minus 29 equals box. But I think it's way easier to add up from 29 to 93 than to subtract those two numbers.*

Derek *Me too, but you can hop backwards on the line too. It comes out the same.*

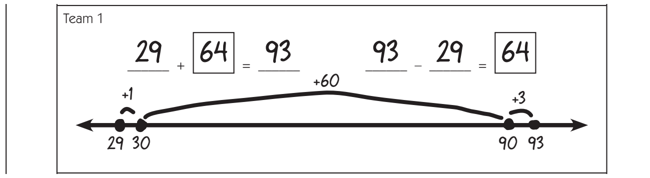
3. When you have recorded an addition and a subtraction equation to represent the problem, give students each a whiteboard/chalkboard, pen/chalk, and an eraser. Ask them to draw an open number line on their board, and follow along with you as you find the difference between the two numbers you spun.

Teacher *Okay, I want to make this really easy, so I'm going to take one hop from 29 up to 30. Then I think I'll make one giant hop from 30 up to 90. How far is that? Right, it's 60. Then all I need is one more hop up to 93. What do I need to do next?*

Students *Add up the hops!*
You have to add the numbers to see how far it is from 29 to 93.

Teacher *Okay, write the equation with me on your boards. 1 + 60 + 3 = 64. The difference between 29 and 93 is 64. I'll write that in my equation boxes.*

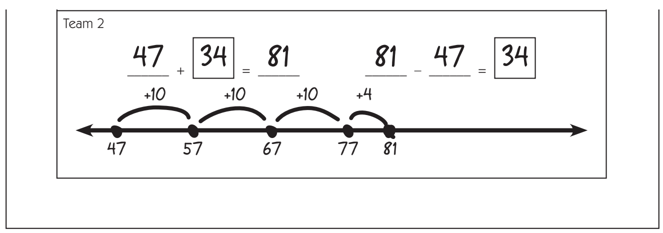
Activity 5 Great Difference Wins (cont.)



4. Ask children to erase their boards. Call a student up to spin for the class, and write the equations with help from his or her classmates. Have children pair-share ideas about whether their difference will be greater than or less than yours.

> ***Anna*** *We got 47 and 81. I don't think it's very far from 47 up to 81 because you just hop up 3 to 50, and then go 30 more to get to 80. I think our difference is going to be less.*
>
> ***Marco*** *Yeah, 81 minus 47 doesn't sound like it's going to be as big as 93 – 29. I think you have to get a really big number on the first spin and a really little number on the second spin to win.*

5. Then ask students to each draw an open number line on their board and find the difference between the two numbers. Remind them to add up their hops to find the difference between the two numbers they spun. As they finish, have them share and compare strategies and solutions with the people sitting nearest them. Then invite one student up to share and explain his or her work to the class by drawing on the transparency.



> ***Joanie*** *I like going by tens, so I just went 57, 67, 77, and then I counted to get to 81 because it's only 4 more. We only got 34 and Mrs. Peck got 64. She won this time.*

6. Write the scores on the board as students do so on their boards. Then have them insert the correct sign (<, =, or >) to show the relationship between the two numbers.

64 > 34

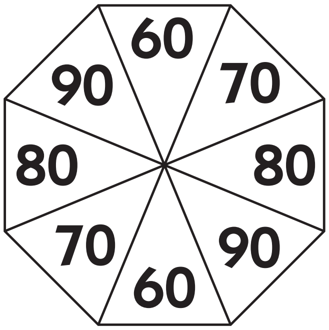
7. Erase the transparency and play a second and even third round of the game as time allows.

Extensions

- Play a round of Greatest Difference Wins every so often with your class.
- Run and laminate 3 copies of Greatest Difference Wins on cardstock, and place them in a tub long with overhead markers and wet wipes to add to your current set of Work Places.
- Look for related work with the open number line in the Grade 2 Bridges Practice Book.

Greatest Difference Wins

Spin 1



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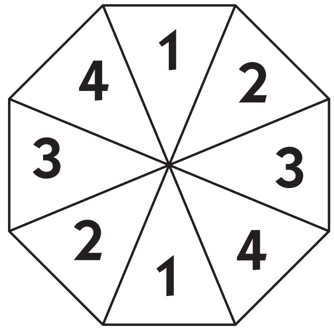

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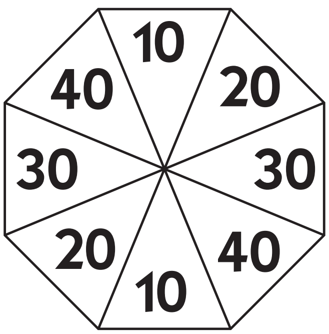
Spin 2



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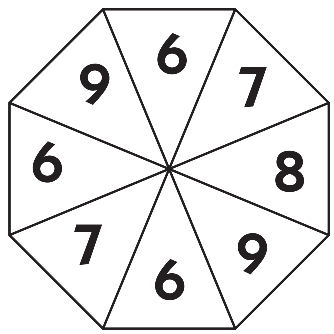

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Team 1

______ + ☐ = ______ ______ − ______ = ☐

Team 2

______ + ☐ = ______ ______ − ______ = ☐

Set A9 ★ Activity 6

ACTIVITY

Modeling the Traditional Algorithm for Multi-Digit Subtraction

Overview
Students work in pairs to solve a double-digit subtraction story problem. They share their strategies with the entire class while the teacher records each method in the form of a poster. The teacher then presents the traditional algorithm and has the whole class practice using it to solve a variety of 2-digit subtraction problems.

Skills & Concepts
★ subtract whole numbers accurately using the traditional regrouping algorithm

★ estimate differences to predict solutions to problems or determine reasonableness of answers

★ understand the mathematical relationship between addition and subtraction

You'll need
★ Andrew's Book (page A9.40, run one copy on a transparency)

★ Subtraction Board (page A9.41, run one copy on a transparency)

★ Ten Frames (page A9.9, see Advance Preparation)

★ 3–4 pieces of 12″ × 18″ white drawing or construction paper

★ 9″ × 12″ light blue construction paper (1 sheet for each pair of students)

★ copy or lined paper (1 sheet per student)

★ 3–4 blank overhead transparencies

★ overhead base ten pieces

★ set of base ten pieces for each pair of students

★ glue sticks (half-class set)

Advance Preparation Run several copies of the Ten Frames sheet and cut the frames apart along the heavy lines. Each pair of students will need 1 ten frame.

Instructions for Modeling the Traditional Algorithm for Multi-Digit Subtraction
1. Display the word problem on the overhead. Read the problem out loud with the class and ask students to restate the question in their own words. Work with their input to underline any information that will help solve the problem. Then ask students to pair-share estimates, and call on a few volunteers to share their thinking with the class.

Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Blackline Run 1 copy on a transparency.

Andrew's Book

Andrew's book has 72 pages. He has read 28 pages so far. How many pages does Andrew have left to read?

2. Give students each a blank piece of paper. Have them work in pairs to solve the problem. Ask them to record all of their work, along with the solution, on their own paper. Remind them that they can use sketches and numbers, and that the base 10 pieces are available as well. Circulate to observe and talk

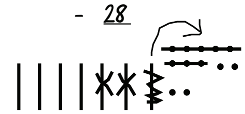
Activity 6 Modeling the Traditional Algorithm for Multi-Digit Subtraction (cont.)

with students as they're working. Pass out blank transparencies to at least 3 students, each of whom has used a different strategy, and ask them to copy their work onto the transparency to share with the class.

3. When most pairs are finished, ask the students you selected to share their solutions and explain their strategies at the overhead. Record each strategy on a separate piece of 12" x 18" paper labeled with the student's name. Ask the contributing students to work with the rest of the class to name their strategies.

Jason's Sketch, Cross-Out & Count Method

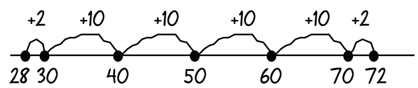
$$\begin{array}{r} 72 \\ -\underline{28} \end{array}$$



1. Draw 7 strips and 2 units for 72.
2. Cross out 2 strips.
3. Split up another strip into 10 units, and cross out 8 of them.
4. Count what's left. 44 pages

Lupe's Number Line Method

$$\begin{array}{r} 72 \\ -\underline{28} \end{array}$$



2 + 10 + 10 + 10 + 10 + 2 = 44

He has to read 44 more pages.

Ryan's Negative Number Method

$$\begin{array}{r} 72 \\ -\underline{28} \end{array}$$

70 – 20 = 50
2 – 8 = –6

50 – 6 = 44 pages

Yolanda's Borrowing Way

$$\begin{array}{r} \overset{6}{\cancel{7}}12 \\ -\underline{28} \\ 44 \end{array}$$ pages

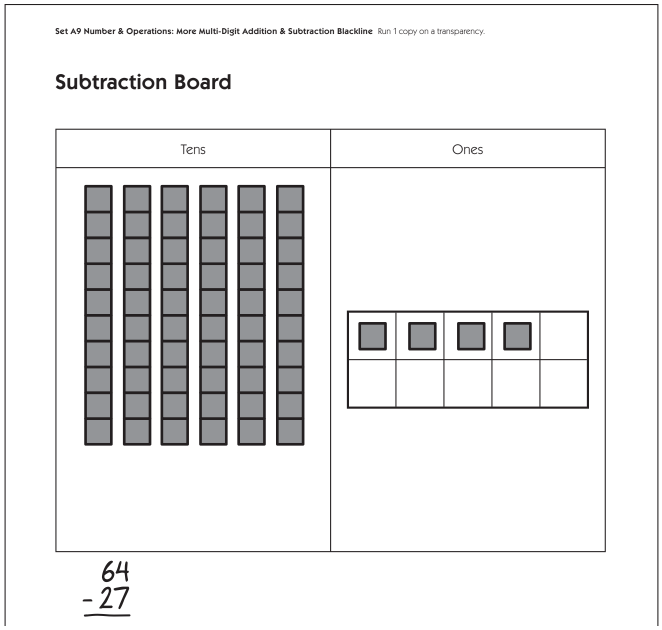
If you don't use negative numbers, you can't do 2 –8. Move a 10 over from the 10's column and split it into 1s. Now you have 12 there.

12 – 8 = 4
60 – 20 = 40
So it's 44 pages

4. Acknowledge everyone's strategies. If none of the students shared a "borrowing" algorithm, contribute one to the collection yourself by creating a poster similar to Yolanda's above as students watch. Explain that this strategy is called the regrouping method, and adults often use it for solving multi-digit subtraction problems.

5. Now model the "borrowing" algorithm step-by-step with a new combination, 64 – 27. First, place the Subtraction Board on display at the overhead, and record the combination on the lower part of the sheet. Ask students to estimate the answer and pair-share their ideas. Then have several volunteers share their estimates and reasoning with the class. Next, build 64 with the base 10 pieces on the board, as shown below.

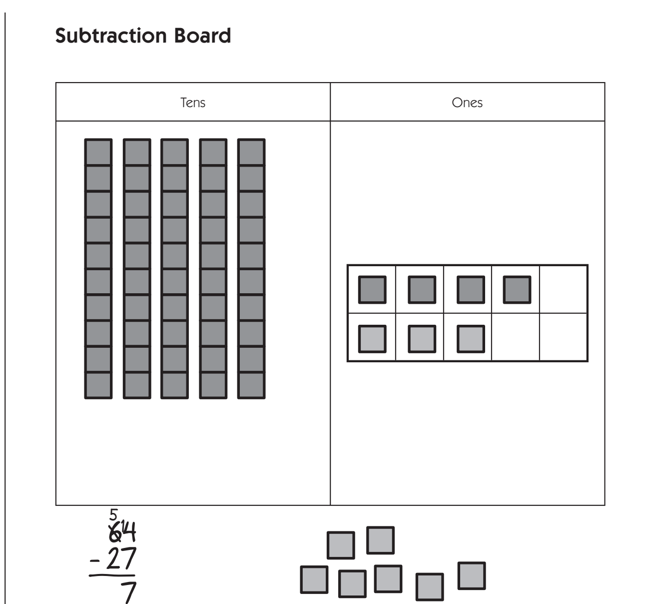
Activity 6 Modeling the Traditional Algorithm for Multi-Digit Subtraction (cont.)



6. Explain that when people use this method, they start with the 1s instead of the 10s. Ask students to consider the answer to 4 – 7. Some may say that it is impossible to subtract 7 from 4. Others may volunteer an answer of negative 3, and some may believe the answer is 3. If negative numbers come up in the discussion, explain that this method doesn't include the use of negative numbers. If some students are convinced that the answer is 3, have students hold up 4 fingers. Is it possible to subtract 7 from this collection?

7. As students watch, move one of the strips over to the 1's side and exchange it for 10 ones to create a collection of 14. Ask students to compute the answer to 14 – 7 mentally. Then remove 7 units from the board and move them to the lower part of the sheet. Confirm with students that 7 units still remain on the board. Record your action in numeric form. Have students explain what you've done so far. Ask:

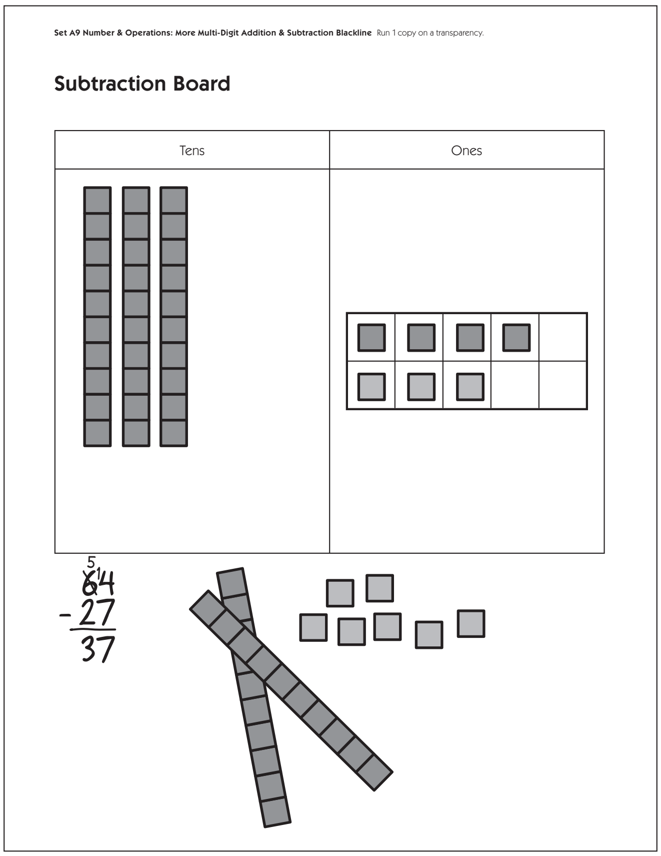
- Why did I move a strip over and exchange it for 10 ones?
- Why did I change the 4 to 14?
- Why did I cross out the 6 on the ten's side and write a 5 instead?



Activity 6 Modeling the Traditional Algorithm for Multi-Digit Subtraction (cont.)

Students *You took one of the strips and made it into 1s because you didn't have enough over there to take away 7.*
You crossed out the 6 because you took one of the strips and turned it into 1s.
Writing the little 1 by the 4 makes it into 14. It's like moving a strip over.

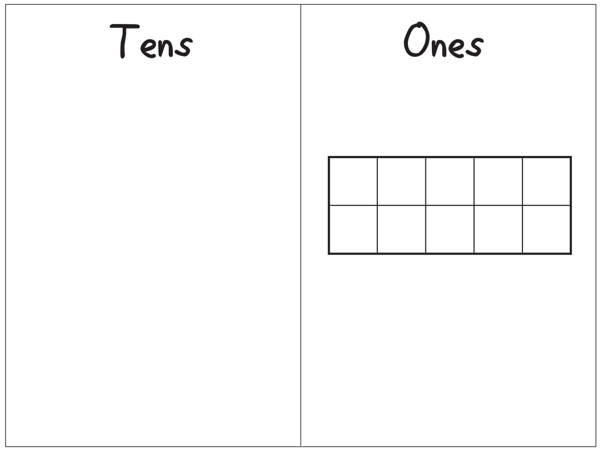
8. Work with input from the class to subtract 2 strips from the collection, and record the results. Draw students' attention to the pieces at the bottom of the sheet. Did you really subtract 27? How many were left afterwards? What would happen if you put the 27 you just moved back onto the subtraction board?



Students *Yep, you took off 27!*
There are still 37 left on the board.
If you put the 27 back on the board, it would get you back up to 64!

9. Erase the problem and remove the pieces from the transparency. Then explain that the children will work in pairs to create their own subtraction boards. Give each pair of students a piece of 9" x 12" light blue construction paper and one paper 10 frame. Ask them to work together to fold the construction paper in half, write "Tens" at the top of the left-hand column, and write "Ones" at the top of the right-hand column. Then have them glue the ten frame into place on the right-hand side of the paper, so their subtraction board looks like yours. Ask them to put their names on the back.

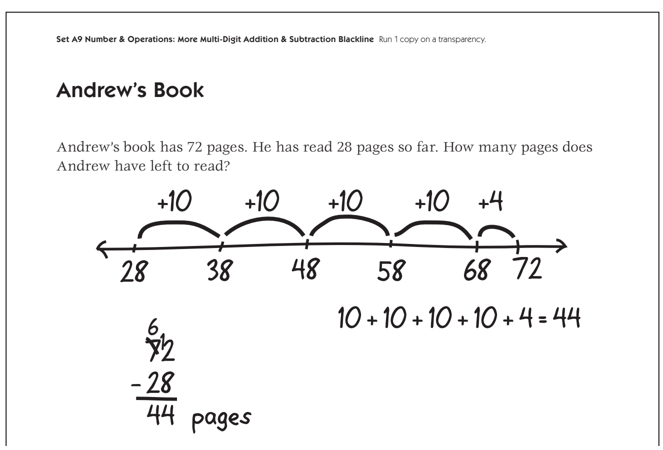
Activity 6 Modeling the Traditional Algorithm for Multi-Digit Subtraction (cont.)



10. As students finish making their subtraction boards, have helpers distribute base 10 pieces to each pair. Repeat Steps 5 through 8 with the combinations below. As you record each combination at the overhead, have children estimate a solution to the problem and explain their estimates. Then have them work in pairs on their subtraction boards to model each action with the base 10 pieces as you work with the overhead pieces and record each step with numbers.

$$\begin{array}{r} 85 \\ -\ 37 \\ \hline \end{array} \qquad \begin{array}{r} 48 \\ -\ 22 \\ \hline \end{array} \qquad \begin{array}{r} 50 \\ -\ 18 \\ \hline \end{array} \qquad \begin{array}{r} 61 \\ -\ 16 \\ \hline \end{array}$$

11. Collect students' subtraction boards for use in the next activity, and have them put their base ten pieces away. Place the transparency of Andrew's Book on display at the overhead. Read the problem with the students. Then work with their input to solve the problem using the open number line strategy and the traditional algorithm. Ask the children to compare and contrast the two methods. How are they alike? How are they different?


Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Blackline Run 1 copy on a transparency.

Andrew's Book

Andrew's book has 72 pages. He has read 28 pages so far. How many pages does Andrew have left to read?

Students *I like the number line way, but it's more work.*
I think it's easier to add up than do take away.
I think the other way is cool. It's really fast.
That's the way my uncle showed me.

Andrew's Book

Andrew's book has 72 pages. He has read 28 pages so far. How many pages does Andrew have left to read?

Subtraction Board

Tens	Ones

Set A9 ★ Activity 7

ACTIVITY

Recording the Traditional Algorithm for Double-Digit Subtraction

Overview
Students solve several double-digit subtraction problems with base 10 pieces. Then they record the process numerically as the teacher continues to model with the pieces at the overhead. Finally, students write and solve a double-digit story problem of their own.

Skills & Concepts
★ subtract whole numbers accurately using the traditional regrouping algorithm

★ estimate differences to predict solutions to problems or determine reasonableness of answers

★ use the mathematical relationship between addition and subtraction to solve problems

You'll Need
★ New Playground Equipment (page A9.48, run 1 copy on a transparency)

★ Subtraction Problems (page A9.49, run a class set)

★ Subtraction Board transparency from Activity 6

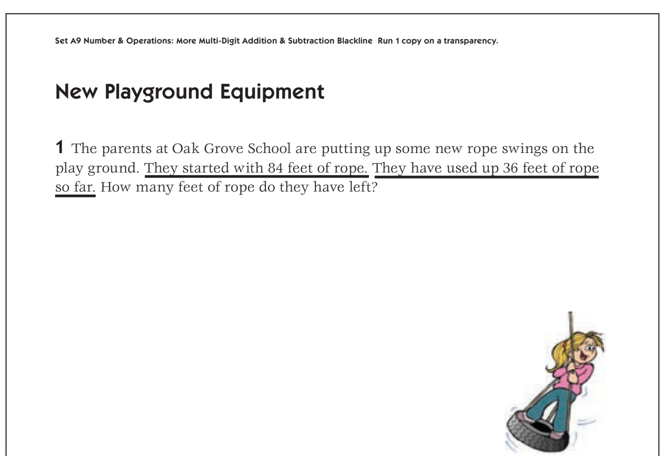
★ students' subtraction boards from Activity 6

★ overhead base ten pieces

★ set of base ten pieces for each pair of students

★ a piece of paper for masking portions of the overhead

Instructions for Recording the Traditional Algorithm for Double-Digit Subtraction
1. Let students know that you are going to do some more work with the regrouping method for subtracting 2-digit numbers today. Then display the first word problem of New Playground Equipment on the overhead. Read the problem out loud with the class and ask students to restate the question in their own words. Work with their input to underline any information that will help solve the problem. Ask students to pair-share estimates, and call on a few volunteers to share their thinking with the class.


Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Blackline Run 1 copy on a transparency.

New Playground Equipment

1 The parents at Oak Grove School are putting up some new rope swings on the play ground. They started with 84 feet of rope. They have used up 36 feet of rope so far. How many feet of rope do they have left?

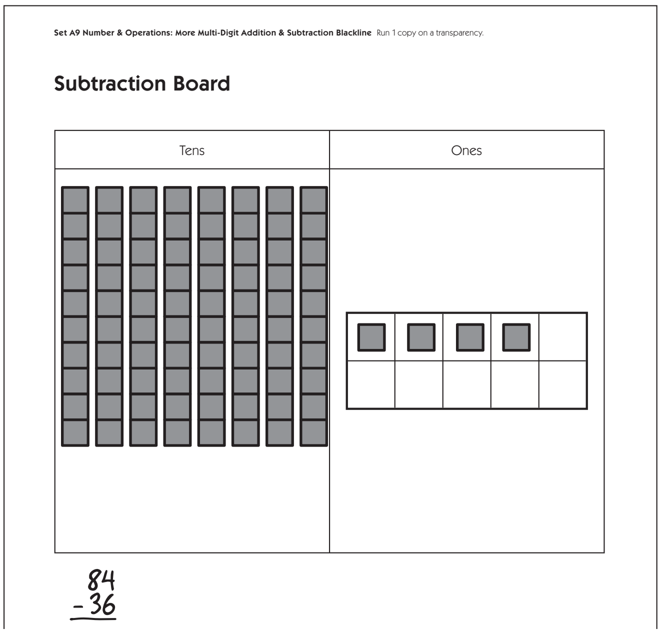
2. Place the Subtraction Board on display at the overhead and work with input from the class to write an equation to represent the problem on the lower part of the transparency. Then have helpers distribute

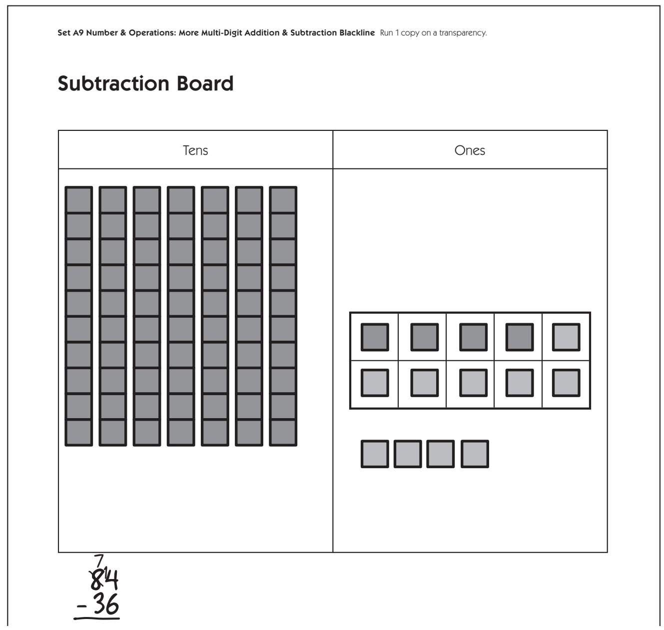
Activity 7 Recording the Traditional Algorithm for Multi-Digit Subtraction (cont.)

subtraction boards and base ten pieces to pairs of students. Set out 8 strips and 4 units on your board as students do so on theirs.

3. Remind students that when people use this method, they start with the 1s instead of the 10s. Ask students to consider the number of units on the ones side of the board and decide whether or not they need to trade in a strip for 10 units. Why or why not?

4. After a bit of discussion, move a strip from the tens to the ones side, trade it in for 10 units, and arrange the units to show there are 14 on your board as students do so on theirs. Record the action in numeric form below the subtraction board, and have students explain.





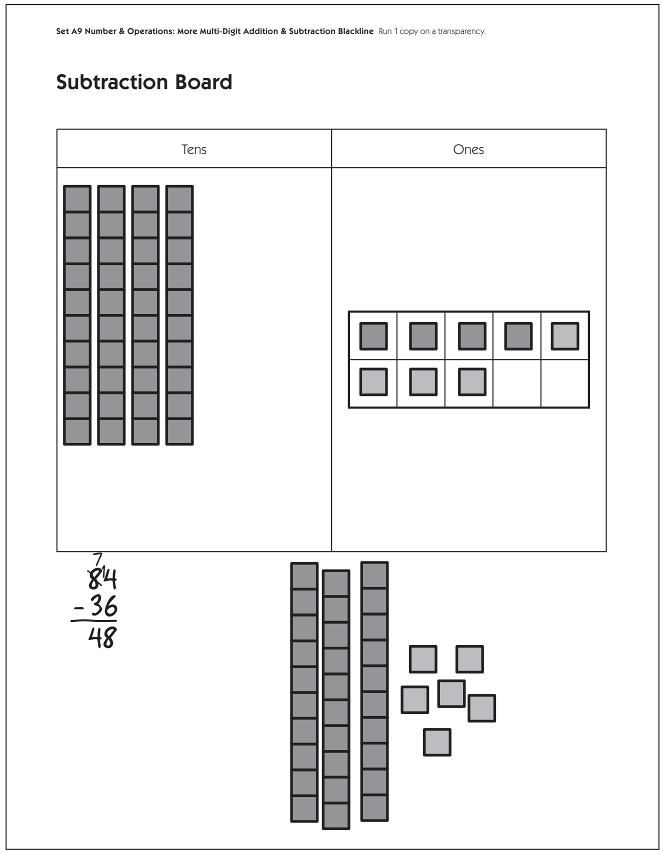
> ***Students*** *We had to get some more ones because you can't go 4 take away 6.*
> *You crossed out the 8 because we moved over a strip and traded it in for ones.*
> *Now we have 14, so we can take away 6.*
> *That little 1 you wrote next to the 4 makes it like 14 instead of 4.*

5. Work with input from the class to subtract 6 units from the ones side and 3 strips from the tens side. Move these pieces to the lower part of the transparency, as students replicate your actions on their own boards.

Ask:

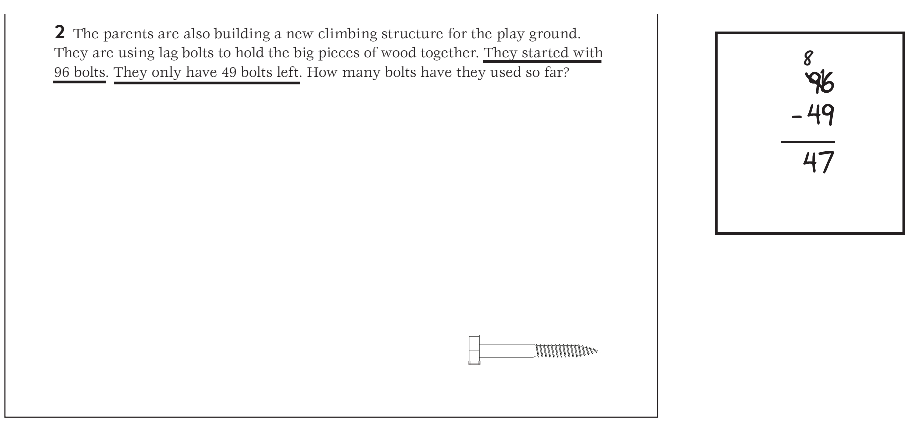
- Why did we remove 6 ones from the board?
- Why did we remove 3 tens from the board?
- How many did we subtract in all?
- How many are left on our board?
- How many feet of rope did the parents have left to make more swings?
- What would happen if we added the 3 strips and 6 units back to the collection on our board?

Activity 7 Recording the Traditional Algorithm for Multi-Digit Subtraction (cont.)



6. Ask children to clear their boards and get ready for a new problem. Remove the pieces from the Subtraction Board, erase it, and remove it from the overhead. Then display the second story problem. Read the problem with the students, and work with them to underline the relevant information. Ask them to pair-share estimates, and call on a few volunteers to share and explain their thinking.

7. Work with input from the class to record an equation on the board. Place the Subtraction Board back on display at the overhead. Then call a volunteer up to the overhead to lead the class in setting up the problem on their boards and working it, as you record each step with numbers at the board.



8. Next, write 75 – 29 on the board as children clear their subtraction boards. Ask students to pair-share story problems that match this equation. Then call on a volunteer to share his or her problem with the class. Have students estimate the solution. Then ask them to work the problem with base 10 pieces on

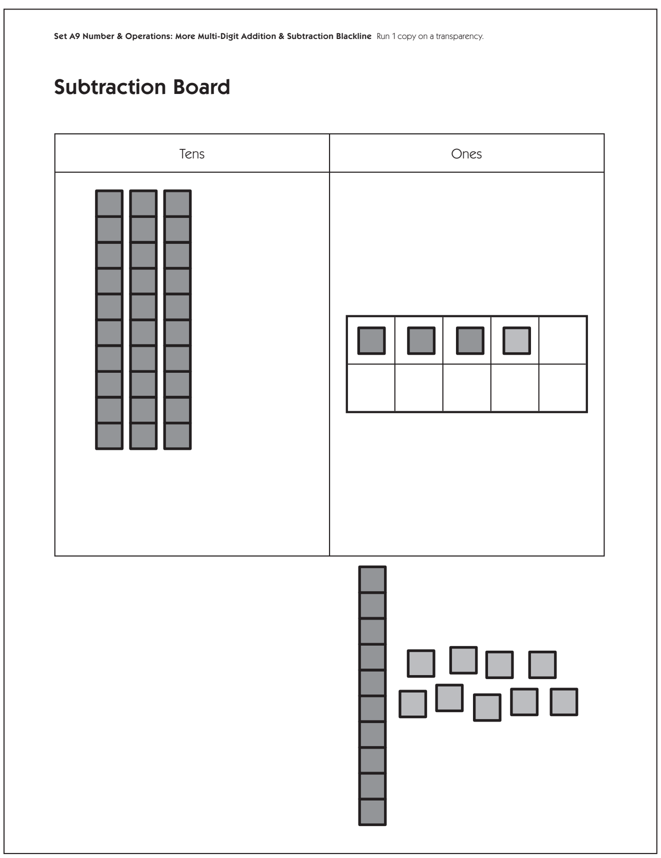
Activity 7 Recording the Traditional Algorithm for Multi-Digit Subtraction (cont.)

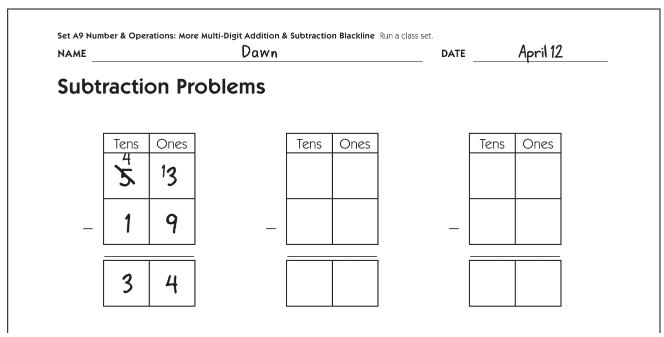
their subtraction boards as a classmate leads at the overhead, and you record each step with numbers at the board.

9. Give students each a copy of the Subtraction Problems sheet. Explain that you are going to work some problems with the base ten pieces at the overhead while they record each step with numbers on their worksheet. Set 5 strips and 3 units onto the board at the overhead and have students record that number on their worksheet. Then explain that you are going to take away 19, and have students record the information. (If you frame this as a story problem, it may help some of your students. An example in this case might be, "There were 53 apples on the tree. 19 of them fell on the ground. How many were left in the tree?")

Ask:
- What is our starting number?
- How many are we going to take away?
- Will we need to move a strip to the ones side and trade it in for 10 ones to solve this problem? How do you know?
- What is your estimate of the answer?

10. Work with input from the class to perform the needed actions with the base 10 pieces as student record the process with numbers on their worksheets.





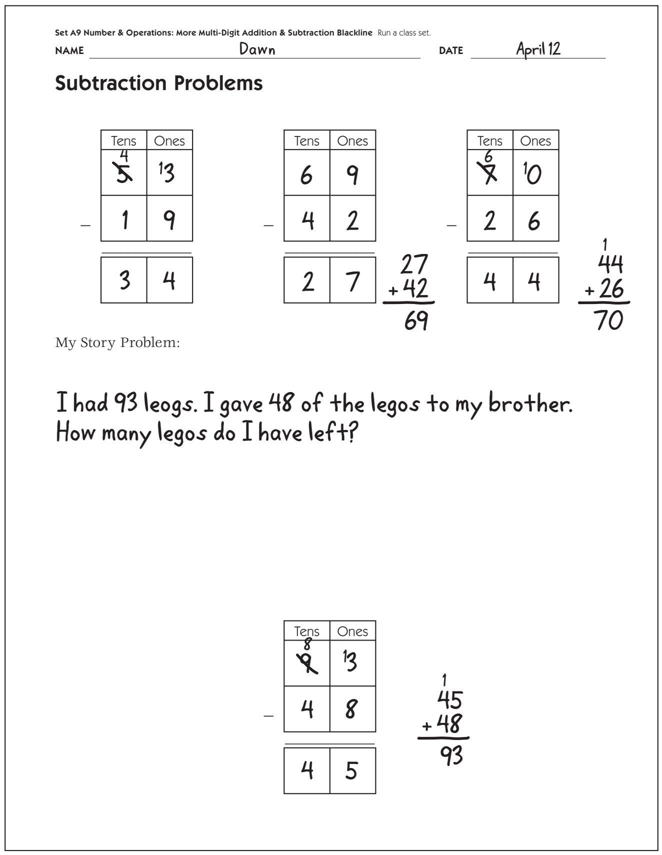
11. Repeat steps 9 and 10 with the combinations shown below. As you work, discuss the fact that if you add the pieces that have been removed back into the collection on the board, the total is the number you

Activity 7 Recording the Traditional Algorithm for Multi-Digit Subtraction (cont.)

started with. Ask children to add the subtrahend and the difference to see if this holds true in each case. Explain that this is one way people check their work to make sure they have the correct answer.

$$\begin{array}{r} 69 \\ -\ 42 \\ \hline \end{array} \qquad \begin{array}{r} 70 \\ -\ 26 \\ \hline \end{array}$$

12. Finally, write the combination 93 – 48 on the board. Ask students to write their own story problem to match, and then record and solve the problem at the bottom of their worksheet. Encourage them to use their base 10 pieces and subtraction boards if necessary.


Set A9 Number & Operations: More Multi-Digit Addition & Subtraction Blackline Run a class set.

NAME Dawn DATE April 12

Subtraction Problems

Tens	Ones
$\cancel{5}$ 4	13
− 1	9
3	4

Tens	Ones
6	9
− 4	2
2	7

$$\begin{array}{r} 27 \\ +42 \\ \hline 69 \end{array}$$

Tens	Ones
$\cancel{7}$ 6	10
− 2	6
4	4

$$\begin{array}{r} {}^{1}\ \\ 44 \\ +26 \\ \hline 70 \end{array}$$

My Story Problem:

I had 93 leogs. I gave 48 of the legos to my brother. How many legos do I have left?

Tens	Ones
$\cancel{9}$ 8	13
− 4	8
4	5

$$\begin{array}{r} {}^{1}\ \\ 45 \\ +48 \\ \hline 93 \end{array}$$

Extensions

- In order to provide students additional opportunities to develop fluency with the borrowing algorithm for multi-digit subtraction, see Supplement Set A5, Activity 4.
- Look for related work with multi-digit subtraction in the Grade 2 Bridges Practice Book.
- Encourage students to continue using their subtraction boards and base ten pieces to model double-digit subtraction problems until they gain confidence working with the numbers only.

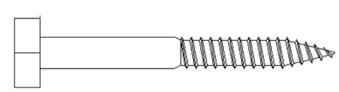
Independent Worksheets

See Set A9 Independent Worksheets 4–8 for more practice with the traditional algorithm for 2-digit subtraction

New Playground Equipment

1 The parents at Oak Grove School are putting up some new rope swings on the play ground. They started with 84 feet of rope. They have used up 36 feet of rope so far. How many feet of rope do they have left?

2 The parents are also building a new climbing structure for the play ground. They are using lag bolts to hold the big pieces of wood together. They started with 96 bolts. They only have 49 bolts left. How many bolts have they used so far?



NAME ______________________________ **DATE** ______________

Subtraction Problems

	Tens	Ones
–		

	Tens	Ones
–		

	Tens	Ones
–		

My Story Problem:

____

____

____

____

____

____

____

____

____

	Tens	Ones
–		

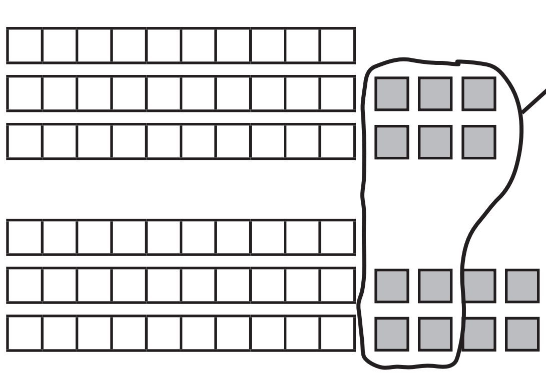
NAME ______________________________ **DATE** ______________

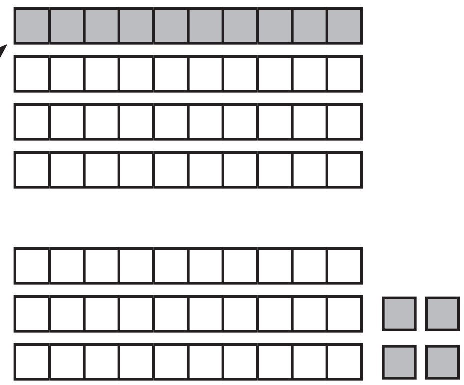
Set A9 ★ Independent Worksheet 1

INDEPENDENT WORKSHEET

PJ Panda's Regrouping Method for Addition

When PJ Panda adds big numbers, he adds the units first. If he gets more than 10, he puts 10 in a group and trades them in for a strip. Then he adds the strips to finish the problem.

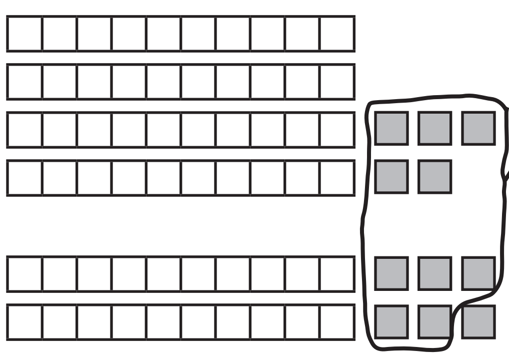




$$\begin{array}{r} {}^{1} \\ 36 \\ +\ 38 \\ \hline 74 \end{array}$$

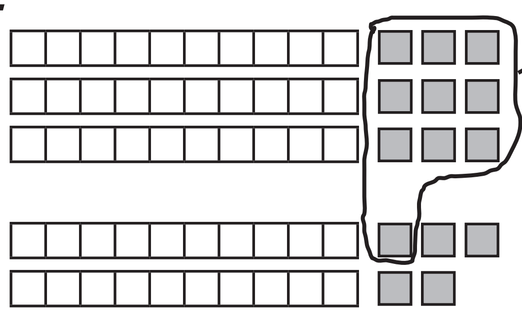
Use PJ's regrouping method to solve these problems.

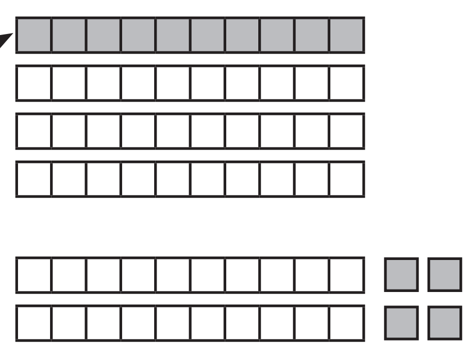
1



$$\begin{array}{r} 45 \\ +\ 26 \\ \hline \end{array}$$

2





$$\begin{array}{r} 39 \\ +\ 25 \\ \hline \end{array}$$

NAME ______________________________ **DATE** ______________

Set A9 ★ Independent Worksheet 2

INDEPENDENT WORKSHEET

Adding with PJ Panda

1 When PJ Panda adds big numbers, he adds the ones first. If he gets more than 10, he puts 10 in a group and moves them over to the tens column. Then he adds the tens to get the total. Use PJ's method to solve these problems.

ex

	Tens	Ones
	1 5	7
+	2	5
	8	2

a

	Tens	Ones
	4	6
+	3	9

b

	Tens	Ones
	1	8
+	6	2

c

	Tens	Ones
	3	6
+	4	8

d

	Tens	Ones
	1	4
+	8	2

e

	Tens	Ones
	3	6
+	5	7

f

	Tens	Ones
	8	7
+		9

g

	Tens	Ones
	4	5
+	4	5

2 Solve these problems byadding the numbers in your head.

80 + 3 = ______ 30 + 9 = ______ 40 + 13 = ______ 70 + 12 = ______

$\begin{array}{r} 70 \\ +\ 5 \\ \hline \end{array}$ $\begin{array}{r} 40 \\ +\ 12 \\ \hline \end{array}$ $\begin{array}{r} 10 \\ +\ 6 \\ \hline \end{array}$ $\begin{array}{r} 50 \\ +\ 17 \\ \hline \end{array}$ $\begin{array}{r} 60 \\ +\ 7 \\ \hline \end{array}$ $\begin{array}{r} 30 \\ +\ 18 \\ \hline \end{array}$ $\begin{array}{r} 40 \\ +\ 19 \\ \hline \end{array}$

$\begin{array}{r} 22 \\ +\ 5 \\ \hline \end{array}$ $\begin{array}{r} 32 \\ +\ 5 \\ \hline \end{array}$ $\begin{array}{r} 42 \\ +\ 5 \\ \hline \end{array}$ $\begin{array}{r} 52 \\ +\ 5 \\ \hline \end{array}$ $\begin{array}{r} 132 \\ +\ 5 \\ \hline \end{array}$ $\begin{array}{r} 452 \\ +\ 5 \\ \hline \end{array}$ $\begin{array}{r} 672 \\ +\ 5 \\ \hline \end{array}$

NAME ______________________________ **DATE** ______________

Set A9 ★ Independent Worksheet 3

INDEPENDENT WORKSHEET

More Panda Problems

1 When PJ Panda adds big numbers, he adds the ones first. If he gets more than 10, he puts 10 in a group and moves them over to the tens column. Then he adds the tens to get the total. Use PJ's method to solve these problems.

ex

	Tens	Ones
	1 2	9
+	4	7
	7	6

a

	Tens	Ones
	2	4
+	1	8

b

	Tens	Ones
	7	4
+	2	0

c

	Tens	Ones
	5	5
+	3	2

d

	Tens	Ones
	5	8
+	4	7

e

	Tens	Ones
	4	0
+	6	3

f

	Tens	Ones
	6	2
+	1	8

g

	Tens	Ones
	4	6
+	4	6

2 PJ ate 36 pounds of bamboo in the morning. He ate 29 more pounds of bamboo in the afternoon. How many pounds of bamboo did he eat in all? Show your work.

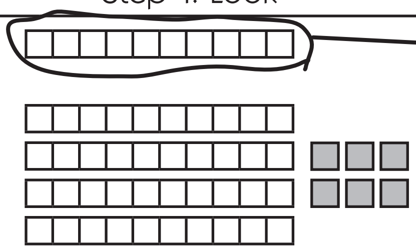
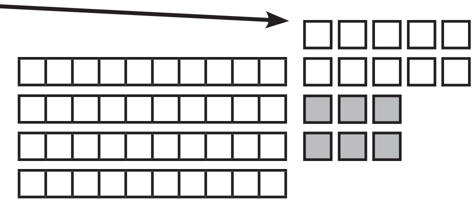
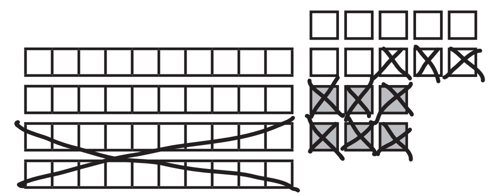
NAME ____________________ DATE ____________

Set A9 ★ Independent Worksheet 4

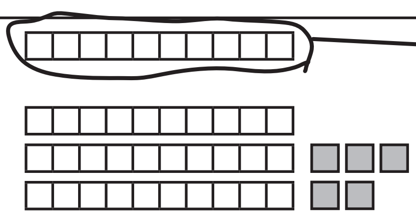
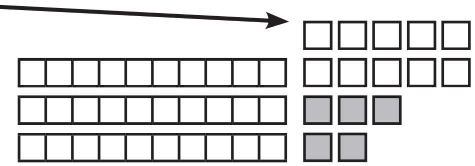
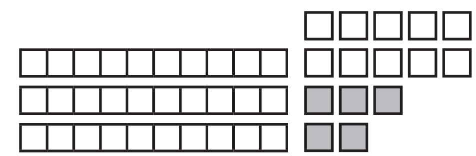
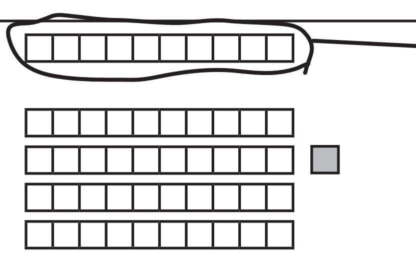
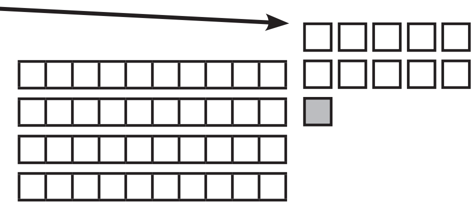
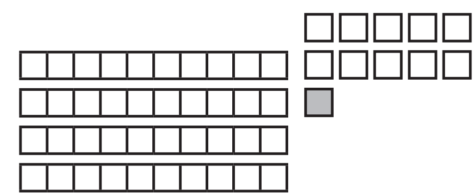
INDEPENDENT WORKSHEET

PJ Panda's Regrouping Method for Subtracting

When PJ Panda subtracts big numbers, he starts with the units first. If he doesn't have enough, he trades in a strip for 10 units. After that, he subtracts the ones and then the tens to get the answer.

Step 1: Look	Step 2: Trade a strip if you need to	Step 3: Subtract
$56 - 29$ 	$\overset{4}{\cancel{5}}\overset{1}{6} - 29$ 	$\overset{4}{\cancel{5}}\overset{1}{6} - 29 = 27$ 

Use PJ's method to solve these problems.

$45 - 18$ 	$45 - 18$ 	$45 - 18$ 
$51 - 34$ 	$51 - 34$ 	$51 - 34$ 

NAME ______________________________ **DATE** ______________

Set A9 ★ Independent Worksheet 5

INDEPENDENT WORKSHEET

Subtracting with PJ Panda

1 When PJ Panda subtracts big numbers, he looks at the ones first. If he doesn't have enough ones, he trades in a ten for 10 ones. After that, he subtracts the ones and then the tens. Use PJ's method to solve these problems.

ex

	Tens	Ones
	5 ~~6~~	17
–	2	9
	3	8

a

	Tens	Ones
	8	2
–	1	8

b

	Tens	Ones
	9	8
–	5	3

c

	Tens	Ones
	5	6
–	2	9

d

	Tens	Ones
	9	0
–	5	5

e

	Tens	Ones
	7	1
–	2	6

f

	Tens	Ones
	7	7
–		9

g

	Tens	Ones
	6	0
–	1	7

2 Subtract these numbers in your head.

84 – 3 = ______ 39 – 6 = ______ 45 – 10 = ______ 70 – 5 = ______

85	45	17	58	60	36	67
– 5	– 10	– 6	– 10	– 3	– 20	– 17
27	37	47	52	132	452	672
– 5	– 5	– 5	– 12	– 12	– 12	– 12

NAME ______________________________ **DATE** ______________

Set A9 ★ Independent Worksheet 6

INDEPENDENT WORKSHEET

Check Your Answers with PJ

1 PJ checks his subtraction answers by adding the number he subtracted and the answer he got. If they add up to the starting number, he knows he got the right answer. Use PJ's strategy to check your answers.

ex

	Tens	Ones
	7 ~~8~~	11
–	4	7
	3	4

Add to Check

$$\begin{array}{r} {}^{1}\\ 34 \\ +47 \\ \hline 81 \end{array}$$

a

	Tens	Ones
	5	2
–	1	6

Add to Check

b

	Tens	Ones
	9	9
–	2	5

Add to Check

c

	Tens	Ones
	6	0
–	3	2

Add to Check

d

	Tens	Ones
	7	7
–	1	9

Add to Check

e

	Tens	Ones
	5	8
–	3	1

Add to Check

2 Subtract these numbers in your head.

78 – 18 = ______ 47 – 17 = ______ 56 – 16 = ______ 82 – 12 = ______

NAME ______________________________ **DATE** ______________

Set A9 ★ Independent Worksheet 7

INDEPENDENT WORKSHEET

Addition & Subtraction Practice

1 Add the numbers. Use the regrouping method.

60	30	47	67	75	36	37
+ 4	+ 47	+ 35	+ 18	+ 25	+ 36	+ 45

290	340	569	345	629	325	238
+ 9	+ 20	+ 25	+ 15	+ 45	+ 426	+ 527

2 Use pictures, numbers, and/or words to add the numbers in each box. Show your work.

a 37 + 29 =	**b** 338 + 222 =

3 Subtract the numbers. Use the regrouping method.

49	60	67	43	75	30	100
– 9	– 15	– 23	– 25	– 29	– 15	– 75

4 Choose one of the problems below. Circle it. Then solve it. Show your work.

45 – 16 = 51 – 25 = 93 – 49 = 276 – 69 =

NAME ______________________ **DATE** ______________

Set A9 ★ Independent Worksheet 8

INDEPENDENT WORKSHEET

Equations & Expressions

1 Fill in the missing numbers to solve these addition equations.

a $50 + 40 + 10 = \square$	**b** $60 + 4 + \square = 74$	**c** $50 + \square + 9 = 79$
d $80 = 40 + 30 + \square$	**e** $20 + \square + 20 = 60$	**f** $\square + 30 + 20 = 100$

2 Fill in the missing numbers to solve these subtraction equations.

a $60 - \square = 40$	**b** $75 - \square = 25$	**c** $120 - 60 = \square$
d $100 - 30 = 20 + \square$	**e** $90 - 40 = 25 + \square$	**f** $\square - 40 = 20 + 30$

3 Write a story problem to match this expression. Then solve the problem. Show your work.

$$\boxed{83 - 25 =}$$

My story problem:

____

____

____

____

My work:

NAME ______________________ **DATE** ______________

Set A9 ★ Independent Worksheet 9

INDEPENDENT WORKSHEET

Combining Numbers to Make 100

1 Circle all the additions that combine to 100 in red. Next, circle all the additions that do not make 100 in blue. Then take a pencil and go back and do them.

70 + 30	60 + 60	20 + 80	75 + 25	50 + 50	100 + 0	50 + 40
60 + 70	96 + 4	95 + 5	70 + 80	60 + 40	93 + 7	0 + 100
100 + 100	10 + 90	40 + 60	25 + 75	92 + 8	20 + 80	100 + 90

2 Add these strings of numbers. Use combinations of 100 to help.

ex a 30 + 60 + 20 + 40 = 150 100	**ex b** 80 + 50 + 20 + 50 + 40 = 240 100 100
a 30 + 70 + 90 + 10 = _______	**b** 20 + 60 + 40 + 20 = _______
c 90 + 50 + 50 + 30 + 70 = _______	**d** 80 + 20 + 50 + 20 + 50 = _______
e 20 + 98 + 80 + 2 + 43 = _______	**f** 96 + 92 + 4 + 8 + 59 = _______

BRIDGES IN MATHEMATICS 2

GRADE 2 SUPPLEMENT

Set D1 Measurement: Duration

Includes

Skills & Concepts

★ demonstrate an understanding of units of time and time relationships (seconds in a minute and minutes in an hour)

★ identify quantitative and qualitative change over time

★ analyze quantitative and qualitative change over time

★ match a.m. and p.m. to familiar situations

★ use appropriate tools to measure liquid volume in cups, quarts, and gallons; ounces and pounds

★ organize data in charts

★ infer trends in a data set as increasing, decreasing, or random

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Set D1 Measurement: Duration
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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at www.mathlearningcenter.org.

Set D1 ★ Activity 1

ACTIVITY

Time Tests

Overview

Students discuss some of the things they know about 1 second, 1 minute, and 1 hour, and try a variety of experiments to find out just how long these time increments really are.

Skills & Concepts

★ demonstrate an understanding of units of time and time relationships (seconds in a minute and minutes in an hour)

★ identify quantitative and qualitative change over time

You'll need

★ classroom clock with a second hand

★ whiteboard and markers

★ a piece of scratch paper for each child

★ pencils

★ 3 or 4 tubs of pattern blocks or other building materials (e.g. legos, construx, wood cubes, blocks)

★ 3 or 4 tubs of geoblocks (divide your entire supply)

Instructions for Time Tests

1. Gather children to your discussion circle. Explain that you're going to talk about time today. Write the following question on the whiteboard: How long is a second? Read the question with the class and ask students to pair-share some ideas. Can they describe how long a second is? Can they think of some things they could do in just one second? Then invite volunteers to share their ideas with the class as you record at the whiteboard.

How Long is a Second?

- It's like 1 wink.
- I can snap my fingers in 1 second.
- I can blink my eyes in 1 second.
- People always say "Just a second."
- It's 1 tick on the clock.
- There are 60 seconds in a minute.

2. Draw students' attention to the classroom clock. Show them the second hand and explain that each time it moves, 1 second has passed. Explain that some people like to count seconds like this: 1, one thousand; 2, one thousand; 3, one thousand; and so on. Try it with the class. Can you and the students pace the count to match the movement of the second hand?

3. Now try some experiments. Have students snap their fingers in time to the ticking of the clock. Does that speed feel about right, or does it seem like they could snap more than once per second? Repeat the experiment with clapping and then blinking. Students may decide that snapping their fingers once per second seems about right, but they can clap 2 or 3 times in a second, and blink even more times than that per second.

Activity 1 Time Tests (cont.)

4. Next, write this question on the whiteboard: How long is a minute? Ask students to pair-share ideas and then record some of them on the board. What do they know about a minute? What are some of the things they can do in a minute?

How Long is a Minute?
- It's longer than a second.
- It's still really short.
- I can get dressed in 1 minute.
- I can swim a lap in less than a minute.
- I can eat my breakfast in just 1 minute.
- I can brush my teeth in 1 minute, but my mom makes me brush for 2 minutes.
- There are 60 minutes in an hour.

5. Draw students' attention back to the clock. Explain that when the second hand gets to the 12, you're all going to watch the clock without making a sound for 1 minute. Try this and then ask students to discuss the experience. How many seconds passed? Did a minute seem short or long to them?

6. Ask students to stand up. Demonstrate holding your arms outstretched on either side, so your body looks like the letter T. Ask them if they think they can do the same and hold the position for 1 minute. Then explain that when the second hand reaches the 12, you'll all stand that way for 1 minute. If they have to put their arms down and rest before a minute passes, that's okay, but no one including you can talk. At the end of the minute, ask students to discuss the experience. Did a minute seem short or long this time?

7. Ask students how many times they think they can write their first name in 1 minute. Record some of their estimates at the board. Then have them return to their tables and get out their pencils while you give each of them a piece of scratch paper. Explain that you'll say, "Go," when the second hand reaches the 12, and they'll have exactly 1 minute to write their first name as many times as they can. If some students want to use shorter nick-names, that's fine, but they have to print well enough so other people can read their writing. Try this and then have students share and compare their results. Were there any surprises?

8. While students remain at their tables, write this question on the board: How long is an hour? Ask them to pair-share ideas and record some of their responses on the board. What do they know about an hour? What are some of the things they can do in an hour? Can they name events in their daily life that take an hour?

Activity 1 Time Tests (cont.)

How Long is an Hour?
- It's a really long time.
- We have math for an hour every day.
- We have reading for 2 hours every day.
- If you watch 2 TV shows that's an hour.
- It takes me an hour to get ready for school.
- I get to watch TV for 1 hour every day.
- It takes an hour to drive to my grandma's.

9. Now pass out the tubs of math materials. Each table will need one tub of pattern blocks or other building materials. Give students at each table a few moments to divide the materials, so each child has a good supply in front of him or her. When they have their materials organized, ask students to put their hands in their laps. Explain that you are going to give them 1 second to build with the materials. At your signal, they're to start, and then they're to stop when they hear the signal again. Try this several times, and then have them put their hands back in their laps. What can they do with the materials in 1 second?

> ***Students*** *Not much!*
> *I hardly got started!*
> *I put 2 triangles together.*
> *I put 1 block on top of another.*
> *A second isn't long enough to do anything.*

10. Repeat step 9, but give students a minute instead of a second this time. What can they do with the materials in 1 minute?

> ***Students*** *I made a flower with the pattern blocks.*
> *I made a pretty tall tower with the little cubes.*
> *I started a really cool pattern, but a minute wasn't enough time to finish it.*

11. Now offer to give students an hour to build with their materials. Some may say they won't be able to keep working for an hour. Others may say that they'll run out of materials or ideas before an hour has passed. Just explain that you'll give the signal when the second hand reaches the 12 and record the starting time on the board. Get them started and let them work for 10 minutes. Then ask them to stop. Write the time on the board, and explain that it's only been 10 minutes. How many more minutes would it take for an hour to pass? What were they able to accomplish in 10 minutes? Could they really continue to build for an hour? Can they think of any activities they could sustain for a full hour?

Extension

- Over the next few days, note the times you start and stop reading time, math time, lunch, gym, and so on. How does an hour feel in the context of classroom instruction? How does an hour feel when they're in the car, or waiting for their mom to come home from work? How does an hour feel when they're doing something they really like to do? How does an hour doing chores feel?

Set D1 ★ Activity 2

ACTIVITY

A Second, a Minute, or an Hour?

Overview
How long does it take to stack 15 wooden cubes? How long does it take to knock the stack over? Using a collection of items the teacher has gathered beforehand, students suggest and conduct a variety of time-related experiments.

Skills & Concepts
★ demonstrate an understanding of units of time and time relationships (seconds in a minute and minutes in an hour)

★ identify quantitative and qualitative change over time

★ analyze quantitative and qualitative change over time

Recommended Timing
Anytime after Set D1 Activity 1

You'll need
★ classroom clock with a second hand

★ Work Places currently in use

★ *Pigs on a Blanket* by Amy Axelrod (optional)

★ a cafeteria tray (see Advance Preparation)

★ fifteen ¾″ wooden cubes in a small container

★ 4 or 5 ice cubes in a cup

★ a small, clear container of very hot water

★ several popsicle sticks

★ a saucer

★ several pieces of scratch paper

★ a pair of scissors

★ a box of 8 crayons

★ a pencil

Advance Preparation Place the last 9 items listed above on a cafeteria tray immediately before you conduct this activity.

Instructions for A Second, a Minute, or an Hour?
1. Place the tray of materials you've prepared in the middle of the discussion circle, within easy reach. Invite students to join you in the circle. Give the children a few moments to look at the things on the tray, and then explain that you're going to use them to do some time experiments today.

2. Draw students' attention to the tub of wooden cubes. How long do they think it will take you to stack all 15 cubes—a second, a minute, or an hour? A few might respond that it will only take a second, but most will probably say that it will take closer to a minute. Wait until the second hand on the classroom clock reaches the 12 and then ask students to watch the clock as you stack the cubes. Discuss the results when you're finished. Did it take more than a second? Did it take exactly a minute? Did it take closer to 1 second or 1 minute?

3. Invite one of the students to knock over the stack of cubes. How long will it take—a second, a minute, or an hour? Ask students to whisper their predictions to the people sitting next to them, and then watch the clock as your volunteer knocks over the stack. Did it take closer to 1 second or 1 minute?

Activity 2 A Second, a Minute, or an Hour? (cont.)

4. Point out that both of these experiments involved changing the materials in some way. You took the cubes out of their tub and stacked them. Your helper knocked the stack over. Now ask students to brainstorm some other 1-second, 1-minute, and 1-hour experiments you could try using only the materials on the tray. As they discuss various ideas, be sure they know that the water in the container is quite hot. Record their suggestions on the board.

One Second	One Minute	One Hour
• rip the paper in half • break one of the 2 popsicle sticks • dump the ice cubes out of the cup • drop an ice cube into the cup • spill the water • dump out the crayons • break the pencil • stack 2 cubes	• cut out a paper snowflake • melt an ice cube in the hot water (if you stir that will help) • write your name and address on the paper • write your first name 10 times on the paper • make a little building withthe wooden cubes and the popsicle sticks	• draw a really, really good picture • get an ice cube to melt if you just put it in the saucer • write a really good story • melt all the ie cubes by leaving them in the cup

5. Invite volunteers to try some of the 1-second and 1-minute suggestions as their classmates watch and time them. Place a star beside the suggestions that actually take the predicted amount of time (or close to it).

6. If it hasn't already been suggested by the class, propose that you place one of the ice cubes on the saucer and leave the rest in their cup. Will it take less than, more than, or exactly an hour for the cube on the saucer to melt? What about the cubes in the cup? Set up both experiments and record the starting time on the whiteboard. Appoint an official "watch-person" to keep an eye on the ice cubes, and send the students out to do Work Places for the rest of your math time.

7. Record the time when the cube on the saucer is finally all melted. Do the same for the cup of ice cubes. Then work with students to calculate the amount of time it actually took in both cases. Are they surprised?

Extension

- Read *Pigs on a Blanket* by Amy Axelrod to your class. This amusing book addresses the passage of time, exploring intervals such as 13 minutes, 30 minutes, 45 minutes, and an hour. Reading it to the class is also a great way to review time-telling, especially if you have a Judy Clock or small student clocks for children to use while they're listening to the story.

Set D1 ★ Activity 3

ACTIVITY

How Long Does It Take?

Overview
Students sort a collection of pictures by the amount of time it takes to do each activity shown. Then they describe and illustrate 3 different activities, one that takes 1 second, one that takes 1 minute, and one that takes 1 hour.

Skills & Concepts
★ demonstrate an understanding of units of time and time relationships (seconds in a minute and minutes in an hour)

Recommended Timing
Anytime after Set D1 Activity 2

You'll need
★ How Long Does It Take? Activity Cards, sheets 1 and 2 (pages D1.9 and D1.10, class set)

★ 12″ × 18″ drawing paper, 1 sheet per student

★ scissors

★ glue sticks

★ pencils

★ crayons

Instructions for How Long Does It Take?
1. Gather children to your discussion circle. Show them a copy of the first sheet of How Long Does It Take? Activity Cards. Give them a moment to examine the pictures and ask them to identify one activity that would take about a second to do. Ask them to find another that would take about a minute, and another that would take about an hour. Depending on students' experiences and sense of time, they may not always agree, and that's fine.

> ***Students*** *You can open a lunchbox in 1 minute.*
> *I think it would only take about a second.*
> *I can make my bed in a minute.*
> *It only takes me a second to make my bed!*
> *It would take about an hour to go to the park and play.*
> *My dad wouldn't let me stay that long.*
> *I get to watch TV for an hour after school.*
> *We get to watch more than that, but it's closer to an hour than a minute or a second!*

2. Explain that in a minute, you're going to give each of them 2 sheets of the activity cards. Their job will be to cut out all 18 cards and sort them according to the amount of time it takes to do each activity. Then demonstrate how to fold a piece of 12" × 18" drawing paper into thirds and label each third as shown on the next page. Explain that they'll need to glue each picture where they think it belongs on the sheet. Be sure they understand these times are only approximate. It might actually take them 2 minutes to make their bed or 45 minutes to get ready for bed and read a bed-time story, but it takes closer to a minute than an hour to make their bed, and closer to an hour than a minute to get ready for bed.

Activity 3 How Long Does It Take? (cont.)

1 second	1 minute	1 hour

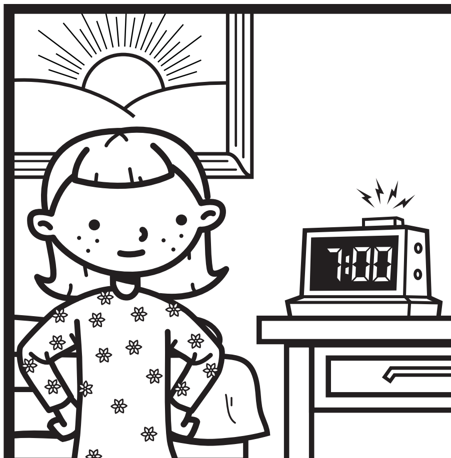
3. When students understand what to do, send them back to their tables to get out their scissors and glue sticks while you pass out the blacklines and sheets of drawing paper. Ask them to go to work as soon as they have all the materials they need. Encourage them to discuss their decisions with their neighbors as they work, and reassure them that it's okay if they don't always agree. It can take different amounts of time for different people to do the same thing.

4. When they're finished sorting and gluing the pictures, have them turn their papers over and write the same headings at the top: 1 second, 1 minute, and 1 hour. Then ask them to describe and illustrate an activity under each heading. Encourage them to think of their own ideas rather than copying what's already shown on the activity cards they've just sorted.

Extension

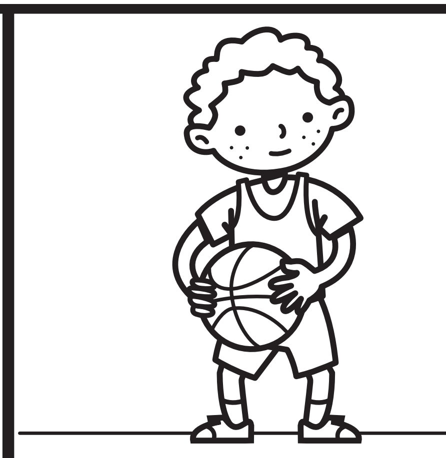
- Display children's drawings on a classroom wall or in the hall for parents, teachers, and other students to enjoy.

How Long Does It Take? Activity Cards page 1 of 2



Get out of bed

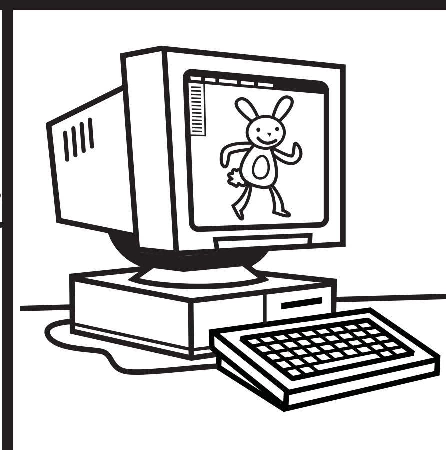
Jump 1 time



Bounce a basketball 1 time

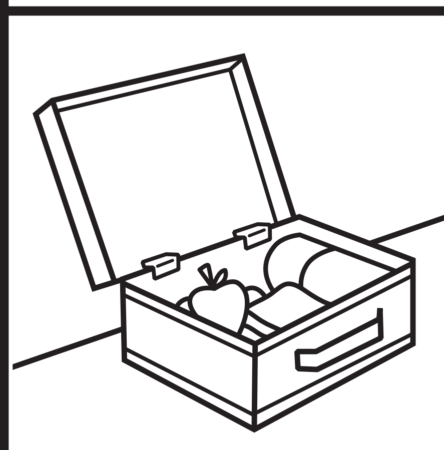
Brush your teeth

Eat 1 waffle



Play computer games

Watch TV



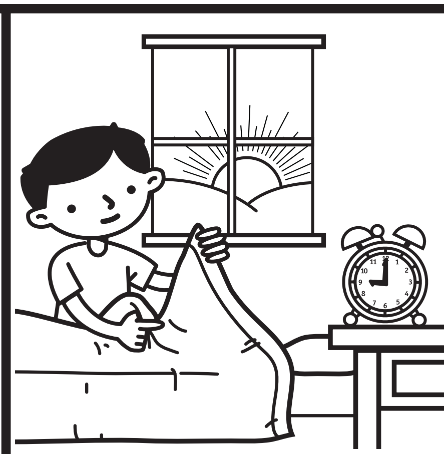
Open your lunchbox

Go to soccer practice

How Long Does It Take? Activity Cards page 2 of 2

Play at the park

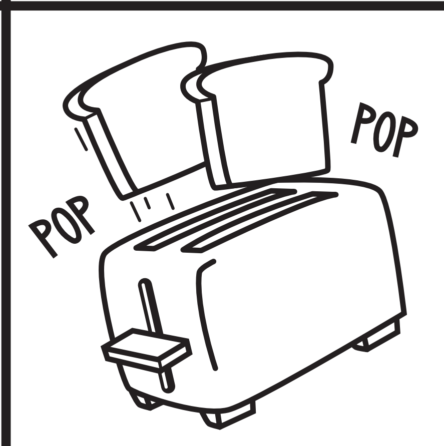
Turn on the TV



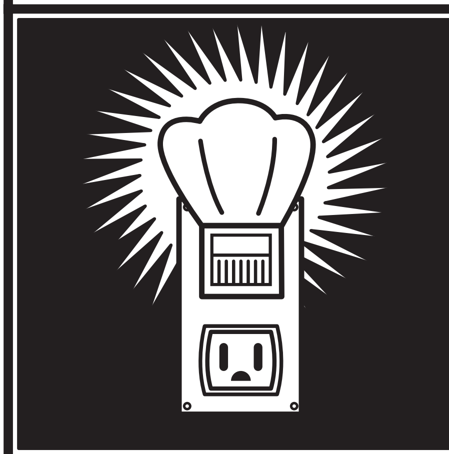
Make your bed

Fry 2 eggs

Turn off an alarm clock



Make toast



Turn on a nightlight

Get ready for bed and read a bed-time story

Brush your hair

Set D1 ★ Activity 4

ACTIVITY

The Water Experiment

Overview

The teacher shares three units of liquid measure with the class: a cup, a quart, and a gallon. Students help measure and pour water from one container to the next to discover that a quart holds 4 cups, and a gallon holds 4 quarts or 16 cups. After a gallon container has been filled and the water tinted blue, the class empties it into a plastic aquarium. Students discuss what might happen if they set the aquarium somewhere in the room where it won't be disturbed. Will the amount of water in the aquarium remain the same, increase, or decrease? Will the water change in any other way? How long will it take before changes start to occur? Students observe the water quality, check the level, measure the quantity, and record their observations on a chart each week.

Skills & Concepts

★ identify quantitative and qualitative change over time

★ analyze quantitative and qualitative change over time

★ use appropriate tools to measure liquid volume in cups, quarts, and gallons

★ organize data in charts

★ infer trends in a data set as increasing, decreasing, or random

★ generalize connections among mathematics, the environment, and other subjects

You'll need

★ Water Experiment Chart (page D1.14, run copies as needed)

★ plastic aquarium or other clear or translucent open container that holds a gallon

★ two empty, clean 1-gallon milk jugs (see Advance Preparation)

★ 1-cup measuring cup

★ clear or translucent 1-quart container

★ small bottle of blue or green food coloring

★ fine-tip permanent marker

★ cafeteria tray

★ towel

★ funnel

★ 1-quart plastic pitcher

★ individual chalkboards or whiteboards, chalk or dry-erase pens, and erasers

★ a piece of chart paper

Advance Preparation Run a strip of masking tape up the side of the quart container, one of the gallon milk jugs, and the plastic aquarium. Fill the other milk jug with exactly 1 gallon of water. Set the two jugs, the 1-cup measure, quart container, food coloring, funnel, permanent marker, and plastic aquarium on the cafeteria tray. Place the tray in the middle of your discussion area right before you conduct this activity.

Instructions for The Water Experiment

1. Distribute chalkboards/whiteboards, chalk/pens, and erasers to students, and ask them to join you in the discussion area. Have them form a circle and set their writing materials down in front of them. Explain that you are going to do some measuring today, and then the class is going to set up an experiment.

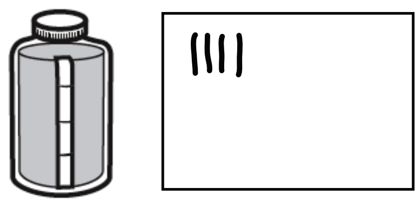
2. Show students the empty gallon jug, the quart container, and the 1-cup measure. Explain that these are tools people use to measure liquid volume (or capacity). Which holds the most? Which holds the

Activity 4 The Water Experiment (cont.)

least? Draw students' attention to the filled gallon jug. Place the 1-cup measure near the jug. Ask students to estimate how many cups of water the gallon jug is holding. Have them record their estimates on their chalkboard/whiteboards and take a moment to pair-share their ideas.

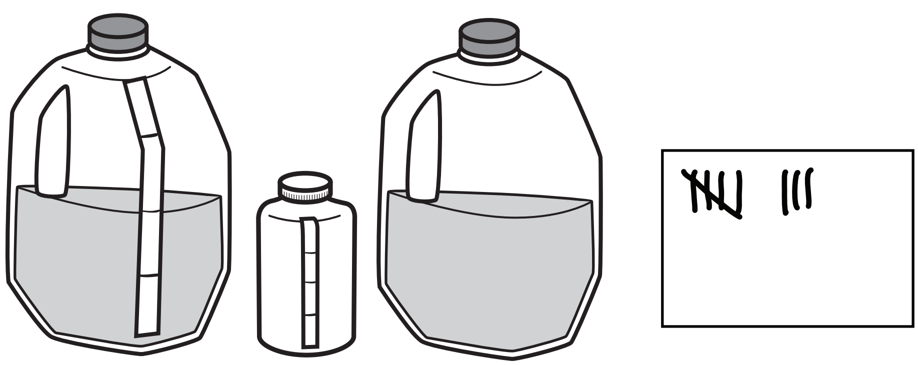
3. Before you start measuring the water, show students the bottle of food coloring. Ask them to predict what will happen if you squeeze 15 drops of coloring into the water. Will the water change in any way? How? How long will it take for the change to occur? After students have discussed these questions, have them count as you put 15 drops of coloring into the gallon of water. Ask them to watch silently for 1 minute and then share any changes they can observe.

4. Next, call on volunteers to help you transfer the water from the filled to the empty gallon jug, measuring as you go. First fill the one-cup measure. Then pour the water from the cup into the quart container. Mark the masking tape to show the water level. Repeat this 3 more times, marking the tape each time. How many cups does it take to fill the quart container? Ask students to make tally marks on their whiteboards to help keep track of the number of cups you've poured out of the first gallon jug so far.



5. Pour the water from the quart container into the empty gallon jug and mark the masking tape to show the water level. How many more quarts do students think it will take to fill the jug? Discuss this briefly. Then call on more volunteers to help you transfer another 4 cups of water from the first jug to the quart, and then to the second jug. Ask the class to continue tracking your work with tally marks.

6. How many cups have you measured out so far? How many quarts have you filled and emptied into the second gallon jug. How full are both jugs now?



Students *They're both half full.*
We've poured 8 cups out of the first one so far.
We filled up that quart bottle 2 times.
Four cups fit in a quart.
And 2 of those quarts only fill up half the big milk jug.

Activity 4 The Water Experiment (cont.)

7. Ask students if you need to continue measuring the water out of the first jug one cup at a time. Propose instead that you pour the remaining water directly into the quart container as you measure the contents of the first jug into the second jug. Will they be able to keep recording the number of cups on their boards?

> ***Jonah*** *Yes! Every time you fill a quart, it's worth 4 cups, so we just make 4 marks. Plus it's faster that way.*

8. When all the water has been measured into the second jug, and students have determined that a gallon holds 4 quarts or 16 cups, explain that you are going to pour all of the water into the plastic aquarium. Will the water fill the aquarium? Have students discuss their predictions. Then pour the gallon of tinted water into the aquarium and mark the water level.

9. Now ask students to predict what will happen if you put the aquarium in a safe place somewhere in the classroom and leave it sit uncovered and undisturbed. Will there be any changes? If so, how long might they take to occur? Record students' predictions on a piece of chart paper.

Water Experiment Predictions

- The water might dry up.
- The water might get more blue.
- The aquarium might get some blue on it.
- There might get to be more water.
- Nothing will happen. No changes.
- It might dry up in a day.
- It might take a week or a month.
- If no one touches it, it won't change.
- The water might take a year to dry up.

10. Work with input from the class to decide where to place the aquarium. Then show students the Water Experiment Chart. Explain that a different group of children will examine the water and the aquarium for changes each week. They will also measure the water to see if the amount has changed, and enter the data on a chart.

11. Once the experiment is set up, take time during Number Corner each week to examine the Water Experiment Chart together and discuss any changes your students have observed. Does the data on the chart indicate that the quantity of water is increasing, decreasing, changing at random, or not changing at all from one week to the next? You will need to keep the tray of measuring equipment and the towel available over the coming months. You will probably also want to have a parent helper or aide supervise the measuring group each week to help them handle the water carefully, measure with accuracy, and record the data. Be sure all your students get a turn to participate in making measurements over the coming months.

NAME ______________________ DATE ______________

Water Experiment Chart

DATE	WATER QUANTITY	WATER QUALITY/COMMENTS

Set D1 ★ Activity 5

ACTIVITY

Two Pounds of Apples

Overview

Start with two sets of apples, each weighing a pound. Peel one set and leave the skins on the other. Place the two sets in a warm, sunny location in your classroom and leave them uncovered and undisturbed. Will the apples in either set change? How will they change? How long will it take? This experiment provides students with an opportunity to measure weight in pounds and ounces as they explore qualitative and quantitative changes.

Skills & Concepts

★ identify quantitative and qualitative change over time

★ analyze quantitative and qualitative change over time

★ use appropriate tools to measure weight in ounces and pounds

★ organize data in charts

★ infer trends in a data set as increasing, decreasing, or random

★ generalize connections among mathematics, the environment, and other subjects

You'll need

★ Apple Weights Record Sheet (page D1.18, run a third of a class set)

★ 12 medium sized apples (see Advance Preparation)

★ 12 adhesive dots (see Advance Preparation)

★ a balance scale

★ standard pound and ounce weights *or* several 1-pound boxes of modeling clay (see Advance Preparation)

★ a carrot peeler

★ several paper plates

★ paper towels

★ 2 pieces of chart paper

★ *The Apple Doll*, by Elisa Kleven (optional)

Advance Preparation Bring a dozen medium-sized apples to school in a paper sack. Weigh them beforehand to make sure they don't weigh more than 3–4 pounds in all. Write a letter on each adhesive dot, from A–L, and label each apple with one of the dots. If you have standard pound and ounce weights, use them. If not, use three 1-pound boxes of modeling clay for 1-pound weights. Cut each stick of clay from a fourth box into quarters and roll them into balls to create sixteen 1-ounce weights.

Instructions for Two Pounds of Apples

1. Gather students to your discussion area and have them form a circle. Tell them that you are going to do a new experiment, but they need to do some preliminary work before you can start. Place the sack of apples in the center of the circle and show students how you have labeled each apple with a letter.

2. Explain that the experiment requires two sets of apples that weigh one pound each. Ask students to estimate the weight of the entire sack of apples. Then place the sack on one side of the balance and have students help you balance the other side with pounds and ounces as needed. Discuss with students how they might go about finding combinations of apples that weigh as close to one pound as possible. Show them one of the Apple Weights Record Sheets and work with their input to find one combination of apples that works. Is this the only possible combination?

Activity 5 Two Pounds of Apples (cont.)

Set D1 Measurement: Duration Blackline

NAME Mrs. Fisher DATE Jan. 7

Apple Weights Record Sheet

Find two sets of apples that weigh one pound each. Record the letters of the apples in each group below.

Group 1: B, D, and G Group 2: ______

3. Make the apples, the Apple Weights Record Sheets, the balance scale and the weights available to children during Work Places over the next few days. Ask them to work in pairs to find groupings of apples that weigh a pound each. Chances are, there will be a number of combinations that work.

4. After 3–4 days, ask students to form a circle in the discussion area to set up the experiment. Acknowledge the fact that they probably found several or more different combinations of apples that weighed very close to or exactly a pound. Choose two of the combinations, and work with help from the students to weigh both sets again, making sure they are one pound each. Then explain that you are going to place each set of apples on a double or triple layer of paper plates. The apples will be placed in such a way that they aren't touching one another. You will find a warm, sunny place to set them in the classroom, where they will remain undisturbed. The only difference between the two sets is that you are going to peel one of the sets and leave the other with the skins on.

5. Peel the apples in one of the sets as students watch and discuss their predictions. Will the apples in either set change? If so, how? How long will it be before changes start to appear? As soon as you have finished peeling the apples, set them on one plate. Set the "skins-on" apples on another. Record the time on a piece of chart paper, as well as the weight of each set of apples. Then record some of the predictions your students have made.

Apple Experiment

Peeled: 1 pound
Skins-On: 1 pound

Start Time 9:35 a.m.

Predictions

Peeled Apples:
- rotten
- squishy
- turn brown right away
- get buggy
- changes faster than the ones with skins on
- maybe get mold on them
- maybe dry up

Skins-On Apples:
- rotten
- mushy
- won't turn brown
- get buggy
- change slower
- might get moldy

6. Next, work with students to make a recording chart. Solicit their suggestions about the title of the chart, and how to set it up so they can keep track of changes in the weight and appearance of the apples in the two different sets. Decide with them how often to check the apples, and write in the first few dates. Then record the first day's data. The chart you make with them might look something the one shown below.

Activity 5 Two Pounds of Apples (cont.)

Apple Watching Experiment

	Peeled Apples		Skin-On Apples	
Date	Weight	Appearance	Weight	Appearance
1/10	1 pound	white, no peels, a tiny bit of brown	1 pound	red, hard, shiny, little white dots
1/11				
1/12				
1/13				

7. Have a different pair of students weigh the two sets of apples and record observations on the chart each day for 2–3 weeks, possibly longer depending on how long the apples take to change. Take time during Number Corner to discuss the changes, especially the weight changes recorded on the chart. What trends can students infer from the weight data? Is the weight of either or both sets of apples increasing, decreasing, or changing at random? Is one set of apples losing weight more rapidly than the other? Why might that be?

Extension

- If you have access to *The Apple Doll*, by Elisa Kleven, read it to your class. This is a beautifully written picture book that might inspire you and your students to make your own apple dolls. If so, there are instructions included in the book.

NAME ____________________ **DATE** ____________

Apple Weights Record Sheet

Find two sets of apples that weigh about one pound each. Record the letters of the apples in each group below.

Group 1: ____________________ Group 2: ____________________

NAME ____________________ **DATE** ____________

Apple Weights Record Sheet

Find two sets of apples that weigh about one pound each. Record the letters of the apples in each group below.

Group 1: ____________________ Group 2: ____________________

NAME ____________________ **DATE** ____________

Apple Weights Record Sheet

Find two sets of apples that weigh about one pound each. Record the letters of the apples in each group below.

Group 1: ____________________ Group 2: ____________________

Set D1 ★ Activity 6

ACTIVITY

A Quart of Ice Cubes

Overview

How long does it take for a quart of ice cubes to melt? How much water will there be when all the cubes have melted? Students make predictions and then work with the teacher to set up the experiment. Some of the decisions they have to make include where to place the container, how often to check it, how to set up a recording chart, and what to do if the ice has not melted by the end of the school day.

Skills & Concepts

★ identify quantitative and qualitative change over time

★ analyze quantitative and qualitative change over time

★ use appropriate tools to measure liquid volume in cups and quarts

★ use appropriate tools to measure weight in ounces and pounds (see Extensions)

★ measure temperature on Celsius and Fahrenheit thermometers (see Extensions)

★ organize data in charts

★ infer trends in a data set as increasing, decreasing, or random

★ match a.m. and p.m. to familiar situations

★ generalize connections among mathematics, the environment, and other subjects

You'll need

★ 2–3 trays of ice cubes (see Advance Preparation)

★ clear or translucent 1-quart jar (see Advance Preparation)

★ 1-cup measure

★ fine-tip permanent marker

★ cafeteria tray

★ towel

★ 2 pieces of chart paper

★ balance scale, pound and ounce weights (optional)

★ Celsius and Fahrenheit thermometers (optional)

Advance Preparation Run a strip of masking tape up the side of the quart jar. Prepare 2–3 trays of ice cubes; enough to fill the jar. Keep these in the freezer until just before you conduct the activity. Right before you meet with the students, place the quart jar, 1-cup measure, and trays of ice cubes on the cafeteria tray and set it near your discussion area.

Instructions for A Quart of Ice Cubes

1. Gather students to your discussion area and have them form a circle. Tell them you are going to work together to set up a new experiment today. Show them the quart jar and help them recall that a quart holds 4 cups of liquid. Explain that you are going to fill the jar with ice cubes and then watch to see what changes occur and how long it takes for them to appear. Count the number of ice cubes in one tray and ask students to estimate how many cubes it will take to fill the quart jar.

2. Ask students to help you keep track of the number of ice cubes as you dump as many trays as needed into the quart jar. Then set the jar in the middle of the circle. Record the number of cubes it took to fill the jar and the current time on a piece of chart paper. Then have students share any observations they can make about the ice and the jar right now. Ask them to predict what might happen if you leave the

Activity 6 A Quart of Ice Cubes (cont.)

jar out uncovered and undisturbed. How long will it take for the changes to start? Most students will readily predict that the ice will melt. How long will it take for the entire quart of ice to melt? How much water will there be when all the ice has melted? Record students' predictions on the chart paper. As you do so, introduce the convention of labeling time as a.m. or p.m. so people know whether students are talking about times between midnight and noon, or between noon and midnight.

Ice Cube Experiment

20 ice cubes　　　Start Time 9:45 a.m.

Predictions

- The ice will melt.
- It will make a lot of water.
- They will make exactly 1 quart of water.
- There is lots of space between the cubes so it will only be maybe 2-3 cups of water.
- They will all melt by 3:00 p.m.
- They will be melted by lunchtime, 11:45 a.m.
- It will take 2 days for them to all melt.
- They will melt when we're asleep ton ight at about 11:30 p.m.

3. Now explain that one of the challenges all scientists face is how to collect and record their data. Show students the second piece of chart paper and work with them to set up a recording chart that will help answer their questions, including the length of time it will take for all the ice to melt, and the amount of water that will result. Here are some of the issues to address with the class as you make the chart:

- What should the title of our chart be?
- What information do we want to record on our chart?
- How often should we check on the ice cubes to see if they are completely melted?
- Who will do the checking?
- What if the ice hasn't melted by the time we go home today?

Students may have other thoughts and ideas about what to put on the chart. Implement their suggestions as you draw up the chart for your class.

Our Ice Cube Experiment　　　How much water?

Date & Time		Ice Melted Yet?			Inspectors
		None	Part	All	
1/6	9:45 a.m.	X			The Class
1/6	10:45 a.m.				Jess & Sara
1/6	11:45 a.m.				Juan & Kim
1/6	12:45 p.m.				DeShawn & Geri
1/6	1:45 p.m.				Rosa & Aja
1/6	2:45 p.m.				Max & Yuki
1/6	3:45 p.m.				Mr. Gomez
1/6	4:45 p.m.				Mr. Gomez
1/7	8:45 a.m.				The Class

Activity 6 A Quart of Ice Cubes (cont.)

4. When the ice has fully melted, work with help from the students to measure the amount of water in the container. Is it more than, less than, or exactly a quart? Why might the results have turned out the way they did? Would you get exactly the same results if you repeated the experiment? Why or why not? What increased during the observation period? What decreased?

Extensions

- Your students might be interested in tracking the weight of the ice and container during this experiment. Whether or not the weight of the ice-filled jar will change as the ice changes to water is a genuine question for second graders. If you want to pursue this exploration with your students, you will need a sturdy balance scale, as well as pound and ounce weights. (If you don't have manufactured weights, a 4-stick box of school modeling clay usually weighs a pound. Each stick can be cut into fourths to approximate ounces.)
- You and your students might also want to track the temperature of the ice-filled jar as the ice melts. If so, you will need a thermometer that measures temperature in both Celsius and Fahrenheit, or one thermometer of each type. Take the opportunity to have children read and record the temperature using both scales. Some may be interested in the fact that the freezing point of water at sea level is 0° C and 32° F.

BRIDGES IN MATHEMATICS 2

GRADE 2 SUPPLEMENT

Set D2 Measurement: Length in U.S. Customary Units

Includes

Skills & Concepts

★ explain the need for equal length units and the use of standard units of measure

★ apply concepts of partitioning and transitivity

★ use a measurement tool iteratively to measure the length of an object longer than the tool

★ identify objects that represent standard units and use them to measure length

★ estimate length in inches, feet, and yards

★ measure length to the nearest inch, foot, and yard

★ demonstrate an understanding that using different measurement units will result in different numerical measurements for the same object

★ recall equivalencies associated with length: 12 inches = 1 foot; 3 feet = 1 yard

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P0709

Bridges in Mathematics Grade 2 Supplement
Set D2 Measurement: Length in U.S. Customary Units
The Math Learning Center, PO Box 12929, Salem, Oregon 97309. Tel. 1 800 575–8130.

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P0709

Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at www.mathlearningcenter.org.

Set D2 ★ Activity 1

ACTIVITY

Measuring Length in Teacher Feet

Overview
Students measure the width of the classroom with their feet. When they discover that the answers vary from one child to the next, they discuss the need for a standard unit of measure. Finally, they use teacher feet to measure various lengths around the classroom.

Skills & Concepts
★ explain the need for equal length units and the use of standard units of measure

★ apply concepts of partitioning and transitivity

★ use a measurement tool iteratively to measure the length of an object longer than the tool

★ identify objects that represent standard units and use them to measure length

★ demonstrate an understanding that using different measurement units will result in different numerical measurements for the same object

You'll need
★ Teacher Feet Record Sheet (page D2.4, half class set)

★ Teacher Feet (half class set, see Advance Preparation)

★ whiteboard and markers

★ a ruler

★ adding machine tape (optional)

★ *How Big is a Foot?*, by Rolf Myller (optional)

Advance Preparation Find a shoe, your own or one belonging to another teacher in your building, that's about a foot long (1–2 inches more or less is fine). Lay the shoe on a piece of construction paper and trace around it. Use the tracing as a pattern to cut out a half-class set of teacher feet (each pair of students will need 1 teacher foot for this activity).

Note Save the construction paper teacher feet for use in Set D2 Activity 2.

Instructions for Measuring Length in Teacher Feet
1. Invite students to your discussion circle. As they watch, take 3 or 4 heel-to-toe steps, being careful not to leave any gaps as you walk. If they were to walk across the width of classroom just like this, how many steps do they think it would take? Ask them to pair-share estimates and then call on volunteers to share with the class. Record their estimates on the whiteboard.

2. Choose 3 pairs of helpers. Assign one student in each pair to be Partner A and the other to be Partner B. Have the 3 pairs position themselves along one side of the classroom while the rest of the students stay seated in the circle. Ask each pair to try to choose a location where they'll be able to walk across the room without running into desks, tables, or other furniture. Then have them measure the distance across the classroom, Partner A taking slow and careful heel-to-toe footsteps while Partner B counts. As they finish, have them report their results as you record at the whiteboard. Then ask them to reverse roles, Partner A now counting as Partner B steps back across the room. When they return to the circle, record their second set of results.

3. Ask the class to discuss the 6 measurements. How do the numbers compare? Are they all the same? If not, how might students account for the differences? Which measurement is correct?

Activity 1 Measuring Length in Teacher Feet (cont.)

How far is it across our classroom if you measure it with heel-to-toe steps?

Estimates			Actual Number of Foot Steps	
30	25	100	Alesha	50 steps
42	35	29	Brant	37 steps
50	23	40	Marissa	43 steps
			Drexler	34 steps
			Kelsie	40 steps
			Javier	45 steps

4. Explain that people used their feet as a way to measure distances for centuries. As students might guess, this created problems, which some towns solved by choosing the length of one person's foot (perhaps the mayor's or the king's) to be the official length.

5. Then show students one of the construction paper "teacher feet" you've prepared, and demonstrate that it's about the same length as a 12-inch ruler. Explain that they're going to work in pairs to measure various things around the classroom. Each pair will get 1 teacher's foot to use as a measuring tool. Talk with students about how they might measure the length of a table, the width of the calendar pocket chart, or the distance from your desk to the door using a single teacher foot.

> ***Paulina*** *I could set it down at the end of the table and then Amanda could put her finger where it ends. Then I could pick up the foot and move it to where her finger is, and we could just keep going like that.*
>
> ***Jose*** *We could get together with some other kids and put the feet together in a line. Maybe like 3 or 4 would be long enough to measure some stuff.*
>
> ***Marissa*** *We could get some long paper and stretch it out as long as what we're measuring. Then we could put the foot down at the start and mark where it comes to with a pencil. If we kept doing that we could see how many feet it took at the end.*

6. Show children a copy of the Teacher Feet Record Sheet. Work with one of the students to model the process of choosing something to measure, estimating how many teacher feet it is, and then measuring to find its actual length in teacher feet.

Set D2 Measurement: Length in Customary Units Blackline Run a half-class set

NAME Mrs. Ramirez and Brandt DATE

Teacher Feet Record Sheet

1 How long are some of the things around our classroom in teacher feet?

Things We Measured	Estimate	Actual Answer
the whiteboard ledge	10 TF	8 TF

7. Once students understand what to do, give each pair a teacher foot and a record sheet and send them out to work.

Activity 1 Measuring Length in Teacher Feet (cont.)

Extension

- Read *How Big is a Foot?*, by Rolf Myller after the class does this activity. This book was first published in 1962 and reprinted in 1990. Chances are good you'll find it in your school library. It's very accessible to second graders, and reinforces the need for standard units of measure in a very engaging way.

NAME ______________________________ **DATE** ______________

Teacher Feet Record Sheet

1 How long are some of the things around our classroom in teacher feet?

Things We Measured	Estimate	Actual Answer

2 What was the longest thing you measured?

3 What was the shortest thing you measured?

4 How many teacher feet do you think it would take to measure the distance from the classroom door to the office door?

Set D2 ★ Activity 2

ACTIVITY

Measuring Length in Giant Feet

Overview
After listening to the story of *Jack and the Beanstalk*, students work in pairs to draw and cut out a giant's foot about a yard long. Then each pair uses their giant foot to measure various distances in and around the classroom.

Skills & Concepts
★ apply concepts of partitioning and transitivity

★ use a measurement tool iteratively to measure the length of an object longer than the tool

★ identify objects that represent standard units and use them to measure length

Recommended Timing
After Set D2 Activity 1

You'll need
★ Giant Feet Record Sheet (page D2.8, half class set)

★ 18″ × 36″ pieces of butcher paper, half class set, plus a few extra

★ Teacher Feet from Set D2 Activity 1

★ pencils

★ scissors

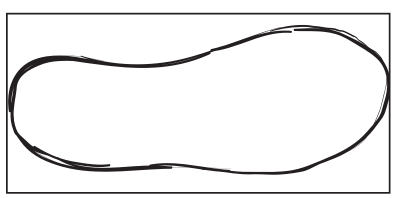
★ a yardstick

★ *Jack and the Beanstalk* (see note)

Note You'll probably find several different versions of this folktale in your school library. If not, you can find many different versions online.

Instructions for Measuring Length in Giant Feet
1. Gather children to your discussion circle. Read *Jack and the Beanstalk* to the class, and take some time to discuss the story.

2. Fasten one of the pieces of butcher paper to the whiteboard. Explain that one of the giant's feet was as long as the paper. As students watch, sketch a footprint on the paper and cut it out.



3. Use some of the Teacher Feet from Set D2 Activity 1 and your yardstick to show students that the giant foot is *about* as same as 3 teacher feet or 1 yard. Ask children to estimate how wide the classroom is in giant feet. Record some of their estimates on the whiteboard.

4. Work with student input and help from one of the children to measure the width of the room with the giant's foot. What do you have to do to measure a distance with a single unit? (One solution is to pick it up and move it as many times as necessary.) How can you ensure that your measurement is as accurate as possible? (One thing you can do is get a partner to mark where the tip of the foot lands each time so you can set the heel down accurately as you move across the floor.)

Activity 2 Measuring Length in Giant Feet (cont.)

5. When you're finished, record the actual measurement on the whiteboard. How does it compare with some of the measurements students made during Set D2 Activity 1?

6. Have students pair up (or assign partners if you prefer). Explain that you're going to give each pair a piece of butcher paper the same size as the one you just used. They'll need to draw a giant foot on the paper and cut it out. Although the foot needs to match the length of the paper, it can be a different shape. Perhaps they'll decide to make their giant foot look more like an animal paw or some other kind of foot. Once they've prepared their giant foot, they'll use it to measure different distances in and around the classroom.

7. Show children a copy of the Giant Feet Record Sheet. Set the parameters for this activity carefully, letting students know where they can and cannot work. Then have students brainstorm a list of some of the distances they might measure. Record their ideas on the whiteboard.

Things to Measure in Giant Feet
- the length of the classroom
- the distance from the end of the chalkboard to the teacher's desk
- the distance from our table to our door
- the distance around the big rug
- the distance all the way around the clasroom
- the distance from our classroom door to the office door
- the distance from one end of the corridor to the other

Set D2 Measurement: Length in Customary Units Blackline Run a half-class set.

NAME ______________________ DATE ____________

Giant Feet Record Sheet

1 How long are some of the things around our classroom in giant feet?

Things We Measured	Estimate	Actual Answer

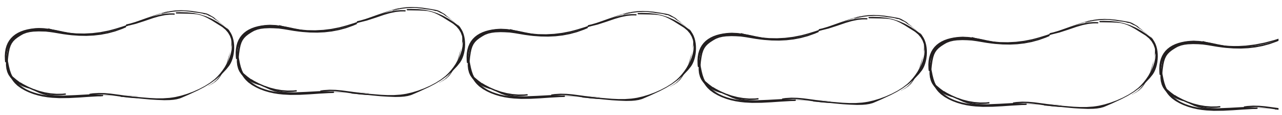
8. Once students understand what to do, give each pair a piece of butcher paper and a record sheet and send them out to work.

Extensions

- Let students measure you with some of the Teacher Feet from Measurement—Length Activity 1 to get a sense of how your height compares to the size of your foot. Ask them to use this information, along with some of their butcher paper Giant Feet, to see how tall the giant might have been.

  Rachel *It takes 5 teacher feet and then about half of another to measure Ms. Jones. We could fold one of the giant feet in half to see how tall he was.*

Activity 2 Measuring Length in Giant Feet (cont.)



Sam *Wow! That's huge!*

Drexler *Yeah! It's nearly half-way across the room!*

- Have students draw and paint parts of a "life-size" giant on sheets of butcher paper and then tape them together. Post the giant, along with students' measuring record sheets and a description of the activity in the cafeteria or gym (or someplace where the ceiling is more than 18´ tall). You can also post the display in the hallway if you don't mind having the giant lying down on the job.
- Give students time to decorate the giant feet they made to accompany the display described above.

NAME ______________________________ **DATE** ______________

Giant Feet Record Sheet

1 How long are some of the things around our classroom in giant feet?

Things We Measured	Estimate	Actual Answer

2 What was the longest thing you measured?

3 What was the shortest thing you measured?

4 How many giant feet do you think it would take to measure the distance across the playground?

Set D2 ★ Activity 3

ACTIVITY

Head Strings

Overview

Each student cuts a piece of string to match the circumference of his or her head. Next, students estimate and measure the length of their strings with tile. The children use their strings to estimate the length of other objects around the classroom, and then measure each object with tile.

Skills & Concepts

★ apply concepts of partitioning and transitivity
★ use a measurement tool iteratively to measure the length of an object longer than the tool
★ identify objects that represent standard units and use them to measure length

Recommended Timing

After Set D2 Activity 2

You'll need

★ Head String Record Sheet (page D2.12, class set)
★ a 30″ length of string for each student, plus a few extra
★ color tile (see Advance Preparation)
★ whiteboard and markers
★ a large picture book
★ pencils
★ scissors
★ rulers
★ *Jim and the Beanstalk*, by Raymond Briggs (optional)

Advance Preparation Divide all of your color tile into tubs or containers so that students sitting at each table have access to a good supply. (If you have more than about 20 students, you may want to borrow some tile from another classroom for this activity.)

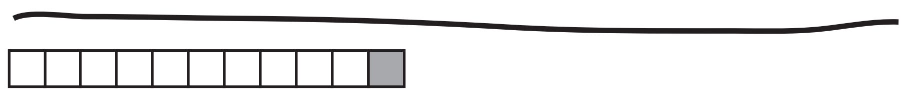
Instructions for Head Strings

1. Gather children to your discussion circle. Let them know that they're going to use color tiles to do some measuring today. Then as they watch, wrap a length of string around your head and cut it to match. Explain that you've cut the string to match the circumference, or the distance around your head. Lay it in the middle of the circle and line up 4–5 tiles beside it, starting at one end of the string. Ask students to use the information to estimate the length of your head string in tiles.

Students *I think it's going to be about 20 because it sort of looks like 5, 5, 5, and 5 more will fit.*
I think more like 15. It just doesn't look like it's as much as 20.
I'd say 25.
I think it'll be 30.

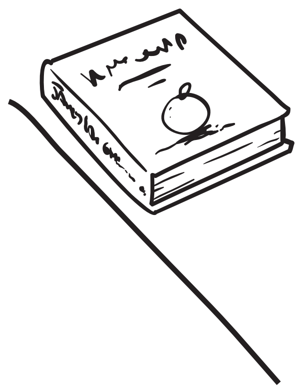
2. Record students estimates on the whiteboard and then add as many tiles as necessary to match the length of the string. Stop when you've reached the halfway point and invite students to revise their estimates.

Activity 3 Head Strings (cont.)



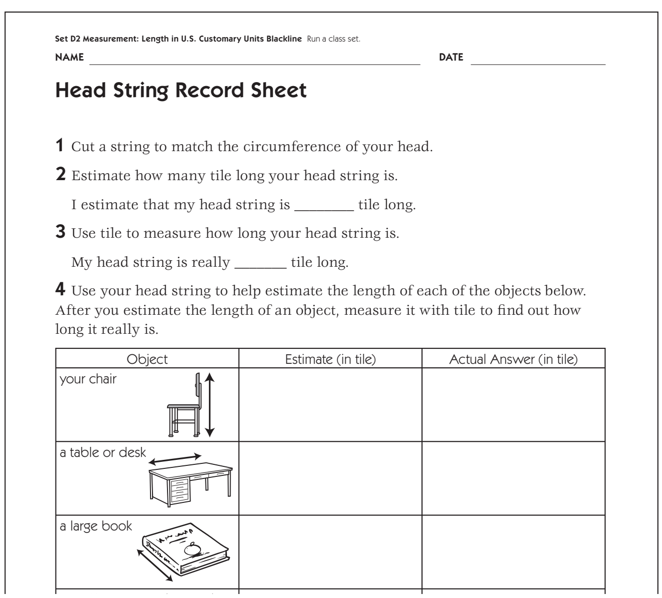
Students *I want to change from 15 to 20. It's 11 so far, and it's already gone halfway.*
Can I change from 30 down to 23? I think it's going to be about 12 more.

3. When you're finished, record the actual number of tiles it took to measure the string. Then move the tiles aside and set a large picture book in the middle of the circle beside your head string. Ask students to use what they know about the length of the string to estimate how many tiles it will take to measure the length of the book. Record their estimates.



Students *That book looks like it's about half as long as the string.*
The string is 22 tiles long, so the book is maybe 11.
I don't think the book is half way. What happens if you fold the string in half? See? I think it's about 9 or 10 tiles.

4. Measure the length of the book with tiles and record the answer. Then show students a copy of the Head String Record Sheet and review the instructions with them.



Set D2 Measurement: Length in U.S. Customary Units Blackline Run a class set.

NAME ______________________ **DATE** ____________

Head String Record Sheet

1 Cut a string to match the circumference of your head.

2 Estimate how many tile long your head string is.

I estimate that my head string is ________ tile long.

3 Use tile to measure how long your head string is.

My head string is really _______ tile long.

4 Use your head string to help estimate the length of each of the objects below. After you estimate the length of an object, measure it with tile to find out how long it really is.

Object	Estimate (in tile)	Actual Answer (in tile)
your chair		
a table or desk		
a large book		

Activity 3 Head Strings (cont.)

5. When students understand what to do, send them back to the tables to get their pencils and scissors as you pass out a length of string and a record sheet to each of them. Have helpers place a tub of tiles on each table. Encourage them to help each other cut their head strings, and let them know that they'll need to share the tiles with others at their tables.

6. Reconvene students toward the end of your math time to share and compare their work. How many tiles did it take to measure the length of the ruler? (12) What does that tell them about the length and width of each tile? (Each tile is 1" × 1".)

Extensions

- If students enjoyed finding the height of the giant in Set D2 Activity 2, they may also enjoy using your head string to cut a length of string that might match the giant's head.

  Hunter *It took 3 teacher feet to fit into a giant foot, right?*

  Shelby *Right, so maybe if we cut a string 3 times as long as the teacher's head string and put it in a circle, we could see how big around the giant's head was!*

  Tate *Let's try it and see if it looks big enough!*

- Read *Jim and the Beanstalk*, by Raymond Briggs to the class. In this modern retelling of the old classic, Jim helps the giant, who's now old and infirm, and does some measuring in the process.

NAME ______________________________ **DATE** ______________

Head String Record Sheet

1 Cut a string to match the circumference of your head.

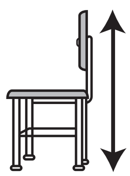
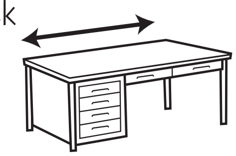
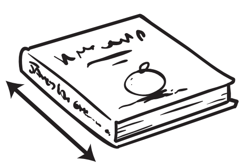
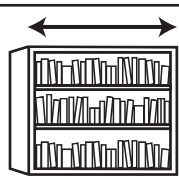
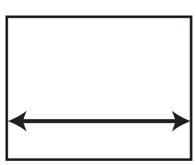
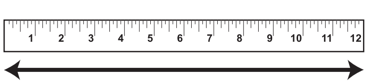
2 Estimate how many tile long your head string is.

I estimate that my head string is ________ tile long.

3 Use tile to measure how long your head string is.

My head string is really _______ tile long.

4 Use your head string to help estimate the length of each of the objects below. After you estimate the length of an object, measure it with tile to find out how long it really is.

Object	Estimate (in tile)	Actual Answer (in tile)
your chair 		
a table or desk 		
a large book 		
a shelf 		
a big piece of paper 		
the length of a ruler 		

Set D2 ★ Activity 4

ACTIVITY

Making Inchworm Rulers

Overview

Students share what they know about 12″ rulers. Then they make their own rulers and use them to find things in the classroom that are shorter than, longer than, and the same length as a foot.

Skills & Concepts

★ identify objects that represent standard units and use them to measure length

★ generate common measurement referents for inches and feet

★ learn that there are 12 inches in a foot

★ generalize connections among mathematics, the environment, and other subjects

You'll need

★ Meet the Inchworm! (page D2.16, run 1 copy)

★ Inchworm Strips (page D2.17, quarter class set, see Advance Preparation)

★ Inchworm Ruler Record Sheet (page D2.18, run a class set)

★ 12" ruler

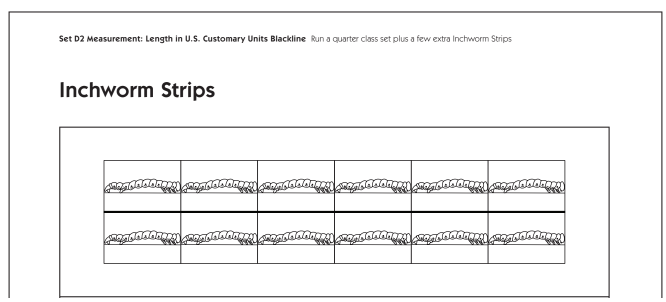
★ 2" × 12" strips of poster board, 1 per student, plus 2–3 extra strips

★ glue sticks

★ scissors

★ yellow and green crayons or colored pencils

Advance Preparation Run a quarter class set of the Inchworm Strips on page D2.17. Make sure your copy machine is set at 100% or a percentage that results in strips of inchworms that are exactly 6″ long. Cut the sheets into quarters to provide two 6″ strips for each student.


Set D2 Measurement: Length in U.S. Customary Units Blackline Run a quarter class set plus a few extra Inchworm Strips

Inchworm Strips

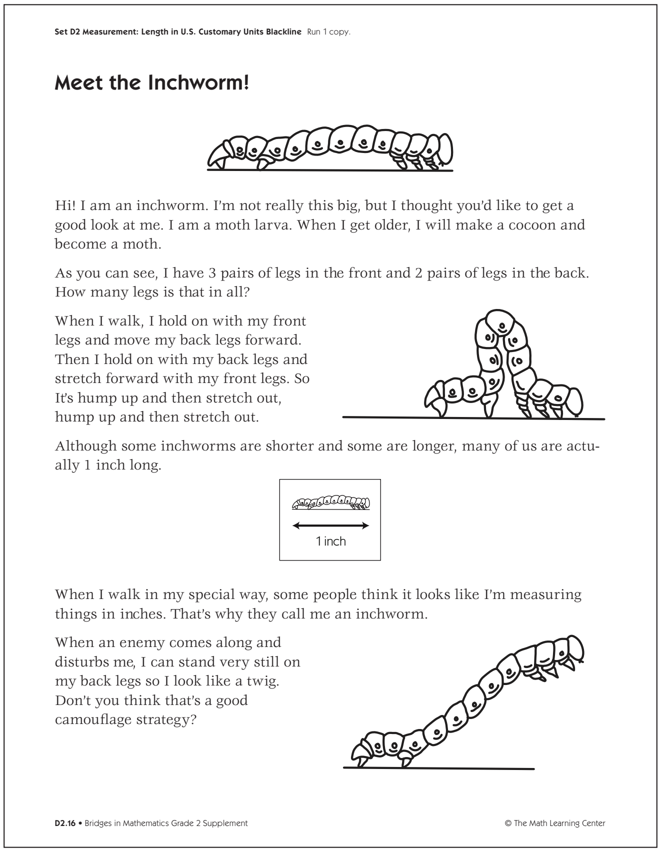
Instructions for Making Inchworm Rulers

1. Invite students to your discussion area. Show them a 12-inch ruler, but don't identify it by name. Ask them to pair-share anything they know about this tool. After a minute or two, ask volunteers to share their ideas with the class. As the discussion unfolds, guide students to address some of the questions below:

- What is the name of this tool?
- What do people use it for?
- Who is likely to use this tool, and when?
- How does a ruler help us measure the length of something?
- How long is it?
- Why is a ruler marked with numbers and lines?

Activity 4 Making Inchworm Rulers (cont.)

2. Next, explain that the students are each going to make their own ruler today, with the help of an animal called an inchworm. Show them your copy of Meet the Inchworm! and invite any comments they may have about the illustrations. Then read the sheet to the children and ask them to listen carefully to find out why this animal is called an inchworm.



Meet the Inchworm!

Hi! I am an inchworm. I'm not really this big, but I thought you'd like to get a good look at me. I am a moth larva. When I get older, I will make a cocoon and become a moth.

As you can see, I have 3 pairs of legs in the front and 2 pairs of legs in the back. How many legs is that in all?

When I walk, I hold on with my front legs and move my back legs forward. Then I hold on with my back legs and stretch forward with my front legs. So It's hump up and then stretch out, hump up and then stretch out.

Although some inchworms are shorter and some are longer, many of us are actually 1 inch long.

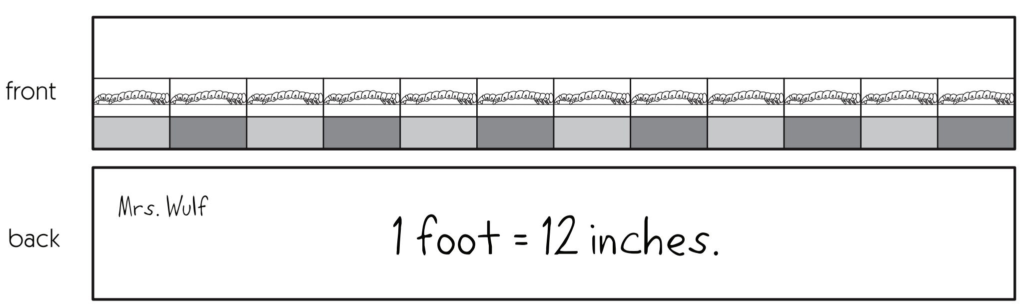
1 inch

When I walk in my special way, some people think it looks like I'm measuring things in inches. That's why they call me an inchworm.

When an enemy comes along and disturbs me, I can stand very still on my back legs so I look like a twig. Don't you think that's a good camouflage strategy?

3. Invite students to share more comments about the inchworm after you finish reading the sheet. Then show them the materials they'll use to make their own ruler: a strip of poster board, a quarter sheet of inchworm strips, a yellow and a green crayon, a pair of scissors, and a glue stick. Use the ruler to measure the poster board strip. Is it really 1 foot long? Give students a few moments to examine the pair of inchworm strips. How long do they think each strip will be when it's cut out? Why? If you cut out the two strips and lay them end-to-end, will they stretch the length of the poster board strip? How do they know?

4. Demonstrate how to color the sections below the inchworms on the strips in a pattern of alternating yellow and green. Then show students how to cut out the 2 strips and glue them to the poster board strip. Finally, turn your ruler over and label it as shown below.



Activity 4 Making Inchworm Rulers (cont.)

5. When students understand what to do, distribute the materials they'll need and send them back to work at their tables. As a few of the students finish, call the class back to your discussion circle briefly. Give them each a copy of the Inchworm Ruler Record Sheet. Read the sheet with them and explain the tasks as needed. Ask them to work in pairs to complete the sheet as soon as they're finished making their rulers.

Set D2 Measurement: Length in U.S. Customary Units Blackline Run a class set.

NAME ______________________ DATE ____________

Inchworm Ruler Record Sheet

1 Use your inchworm ruler. Find at least 4 things in the room that are:
- shorter than 1 foot
- exactly 1 foot long
- longer than 1 foot

Fill in this chart to show what you find.

SHORTER THAN 1 FOOT	EXACTLY 1 FOOT	LONGER THAN 1 FOOT

2 My shoe is (circle one)

shorter than a foot   exactly a foot   longer than a foot

3 My arm is (circle one)

shorter than a foot   exactly a foot   longer than a foot

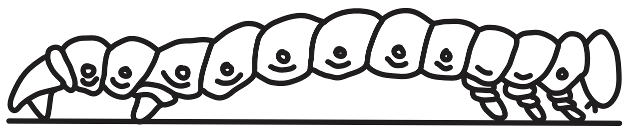
CHALLENGE

4 There are ________ inches in 1 foot.

5 There are ________ inches in 2 feet.

6. If necessary, give students more time the following day, perhaps during a designated seatwork period, to complete the sheet. During the next activity in this set, children will number their inchworm rulers and use them for more measuring tasks, so don't send the rulers home yet.

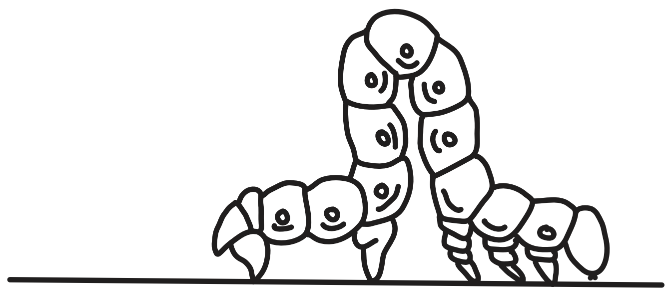
Meet the Inchworm!



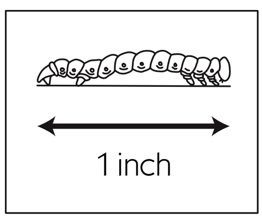
Hi! I am an inchworm. I'm not really this big, but I thought you'd like to get a good look at me. I am a moth larva. When I get older, I will make a cocoon and become a moth.

As you can see, I have 3 pairs of legs in the front and 2 pairs of legs in the back. How many legs is that in all?

When I walk, I hold on with my front legs and move my back legs forward. Then I hold on with my back legs and stretch forward with my front legs. So It's hump up and then stretch out, hump up and then stretch out.

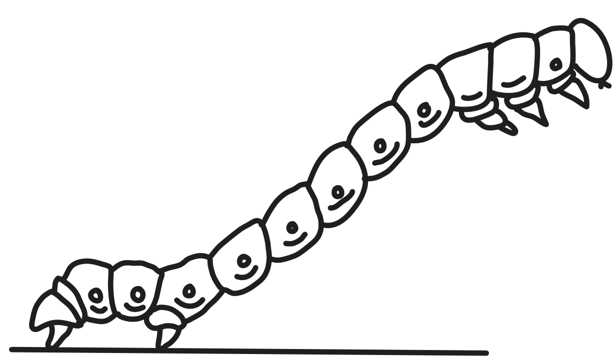


Although some inchworms are shorter and some are longer, many of us are actually 1 inch long.

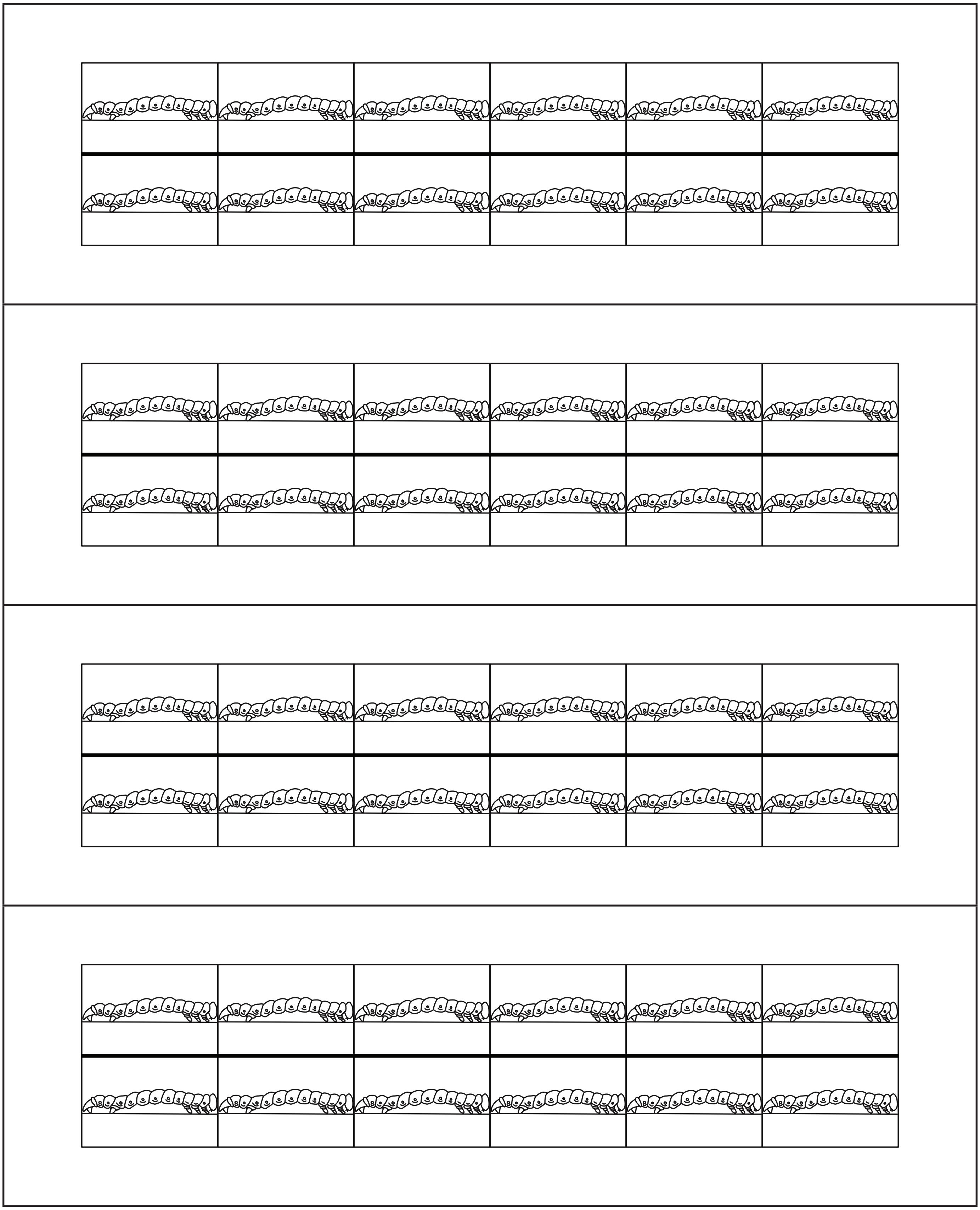


When I walk in my special way, some people think it looks like I'm measuring things in inches. That's why they call me an inchworm.

When an enemy comes along and disturbs me, I can stand very still on my back legs so I look like a twig. Don't you think that's a good camouflage strategy?



Inchworm Strips



NAME ______________________________ **DATE** ______________

Inchworm Ruler Record Sheet

1 Use your inchworm ruler. Find at least 4 things in the room that are:

- shorter than 1 foot
- exactly 1 foot long
- longer than 1 foot

Fill in this chart to show what you find.

SHORTER THAN 1 FOOT	EXACTLY 1 FOOT	LONGER THAN 1 FOOT

2 My shoe is (circle one)

shorter than a foot   exactly a foot   longer than a foot

3 My arm is (circle one)

shorter than a foot   exactly a foot   longer than a foot

CHALLENGE

4 There are ________ inches in 1 foot.

5 There are ________ inches in 2 feet.

Set D2 ★ Activity 5

ACTIVITY

Estimate & Measure Inches

Overview
After some group work and discussion, students number their inchworm rulers so they are easier to read. Then they use color tile and their rulers to estimate and measure the length of various objects around the classroom. Students may revisit this activity on their own during Work Places.

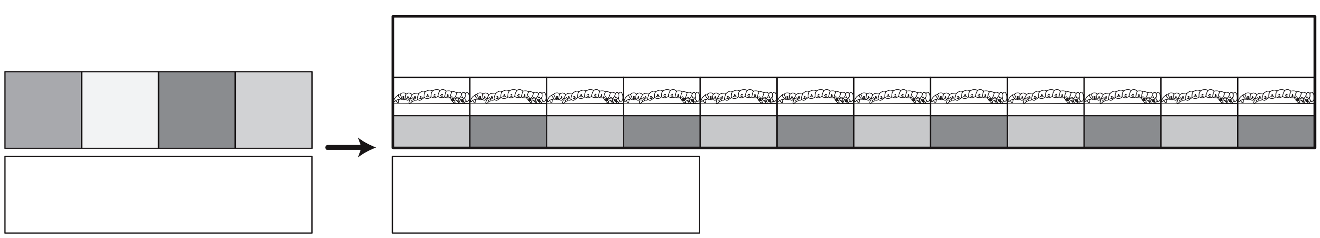
Skills & Concepts
- ★ estimate length in inches
- ★ measure length to the nearest inch

You'll need
- ★ Estimate & Measure Inches, Record Sheets 1–3 (pages D2.22–D2.24, run a class set of each)
- ★ students' inchworm rulers from Set D2, Activity 4
- ★ inch-wide paper strips (see Advance Preparation)
- ★ color tile (see Advance Preparation)
- ★ pencils
- ★ several classroom rulers marked in inches

Advance Preparation Cut a half-class set of inch-wide colored paper strips in the following lengths and colors: 4″ yellow strips, 8″ blue strips, and 10″ red strips. Divide your color tile into tubs or containers so that each pair of students has easy access to 25–30 tile while they are in the discussion circle and later as they are working independently.

Instructions for Estimate & Measure Inches
1. Gather students to the discussion area and have them form a circle. Ask them to bring their inchworm rulers and pencils with them. When they're settled, have them pair up with their neighbors. Explain that they are going to work together to measure some strips of paper, first with tile and then with an inchworm ruler. Have one child in each pair put his or her ruler aside for now, and give each pair a container of tile.

2. Hold up one of the 4″ yellow construction paper strips. Ask students to estimate its length. Record their ideas on the board. Then give each pair of students one of the 4″ strips. Have them place tile end-to-end to measure the length of their strip. Then have them measure the same strip with their inchworm rulers. Discuss the results.



Students *It was 4 both times, 4 tiles, and then 4 of those worms on the ruler.*
Yep, it took 4 tiles first. Then with the ruler, it went up to 4 inchworms.
Those tiles are 1 inch, remember?
The ruler is kind of like having tiles stuck together.

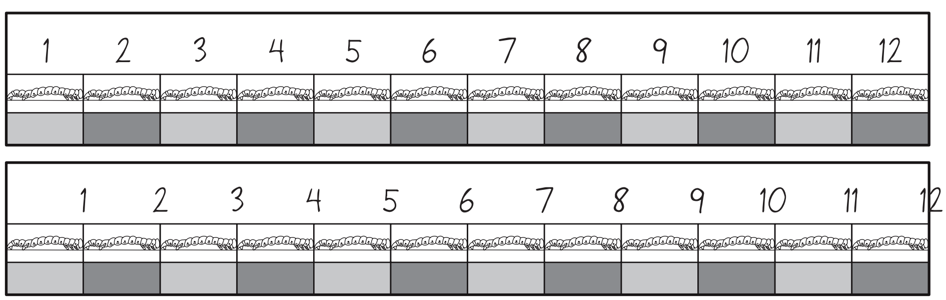
Activity 5 Estimate & Measure Inches (cont.)

3. Repeat step 2 with the 8˝ blue paper strips and the 10˝ red paper strips. Encourage students to use the shorter strips to help estimate the lengths of the longer strips. As you discuss the results of measuring the second and third strips with tile and rulers, ask students which measuring tool is easier to use and why.

4. Although some students may prefer the tile, chances are some will believe that the ruler is quicker and easier because it doesn't require them to line up a collection of objects. Even so, they still have to count the inchworms along the ruler to be sure of the lengths they're measuring. Ask them to discuss the idea of numbering their ruler to make it even easier to use. Is there some way they can write numbers above the inchworms so they don't have to count the worms every time they measure something?

5. Give students a minute or two to pair-share ideas about ways to number their rulers. Then ask volunteers to share their thinking with the class. After some ideas have been shared, ask students to use their pencils to write numbers on their rulers that will make their measuring job easier. Encourage them to use a system that makes best sense to them.

Chances are, many students will number the worms, as shown on the top ruler. A few, however, perhaps more familiar with rulers, may choose to make a tic-mark between each worm and number the marks. This may lead to an interesting discussion about the 12th number. It's clear that there are 12 inch worms on the ruler, but where does the 12 belong if you number a tic-mark at the end of each worm? You may want to have interested students inspect a classroom ruler marked in inches to see how the problem has been solved on a "regular" ruler.



6. When students have numbered their rulers, give them each a copy of the first Estimate & Check Inches record sheet. Review the sheet with the class and clarify as needed. When students understand what to do, send pairs back to their tables to work together. Explain that they need to help each other with the measuring jobs, but they each need to complete their own sheet. Remind them to estimate the length in inches before they measure, and to measure each item with tile as well as their ruler.

Note *Having students measure the same objects twice, once with tile and once with their inchworm rulers will help them make a smoother transition from measuring by lining up and counting concrete objects, to using a ruler, which is more efficient, but also more abstract.*

Extension

- If some students aren't able to complete their measuring sheets during your math period, collect them and give them back to the children during Work Places sometime in the next few days. There are two additional Estimate & Check Inches record sheets on pages D2.23 and D2.24. The second sheet involves measuring some lengths that are more than 12 inches. The third sheet invites children to choose their own items to measure in inches. Place copies of these two sheets in a tub, along with

Activity 5 Estimate & Measure Inches (cont.)

the tile, to create a Work Place for students to revisit on their own. (This activity may be used to replace Work Place 3C, Math Bucket Mystery Patterns.)

Set D2 Measurement: Length in U.S. Customary Units Blackline Run a class set.

NAME ____________________ DATE ____________

Estimate & Measure Inches Record Sheet page 1 of 3

1 Use square inch tiles and your inchworm ruler to estimate and measure length in inches.

- Write down your estimate. How many inches long do you think it is?
- Measure the length with tiles.
- Measure it again with your ruler.

OBJECT	MY ESTIMATE	LENGTH IN TILES	LENGTH IN INCHES
a Pencil	_______ inches	_______ tiles	_______ inches
b Crayon	_______ inches	_______ tiles	_______ inches
c Book	_______ inches	_______ tiles	_______ inches
d Chair Seat	_______ inches	_______ tiles	_______ inches
e 10 Unifix Cubes	_______ inches	_______ tiles	_______ inches
f Calculator	_______ inches	_______ tiles	_______ inches
g You Choose ___________	_______ inches	_______ tiles	_______ inches

Set D2 Measurement: Length in U.S. Customary Units Blackline Run a class set.

NAME ____________________ DATE ____________

Estimate & Measure Inches Record Sheet page 2 of 3

2 Use square inch tiles and your inchworm ruler to estimate and measure length in inches.

- Write down your estimate. How many inches long do you think it is?
- Measure the length with tiles.
- Measure it again with your ruler.

OBJECT	MY ESTIMATE	LENGTH IN TILES	LENGTH IN INCHES
a Your Hand	_______ inches	_______ tiles	_______ inches
b Piece of Paper	_______ inches	_______ tiles	_______ inches
c Shoe	_______ inches	_______ tiles	_______ inches
d Table	_______ inches	_______ tiles	_______ inches
e You Choose ___________	_______ inches	_______ tiles	_______ inches
f You Choose ___________	_______ inches	_______ tiles	_______ inches

3 How many inches are there in 1 foot? (circle the right answer)

2 inches   10 inches   12 inches   16 inches

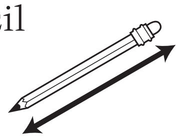
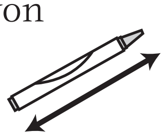
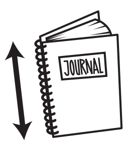
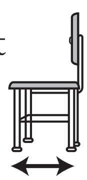
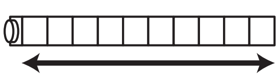
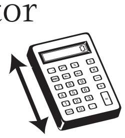
Note *Students will need their inchworm rulers for the next few activities. They can take their rulers home after that, but you may also choose to laminate the rulers and have students keep them at school for use throughout the year.*

NAME ______________________________ **DATE** ______________

Estimate & Measure Inches Record Sheet page 1 of 3

1 Use square inch tiles and your inchworm ruler to estimate and measure length in inches.

- Write down your estimate. How many inches long do you think it is?
- . Measure the length with tiles.
- Measure it again with your ruler.

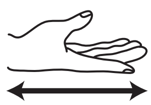
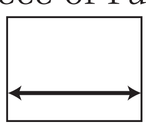
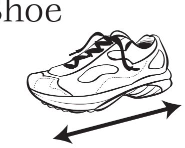
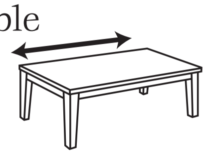
OBJECT	MY ESTIMATE	LENGTH IN TILES	LENGTH IN INCHES
a Pencil 	________ inches	________ tiles	________ inches
b Crayon 	________ inches	________ tiles	________ inches
c Book 	________ inches	________ tiles	________ inches
d Chair Seat 	________ inches	________ tiles	________ inches
e 10 Unifix Cubes 	________ inches	________ tiles	________ inches
f Calculator 	________ inches	________ tiles	________ inches
g You Choose ____________	________ inches	________ tiles	________ inches

NAME ______________________________ **DATE** ________________

Estimate & Measure Inches Record Sheet page 2 of 3

2 Use square inch tiles and your inchworm ruler to estimate and measure length in inches.

- . Write down your estimate. How many inches long do you think it is?
- . Measure the length with tiles.
- . Measure it again with your ruler.

OBJECT	MY ESTIMATE	LENGTH IN TILES	LENGTH IN INCHES
a Your Hand 	________ inches	________ tiles	________ inches
b Piece of Paper 	________ inches	________ tiles	________ inches
c Shoe 	________ inches	________ tiles	________ inches
d Table 	________ inches	________ tiles	________ inches
e You Choose ____________	________ inches	________ tiles	________ inches
f You Choose ____________	________ inches	________ tiles	________ inches

3 How many inches are there in 1 foot? (circle the right answer)

2 inches 10 inches 12 inches 16 inches

NAME ______________________ **DATE** ______________

Estimate & Measure Inches Record Sheet page 3 of 3

4 Use square inch tiles and your inchworm ruler to estimate and measure length in inches.

- Choose what you want to measure. Show it on your record sheet.
- Write down your estimate. How many inches long do you think it is?
- Measure the length with tiles.
- Measure it again with your ruler.

OBJECT	MY ESTIMATE	LENGTH IN TILES	LENGTH IN INCHES
a You Choose __________	______ inches	______ tiles	______ inches
b You Choose __________	______ inches	______ tiles	______ inches
c You Choose __________	______ inches	______ tiles	______ inches
d You Choose __________	______ inches	______ tiles	______ inches
e You Choose __________	______ inches	______ tiles	______ inches
f You Choose __________	______ inches	______ tiles	______ inches

Set D2 ★ Activity 6

ACTIVITY

From Feet to Yards

Overview

Students estimate the length of a distance you've pre-marked in the corridor outside the classroom and then use their inchworm rulers to measure it in feet. When they return to the classroom, they work in groups of three to cut yard-long lengths of string, and then re-measure the distance in the hall, this time in yards instead of feet.

Skills & Concepts

- ★ estimate length in feet and yards
- ★ measure length to the nearest foot and the nearest yard
- ★ learn that there are 3 feet in a yard
- ★ predict whether the measurement will be greater or smaller when different units are used to measure the same length

You'll need

- ★ students' inchworm rulers from Set D2, Activity 4
- ★ a yardstick
- ★ a ball of heavy cotton string for each group of 3 children (see note)
- ★ scissors
- ★ felt pens
- ★ blue masking tape (see Advance Preparation)
- ★ a piece of chart paper and a felt pen (see Advance Preparation)
- ★ a piece of 12″ × 18″ drawing paper for each student (optional)
- ★ pencils and crayons (optional)

Advance Preparation Measure out a length of 24 feet in the corridor outside your classroom. Mark it at either end with a strip of blue masking tape. Post the piece of chart paper on the wall near the length you've marked in the corridor.

Note If you don't have multiple balls of string, wind several yards of string around a large craft stick or a small piece of poster board for each group.

Instructions for From Feet to Yards

1. Explain that you're going to take the children into the corridor outside your classroom to do some measuring. Have them to line up at the door with their inchworm rulers. Once they're out in the corridor, have them stand or sit in a line along one wall. (If it's an outside corridor, have them to sit or stand along the edge of the walkway across from the wall.)

2. Have a volunteer walk the distance between the two pieces of masking tape as the other students watch. How many feet long is the distance you've marked off? Ask students to pair-share estimates, and then call on volunteers to share their ideas. Record their estimates on the piece of chart paper you've posted.

Activity 6 From Feet to Yards (cont.)

3. Then call on students one by one to lay down their inchworm rulers end-to-end, name side up, to measure the distance. If you have fewer than 24 students, ask them to work together to figure out how to measure the remaining distance. They might propose using some of the regular rulers from the classroom, or re-using some of their inchworm rulers. When all the rulers have been laid end-to-end, count them with the class. Then ask students to retrieve their rulers, line up again, walk back into the classroom, and join you in the discussion area.

4. When they're settled back in the classroom, ask students to discuss the length they measured. Here are some questions to pose:

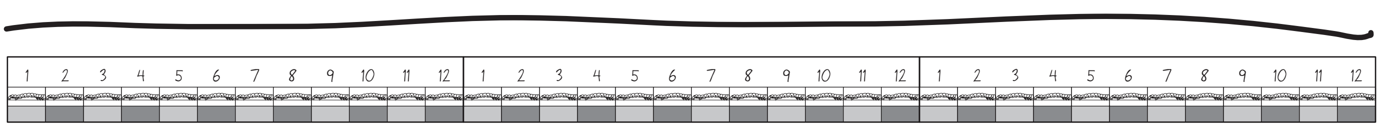
- How many feet long was the distance we just measured?
- What else can you think of that might be about that long?
- Can you think of a tool that might have made our job easier?

5. After some discussion, show students the yardstick. Explain that in addition to using inches and feet, people sometimes measure length in yards. How does the yardstick compare to a foot? After students have made some estimates, borrow some of their inchworm rulers and work with their input to measure the yardstick.

6. When the students have determined that there are 3 feet in a yard, ask them what would happen if you measured the length in the corridor using yards instead of feet. Would it take more or fewer of these units to measure the distance? Ask students to pair-share their ideas, and then call on volunteers to explain their thinking to the class.

> ***Students*** *Those yards are bigger, so it would take more of them.*
> *But the stick is longer than our worm rulers. It took a whole bunch of rulers to measure out there. It wouldn't take as many of these sticks.*

7. While some students may be positive that it would take fewer yards than feet to measure the distance, others may be just as convinced that because a yard is longer than a foot, it will take more of them. Explain that you're going to have the students work in groups of 3 to carefully measure and cut a length of string that is one yard long. Borrow an inchworm ruler from one of the students and ask two volunteers to help you model the process in the discussion circle with input from the class. What can you do to ensure that the length you cut is accurate?



> ***Alex*** *Let's pull it a little tighter so the string is really straight!*

8. When students understand what to do, assign the groups of 3 and send them off to work. Encourage them to be as accurate as possible. As groups finish, have them bring their yard-long strings back to the discussion area and seat themselves there until everyone has returned.

9. When all the groups have finished, take the class back out into the corridor. Have them think again about whether it will take more or fewer yards than feet to measure the distance. After they've had a few moments to think about it, ask them to estimate how many yard-long strings it will take to measure the distance. Record their estimates on your chart paper. Then call on students one by one, one from

Activity 6 From Feet to Yards (cont.)

each group, to place their strings end-to-end to measure the distance. Use blue masking tape to hold the strings down at either end if necessary. Determine the total with the class, and then have students return to the classroom.

10. Collect students' yard-long strings. You will need them for other activities in this set. Collect or have students put away their inchworm rulers for use in future activities.

11. Take a few minutes to discuss the results. Did it take more yards or more feet to measure the distance in the corridor? How did the number of yards compare with the number of feet it took? Why did it work that way? Why is it useful to have different sized units to measure length? What are some other things people might choose to measure in yards instead of feet? What are some things people might choose to measure in inches or feet instead of yards?

Extensions

- After you measure the length in the corridor in feet and have determined with the class that there are 3 feet in a yard, ask students to predict how many yards it will take to measure the distance based on the number of feet. That is, if they know the length is 24 feet, and there are 3 feet in a yard, can they use the information to make an accurate prediction before you go out to measure?
- Give students each a piece of drawing paper. Have them fold it into thirds and label each section as shown below. Ask them to draw and label one or more objects in each section that people might choose to measure using that unit. Display their drawings on the classroom wall or in the corridor.

Inches	Feet	Yards

Set D2 ★ Activity 7

ACTIVITY

Measuring in Yards

Overview
Students use the yard strings they cut during the previous to measure things around the room to the nearest yard.

Skills & Concepts
- ★ estimate length to the nearest yard
- ★ measure length to the nearest yard
- ★ recall equivalencies associated with length: 12 inches = 1 foot; 3 feet = 1 yard

You'll need
- ★ Measuring in Yards (page D2.31, run a class set)
- ★ students' yard strings from Set D2, Activity 6
- ★ string (see Advance Preparation)
- ★ *Twelve Snails to One Lizard*, by Susan Hightower (optional)

Advance Preparation Cut enough extra yard strings so that you have one for each pair of students in your class.

Instructions for Measuring in Yards
1. Gather students to your discussion area. Explain that they are going to work in pairs today to measure some things around the room in yards. Then give them each a copy of the Measuring in Yards sheet. Read the sheet with the class and provide clarification as needed.

2. Before you send students out to work, ask them to look around the room from where they're sitting. What do they see that is probably shorter than 1 yard? Can they see something that looks like it would be longer than 1 yard, or exactly 1 yard long? Can they spot something that looks like it is about 2 yards long? How many feet would that be? How do they know? When they go out to work with their partner, how will the two of them use a single string that is one yard long to measure 2 yards?

> ***Students*** *We can hold the string together and then move it.*
> *First we can stretch it out. Then I can hold it down on one end and Joshua can move it around to do the next yard.*
> *We can be like inchworms except measuring yards.*
> *We can be yardworms!*

3. Take a minute to talk about measuring to the nearest yard. What if they can't find something that is exactly 3 yards long?

> ***Shanti*** *It says to find something about 3 yards long. It doesn't have to be perfect.*

Work with a volunteer to measure something students estimate to be about 3 yards long. As you do so, talk with students about determining the nearest yard. How will they know if the length is closer to 2 yards or closer to 3 yards?

4. When students understand what to do, give each pair a yard string and send them out to work.

Activity 7 Measuring in Yards (cont.)

Set D2 Measurement: Length in U.S. Customary Units Blackline Run a class set.

NAME ______________________ DATE ____________

Measuring in Yards

1 Use your yard string. Find 2 things in the room that are:
- shorter than 1 yard
- exactly 1 yard long
- longer than 1 yard.

Fill in this chart to show what you find.

SHORTER THAN 1 YARD	EXACTLY 1 YARD LONG	LONGER THAN 1 YARD

2 My partner is (circle one)

shorter than a yard exactly a yard longer than a yard

3 A bookshelf in our room is (circle one)

shorter than a yard exactly a yard longer than a yard

4 Find something in the room that is about 2 yards long. Find something that is about 3 yards long. Find something that is about 4 yards long. Fill in the chart to show what you find.

ABOUT 2 YARDS LONG	ABOUT 3 YARDS LONG	ABOUT 4 YARDS LONG

5 How many feet are there in 1 yard? There are _______ feet in 1 yard

6 How many feet are there in 2 yards? There are _______ feet in 2 yards.

7 How many inches are there in 1 foot? There are _______ inches in 1 foot.

8 How many inches are there in 1 yard? There are _______ inches in 1 yard

Extension

- If you have access to the book, read *Twelve Snails to One Lizard*, by Susan Hightower, to your students. In this story, Milo the Beaver needs to cut a branch exactly 36 inches long to bridge a gap in his dam. As luck would have it, the snails in his neck of the woods are exactly 1 inch long, the iguana lizards are 1 foot long, and the nearest boa happens to be 1 yard long. Not all of Milo's friends are interested in helping with the measuring task at hand, but the story may help children remember the relationships among the inches, feet, and yards.

NAME ______________________________ DATE ______________

Measuring in Yards

1 Use your yard string. Find 2 things in the room that are:
- shorter than 1 yard
- exactly 1 yard long
- longer than 1 yard.

Fill in this chart to show what you find.

SHORTER THAN 1 YARD	EXACTLY 1 YARD LONG	LONGER THAN 1 YARD

2 My partner is (circle one)

shorter than a yard exactly a yard longer than a yard

3 A bookshelf in our room is (circle one)

shorter than a yard exactly a yard longer than a yard

4 Find something in the room that is about 2 yards long. Find something that is about 3 yards long. Find something that is about 4 yards long. Fill in the chart to show what you find.

ABOUT 2 YARDS LONG	ABOUT 3 YARDS LONG	ABOUT 4 YARDS LONG

5 How many feet are there in 1 yard? There are ________ feet in 1 yard

6 How many feet are there in 2 yards? There are ________ feet in 2 yards.

7 How many inches are there in 1 foot? There are ________ inches in 1 foot.

8 How many inches are there in 1 yard? There are ________ inches in 1 yard

Set D2 ★ Activity 8

ACTIVITY

How Long? How Tall?

Overview

During this measuring extravaganza, students first estimate and measure the height of the teacher and one of their classmates in yards, feet, and inches. Children then work in small groups to measure, cut, label, and illustrate lengths of adding machine tape to match the lengths of various large animals.

Skills & Concepts

★ use common referents to make estimates in inches, feet, and yards

★ measure length in inches, feet, and yards

★ predict whether the measurement will be greater or smaller when different units are used to measure the same object

★ recall equivalencies associated with length:
12 inches = 1 foot; 3 feet = 1 yard

★ generalize connections among mathematics, the environment, and other subjects

You'll need

★ Animal Information Cards (pages D2.36 and D2.37, run 1 copy of each sheet on card stock, see Advance Preparation)

★ one small envelope for every 3–4 students

★ a roll of adding machine tape for each group of 3–4 students (see note)

★ students' inchworm rulers from Set D2, Activity 4

★ students' yard strings from Set D2, Activity 6

★ classroom rulers

★ 1 or more yardsticks

★ 3 cloth measuring tapes (from your Bridges kit)

★ scissors

★ crayons, colored pencils, and felt markers

★ Internet access or animal books (optional)

★ *Is a Blue Whale the Biggest Thing There Is?*, by Robert E. Wells (optional)

Advance Preparation Run one copy of both sheets on card stock. Cut the 12 cards apart. Each group of 3–4 children in your class will need one card. Choose the cards you want to use and place each in a small envelope. You may also want to pre-arrange the work groups taking into consideration which students work best together.

Note You can either provide each group with its own roll of adding machine tape, or pre-cut a length of about 18 feet for each group from a single roll. If you cut lengths, gently fold each length back and forth on itself and fasten it in the middle with a paperclip to make it more manageable to carry around.

Activity 8 How Long? How Tall? (cont.)

Instructions for How Long? How Tall?

1. Gather students to your discussion area. Place a cloth measuring tape, a yardstick, a classroom ruler, an inchworm ruler, and a yard string within easy reach and sight of the students. Stand up and invite one of the children to stand next to you. Ask students to compare your heights, and make some estimates. Here are some questions to pose:

- Which one of us is taller? Which one of us is shorter?
- Is either of us taller than 1 yard? Is either of us taller than 2 yards?
- About how many feet tall do you think I am? What about my volunteer? (Record students' estimates on the board.)
- About how much taller am I than my volunteer?

2. Place the end of the yardstick on the floor and hold it upright between you and your student volunteer. Ask students to use the visual benchmark provided by this tool to reconsider their estimates. If they know there are 3 feet in a yard, and they can see the 3-foot measure right next to you and your volunteer, does the information help them make more accurate estimates? Invite them to change their estimates if they want to. Record any new estimates on the board in a different color.

3. Work with help from students to measure your height and that of your volunteer to the nearest yard, the nearest foot, and the nearest inch. As you measure in different units, solicit students' ideas about which tools to use for each task. Have students predict whether the results will be greater or smaller as you switch from one unit to the next. Record the measurements as you go. Which unit gives the most accurate measure? Why?

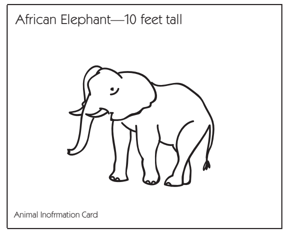
How tall are we to the nearest whole unit?

Mrs. Hill	Gabe
2 yards	1 yard
5 feet	4 feet
65 inches	47 inches

4. Now ask students to think of some of the large animals they've seen at the zoo, or in a video, or on TV, or in a book. What are some of the tallest animals they can think of? What are some of the longest animals? How do the heights or lengths of some of these animals compare to the students' heights?

5. After some discussion, explain that they are going to work in groups of 3 or 4 to measure, cut, label, and illustrate the height or length of a large animal. If you have pre-arranged the work groups, assign children to their groups now. Ask them to rearrange themselves in your discussion area so they are sitting in their groups. Then show them the envelopes you've prepared. Tell them that each envelope has a card in it with a picture of a large animal. Ask one student from one of the groups to select an envelope from your hand. Have that student open the envelope, show the animal card to his or her team-mates, and then give you the card to show to the class.

Activity 8 How Long? How Tall? (cont.)



6. Examine the card with the class. Show them a roll or length of adding machine tape. What tools could they use to measure and cut a length of tape as long as an African elephant is tall? Discuss students' ideas. Then explain that they'll need to do the following:

- Measure and cut the tape to match the height or length of their animal.
- Put their names on the back of the tape.
- Write the name of the animal on the front.
- Write the length or height of the animal in feet.
- Figure out the animal's length or height to the nearest yard and write that on the tape.
- Decorate the tape to communicate something about the animal. Students might draw pictures of the animal or color the tape to match the animal's colors and markings.

7. When students understand what to do, let each group pick an envelope from your hand, open it to discover their assigned animal, and start to work. Once they've started, you may want to list the job expectations in short form on the board. Circulate to provide help and encouragement as needed.

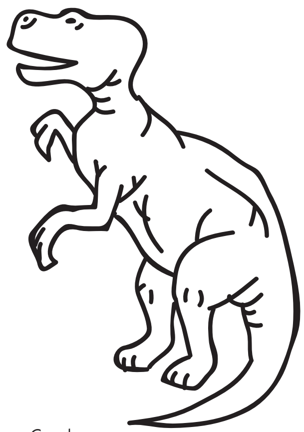
8. Post the finished tapes in order of length in the hallway outside the classroom.

Extensions

- Challenge some or all of the groups to determine and record their animal's height or length in inches.
- Provide animal books or Internet access so children can see photos of their animal. Ask each group member to write one fact about the animal on the tape.
- If you have access to the book, read *Is a Blue Whale the Biggest Thing There Is?*, by Robert E. Wells, to your students. Not a story as such, this book begins with the question, "Is a Blue Whale the Biggest Thing There Is?" and answers it with a series of examples, each larger than the previous, starting with a blue whale and ending with the universe.

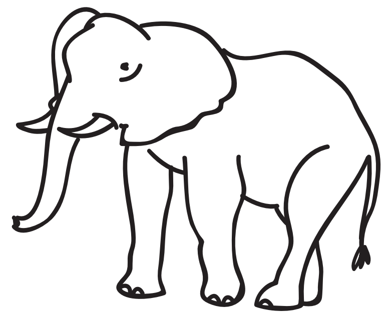
Animal Information Cards page 1 of 2

Tyrannosaurus Rex—18 feet tall



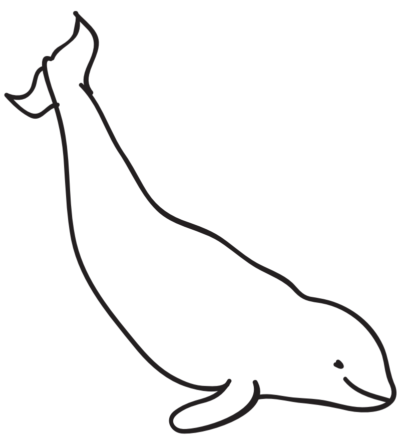
Animal Inofrmation Card

African Elephant—10 feet tall



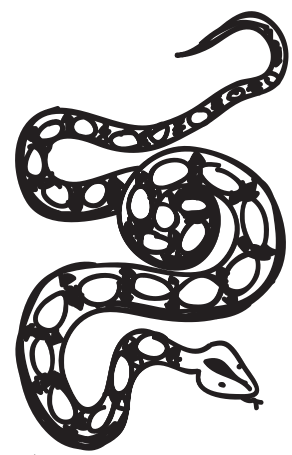
Animal Inofrmation Card

Beluga Whale—15 feet long



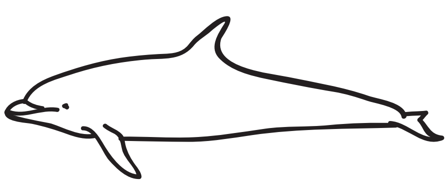
Animal Inofrmation Card

Boa Constrictor—9 feet long



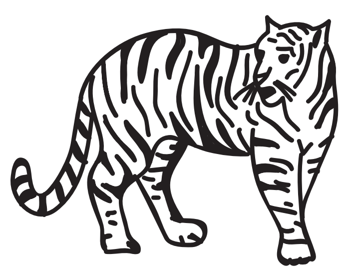
Animal Inofrmation Card

Bottlenose Dolphin—12 feet long



Animal Inofrmation Card

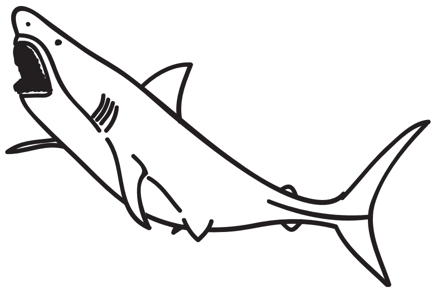
Siberian Tiger—10 feet long



Animal Inofrmation Card

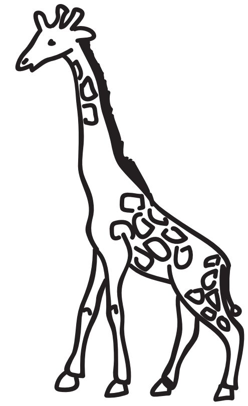
Animal Information Cards page 2 of 2

Great White Shark—15 feet long



Animal Inofrmation Card

Female Giraffe—14 feet tall

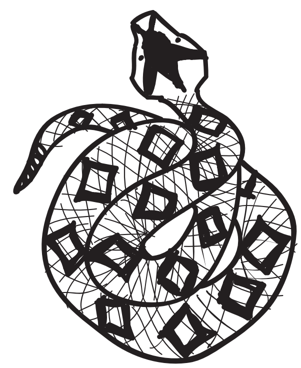


Animal Inofrmation Card

Red Kangaroo—6 feet tall

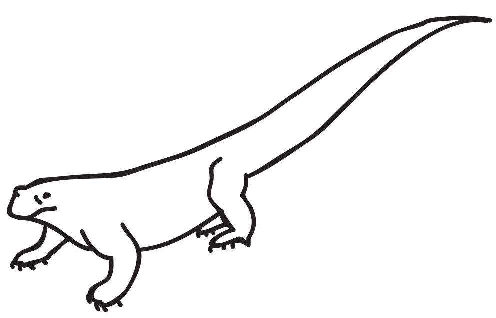
Animal Inofrmation Card

Eastern Diamondback Rattlesnake—8 feet long



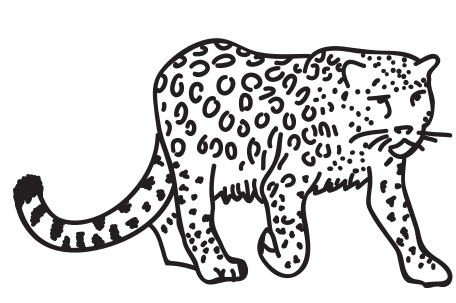
Animal Inofrmation Card

Komodo Dragon—10 feet long



Animal Inofrmation Card

Snow Leopard—6 feet long



Animal Inofrmation Card

BRIDGES IN MATHEMATICS 2

GRADE 2 SUPPLEMENT

Set D3 Measurement: Length in Metric Units

Includes

Skills & Concepts

★ identify objects that represent standard units and use them to measure length

★ estimate length in centimeters and meters

★ measure length to the nearest centimeter or the nearest meter

Published by The MATH LEARNING CENTER Salem, Oregon

P0709

Bridges in Mathematics Grade 2 Supplement
Set D3 Measurement: Length in Metric Units

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P0709

Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at www.mathlearningcenter.org.

Set D3 ★ Activity 1

ACTIVITY

How Long is An Army Ant?

Overview

Using the length of an army ant, students learn about a new, and smaller unit of measure: the centimeter. Then they make their own army ant rulers and use them to find things in the classroom that are about 1 centimeter long, between 1 and 10 centimeters long, and about 10 centimeters long.

Skills & Concepts

★ identify objects that represent standard units and use them to measure length

★ measure length to the nearest centimeter

★ generate common measurement referents for centimeters

★ generalize connections among mathematics, the environment, and other subjects

You'll need

★ Army Ant Strips (page D3.4, quarter class set plus 1 extra, see Advance Preparation)

★ Army Ant Ruler Record Sheet (page D3.5, run a class set)

★ Army Ants (pages D3.6–D3.9, run 1 copy of each, see Advance Preparation)

★ 3 cm × 10 cm strips of poster board, 1 per student, plus 2–3 extra strips

★ glue sticks

★ scissors

★ a ruler marked with both centimeters and inches

★ blue and red crayons or colored pencils

★ book or video about army ants (optional)

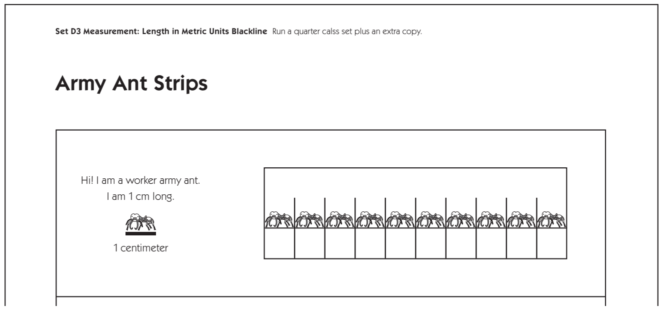
Advance Preparation Run a quarter class set of the Army Ant Strips on page D3.5. Make sure your copy machine is set at 100% or a percentage that results in strips of ants exactly 10 centimeters long. Cut the sheets in quarters to provide one 10-cm strip for each student. Find Army Ants on pages D3.6–D3.9. Make one copy of each sheet and mount them on construction paper or butcher paper, or simply hang the four sheets on the board near your discussion area.

Instructions for How Long is An Army Ant?

1. Gather students to the discussion area and have them form a circle. Ask them to share anything they already know about army ants. If you have access to a book or short video about army ants, share at least some of it with the students right now. Read (or sing) Army Ants to your class, and then ask the students to read or sing it with you.

2. Ask students to think about the ants they've seen. How long do they think ants are? Is an ant longer than an inch? Shorter than an inch? Can they use their fingers to show approximate the length of an ant? Then give each student an Army Ant Strip. Give them a minute to examine the strip and pair-share their comments and observations.

Activity 1 How Long is An Army Ant? (cont.)

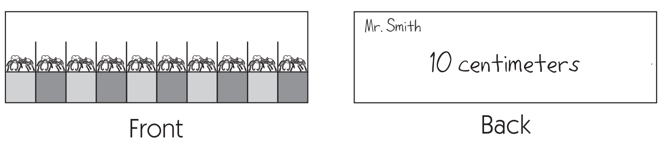


3. Invite a few students to share their observations with the class. Then ask students to think about how a centimeter compares with an inch. Is it longer or shorter? How does the width of their little finger compare with a centimeter? Can they think of other things that are about a centimeter long? How many centimeters long is the row of ants? How do they know?

4. Show students the ruler marked with both inches and centimeters. Explain that in the United States, we often measure length in inches, but scientists, engineers, and people in other countries around the world measure length in centimeters instead. Today, the students are each going to make their own centimeter ruler with help from the army ants.

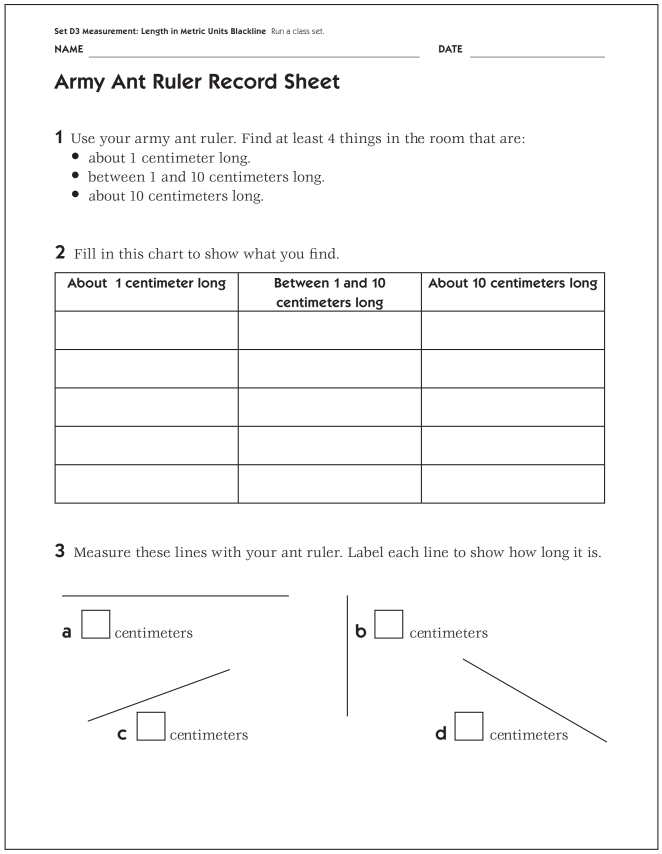
5. Then show children the materials they'll use to make their own ruler: a strip of poster board, a red and a blue crayon or colored pencil, a pair of scissors, a glue stick, and the Army Ant Strip they're holding right now.

6. Demonstrate how to color the sections below the ants in a pattern of alternating red and blue. Then cut out the strip and glue it to the poster board. Finally, turn your centimeter ruler over and label it as shown below.



7. When students understand what to do, distribute the materials they'll need and send them back to work at their tables. As a few of the students finish, call the class back to your discussion circle briefly. Give them each a copy of the Army Ant Ruler Record Sheet. Read the sheet with them and explain the tasks as needed. Ask them to work in pairs to complete the sheet as soon as they're finished making their 10-centimeter rulers.

Activity 1 How Long is An Army Ant? (cont.)


Set D3 Measurement: Length in Metric Units Blackline Run a class set.

NAME ______________________ DATE __________

Army Ant Ruler Record Sheet

1 Use your army ant ruler. Find at least 4 things in the room that are:
- about 1 centimeter long.
- between 1 and 10 centimeters long.
- about 10 centimeters long.

2 Fill in this chart to show what you find.

About 1 centimeter long	Between 1 and 10 centimeters long	About 10 centimeters long

3 Measure these lines with your ant ruler. Label each line to show how long it is.

a ☐ centimeters

b ☐ centimeters

c ☐ centimeters

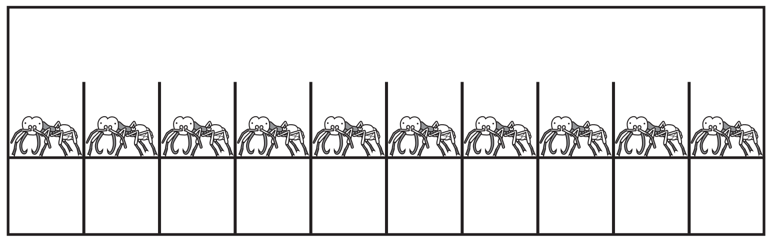
d ☐ centimeters

8. If necessary, give students more time the following day, perhaps during a designated seatwork period, to complete the sheet. Be sure they leave their 10-centimeter rulers at school; they'll need them for the next couple activities.

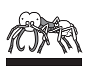
Army Ant Strips

Hi! I am a worker army ant.
I am 1 cm long.

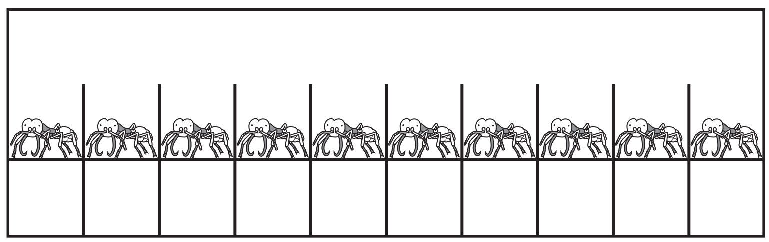
1 centimeter



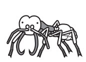
Hi! I am a worker army ant.
I am 1 cm long.



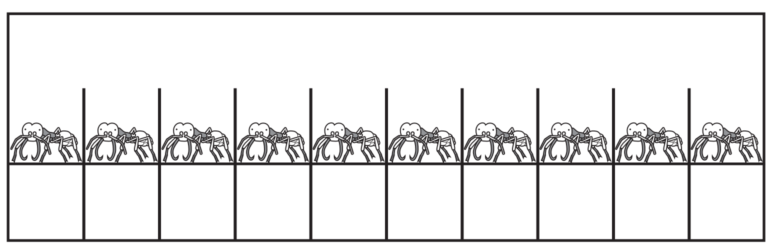
1 centimeter



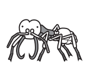
Hi! I am a worker army ant.
I am 1 cm long.



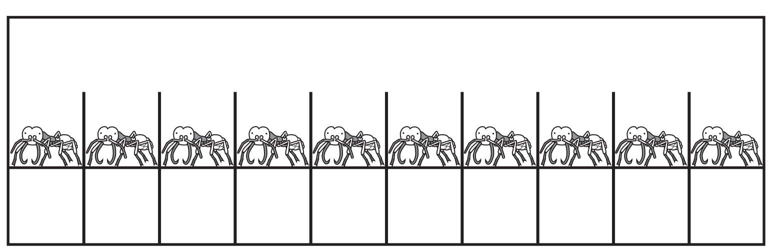
1 centimeter



Hi! I am a worker army ant.
I am 1 cm long.



1 centimeter



NAME ______________________________ **DATE** ______________

Army Ant Ruler Record Sheet

1 Use your army ant ruler. Find at least 4 things in the room that are:

- about 1 centimeter long.
- between 1 and 10 centimeters long.
- about 10 centimeters long.

2 Fill in this chart to show what you find.

About 1 centimeter long	Between 1 and 10 centimeters long	About 10 centimeters long

3 Measure these lines with your ant ruler. Label each line to show how long it is.

a ☐ centimeters

b ☐ centimeters

c ☐ centimeters

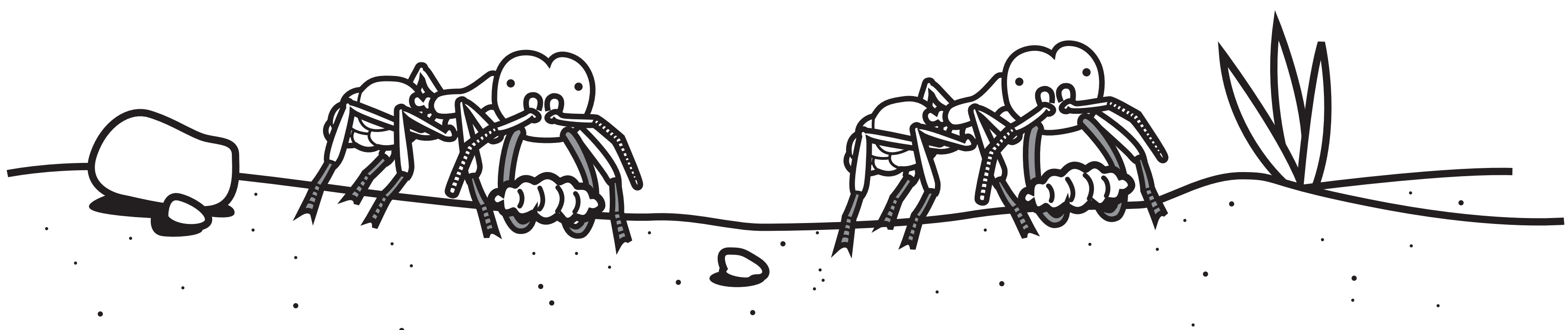
d ☐ centimeters

Army Ants

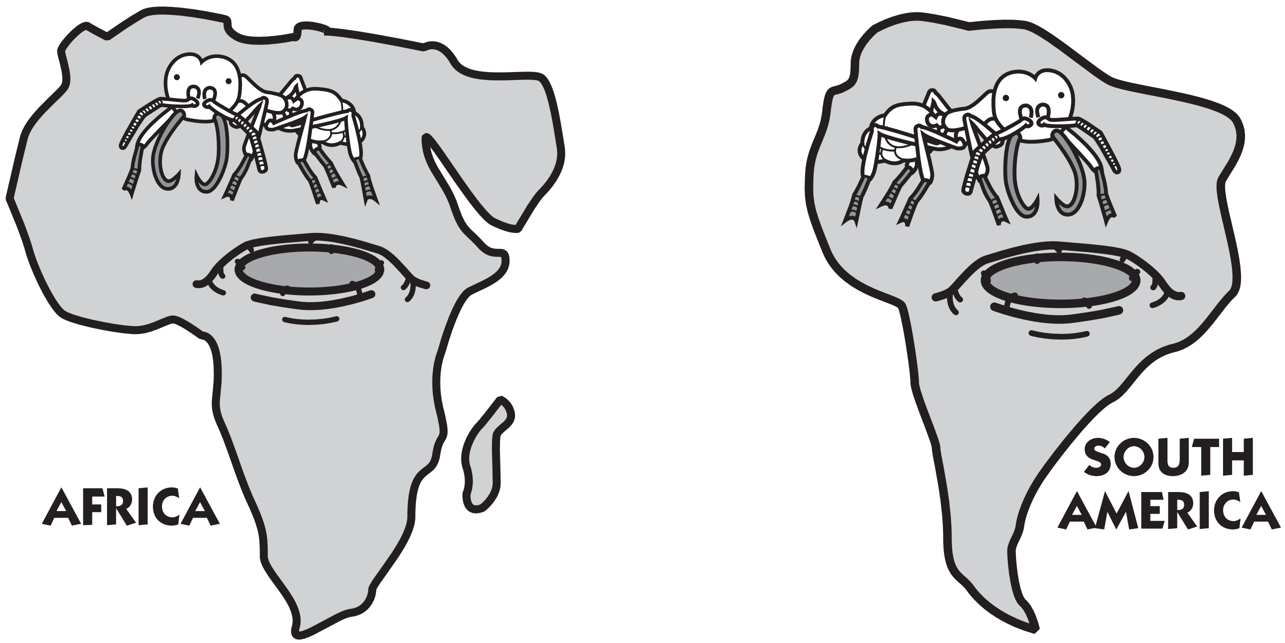
(to the tune of "The Farmer in the Dell")

Army ants are marching,
Thousands at a time,
To find some shelter for the queen,
So she can lay her eggs.

Workers link their bodies,
Ant bivouacs,
When it's time to move again,
They carry all their young.

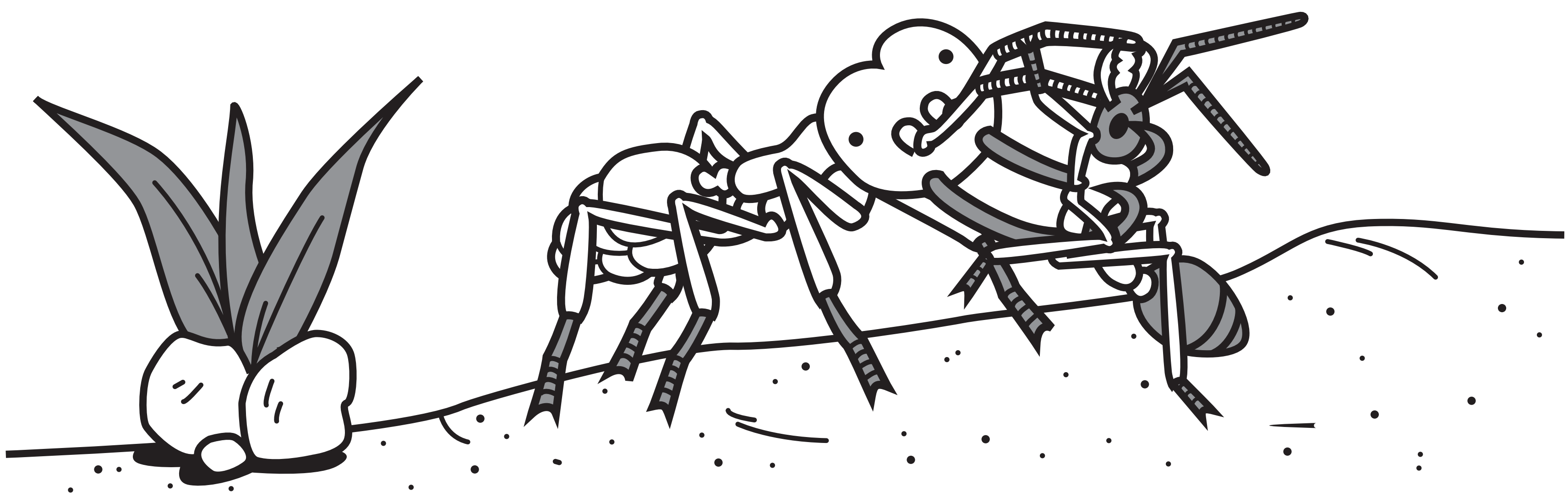


They march when food is scarce,
Eating as they go,
In Africa and the Amazon,
Ants marching in a row.



Soldiers on patrol,
As fierce as they can be,
Defending from the enemy,
I'm glad they won't find me.

by Donna Burk
illustrated by Tyson Smith



Set D3 ★ Activity 2

ACTIVITY

Estimate & Measure Centimeters

Overview

Students number their army ant rulers so they are easier to read. Then they use their rulers to estimate and measure the length of various objects around the classroom. Students may revisit this activity on their own during Work Places.

Skills & Concepts

★ estimate length in centimeters

★ measure length to the nearest centimeter

You'll need

★ Estimate & Measure Centimeters, Record Sheets 1–3 (pages D3.14–D3.16, class set of each)

★ students' army ant rulers from Set D3, Activity 1

★ 1" × 10" strips of yellow construction paper, one for every pair of students

★ pencils

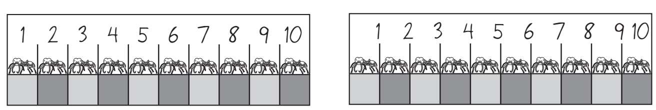
★ several classroom rulers marked with centimeters

★ 3 cloth tape measures from your Bridges kit (optional)

Instructions for Estimate & Measure Centimeters

1. Let students know that they are going to use their army ant rulers to do some more measuring today. Have them write numbers on their rulers that will make their measuring job easier. Encourage them to use a system that makes best sense to them.

Many students will probably decide to write their numbers directly above the ants, as shown on the left below. A few, however, perhaps more familiar with rulers, may choose to make a tic-mark between each ant and number the marks. Again, discussion and debate may emerge about the placement of the number 10 on a ruler marked with tic-marks? Why is it appropriate to mark a ruler so that the numbers appear at the end of each section? You may want to have interested students inspect a classroom ruler marked in centimeters to see how the problem has been solved on a "regular" ruler.



2. Ask students to bring their numbered rulers with them and join you in the discussion area. Have them sit in a circle and pair up with the person sitting next to them. Borrow an ant ruler from one of the students. Set it in the middle of the circle and lay one of the yellow construction paper strips alongside. How do the ruler and the strip of paper compare in length? Would it be possible to measure the length of the strip with just one army ant ruler? If so, how?

> ***Students*** *The yellow paper is way longer!*
> *It looks like it would take about 3 of our rulers to fit on that paper.*
> *Yeah! Let's just put some of our rulers together!*
> *But Mr. Carter said we can only use one ruler.*
> *We need a longer ruler to measure that paper.*
> *You could just move the ruler ahead until you get to the end of the yellow paper.*

Activity 2 Estimate & Measure Centimeters (cont.)

3. Give each student pair a strip of yellow paper. Ask them to use just one of their rulers to measure the length of the strip. If some of them want to mark the strip to show where to place the ruler each time they move it, encourage them to do so. How many centimeters long is the yellow strip? (between 25 and 26 centimeters) After they have had a minute or two to work, ask them to share their results. Here are some questions to pose:

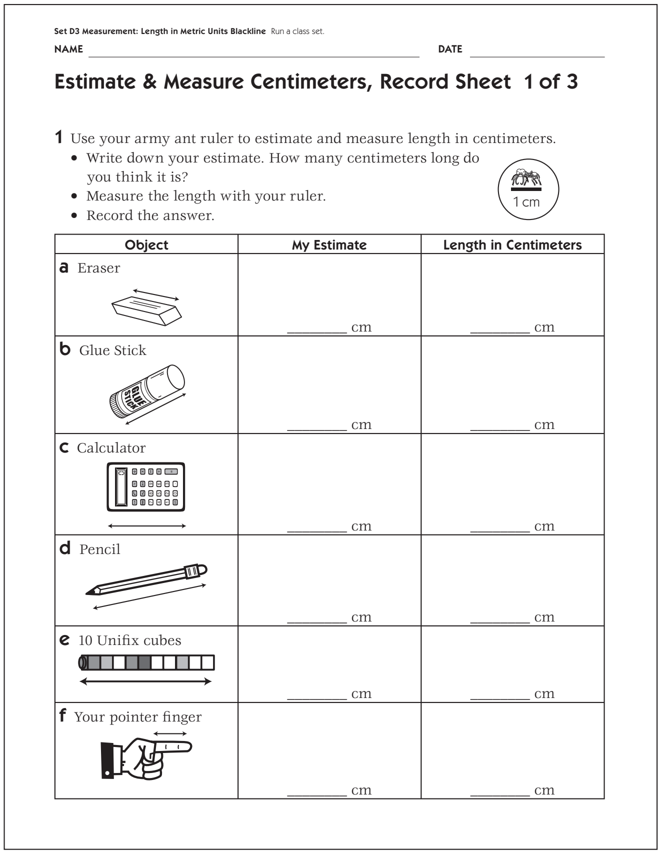
- Did you all get the same answer?
- Why or why not?
- What do you need to do to measure something longer than your ruler with accuracy? How can you keep track of how many times you have moved the ruler, and how many centimeters you've measured so far?
- What if the length of the object doesn't land exactly at the end of a centimeter space? (Encourage your students to measure to the nearest whole centimeter, but don't hesitate to show them how to record ½˝ if some want to be more precise.)

4. Give students each a copy of the first Estimate & Check Centimeters record sheet. Review the sheet with the class. When students understand what to do, send pairs back to their tables to work together. Explain that they need to help each other with the measuring jobs, but they each need to complete their own sheet.

Extension

- If some students aren't able to complete their measuring sheets during your math period, collect them and give them back to the children to complete sometime in the next few days. There are 2 additional Estimate & Check Centimeters record sheets on pages D3.12 and D3.13. The second sheet invites students to use either their own ant ruler or a classroom ruler marked in centimeters. The third sheet offers the option of using either a centimeter ruler or a tape measure marked in centimeters. Place copies of these two sheets in a tub, along with several classroom rulers and the three cloth measuring tapes from your Bridges kit to create a Work Place for students to revisit on their own sometime in the next couple of months.

Activity 2 Estimate & Measure Centimeters (cont.)



Set D3 Measurement: Length in Metric Units Blackline Run a class set.

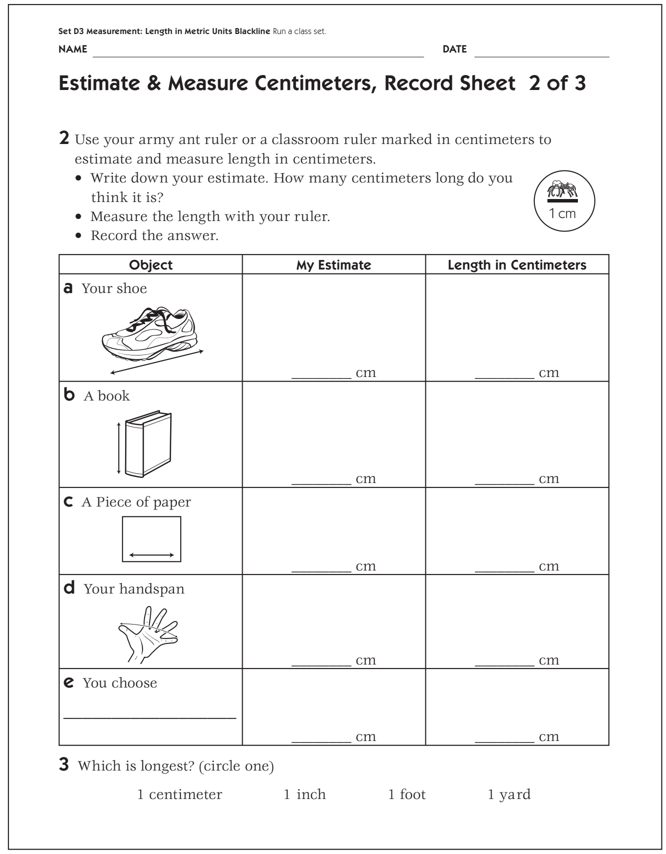
NAME ______________________ DATE ______________

Estimate & Measure Centimeters, Record Sheet 1 of 3

1 Use your army ant ruler to estimate and measure length in centimeters.
- Write down your estimate. How many centimeters long do you think it is?
- Measure the length with your ruler.
- Record the answer.

1 cm

Object	My Estimate	Length in Centimeters
a Eraser	_______ cm	_______ cm
b Glue Stick	_______ cm	_______ cm
c Calculator	_______ cm	_______ cm
d Pencil	_______ cm	_______ cm
e 10 Unifix cubes	_______ cm	_______ cm
f Your pointer finger	_______ cm	_______ cm



Set D3 Measurement: Length in Metric Units Blackline Run a class set.

NAME ______________________ DATE ______________

Estimate & Measure Centimeters, Record Sheet 2 of 3

2 Use your army ant ruler or a classroom ruler marked in centimeters to estimate and measure length in centimeters.
- Write down your estimate. How many centimeters long do you think it is?
- Measure the length with your ruler.
- Record the answer.

1 cm

Object	My Estimate	Length in Centimeters
a Your shoe	_______ cm	_______ cm
b A book	_______ cm	_______ cm
c A Piece of paper	_______ cm	_______ cm
d Your handspan	_______ cm	_______ cm
e You choose ______________	_______ cm	_______ cm

3 Which is longest? (circle one)

1 centimeter   1 inch   1 foot   1 yard

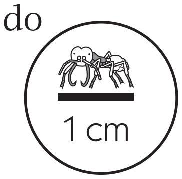
Note *Students will need their army ant rulers for the next activity. They can take their rulers home after that, but you may also choose to laminate the rulers and have students keep them at school for use throughout the year.*

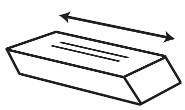
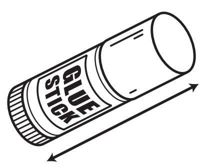
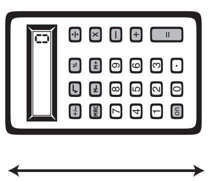
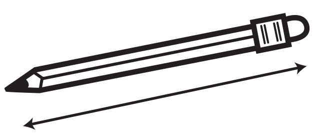
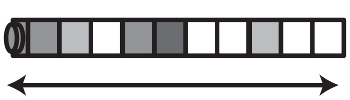
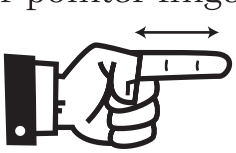
NAME ______________________________ DATE ______________

Estimate & Measure Centimeters, Record Sheet 1 of 3

1 Use your army ant ruler to estimate and measure length in centimeters.

- Write down your estimate. How many centimeters long do you think it is?
- Measure the length with your ruler.
- Record the answer.



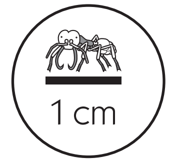
Object	My Estimate	Length in Centimeters
a Eraser 	________ cm	________ cm
b Glue Stick 	________ cm	________ cm
c Calculator 	________ cm	________ cm
d Pencil 	________ cm	________ cm
e 10 Unifix cubes 	________ cm	________ cm
f Your pointer finger 	________ cm	________ cm

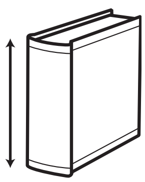
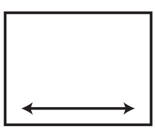
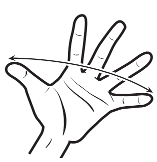
NAME ______________________________ **DATE** ______________

Estimate & Measure Centimeters, Record Sheet 2 of 3

2 Use your army ant ruler or a classroom ruler marked in centimeters to estimate and measure length in centimeters.

- Write down your estimate. How many centimeters long do you think it is?
- Measure the length with your ruler.
- Record the answer.



Object	My Estimate	Length in Centimeters
a Your shoe 	________ cm	________ cm
b A book 	________ cm	________ cm
c A Piece of paper 	________ cm	________ cm
d Your handspan 	________ cm	________ cm
e You choose ______________________	________ cm	________ cm

3 Which is longest? (circle one)

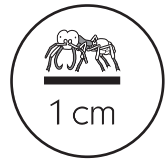
1 centimeter 1 inch 1 foot 1 yard

NAME ______________________________ DATE ______________

Estimate & Measure Centimeters, Record Sheet 3 of 3

4 Use a centimeter ruler or tape measure to estimate and measure length.

- Write down your estimate. How many centimeters long do you think it is?
- Measure the length with your ruler or tape measure.
- Record the answer.



Object	My Estimate	Length in Centimeters
a You choose ______________	________ cm	________ cm
b You choose ______________	________ cm	________ cm
c You choose ______________	________ cm	________ cm
d You choose ______________	________ cm	________ cm
e You choose ______________	________ cm	________ cm
f You choose ______________	________ cm	________ cm

5 Which is shorter? (circle one)

6 centimeters   3 inches

Set D3 ★ Activity 3

ACTIVITY

100 Army Ants & More

Overview
Students combine some of their 10-centimeter rulers to form a meter, and identify objects in the classroom that are about 1 meter long. Then they work together to measure a distance of 14 meters in the hallway, the gym, or on the playground. 14 meters has special significance in the world of army ants, as students will discover.

Skills & Concepts
★ identify objects that represent standard units and use them to measure length

★ measure length to the nearest meter

★ generate common measurement referents for meters

★ generalize connections among mathematics, the environment, and other subjects

You'll need
★ Army Ant Raids (page D3.20, run 1 copy)

★ students' army ant rulers from Set D3, Activity 1 (see Advance Preparation)

★ 1 or more meter sticks

★ blue masking tape or a piece of chalk

★ drawing paper, one sheet per student (optional)

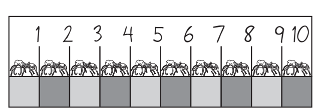
★ crayons, felt markers, pencils (optional)

★ book or video about army ants (optional)

Advance Preparation Borrow 12–15 army ant rulers from students before you conduct this activity. Place these rulers and a meter stick where they'll be easily accessible when you meet with students in your discussion area.

Note You will need room for the children to measure a length of 14 meters during this activity. You may want to reserve the gym or the cafeteria for this purpose, or plan to take students out to the playground.

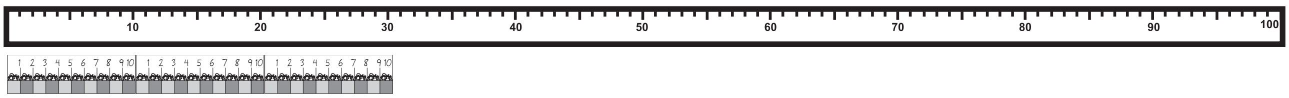
Instructions for 100 Army Ants & More
1. Gather students to your discussion area and ask them to form a circle. Set one of the army ant rulers you've borrowed in the middle of the circle. What do students know about this measuring tool? Ask them to pair-share for a few moments, and then invite volunteers to share their ideas with the class.



Students *There are 10 army ants on it in a line.*
They have really weird heads.
Every army ant is 1 centimeter.
My crayon was almost as long as the little ruler.
It's 10 centimeters long.
Centimeters are really little. They're shorter than inches.

Activity 3 100 Army Ants & More (cont.)

2. Now set a meter stick in the middle of circle beside the 10-centimeter ant ruler. Explain that this measuring tool is called a meter stick, and it is exactly 1 meter long. Just as inches, feet, and yards are related, a meter is related to a centimeter. Ask students to estimate how many centimeters long the meter stick is, using the army ant ruler as a visual benchmark. If students feel that a single ant ruler doesn't give them enough information to make a good estimate, lay a second, and even a third ant ruler down end-to-end with the first.



3. Record students' estimates on the board. Then have a volunteer carefully lay ant rulers end-to-end down the entire length of the meter stick as the children watch and count. Ask students to pair-share anything they know about the length of a meter now.

> ***Students*** *A meter is the same as 10 of our little rulers.*
> *That's 100 ants, all lined up in one long line, just like in the story!*
> *A meter is 100 centimeters!*
> *It's 10 tens. That's 100.*

4. Ask students to look around the room. What can they see from where they're sitting that appears to be about 1 meter long? List students' suggestions on the board and send volunteers out to measure several of the suggested items. Circle any items on the board that turn out to be quite close to a meter long. Stop well before you have exhausted the list, however, and invite students to measure the additional items on their own over the next few days.

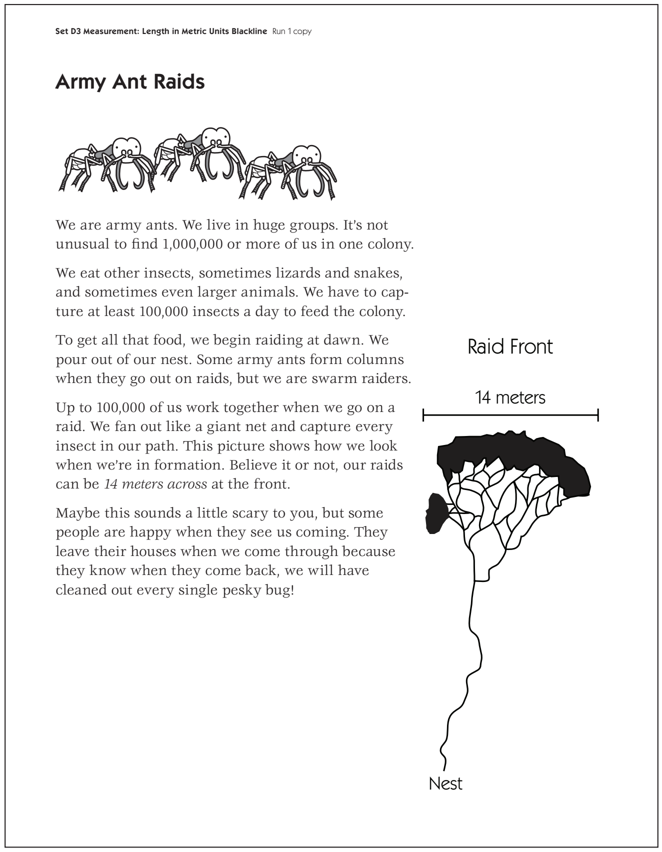
5. Now share the Army Ant Raids sheet. Read it to your students and ask them to imagine a wave of ants 14 meters across. Explain that you are going to take them to the gym (cafeteria, or playground) to measure out a length of 14 meters so they can see just how wide an army ant raid can be.

6. Take the class to the area you have chosen. Bring a meter stick and something to mark the distance at both ends; blue masking tape if you're working inside, or a piece of chalk if you're going out to the playground.

7. When you reach your destination, ask students to sit in a semi-circle. Mark one end of the distance with tape or chalk. Then call volunteers one by one to measure out the distance, moving the meter stick forward one meter at a time until the distance is covered. Ask other children to help as needed to ensure that no gaps are left as the stick is moved each time. When the distance has been measured out, mark the other end with tape or chalk.

8. Ask students to estimate how many of them it would take, standing shoulder to shoulder, to span the distance they just marked off. Are there enough children in your class to cover the distance? Have them line up and try it. If there are not enough of them, plan to revisit the area later in the day if possible with another class to see how many children it takes to make a shoulder-to-shoulder line 14 meters wide.

Activity 3 100 Army Ants & More (cont.)



Set D3 Measurement: Length in Metric Units Blackline Run 1 copy

Army Ant Raids

We are army ants. We live in huge groups. It's not unusual to find 1,000,000 or more of us in one colony.

We eat other insects, sometimes lizards and snakes, and sometimes even larger animals. We have to capture at least 100,000 insects a day to feed the colony.

To get all that food, we begin raiding at dawn. We pour out of our nest. Some army ants form columns when they go out on raids, but we are swarm raiders.

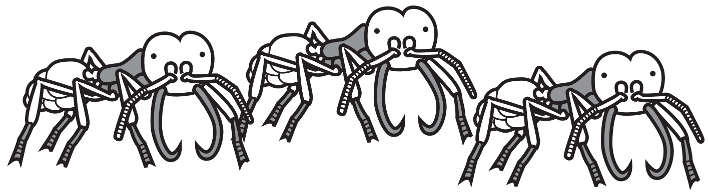
Up to 100,000 of us work together when we go on a raid. We fan out like a giant net and capture every insect in our path. This picture shows how we look when we're in formation. Believe it or not, our raids can be *14 meters across* at the front.

Maybe this sounds a little scary to you, but some people are happy when they see us coming. They leave their houses when we come through because they know when they come back, we will have cleaned out every single pesky bug!

Extensions

- Have students write and draw what they've learned about army ants. Ask them to use the word centimeter and the word meter at least once in their work.
- Read a book or show a video about army ants, and continue to discuss these interesting creatures with your class.
- Challenge interested students to figure out how many ants it would take to make a line 14 meters long.
- Leave the meter stick(s) out so students can continue to find objects around the classroom that are close to 1 meter long. Ask them to refine the list you made on the board during this activity, circling the suggested items that turned out to be close to a meter, and recording additional items they find over the next few days.

Army Ant Raids



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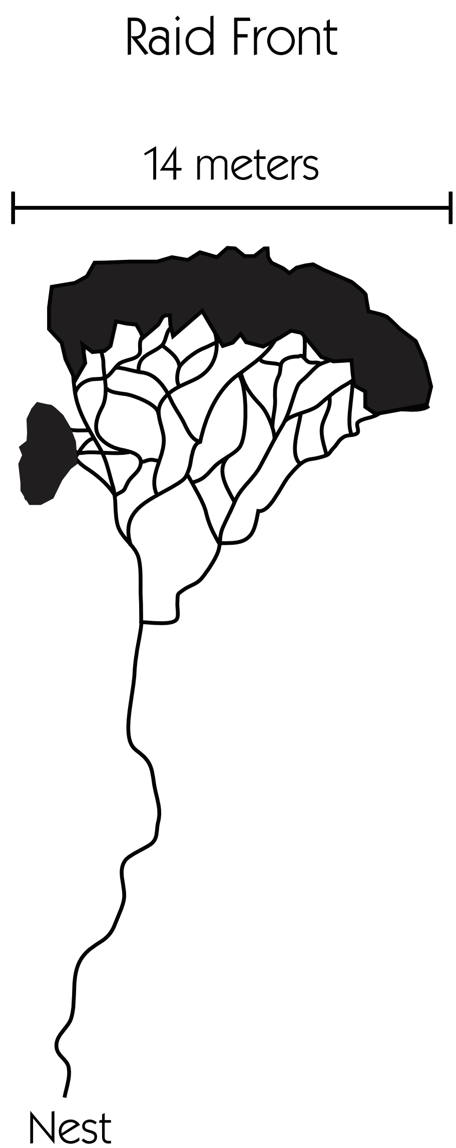
Maybe this sounds a little scary to you, but some people are happy when they see us coming. They leave their houses when we come through because they know when they come back, we will have cleaned out every single pesky bug!



BRIDGES IN MATHEMATICS 2

GRADE 2 SUPPLEMENT

Set D5 Measurement: Telling Time

Includes

Skills & Concepts

★ tell time in increments of 5 minutes using digital and analog clocks

★ represent quantities in word form through twenty

★ represent multiples of ten in word form through ninety

★ match a.m. and p.m. to familiar situations

★ recall equivalencies associated with time: 60 minutes = 1 hour, 24 hours = 1 day

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P0310

Bridges in Mathematics Grade 2 Supplement
Set D5 Measurement: Telling Time
The Math Learning Center, PO Box 12929, Salem, Oregon 97309. Tel. 1 800 575–8130.

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P0310

Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at www.mathlearningcenter.org.

Set D5 ★ Activity 1

ACTIVITY

Shake, Tell & Record the Time

Overview
Students practice reading and writing time to the nearest five minutes on analog and digital clocks.

Skills & Concepts
★ tell time in increments of 5 minutes using digital and analog clocks

You'll need
★ Student Mini-Clocks (page D5.3, quarter class set, see Advance Preparation)

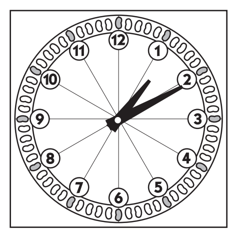
★ Shake, Tell & Record the Time (page D5.4, class set)

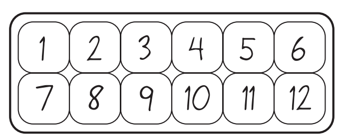
★ egg carton shaker (see Advance Preparation)

★ 1 large red button and 1 small white button

★ *Telling Time: How to Tell Time on Digital and Analog Clocks!*, by Jules Older (optional)

Advance Preparation If you don't have a set of student clocks, run a quarter class set of page 3 on cardstock, and follow the instructions at the top of the blackline to make a mini-clock for each child. Use your egg carton shaker from the December Number Corner or make one now out of a styrofoam egg carton with the lid still on. Write a number from 1–12 at the bottom of each pocket inside the carton.



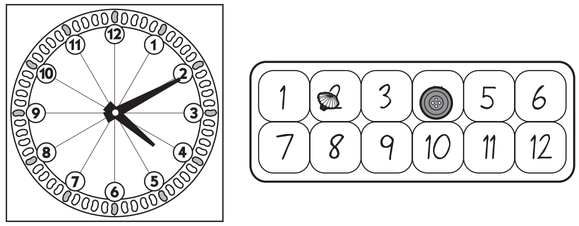


Instructions for Shake, Tell & Record the Time
1. Tell students you're going to do a time-telling activity today. Ask them to get out their pencils as you give each student a mini-clock and a copy of Shake, Tell & Record Time.

2. As they watch, place a red and a white button in your egg carton shaker. Shake the carton, open it, and invite a volunteer to come up and tell his or her classmates where the red button landed. Then ask all the students to set the hour hand on their mini-clock to that number.

Activity 1 Shake, Tell & Record the Time (cont.)

3. Then ask the volunteer to tell the class where the white button landed. Have students set the minute hand on their mini-clock to that number and read the time.



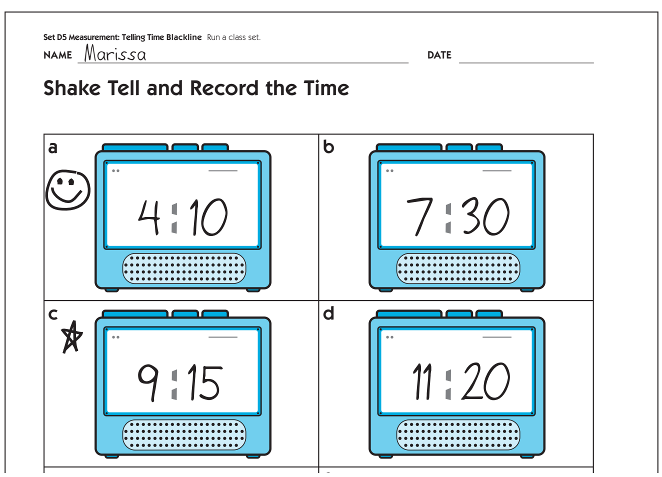
> ***Students*** *It's 4 oh 2.*
> *No—it's 2:20!*
> *No it isn't – it's 4:10.*
> *That's right because the hour hand – that's the short one – is on the 4 and the minute hand is on the 2.*
> *So isn't it 2 minutes after 4?*
> *No, with the minute hand, each number is like 5. It's 5, 10 minutes after 4:00, remember?*
> *Oh yeah – you're right! It's four ten.*

4. When there's general agreement among the students, write the time on the board (4:10 in this case). Then have students record the time on the digital clock in box A on their record sheet.

5. Repeat steps 2–4 seven more times. After the first couple of rounds, invite student volunteers to shake the egg carton and report the location of the buttons to their classmates.

6. When the students have filled all the clocks on their worksheet, read each of the times they've recorded at random. Have them draw a different shape or mark (i.e., star, check mark, circle, triangle, and so on) beside each of the times you read.

> ***Teacher*** *Make a star beside the clock that says 9:15 and a happy face beside the one that says 4:10.*


Set D5 Measurement: Telling Time Blackline Run a class set.

NAME Marissa DATE

Shake Tell and Record the Time

a 4:10

b 7:30

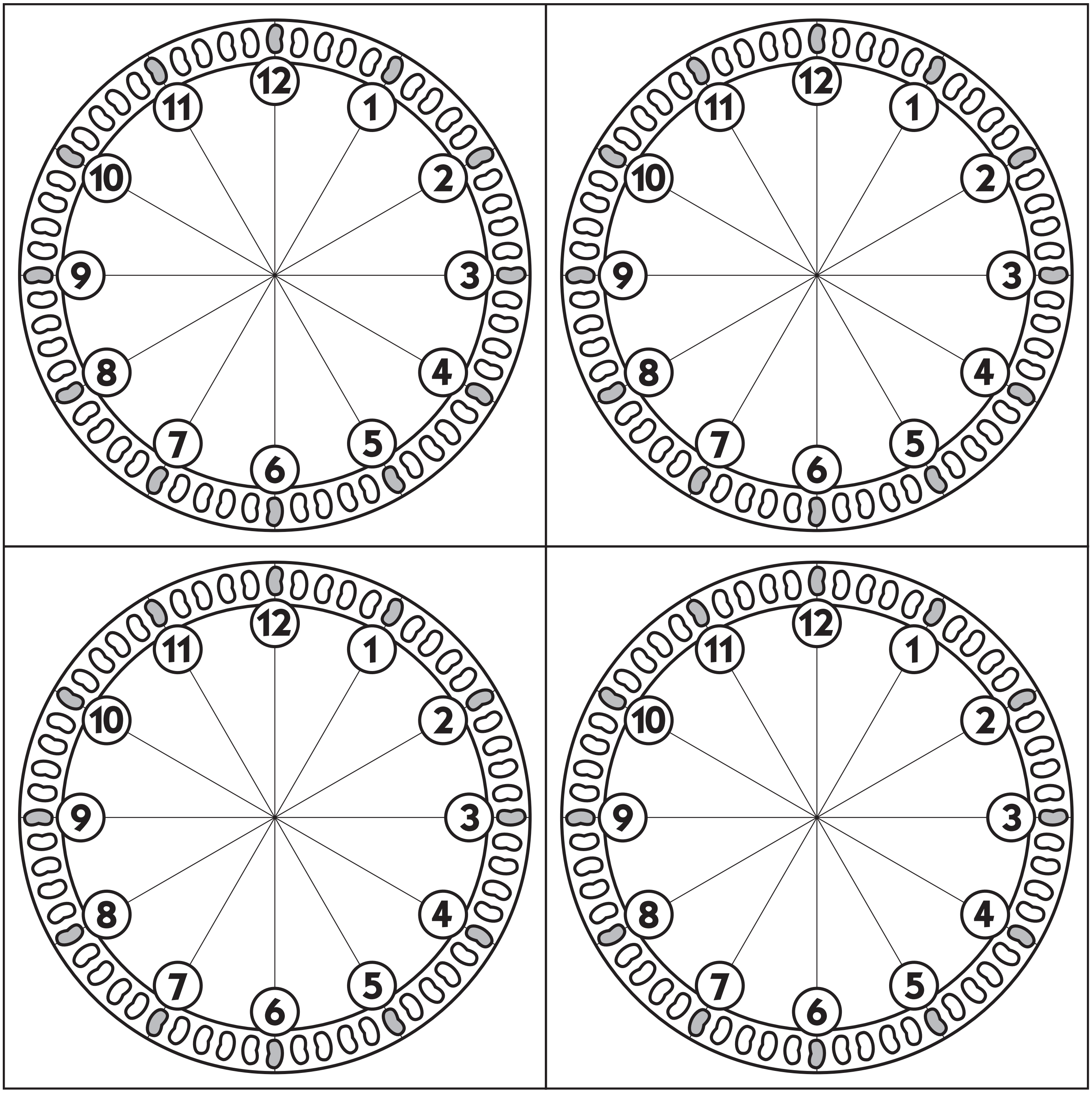
c 9:15

d 11:20

Extension

- Read Telling Time: How to Tell Time on Digital and Analog Clocks!, by Jules Older, to your class before or after this session. This humorous book explains the concept of time, from seconds to hours on both analog and digital clocks, and provides students with more time-telling opportunities.

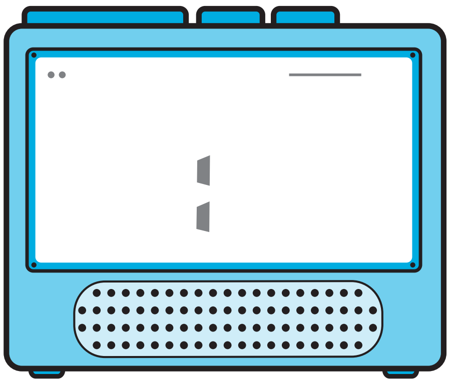
Student Mini Clocks



NAME ______________________________ **DATE** ______________

Shake Tell & Record The Time

a



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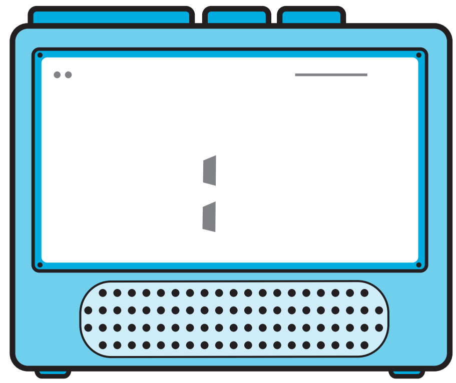

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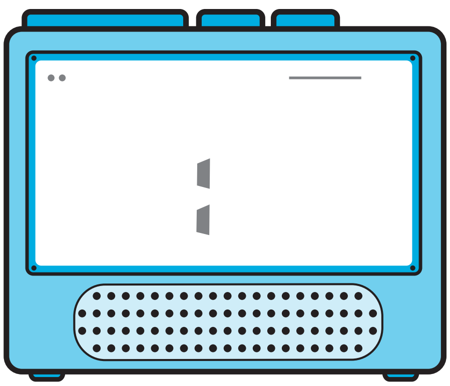

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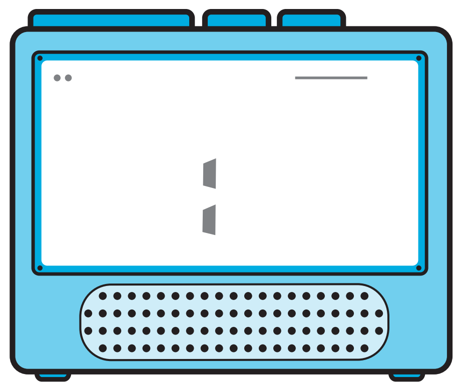

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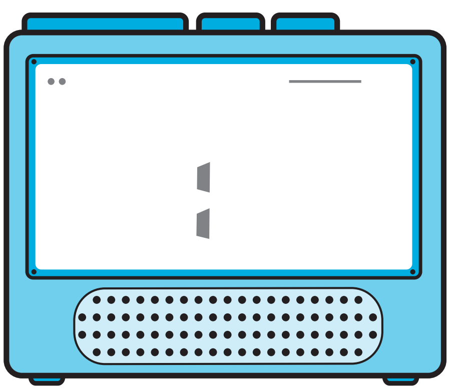

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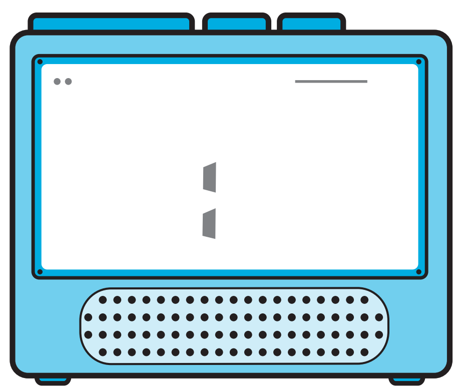

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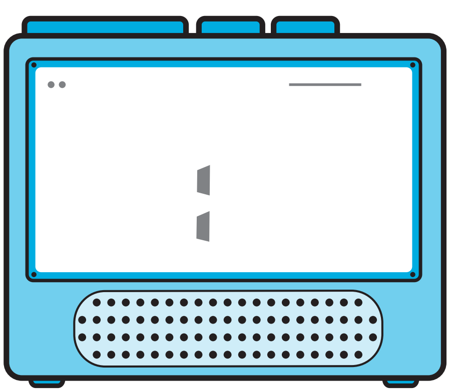

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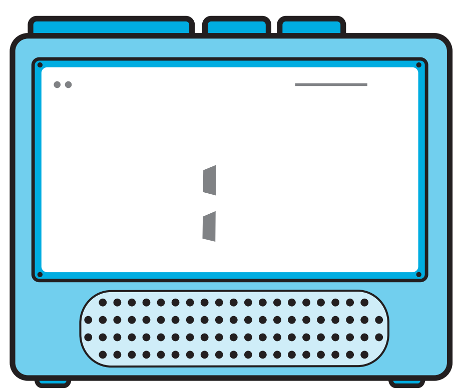


Set D5 ★ Activity 2

ACTIVITY

Telling Time Concentration

Overview
Students practice telling time on digital and analog clocks. Then they make the cards for a concentration game and play the game in pairs.

Skills & Concepts
★ tell time in increments of 5 minutes using digital and analog clocks

You'll need
★ Digital Clocks (page D5.8, half class set, see note)

★ Analog Clocks (page D5.9, half-class set, see note)

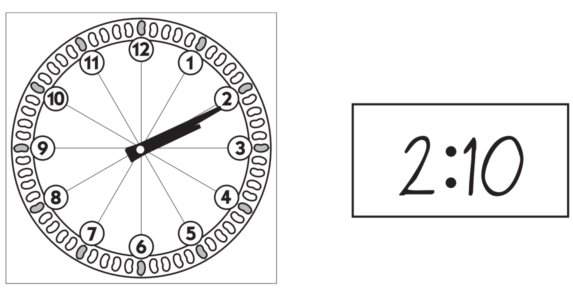
★ class set of Student Mini-Clocks from Set D5 Activity 1

★ whiteboard or overhead and markers

Note Run each blackline on a different color copy paper. Use 2 intense shades, such as bright green and fire-engine red, if possible so the printing and students' writing don't show through as much.

Instructions for Telling Time Concentration
1. Tell students they're going to work in pairs to make some cards for a concentration game that will give them some more practice telling time. Before they make the cards and play the game, you're going to do a time-telling warm up.

2. Have a helper pass out a mini-clock to each student. Make a quick sketch of a simple digital clock on the board or overhead and write in the time 2:10. Ask students to read the time to their partner and then show it on their mini-clock.



3. Repeat step 2 with the following times:
- 9:50
- 5:35
- 11:45

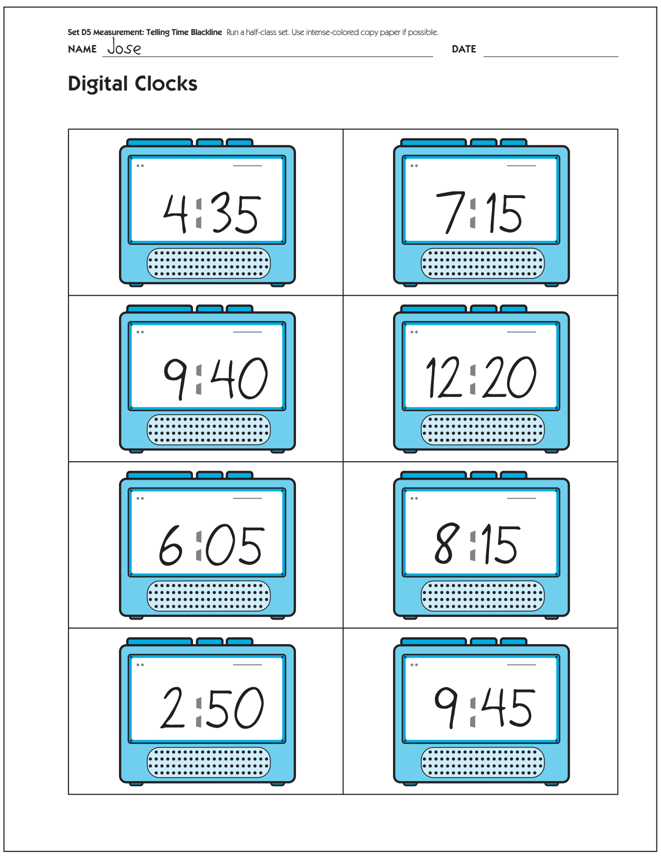
4. Now have students pair up (or assign partners if you prefer). Give one student in each pair a copy of the Digital Clocks blackline, and the other a copy of the Analog Clocks blackline.

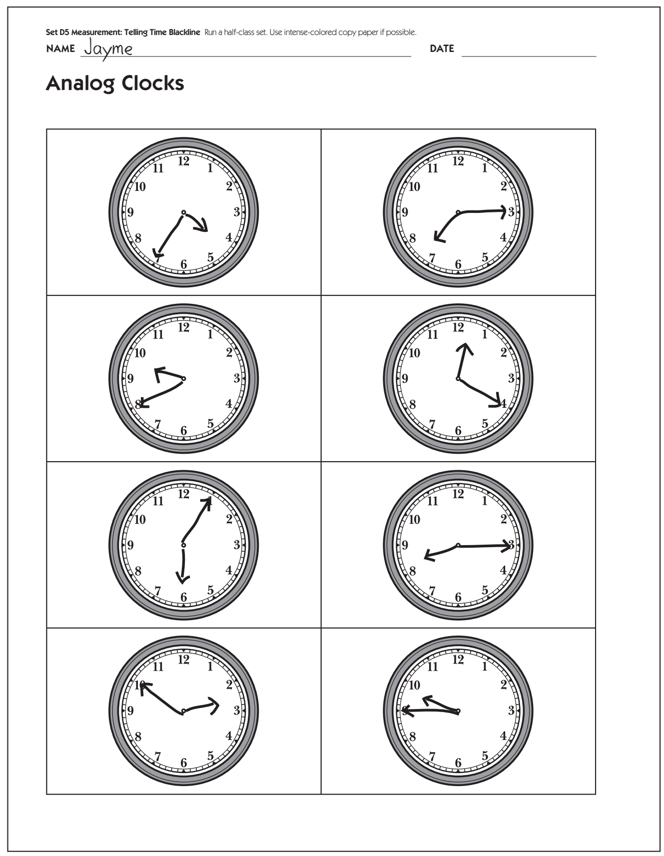
Activity 2 Telling Time Concentration (cont.)

5. Explain that you're going to read 8 different times aloud to the students. One of the partners will write each of the times on one of the digital clocks on his sheet. The other will draw the clock hands to match that time on one of the analog clocks on her sheet.

6. Read the following times out loud:

- Four thirty-five
- Fifteen minutes after seven
- Nine forty
- Twenty minutes past twelve
- Five minutes after six
- Quarter past eight
- Ten minutes to three
- Quarter to ten



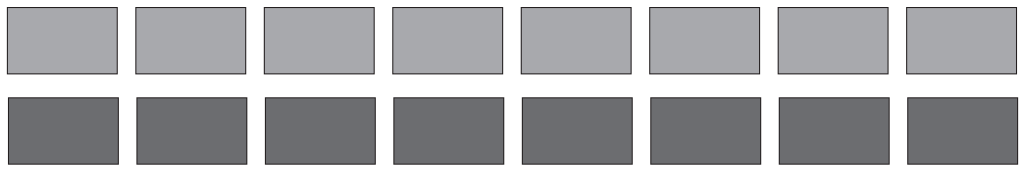


Ask students to help each other to listen carefully and fill in the times on their clocks accurately. If they really can't follow the times as you read them aloud, write them one by one on the board or overhead instead.

7. When students have recorded the correct times, ask them to cut their sheets apart along the heavy lines to make 8 cards. Have each student mix his or her set of cards thoroughly.

8. Have one partner organize the analog clock cards face-down in a horizontal line. Have the other partner place his or her digital cards directly underneath the analog cards as shown below.

Activity 2 Telling Time Concentration (cont.)



9. Players take turns flipping over 2 cards, one from each row, and reading the times aloud. If the times on the 2 cards match, the player gets to keep both, but does not get an additional turn. If the times on the 2 cards don't match, the player flips them back over, leaving them in the same location. Play continues back and forth until all the cards are gone. Players count their cards. The player with the most cards wins the game.

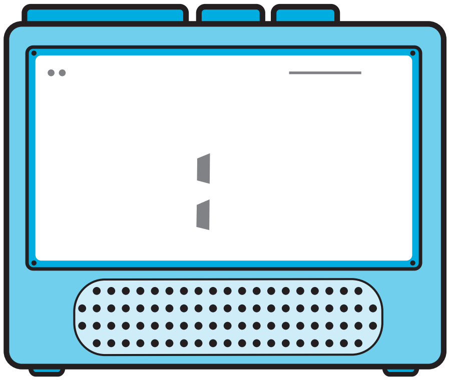
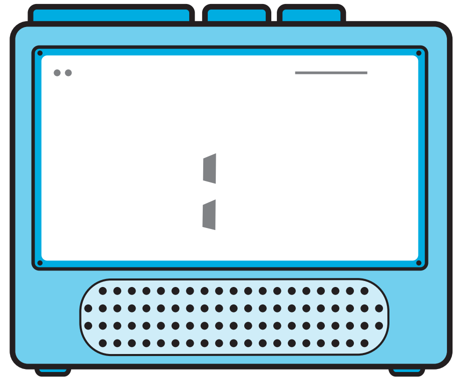
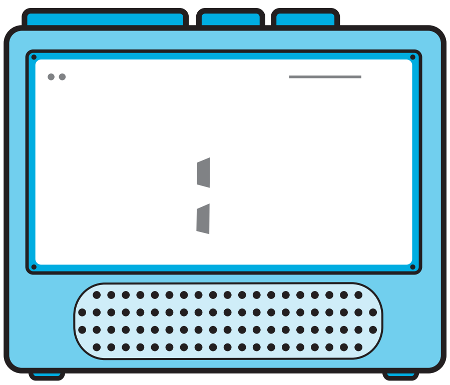
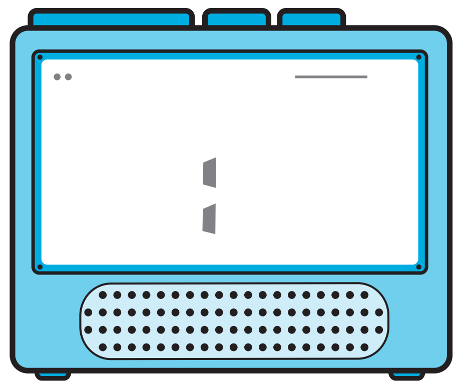
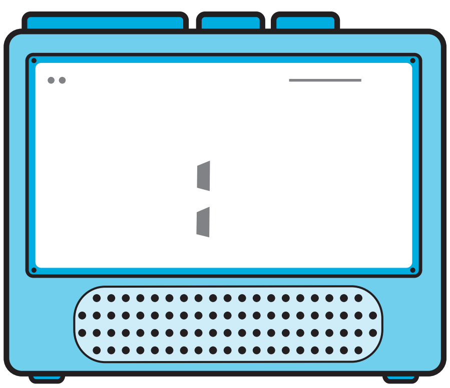
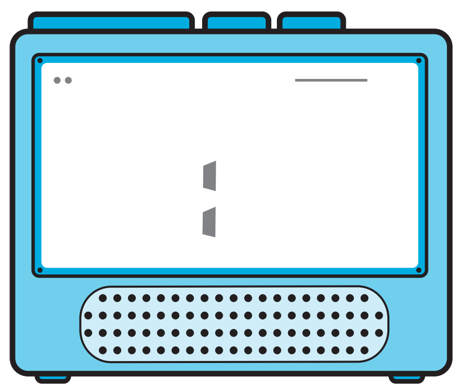
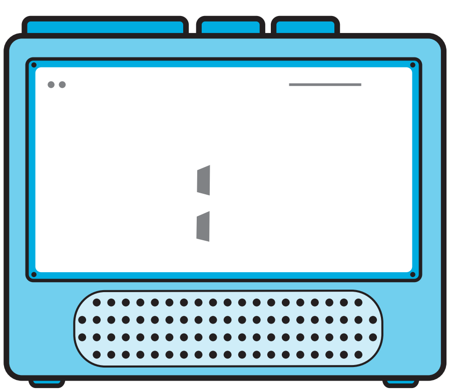
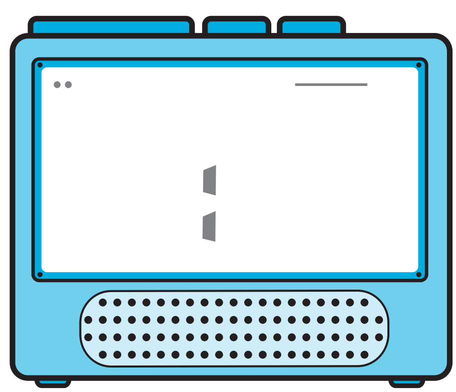
10. Ask pairs who finish before their classmates to mix their cards, place them in 2 rows, and play the game again.

INDEPENDENT WORK SHEET

See Set D5 Independent Worksheets 1–5 for more practice reading and writing time on digital and analog clocks, as well as matching A.M. and P.M. to familiar situations and recalling time equivalencies.

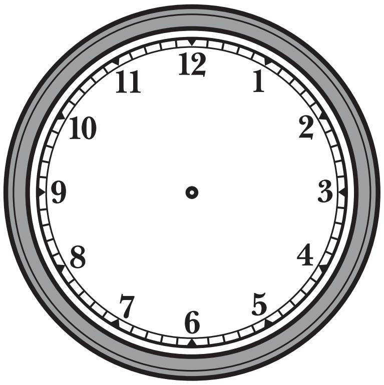
NAME ____________________ **DATE** __________

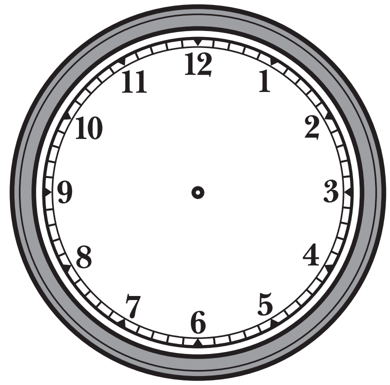
Digital Clocks

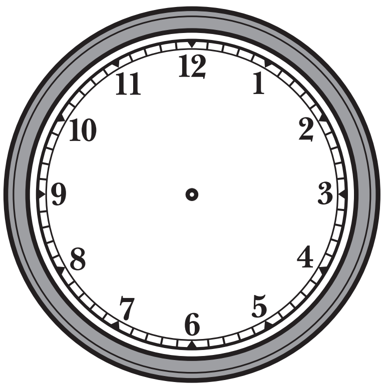









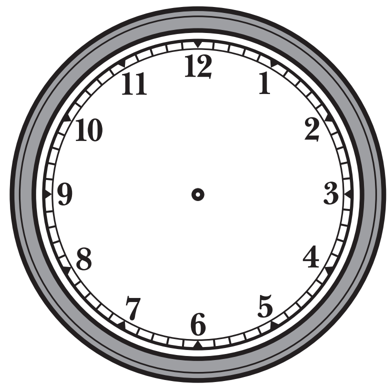
NAME ______________________________ **DATE** ____________

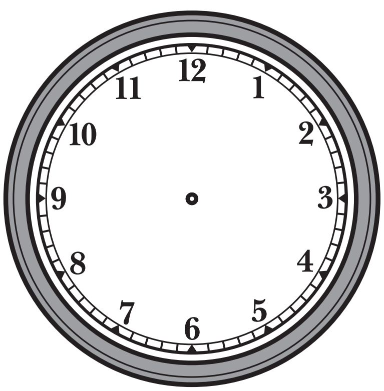
Analog Clocks

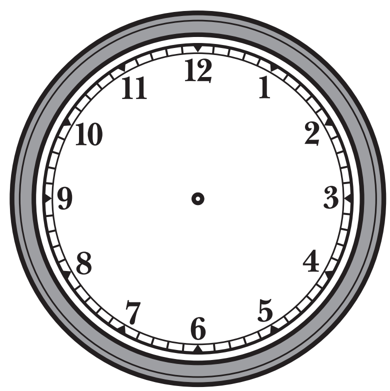


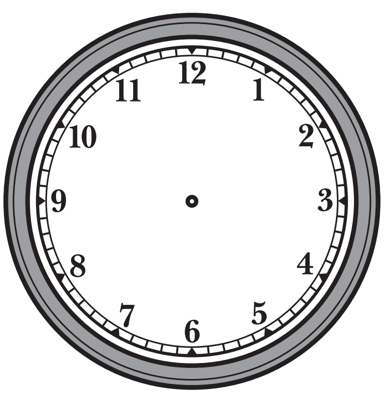


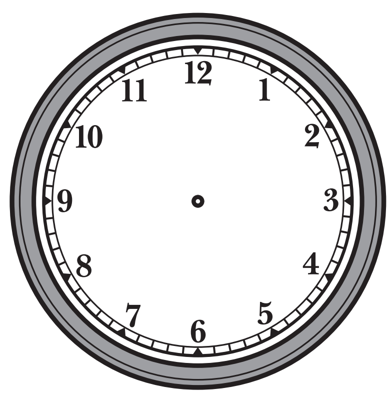












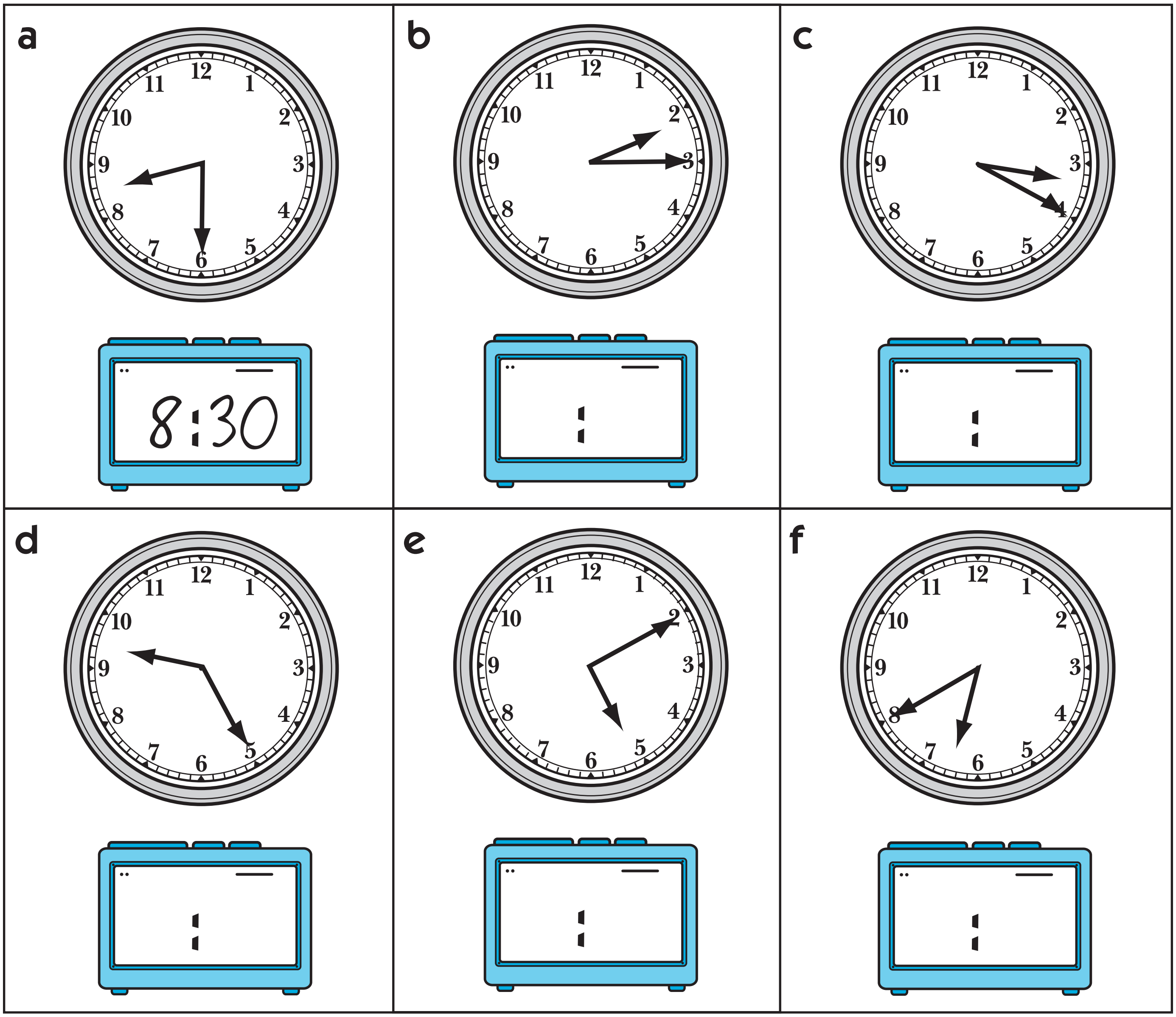
NAME ______________________________ **DATE** ______________

Set D5 ★ Independent Worksheet 1

INDEPENDENT WORKSHEET

Telling Time on Two Kinds of Clocks

1 Read each of these clock faces and write the time on the digital clock.



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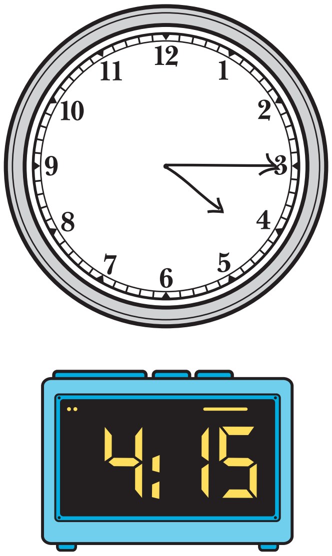
Independent Worksheet 1 Telling Time on Two Kinds of Clocks (cont.)

2 Draw hour and minute hands on the clock facts to show the times below.

a


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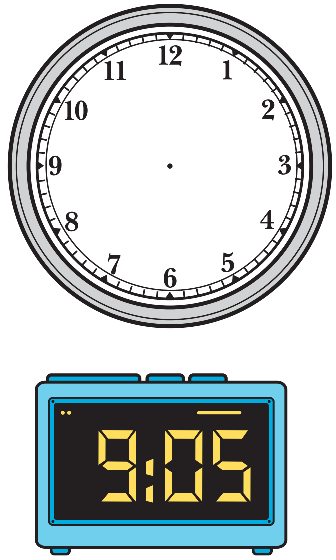

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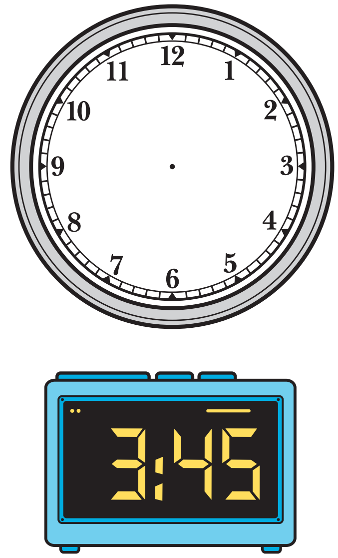

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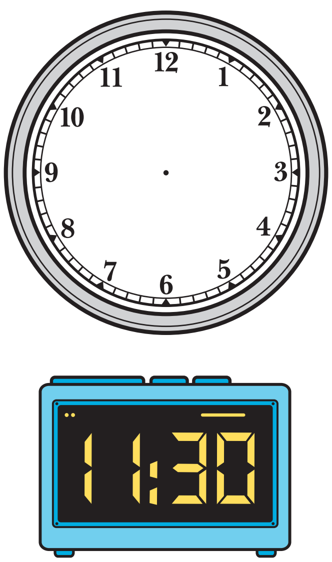

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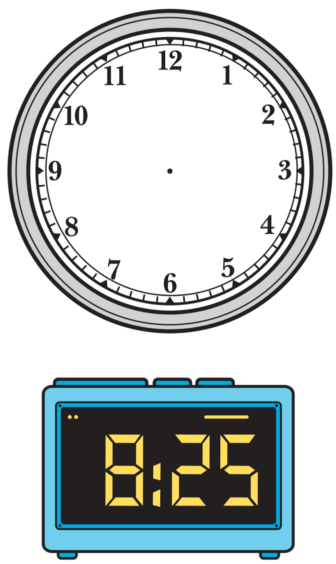

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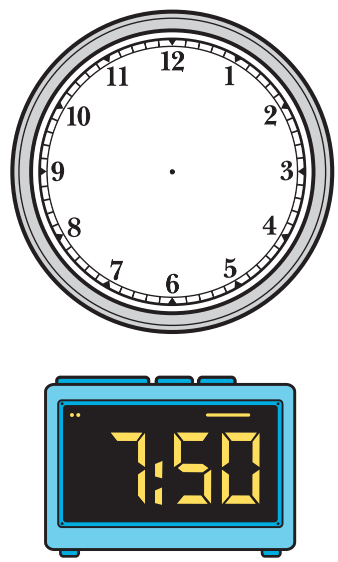


NAME ______________________________ DATE ______________

Set D5 ★ Independent Worksheet 2

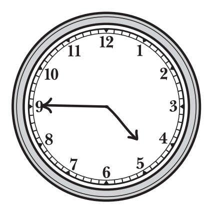
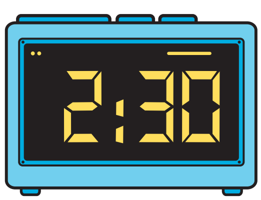
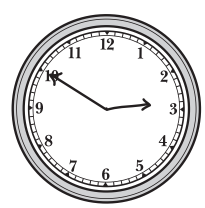
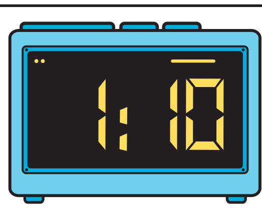
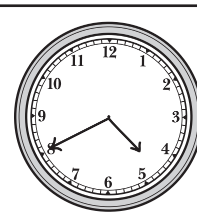
INDEPENDENT WORKSHEET

Writing Time in Different Ways

1 Trace the numerals, number names, and telling time words.

1 one 2 two 3 three 4 four 5 five
6 six 7 seven 8 eight 9 nine 10 ten
11 eleven 12 twelve 20 twenty
30 thirty 40 forty 50 fifty
60 sixty o'clock

2 Write the time shown on each clock with numbers. Write it again with words.

example  3:50 three fifty	**a** 
b 	**c** 
d 	**e** 

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Independent Worksheet 2 Writing Time in Different Ways (cont.)

3 How many minutes are there in an hour? ____________

4 Trace the numerals, number names, and telling time words.

15 fifteen 30 thirty 45 forty-five

quarter past half past quarter 'til

5 Write the time shown on each clock with number words. Write it again with time telling words.

example

four forty-five

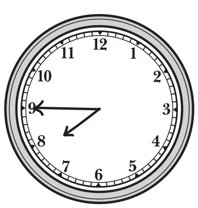
quarter 'til five

a

b

c

d



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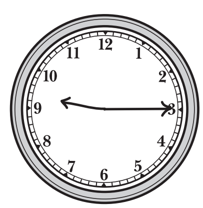


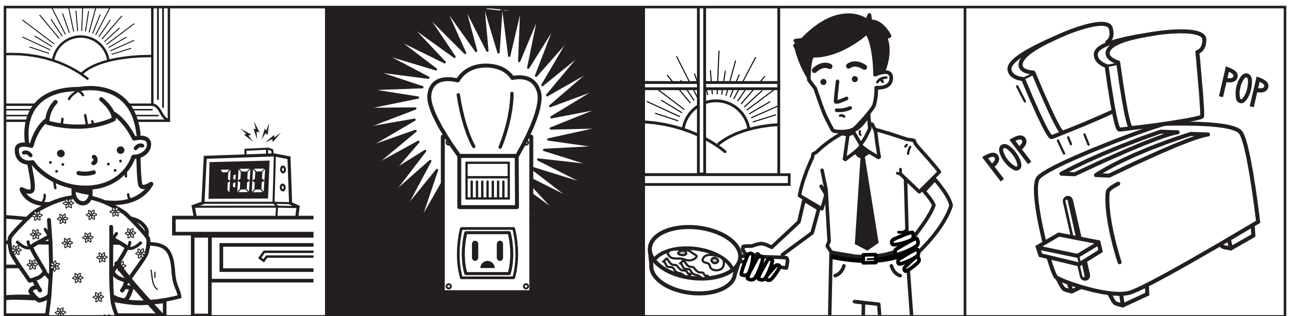
NAME ______________________________ **DATE** ______________

Set D5 ★ Independent Worksheet 3

INDEPENDENT WORKSHEET

A.M. or P.M.?

1 When do people usually do each of these things on a school day? Draw lines to a.m. or p.m. to show.



A.M.
Morning
(Between midnight and noon)

P.M.
Afternoon & Evening
(Between noon and midnight)

2 Marcus is in second grade. School starts for Marcus at (circle one)

8:15 a.m. 8:15 p.m.

3 Erica is in kindergarten. Erica eats dinner at (circle one)

6:00 a.m. 6:00 p.m.

4 James is 7 years old. James goes to bed at (circle one)

8:00 a.m. 8:00 p.m.

(Continued on next page.)

Independent Worksheet 3 A.M. or P.M.? (cont.)

5 Circle the time that people usually do each of these things on a school day.

a Eat lunch

11:45 a.m   11:45 p.m.

b Play at the park

3:00 a.m   3:00 p.m.

c Go to basketball practice.

4:30 a.m   4:30 p.m.

6 Draw a picture of something you do in the a.m. and something you do in the p.m.

A.M.	P.M.

7 How many hours are there in a day? ______________

NAME ______________________________ **DATE** ______________

Set D5 ★ Independent Worksheet 4

INDEPENDENT WORKSHEET

Willy Worm's School Day

1 Trace the numerals, number names, and telling time words.

1 one 2 two 3 three 4 four 5 five

6 six 7 seven 8 eight 9 nine 10 ten

11 eleven 12 twelve 13 thirteen

14 fourteen 15 fifteen 16 sixteen

17 seventeen 18 eighteen 19 nineteen

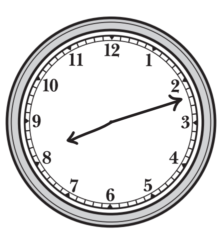
20 twenty a.m. p.m.

2 Willy Worm goes to Worm School. He is in second grade. The clocks show his school-day times. Use number words to write the time. Include a.m. or p.m.

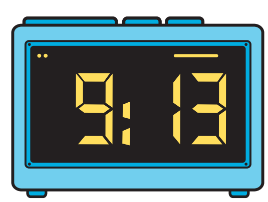
example Willy gets up in the morning.

seven eleven a.m.

a Willy eats breakfast in the morning.



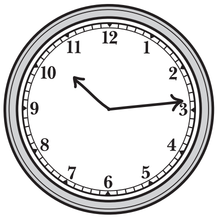
b Willy goes to school in the morning.



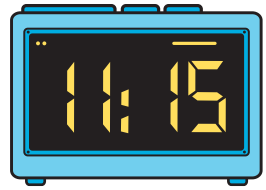
(Continued on next page.)

Independent Worksheet 4 Willy Worm's School Day (cont.)

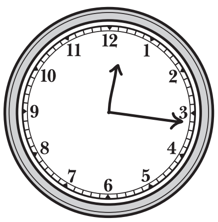
c Willy has recess in the morning.



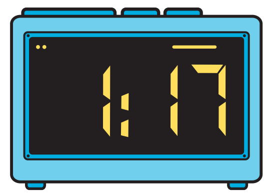
d Willy does math in the morning.



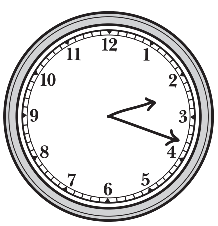
e Willy has lunch in the afternoon.



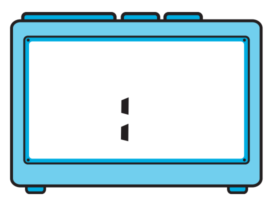
f Willy's teacher reads a story in the afternoon.



g Willy's class goes to the library



h Can you guess when Willy goes home from school in the afternoon? Write the time on the digital clock to show



NAME ______________________________ DATE ______________

Set D5 ★ Independent Worksheet 5

INDEPENDENT WORKSHEET

How Many?

1 How many seconds are there in a minute? (circle one)

10 seconds   30 seconds   60 seconds   100 seconds

2 How many minutes are there in an hour? (circle one)

30 minutes   60 minutes   100 minutes   120 minutes

3 How many days are there in a week? (circle one)

7 days   8 days   10 days   12 days

4 How many weeks are there in the month shown on this calendar? (circle one)

3 weeks   4 weeks   5 weeks   6 weeks

FEBRUARY

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

5 How many months are there in a year? (circle one)

8 months   10 months   11 months   12 months

(Continued on next page.)

Independent Worksheet 5 How Many? (cont.)

6 How many years are there in a decade? (circle one)

5 years	6 years	10 years	12 years

7 How many years are there in a century? (circle one)

50 years	100 years	150 years	200 years

BRIDGES IN MATHEMATICS 2

GRADE 2 SUPPLEMENT

Set D6 Measurement: Temperature

Includes

Skills & Concepts

★ read a thermometer to gather data

Published by The MATH LEARNING CENTER Salem, Oregon

P0709

Bridges in Mathematics Grade 2 Supplement
Set D6 Measurement: Temperature
The Math Learning Center, PO Box 12929, Salem, Oregon 97309. Tel. 1 800 575–8130.

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P0709

Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

The Math Learning Center is a nonprofit organization serving the education community. Our mission is to inspire and enable individuals to discover and develop their mathematical confidence and ability. We offer innovative and standards-based professional development, curriculum, materials, and resources to support learning and teaching. To find out more, visit us at www.mathlearningcenter.org.

Set D6 ★ Activity 1

ACTIVITY

What's the Temperature?

Overview

Students read the temperature on an outdoor thermometer 3 times during the same week, record the results, and compare the readings at the end of the week. This activity will be most interesting if you conduct it at a time of the year when your local temperatures fluctuate by at least a few degrees from one day to the next.

Skills & Concepts

★ read a thermometer to gather data

You'll need

★ What's the Temperature? (page D6.3, class set)

★ an outdoor thermometer (see note)

★ red crayons or colored pencils

Note If the rest of the teachers in your school are using *Bridges in Mathematics*, the first, third, and fifth grade teachers all have outdoor thermometers. In fact, it's possible that there are already several posted in various outdoor locations around the school. If not, borrow one from one of your colleagues or from a science kit and place it outdoors for at least an hour before this activity.

Instructions for What's the Temperature?

1. Talk with students about today's outdoor temperature. Does it seem cold, hot, or somewhere in between? Does anyone know what the predicted temperature for the day is? How do people measure temperature, anyway?

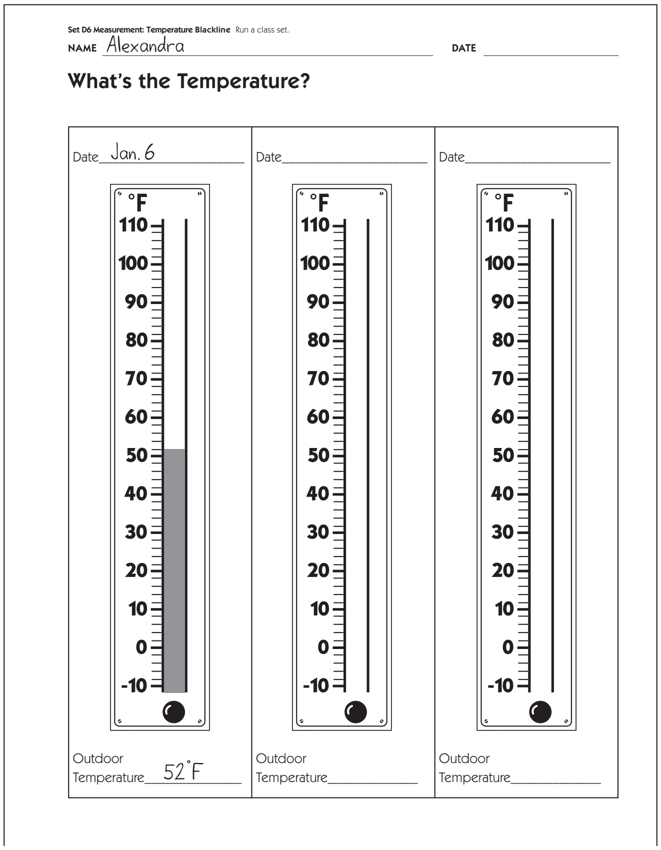
2. Give each student a copy of the What's the Temperature? blackline. Give them a minute to examine the sheet and pair-share their observations. Then call on volunteers to share their observations with the class.

3. As they discuss the sheet, be sure to note with students that the scale on the thermometers counts by 2's. Explain that the "°F" at the top of each means "degrees Fahrenheit." People measure temperature in degrees, and there are two different scales, Fahrenheit and Celsius. In the U.S., temperature is often measured in degrees Fahrenheit rather than Celsius.

4. If possible, go outside with your class to read the outdoor thermometer so students can feel the temperature as they take the reading. If this isn't possible, ask a volunteer to bring the thermometer inside and have students quickly read it. (Some are sure to note how fast the mercury (alcohol) changes to match the indoor temperature.)

5. Once the class agrees on the outside temperature, have each student record the date and the temperature, and then color in the first thermometer to match. Encourage them to mark the temperature level on the thermometer with their pencil and check it with a partner before they color it in.

Activity 1 What's the Temperature? (cont.)


Set D6 Measurement: Temperature Blackline Run a class set.

NAME Alexandra DATE

What's the Temperature?

Date Jan. 6	Date	Date
Outdoor Temperature 52°F	Outdoor Temperature	Outdoor Temperature

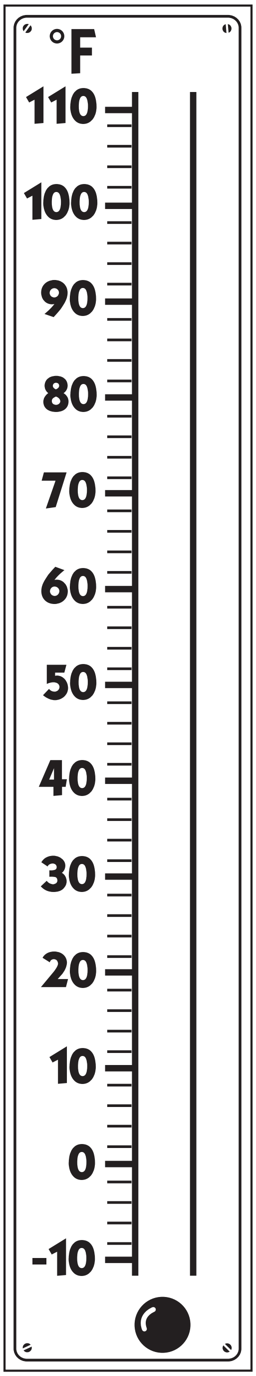
6. Repeat steps 4 and 5 at about the same time two other days during the same week if possible. Have students use the same record sheet each time so the three readings are side-by-side.

7. Ask students to compare the three readings at the end of the week. How has the temperature changed? Which day has been the warmest? The coldest? What's the difference between the temperatures?

NAME ______________________________ **DATE** ______________

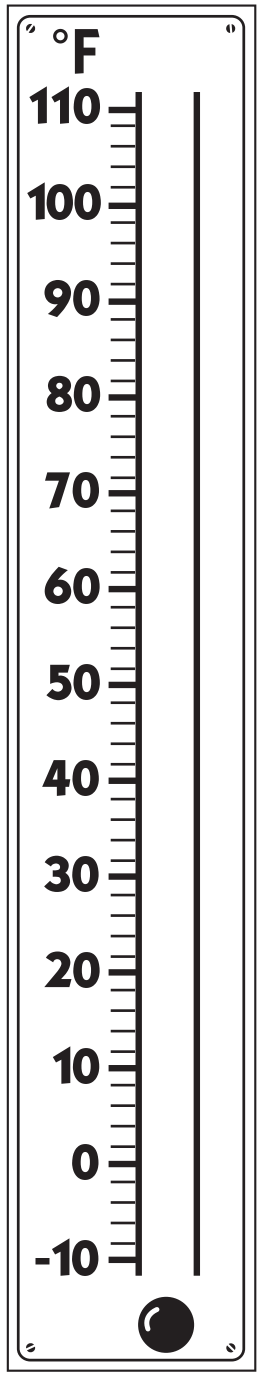
What's the Temperature?

Date______________________



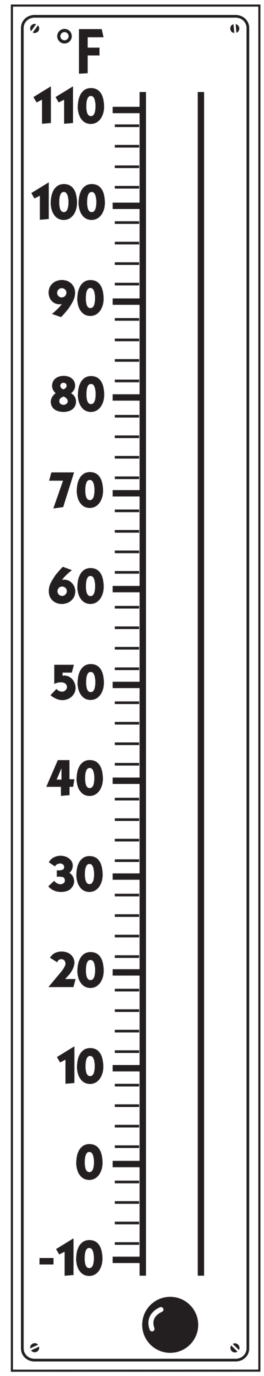
Outdoor
Temperature______________

Date______________________



Outdoor
Temperature______________

Date______________________



Outdoor
Temperature______________

Set D6 ★ Activity 2

ACTIVITY

How Does the Temperature Change During the Day?

Overview
Students read the temperature on an outdoor thermometer in the morning, around noon, and later in the afternoon, record the results, and compare the readings at the end of the day.

Skills & Concepts
★ read a thermometer to gather data

Recommended Timing
After Set D6 Activity 1

You'll need
★ Time & Temperature Record Sheet (page D6.7, run a class set)

★ an outdoor thermometer

★ red crayons or colored pencils

Instructions for How Does the Temperature Change During the Day?
1. As early in the school day as possible, talk with students about the outdoor temperature right now. Does it seem cold, hot, or somewhere in between? What do students predict the temperature is at the moment? Have them pair-share their conjectures and then invite volunteers to share their thinking with the class.

> ***Students*** *It's really cold out there right now!*
> *I was freezing while we were waiting for the bus.*
> *The weather guy on TV said that it was colder than usual for Austin this week.*
> *I think it's about 30 or 40 degrees.*
> *I heard it was 32 degrees last night.*
> *I think it's lower than that, like about 20!*

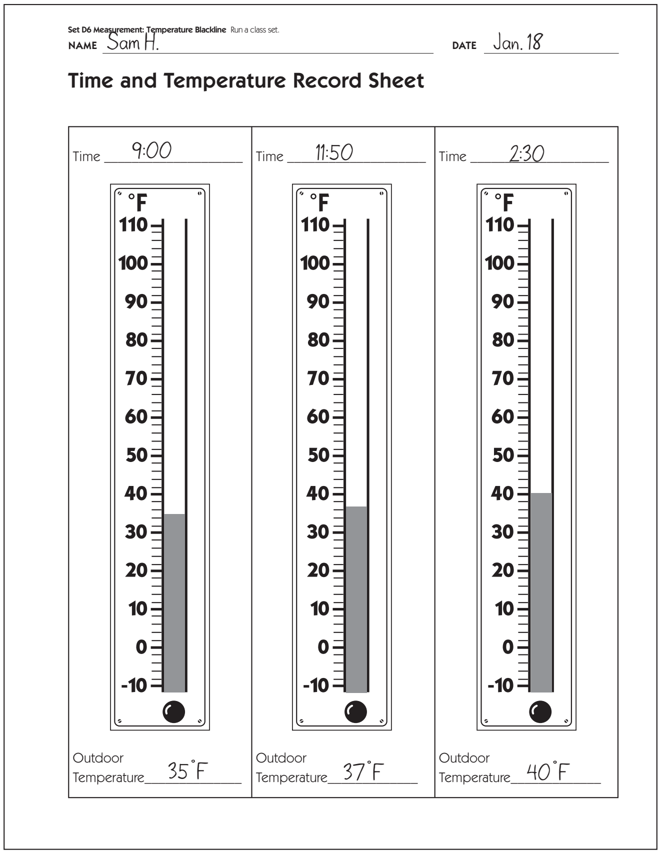
2. Then explain that the class will be taking 3 temperature readings today, one right now, one around noon, and one in the afternoon. Do they think the temperature will change from one time to the next? Why or why not?

3. If possible, go outside with your class to read the outdoor thermometer so students can feel the temperature as they take the reading. If this isn't possible, ask a volunteer to bring the thermometer inside and have students quickly read it.

4. Once the class agrees on the outside temperature, distribute copies of the Time & Temperature Record Sheet. Have each student record the date, the time the first reading was taken, and the temperature, and then color in the first thermometer to match. Encourage them to mark the temperature level on the thermometer with their pencil and check it with a partner before they color it in.

5. Repeat steps 3 and 4 sometime around noon and again later in the school day. Have students use the same record sheet each time so the 3 readings are side-by-side.

Activity 2 How Does the Temperature Change During the Day? (cont.)



6. Ask students to discuss the data they've collected at the end of the day or the following day. Here are some questions to pose:

- Did the temperature change over the course of the day? If so, what's the difference between the 3 readings?
- At what time of the school day was it coldest? warmest?
- What might account for the temperature changes if there were any?
- Do students think they'd see a similar pattern of change on other days? Why? Why not?
- What time of the day or night do they think would be the coldest of all? the warmest? Why?

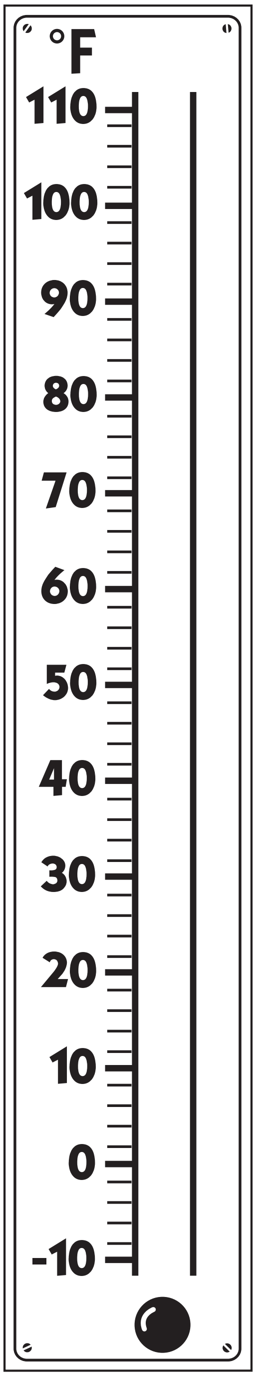
Extension

- You may have a few students who are interested in following the daily changes in temperature over a period of a week or longer. If so, provide additional copies of the record sheet, and encourage these students to share their findings with the class periodically. Display their completed record sheets so other students can look for patterns and trends.

NAME ______________________________ **DATE** ______________

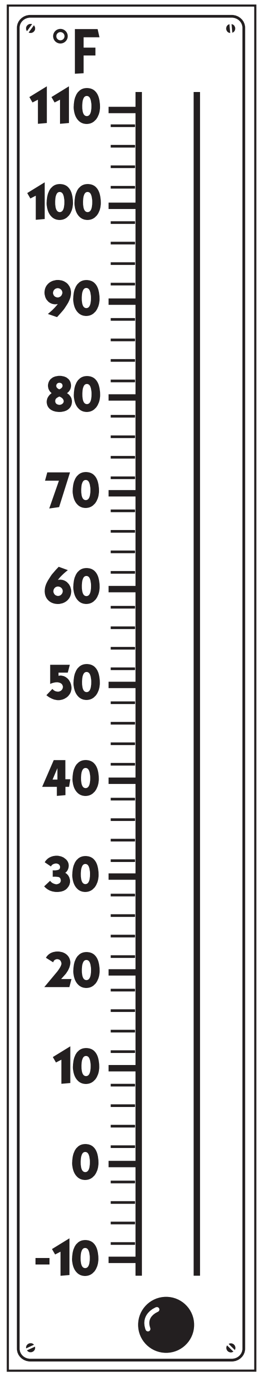
Time & Temperature Record Sheet

Time ______________



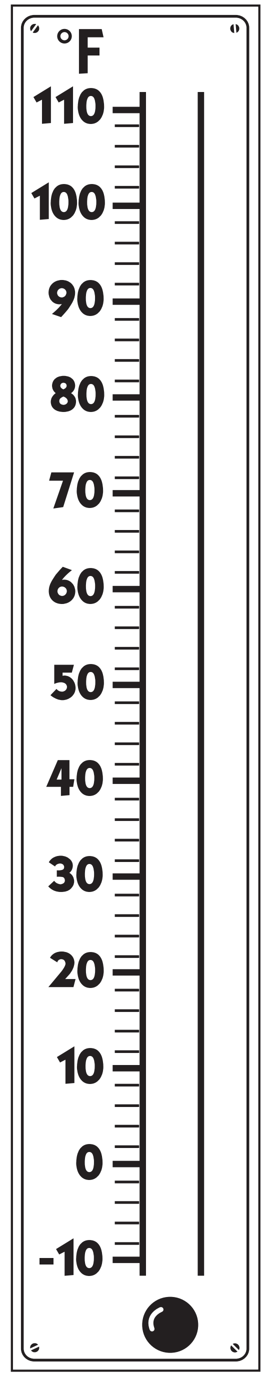
Outdoor
Temperature______________

Time ______________



Outdoor
Temperature______________

Time ______________



Outdoor
Temperature______________

Set D6 ★ Activity 3

ACTIVITY

Forecast & Actual Temperatures on a Thermometer

Overview
How accurate are weather forecasts? In this activity, students look at the day's predicted high for your area and color a thermometer to match. Then they read the outdoor thermometer to see the actual high at your school, record the reading, and compare the two temperatures. You'll want to conduct this activity on 3 afternoons during the same week if possible.

Skills & Concepts
★ read a thermometer to gather data

Recommended Timing
After Set D6 Activity 2

You'll need
★ Forecast & Actual Temperatures on a Thermometer (page D6.11, class set)

★ a copy of the local daily newspaper or access to the Internet

★ an outdoor thermometer

★ red crayons or colored pencils

Instructions for Forecast & Actual Temperatures on a Thermometer
1. Talk with students about today's outdoor temperature. Does it seem cold, hot, or somewhere in between? Does anyone know what the predicted temperature for the day is?

2. Show students the weather section of your local newspaper, or display an online web site that shows the local readings for the previous day and the predictions for today. What were the high and low temperatures yesterday? What is the predicted high for today? Do the children think it's accurate? Why or why not?

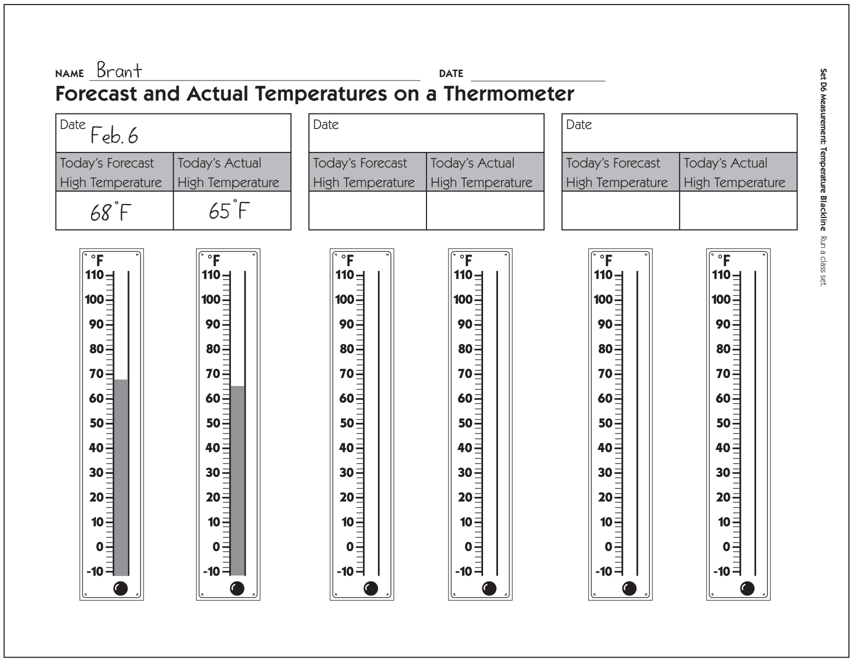
3. Give each student a copy of the Forecast & Actual Temperatures blackline. Give them a minute to examine the sheet and pair-share their observations. Then call on volunteers to share their observations with the class.

4. Have students record the date at the top of the sheet and color in the first thermometer to match the forecast high. Encourage them to mark the temperature level on the thermometer with their pencil and check it with a partner before they color it in.

5. Then go outside with your class to read the outdoor thermometer so students can feel the temperature as they take the reading. If this isn't possible, ask a volunteer to bring the thermometer inside and have students quickly read it. (This step will need to be done in the afternoon to capture the highest temperature for the day at your school.)

6. Once the class agrees on the outside temperature, have each student record the information on his or her sheet and color in the second thermometer to match.

Activity 3 Forecast & Actual Temperatures on a Thermometer (cont.)



7. Discuss the two temperatures with the class. How do they compare? Was the forecast accurate? What might account for the difference, if there is one?

> ***Students*** *It's 3 degrees cooler than they thought it would be.*
> *Maybe it'll get even warmer later on, like after school.*
> *Yeah, I'm going to check the thermometer at our apartment when I get home.*
> *Maybe our thermometer isn't in the warmest place. Maybe if we move it to the playground the temperature will be hotter there.*
> *It's a little cloudy. Maybe they didn't know that there were going to be clouds today.*

8. Repeat this activity twice more this week. At the end of the week, ask students to compare the three sets of forecasted and actual highs they've recorded. Have the forecasts been more accurate some days than others? If there are differences between the forecasted and actual temperatures, is there any pattern? (For instance, have your readings been consistently higher or lower than the forecasts?) How have the actual readings changed from one to the next? Which day has been the warmest? The coldest? Do those results match the forecasts?

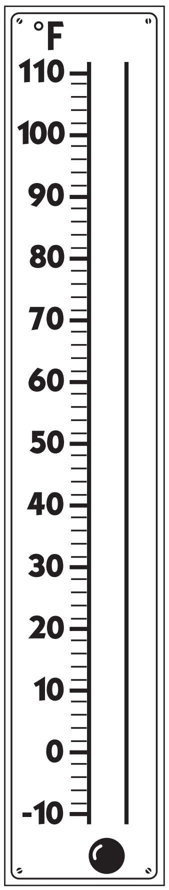
Extension

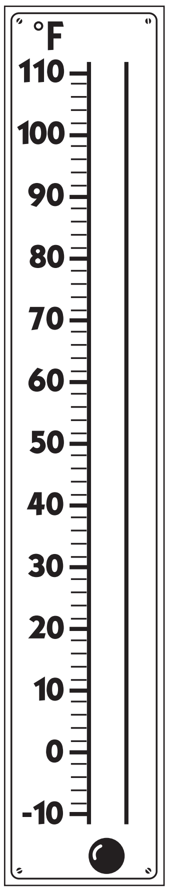
- You may have a few students who are interested in following the forecasted highs and actual readings over a period of several weeks or longer. If so, provide additional copies of the record sheet, and encourage these students to share their findings with the class periodically. Display their completed record sheets so other students can look for patterns and trends.

NAME ____________________ DATE ____________________

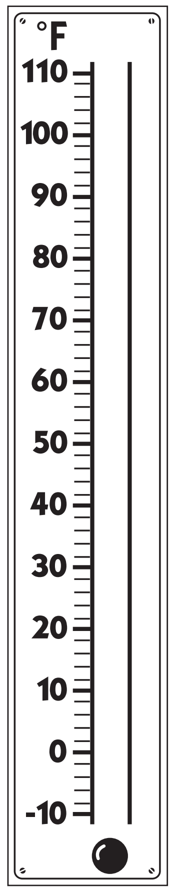
Forecast & Actual Temperatures on a Thermometer

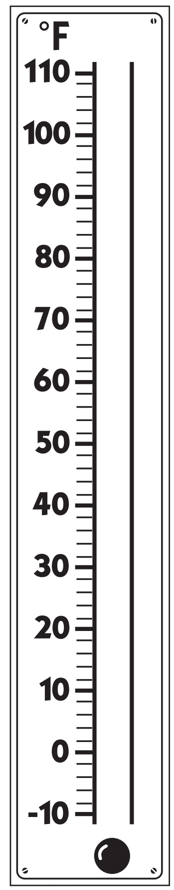
Date	
Today's Forecast High Temperature	Today's Actual High Temperature



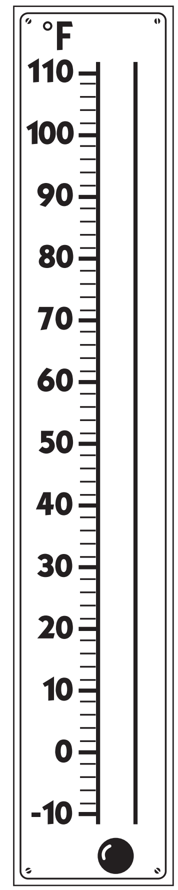


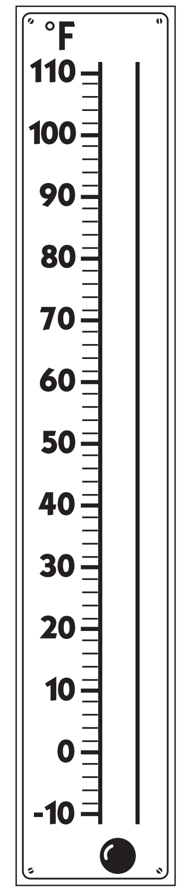
Date	
Today's Forecast High Temperature	Today's Actual High Temperature





Date	
Today's Forecast High Temperature	Today's Actual High Temperature





BRIDGES IN MATHEMATICS 2

BRIDGES GRADE 2

PUBLISHER'S CORRELATIONS TO INDIANA MATHEMATICS STANDARDS

Published by The MATH LEARNING CENTER *Salem, Oregon*

P0511

Bridges Grade 2 Correlations to Indiana Academic Standards for Mathematics

STANDARD 1: NUMBER SENSE

Students understand the relationships among numbers, quantities, and place value in whole numbers* up to 100. They understand that fractions may refer to parts of a set* and parts of a whole.

Standards	Bridges	Number Corner	Bridges Supplement	Assessments
2.1.1 Count by ones, twos, fives, and tens to 100.	Unit 1, Sessions 7, 10-12, 17 Unit 1, pages 42, 47-48, 96-98 (WP's 2B, 2F & 3F) Unit 5, Sessions 2–5, 12, 15, 16, 24, 26 Unit 5, pages 497, 517 (HC 17, 18) Unit 6, Sessions 4–9 Unit 6, page 720 (HC 26) Unit 7, Session 14	September-December, April-May Daily Number Chart September-October, January, March-May Hundreds Grid September-October, December, March-May Bean Clock September-October, March Coin Collector	Set A5 Number & Operations: Multi-Digit Addition & Subtraction, Activities 2 & 3 Set A7 Number & Operations: Numbers to 1,000 on a Line or Grid, Activities 1 & 2 and Independent Worksheets 1 & 2 Set A9 Number & Operations: More Multi-Digit Addition & Subtraction, Activities 3, 4 & 5 Bridges Practice Book, pp 15, 43, 81, 97, 117, 143	Informal Bridges Practice Book, pages 15, 43, 81, 97, 117, 143
2.1.2 Identify the pattern of numbers in each group of ten, from tens through nineties.		September Hundreds Grid October Hundreds Grid	Set A7 Number & Operations: Numbers to 1,000 on a Line or Grid, Activities 1 & 2 and Independent Worksheets 1 & 2	
2.1.3 Identify numbers up to 100 in various combinations of tens and ones.	Unit 5, Sessions 16, 25 Unit 5, page 578 (HC 20)	October Daily Number Chart November Daily Number Chart December Daily Number Chart April Daily Number Chart May Daily Number Chart	Set A5 Number & Operations: Multi-Digit Addition & Subtraction, Activity 1 and Independent Worksheet 1 Bridges Practice Book, pages 89, 91	Informal Bridges Practice Book, pages 89, 91
2.1.4 Name the number that is ten more or ten less than any number 10 through 90.	Unit 6, page 720 (HC 26)	September Hundreds Grid October Hundreds Grid March Hundreds Grid April Hundreds Grid	Set A5 Number & Operations: Multi-Digit Addition & Subtraction, Activities 2 & 3 Set A7 Number & Operations: Numbers to 1,000 on a Line or Grid, Activities 1 & 2 and Independent Worksheets 1 & 2 Bridges Practice Book, pp 15, 117	Informal Bridges Practice Book, page 117

Bridges Grade 2 Correlations to Indiana Academic Standards for Mathematics (cont.)

STANDARD 1: NUMBER SENSE

Students understand the relationships among numbers, quantities, and place value in whole numbers* up to 100. They understand that fractions may refer to parts of a set* and parts of a whole.

Standards	Bridges	Number Corner	Bridges Supplement	Assessments
2.1.5 Compare whole numbers up to 100 and arrange them in numerical order.	Unit 5, Ses. 2, 3, 15, 16, 18, 20, 21 Unit 5, pg. 497 (HC 17) Unit 5, p 578 (HC 20) Unit 6, p 720 (HC 26)	September–May Hundreds Grid September–May Daily Number Chart	Set A4 Number & Operations: Place Value, Activities 1–5 Set A7 Number & Operations: Numbers to 1,000 on a Line or Grid, Activities 1 & 2 and Independent Worksheets 1 & 2 Set A9 Number & Operations: More Multi-Digit Addition & Subtraction, Activity 5 Bridges Practice Book, pp 7, 43, 48, 72, 105, 128, 141	Informal Bridges Practice Book, pp 105, 128, 141
2.1.6 Match the number names (first, second, third, etc.) with an ordered set of up to 100 items.	September–May Calendar Grid		Set A8 Number & Operations: Ordinal Numbers to 100, Activities 1 & 2 and Independent Worksheets 1, 2 & 3	Informal Set A8 Number & Operations: Ordinal Numbers to 100, Independent Worksheet 1
2.1.7 Identify odd and even numbers up to 100.	Unit 3, Sessions 12, 13, 20 Unit 3, pages 292–294 (WP 5E)	September Daily Number Chart October Daily Number Chart October Magnetic Tile May Magnetic Tile	Set A4 Number & Operations: Place Value, Independent Worksheet 2 Bridges Practice Book, page 133	
2.1.8 Recognize fractions as parts of a whole or parts of a group (up to 12 parts).	Unit 1, Session 19 Unit 4, Sessions 9, 11, 14, 16, 17 Unit 7, Session 5–7 Unit 7, pp 793–808 (WP10B, 10C & 10D) Unit 7, p 787 (HC 28)	December Magnetic Tile January Magnetic Tile January Calendar Grid March Calendar Grid		
2.1.9 Recognize, name, and compare the unit fractions: 1/2, 1/3, 1/4, 1/5, 1/6, 1/8, 1/10 and 1/12 .	Unit 1, Session 19 Unit 4, Sessions 9, 11, 14, 16, 17 Unit 7, Session 5–7 Unit 7, pp 793–808 (WP10B, 10C & 10D) Unit 7, p 787 (HC 28)	December Magnetic Tile January Magnetic Tile January Calendar Grid March Calendar Grid	Bridges Practice Book, pp 71, 83, 126, 138, 139	Informal Bridges Practice Book, pp 126, 138

Bridges Grade 2 Correlations to Indiana Academic Standards for Mathematics (cont.)

STANDARD 1: NUMBER SENSE				
Students understand the relationships among numbers, quantities, and place value in whole numbers* up to 100. They understand that fractions may refer to parts of a set* and parts of a whole.				
Standards	**Bridges**	**Number Corner**	**Bridges Supplement**	**Assessments**
2.1.10 Know that, when all fractional parts are included, the result is equal to the whole and to one.	Unit 7, p 786 (HC 28)	March Calendar Grid		
2.1.11 Collect and record numerical data in systematic ways.	Unit 3, Sessions 3, 4, 6, 16 Unit 4, Session 12 Unit 5, Sessions 14, 19, 20, 27 Unit 6, Sessions 5–7, 9 Unit 7, Sessions 4, 6–8, 10–12, 17, 26, 27 Unit 7, page 819 (HC 29) Unit 7, pages 795–797, 802–803 (WP's 10A, 10D) Technology Connections Book, pages 26–27 (Technology Connection 10)	November Calendar Grid December Magnetic Tile January Magnetic Tile February Calendar Grid April Calendar Grid	Bridges Practice Book, pages 25, 112, 123	Informal Unit 7, Session 27 (Work Sample) Bridges Practice Book, pages 106, 112, 123 Bridges Practice Book, pages 106, 112, 123 Formal Unit 7, Sessions 1 & 29 (Unit 7 Pre- and Post-Assessments)
2.1.12 Represent, compare, and interpret data using tables, tally charts, and bar graphs	Unit 3, Sessions 3, 4, 6, 16 Unit 4, Session 12 Unit 5, Sessions 20, 27 Unit 6, Session 10 Unit 7, Sessions 4, 6–8, 13, 17, 28 Technology Connections Book, pages 26–27 (Technology Connection 10)	January Magnetic Tile February Calendar Grid	Bridges Practice Book, pages 25, 106, 112, 123	Informal Bridges Practice Book, pages 106, 112, 123 Formal Unit 6, Session 13 (Unit 6 Post-Assessment) Unit 7, Sessions 1 & 29 (Unit 7 Pre- and Post-Assessments)

Bridges Grade 2 Correlations to Indiana Academic Standards for Mathematics (cont.)

STANDARD 2: COMPUTATION				
Students solve simple problems involving addition and subtraction of numbers up to 100.				
Standards	**Bridges**	**Number Corner**	**Bridges Supplement**	**Assessments**
2.2.1 Model addition of numbers less than 100 with objects and pictures.	Unit 5, Sessions 3, 6–10, 21–25 Unit 5, pp 627–628, 631–633 (WP's 9D, 9F Unit 7, Sessions 9 Unit 7, pp 807–808 (WP 10F)	January–February Base Ten Bank	Set A5 Number & Operations: Multi-Digit Addition & Subtraction, Activity 4 Set A9 Number & Operations: More Multi-Digit Addition & Subtraction, Activities 1, 2 and Independent Worksheets 1–3, 7 Bridges Practice Book, pp 94, 98, 100, 102, 103, 108, 112, 114, 118, 121, 122, 130, 131, 133, 137, 142	Formal Unit 5, Sessions 1 & 32 (Unit Pre- and Post-Assessments) Unit 7, Sessions 2 & 29 (Unit Pre- and Post-Assessments)
2.2.2 Add two whole numbers less than 100 with and without regroup-ing.	Unit 5, Sessions 3, 6–10, 21–25 Unit 5, pp 627–628, 631–633 (WP's 9D, 9F Unit 7, Sessions 9 Unit 7, pp 807–808 (WP 10F)	January–February Base Ten Bank	Set A5 Number & Operations: Multi-Digit Addition & Subtraction, Activity 4 Set A9 Number & Operations: More Multi-Digit Addition & Subtraction, Activities 1, 2 and Independent Worksheets 1–3, 7 Bridges Practice Book, pp 94, 98, 100, 102, 103, 108, 112, 114, 118, 121, 122, 130, 131, 133, 137, 142	Formal Unit 5, Sessions 1 & 32 (Unit Pre- and Post-Assessments) Unit 7, Sessions 2 & 29 (Unit Pre- and Post-Assessments)
2.2.3 Subtract two whole numbers less than 100 without regrouping.	Unit 5, Sessions 3, 6–10, 13, 20, 24, 25 Unit 5, pp 559–560, 631–633 (WP 8B, 9F Unit 7, Sessions 9	March–April Base Ten Bank	Set A5 Number & Operations: Multi-Digit Addition & Subtraction, Activity 4 Set A9 Number & Operations: More Multi-Digit Addition & Subtraction, Activities 3–7 and Independent Worksheets 4–7 Bridges Practice Book, pp 96, 103, 106, 109, 112, 120, 121, 122, 130, 131, 133, 135, 142	Formal Unit 5, Sessions 1 & 32 (Unit Pre- and Post-Assessments) Unit 7, Sessions 2 & 29 (Unit Pre- and Post-Assessments)

Bridges Grade 2 Correlations to Indiana Academic Standards for Mathematics (cont.)

STANDARD 2: COMPUTATION				
Students solve simple problems involving addition and subtraction of numbers up to 100.				
Standards	**Bridges**	**Number Corner**	**Bridges Supplement**	**Assessments**
2.2.4 Understand and use the inverse relationship between addition and subtraction.		October Magnetic Tile November Hundreds Grid December Hundreds Grid	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction, Activities 3, 4, 5, 6, 7 and Independent Worksheet 6 Bridges Practice Book, pp 11, 17, 23, 27, 31, 33, 35, 37, 41, 45, 57, 63, 64, 73, 77, 79, 85, 106, 109, 120	
2.2.5 Use estimation to decide whether answers are reasonable in addition problems.	Unit 5, Sessions 22, 23, 28 Unit 7, Session 9	November Hundreds Grid January Base 10 Bank February Base 10 Bank March Base 10 Bank April Base 10 Bank May Coin Collector	Set A9 Number & Operations: More Multi-Digit Addition & Subtraction, Activities 1, 2, 6, 7 Bridges Practice Book, pp 109 – 111	Informal Bridges Practice Book, pp 109, 110 Formal Unit 5, Sessions 1 & 32 (Unit Pre- and Post Assessments)
2.2.6 Use mental arithmetic to add or subtract 0, 1, 2, 3, 4, 5, or 10 with numbers less than 100.		January–April Base 10 Bank	Bridges Practice Book, pp 7, 9, 13, 19, 21, 29, 49, 50, 59, 69, 71, 81, 98, 100, 112, 130, 142, 144	

STANDARD 3: ALGEBRA AND FUNCTIONS				
Students model, represent, and interpret number relationships to create and solve problems involving addition and subtraction.				
Standards	**Bridges**	**Number Corner**	**Bridges Supplement**	**Assessments**
2.3.1 Relate problem situations to number sentences involving addition and subtraction.	Unit 2, Sessions 7, 9–11 Unit 3, pp 276 (HC 10) Unit 5, Sessions 3, 5–10 Unit 7, Sessions 15, 18–23		Set A2 Number & Operations: Solving Equations, Activities 1 & 2 and Independent Worksheets 1 & 2 Bridges Practice Book, pp 2, 4, 6, 10, 12, 14, 16, 28, 32, 36, 38, 40, 42, 46, 56, 62, 70, 86, 103	

Bridges Grade 2 Correlations to Indiana Academic Standards for Mathematics (cont.)

STANDARD 3: ALGEBRA AND FUNCTIONS				
Students model, represent, and interpret number relationships to create and solve problems involving addition and subtraction.				
Standards	**Bridges**	**Number Corner**	**Bridges Supplement**	**Assessments**
2.3.2 Use the commutative and associative properties for addition to simplify mental calculations and to check results.	Unit 3, Sessions 1, 4, 7 Unit 3, pages 231–234, 284–285 (WP's 4A, 4B, 5A)	October Magnetic Tile November Hundreds Grid December Hundreds Grid	Set A2 Number & Operations: Solving Equations, Independent Worksheet 2 Set A9 Number & Operations: More Multi-Digit Addition & Subtraction, Activities 3, 4 & 5 and Independent Worksheet 9 Bridges Practice Book, pages 11, 17, 23, 27, 31, 33, 35, 37, 41, 45, 57, 63, 73, 79, 85	
2.3.3 Recognize and extend a linear pattern by its rules.	Unit 1, Sessions 6, 9, 11, 12, 16, 22 Unit 4, Sessions 24, 25			
2.3.4 Create, describe, and extend number patterns using addition and subtraction.	Unit 1, Sessions 6, 9, 11-12, 16, 22 Unit 1, pages 40–41, 47–48, 89–97 (Work Places 2A, 2F, 3A, 3C, 3F) Unit 3, Session 12 Unit 4, Sessions 24–25 Technology Connections Book, pages 10–11 (TC 2)	November Magnetic Tile May Magnetic Tile Number Corner Student Book, pages 1, 5, 11, 39, 55, 59, 81	Bridges Practice Book, pages 7, 9, 13, 21, 29, 43, 49, 50, 143	Informal Unit 1, Sessions 11, 12, 21 (Work Samples) Unit 4, Sessions 24–25 (Work Samples) Bridges Practice Book, pages 49, 50, 143
				Formal Unit 1, Sessions 1 & 23 (Unit 1 Pre- and Post-Assessment) Number Corner Student Book, pages 55 & 85 (Check-Ups 3 & 4)

Bridges Grade 2 Correlations to Indiana Academic Standards for Mathematics (cont.)

STANDARD 4: GEOMETRY				
Students identify and describe the attributes of common shapes in the plane and of common objects in space.				
Standards	**Bridges**	**Number Corner**	**Bridges Supplement**	**Assessments**
2.4.1 Construct squares, rectangles, triangles, cubes, and rectangular prisms with appropriate materials.	Unit 4, Sessions 9, 11, 13, Unit 4, pp 364–366, 372–373, 421–422, 427–431 (WP's 6B, 6F, 7A, 7D, 7E, 7F			
2.4.2 Describe, classify, and sort plane and solid geometric shapes (triangle, square, rectangle, cube, rectangular prism) according to the number and shape of faces and the number of sides, edges and/or vertices.	Unit 4, Sessions 2–4, 18–20 Unit 4, pages 363–364, 372–373, 421–422 (WP's 6A, 6F, 7A) Unit 4, pages 343, 437, 458 (HC's 12, 15, 16)	December Calendar Grid May Calendar Grid	Bridges Practice Book, page 61	Informal Bridges Practice Book, page 61 Formal Unit 4, Sessions 1, 21 (Unit 4 Pre- and Post-Assessments)
2.4.3 Investigate and predict the result of putting together and taking apart two-dimensional and three-dimensional shapes.	Unit 1, Sessions 19–21 Unit 3, Sessions 9–11 Unit 4, Sessions 4–6, 8, 9, 11–15 Unit 4, pp 364–371, 423–431 (WP's 6B, 6D, 6E, 7B, 7C, 7E, 7F) Unit 4, p 381 (HC 13)		Bridges Practice Book, pp 2, 14, 66, 76	Formal Unit 4, Sessions 1 & 21 (Unit Pre- and Post-Assessments)
2.4.4 Identify congruent two-dimensional shapes in any position.	Unit 3, Sessions 10,11 Unit 4, Sessions 12, 13, 18–20 Unit 4, pgs. 427–428 (WP 7D) Unit 4. Page 437 (HC 15) Technology Connections Book, pages 20–21 (Technology Connection 7)		Bridges Practice Book, page 65	
2.4.5 Recognize geometric shapes and structures in the environment and specify their locations.	Unit 4, Sessions 10–13	May Calendar Grid		

Bridges Grade 2 Correlations to Indiana Academic Standards for Mathematics (cont.)

STANDARD 5: MEASUREMENT

Students understand how to measure length, temperature, capacity, weight, and time in standard units.

Standards	Bridges	Number Corner	Bridges Supplement	Assessments
2.5.1 Measure and estimate length to the nearest inch, foot, yard, centimeter, and meter.	Unit 2, pp 161, 182 (HC's 6, 7) Unit 7, Sessions 3, 9 Unit 7, pp 752–753 (HC 27) Unit 7, pp 807–808 (WP 10F)		Set D2 Measurement: Length in Customary Units, Activities 5–8 Set D3 Measurement: Length in Metric Units, Activities 1–3 Bridges Practice Book, pp 20, 24, 30, 44, 125, 127, 129, 144	Informal Bridges Practice Book, pp 20, 24, 30, 44, 124, 126, 128 Formal Number Corner Student Book, pp 37 & 87 (Check-Ups 2 & 4)
2.5.2 Describe the relationships among inch, foot, and yard. Describe the relationship between centimeter and meter.			Set D2 Measurement: Length in Customary Units, Activities 1–8 Set D3 Measurement: Length in Metric Units, Activities 1–3	
2.5.3 Decide which unit of length is most appropriate in a given situation.			Set D2 Measurement: Length in U.S. Customary Units, Activities 6, 7, 8 Bridges Practice Book, pages 126, 128	Formal Number Corner Student Book, page 87 (Check-Up 4)
2.5.4 Estimate area and use a given object to measure the area of other objects.	Unit 4, Sessions 8, 9, 14, 15 Unit 4, pp 370–371, 423–426, 428–432 (WP's 6E, 7B, 7C, 7E, 7F) Unit 7, Session 3	April Magnetic Tile		
2.5.5 Estimate and measure capacity using cups and pints.	Unit 6, p 699 (HC 25)		Set D1 Measurement: Duration, Activities 5, 6	
2.5.6 Estimate weight and use a given object to measure the weight of other objects.	Unit 6, p 679 (HC 24)	January Daily Measure	Set D1 Measurement: Duration, Activities 4, 6	
2.5.7 Recognize the need for a fixed unit of weight.	Unit 6, p 679 (HC 24)	January Daily Measure	Set D1 Measurement: Duration, Activities 4, 6	
2.5.8 Estimate temperature. Read a thermometer in Celsius and Fahrenheit.			Set D6 Measurement: Temperature, Activities 1–3	

Bridges Grade 2 Correlations to Indiana Academic Standards for Mathematics (cont.)

STANDARD 5: MEASUREMENT				
Students understand how to measure length, temperature, capacity, weight, and time in standard units.				
Standards	**Bridges**	**Number Corner**	**Bridges Supplement**	**Assessments**
2.5.9 Tell time to the nearest quarter hour, be able to tell five-minute intervals, and know the difference between a.m. and p.m.	Unit 1, Session 17 Unit 1, pages 90–92 (WP 3B)	September, October, December, March, April, May Bean Clock	Set D5 Measurement: Telling Time, Activities 1 & 2 and Independent Worksheets 1, 2, 3, 4, & 5 Bridges Practice Book, pages 39, 58, 97, 103, 115, 131, 135, 142	Informal Set D5 Measurement: Telling Time, Independent Worksheet 5 Bridges Practice Book, pages 39, 58, 97, 103, 115, 131, 135, 142 Formal Number Corner Student Book, pp 10, 37 & 87 (Check-Ups 1, 2 & 4)
2.5.10 Know relationships of time: seconds in a minute; minutes in an hour; hours in a day; days in a week; and days, weeks, and months in a year.		Nov Calendar Grid, Session 3 Feb Calendar Grid, Sessions 2 & 3 April Calendar Grid, Sessions 2 & 3	Set A5 Number & Operations: Multi-Digit Addition & Subtraction, Activity 1 Set D1 Measurement: Duration, Activities 1, 2, 3 & 6	
2.5.11 Find the duration of intervals of time in hours.		April Bean Clock May Bean Clock	Bridges Practice Book, pp 132, 136	
2.5.12 Find the value of a collection of pennies, nickels, dimes, quarters, half-dollars, and dollars.	Unit 1, Session 7 Unit 1, pages 42–43 (WP 2B) Unit 5, Sessions 12, 14, 26, 28 Unit 5, pages 556–558, 565–568, 621–623, 629–630 (WP's 8A, 8E, 9A, 9E) Unit 7, Session 1	September Coin Collector October Coin Collector February Coin Collector March Coin Collector	Set A6 Number & Operations: Money, Activities 1 & 2 and Independent Worksheet 1 Bridges Practice Book, pages 15, 25, 68, 76, 87, 90, 115, 144	Informal Unit 5, page 555 (Observation Checklist) Bridges Practice Book, pages 15, 25, 68, 76, 87, 90, 115, 144 Formal Number Corner Student Book, pp 10, 38 & 88 (Check-Ups 1, 2, & 4) Unit 5, Sessions 1 & 35 (Unit 5 Pre- and Post-Tests)

Bridges Grade 2 Correlations to Indiana Academic Standards for Mathematics (cont.)

STANDARD 6: PROBLEM SOLVING				
Students make decisions about how to set up a problem.				
Standards	**Bridges**	**Number Corner**	**Bridges Supplement**	**Assessments**
2.6.1 Choose the approach, materials, and strategies to use in solving problems.	Unit 2, Sessions 1, 7, 10, 11, 12 Unit 3, Sessions 7, 15 Unit 3, pages 233–234, 295–296 (WP's 4B, 5F) Unit 4, Sessions 4, 6, 19, 20, 22 Unit 5, Sessions 3, 5, 6–10 Unit 7, Sessions 15-16, 20-23	September–May Calendar Grid September–October Hundreds Grid September Magnetic Tile November Magnetic Tile January–April Base Ten Bank	Set A7 Number & Operations: Numbers to 1,000 on a Line or Grid, Activities 1 & 2 Bridges Practice Book, pages 2, 4, 6, 8, 10, 12, 14, 16, 18, 22, 25, 26, 28, 32, 34, 36, 38, 40, 42, 46, 50, 52, 54, 56, 62, 76, 92, 94, 100, 102, 112, 120, 123, 130, 132, 134, 136, 140	Informal Unit 2, Session 10 (Work Sample, see pages 171–173) Unit 5, Session 9 (Work Samples, see page 521, paragraph 3) Unit 5, Session 11 Unit 7, Session 21 (Work Sample, see pages 852–854) Formal Unit 7, pages 739-745, 873-878 (Pre- and Post-Assessments)
2.6.2 Use tools such as objects or drawings to model problems.	Unit 1, Sessions 6, 9, 13, 14, 16, 22 Unit 2, Sessions 7, 10–13 Unit 4, Sessions 4, 6, 8, 9, 11–15, 18, 19, 22 Unit 5, Sessions 3, 6–10, 13, 14, 16, 25, 30–32 Unit 7, Sessions 5, 7, 14–16, 20–23	Nov, February, April Calendar Grid January–April Base Ten Bank		
2.6.3 Explain the reasoning used and justify the procedures selected in solving a problem.	Unit 2, Sessions 1, 7, 9–11 Unit 3, Sessions 1–2 Unit 4, Sessions 4, 6, 8–9, 14–15, 22 Unit 5, Sessions 3, 6–11 Unit 6, Sessions 12–13 Unit 7, Sessions 6, 15–16, 20–23	October Calendar Grid November Magnetic Tile November Daily Measure November Hundreds Grid January Calendar Grid January Base 10 Bank March Base 10 Bank	Set D3 Measurement: Length in Metric Units, Activities 2 & 3 Bridges Practice Book, pages 2, 4, 6, 8, 10, 12, 14, 16, 18, 22, 26, 28, 32, 34, 36, 40, 42, 46, 50, 52, 54, 56, 62, 70, 74, 78, 82, 84, 88, 92, 94, 96, 98, 100, 102, 114, 116, 120, 122, 124, 132, 134, 136	Informal Unit 2, Session 10 (Work Sample, see pages 171–173) Unit 2, Session 13 (Student Reflection) Unit 5, Session 9 (Student Reflection) Unit 7 (Student Reflection, Work Sample) Formal Unit 5, Session 11 (Assessment)

Bridges Grade 2 Correlations to Indiana Academic Standards for Mathematics (cont.)

STANDARD 6: PROBLEM SOLVING				
Students make decisions about how to set up a problem.				
Standards	**Bridges**	**Number Corner**	**Bridges Supplement**	**Assessments**
2.6.4 Make precise calculations and check the validity of the results in the context of the problem.	Unit 2, Sessions 1, 7, 9–11 Unit 4, Session 22 Unit 5, Sessions 3, 6–11 Unit 6, Sessions 12–13 Unit 7, Sessions 6, 15, 20–21	October Calendar Grid November Magnetic Tile November Daily Measure November Hundreds Grid January Calendar Grid January Base 10 Bank March Base 10 Bank	Bridges Practice Book, pages 76, 109, 110, 144	Informal Bridges Practice Book, pages 76, 109, 110, 144
2.6.5 Understand and use connections between two problems.	Unit 1, Sessions 6, 9, 13, 14, 16, 22 Unit 2, Sessions 7, 10–13 Unit 4, Sessions 4, 6, 8, 9, 11–15, 18, 19, 22 Unit 5, Sessions 3, 6–10, 13, 14, 16, 25, 30–32 Unit 7, Sessions 5, 7, 14–16, 20–23			