COMMON CORE MATHEMATICS 2016

Lesson Schedule & Plans
Common Core Basics
Common Core Achieve

2016 MATHEMATICS CALENDAR

JANUARY	*Writing Emphasis - Apostrophes	
	Day One	Day Two
Week of 01.04 - 01.08		
Week of 01.11 - 01.15		
Week of 01.18 - 01.22		
Week of 01.25 - 01.29		

FEBRUARY	*Writing Emphasis - Apostrophes	
	Day One	Day Two
Week of 02.01 - 02.05	**4.1: INTRODUCTION TO INTEGERS AND ABSOLUTE VALUE**	
Week of 02.08 - 02.12	**4.2: ADD INTEGERS**	
Week of 02.15 - 02.19	**4.3: SUBTRACT INTEGERS**	
Week of 02.22 - 02.26	**4.4: MULTIPLY AND DIVIDE INTEGERS**	
Week of 02.29 - 03.04	**4.5: THE COORDINATE GRID**	
	CHAPTER 4: REVIEW AND CHECK YOUR UNDERSTANDING	

MARCH	*Writing Emphasis - Subject / Verb Agreement	
	Day One	Day Two
Week of 03.07 - 03.11	**5.1 EXPRESSIONS**	
Week of 03.14 - 03.18	**5.2 SOLVE ONE-STEP EQUATIONS**	
Week of 03.21 - 03.25	*SPRING BREAK*	
Week of 03.28 - 04.01	**5.3 SOLVE TWO-STEP EQUATIONS**	

APRIL	*Writing Emphasis - Modifiers	
	Day One	*Day Two*
Week of 04.04 - 04.08	**5.4 SOLVE ONE- AND TWO-STEP INEQUALITIES**	
Week of 04.11 - 04.15	**5.5 IDENTIFY PATTERNS**	
Week of 04.18 - 04.22	**CHAPTER 5: REVIEW AND CHECK YOUR UNDERSTANDING**	
Week of 04.25 - 04.29	**6.1 LINEAR EQUATIONS**	

MAY	*Writing Emphasis - Clauses / Phrases	
	Day One	*Day Two*
Week of 05.02 - 05.06	**6.2: GRAPHING LINEAR EQUATIONS**	
Week of 05.09 - 05.13	**6.3: PAIRS OF LINEAR EQUATIONS**	
Week of 05.16 - 05.20	**6.4: SCATTER PLOTS** / **6.5: FUNCTIONS**	
Week of 05.23 - 05.27	**CHAPTER 6: REVIEW AND CHECK YOUR UNDERSTANDING**	
Week of 05.30 - 06.03	***MEMORIAL BREAK***	

JUNE	*Writing Emphasis - Sentence Combining	
	Day One	*Day Two*
Week of 06.06 - 06.10	**3.1: INTRODUCTION TO FRACTIONS**	
Week of 06.13 - 06.17	**3.2: ADD AND SUBTRACT FRACTIONS**	
Week of 06.20 - 06.24	**3.3: MULTIPLY AND DIVIDE FRACTIONS**	
Week of 06.27 - 07.01	**3.4: MIXED NUMBERS**	
	CHAPTER 3: REVIEW AND CHECK YOUR UNDERSTANDING	

JULY	*Writing Emphasis -	
	Day One	Day Two
Week of 07.04 - 07.08		
Week of 07.11 - 07.15		
Week of 07.18 - 07.22		
Week of 07.25 - 07.29		

AUGUST	*Writing Emphasis -	
	Day One	Day Two
Week of 08.01 - 08.05		
Week of 08.08 - 08.12		
Week of 08.15 - 08.19		
Week of 08.22 - 08.26		
Week of 08.29 - 09.02		

SEPTEMBER	*Writing Emphasis -	
	Day One	Day Two
Week of 09.05 - 09.09		
Week of 09.12 - 09.16		
Week of 09.19 - 09.23		
Week of 09.26 - 09.30		

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OCTOBER	*Writing Emphasis -	
	Day One	Day Two
Week of 10.03 - 10.07		
Week of 10.10 - 10.14		
Week of 10.17 - 10.21		
Week of 10.24 - 10.28		
Week of 10.31 - 11.04		

NOVEMBER	*Writing Emphasis -	
	Day One	Day Two
Week of 11.07 - 11.11		
Week of 11.14 - 11.18		
Week of 11.21 - 11.25		
Week of 11.28 - 12.02		

DECEMBER	*Writing Emphasis -	
	Day One	Day Two
Week of 12.05 - 12.09		
Week of 12.12 - 12.16		
Week of 12.19 - 12.23		
Week of 12.26 - 12.30		

COMMON CORE BASICS

Decimals

2.1: Introduction to Decimals

MATERIALS

o CCB Mathematics pages 50 - 53
o [One is one… or is it?](#)
o Place Value Chart

CCR STANDARDS

o MP.4: Model with mathematics.
o Apply and extend previous understandings of numbers to the system of rational numbers.

OBJECTIVES

o Understand decimals as part of the place value system
o Use strategies for rounding decimals
o Compare and order decimal number

KEY CONCEPT

o Decimals represent a part of a number. They are an extension of the place-value system.

VOCABULARY (DEFINE & MODEL)

Tier 2	o Cent o Decimal
Tier 3	o Decimal Point o Hundredth o Tenth
Test Words	o Compare

INTERACTIVE STRATEGY

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WRITING TOPIC

o "How do you use decimals every day?"

WRITING PRACTICE

BEFORE LESSON

For this lesson, students need to know how to round and compare whole numbers. To determine student readiness, draw a number line on the board or on a chart. Mark the number line from 1 to 100 in multiples of ten. Choose several numbers and ask students to round the number to the nearest ten. Continue having students round whole numbers until you are confident they are ready to move on.

BACKGROUND

Tell students that decimals, which represent part of a whole, are used in metric measurement and in our monetary system. Share grocery receipts or look at food advertisements as a class. Point out the decimals and have students read them. Ask students to share other ways decimals are used, such as in track and field events, swimming, and batting averages.

GUIDED PRACTICE

o Understanding Decimals
o Place Value in Decimals
o Compare Decimals
o Round Decimals

CORE SKILL

Model with Mathematics

o Have Students create place value charts.

Apply Number Sense Concepts

Number sense applies to a general understanding of numbers, the quantities they represent, and their relationships with each other.
o **Challenge**: Name four ways to show the number 435 as an example.
o **Sidebar**: Have pairs apply reasoning to their decisions and then share and justify their conclusions with the class.

EXTENSION

Practice Pronunciation

Have students practice saying place-value names, such as hundred, hundredth, thousand, thousandth, and so on.

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Compare Data

Remind students that many sports use statistics that involve decimals.

LESSON REVIEW

Decimals	**2.2: Add and Subtract Decimals**

MATERIALS

o CCB Mathematics pages 54 - 59

CCR STANDARDS

o MP.6: Attend to precision.
o Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

OBJECTIVES

o Add Decimals
o Subtract Decimals

KEY CONCEPT

o Decimals are added and subtracted by using place value much as whole numbers are added and subtracted

VOCABULARY (PRIOR KNOWLEDGE)

Tier 2	o Align o Annexed
Tier 3	o Place Value o Vertically
Test Words	o Organize o Topic

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

o Identify Topic Sentences

BEFORE LESSON

Write addition and subtraction problems on the board and have students copy and solve them. To start, write problems that require no regrouping. When students can demonstrate mastery, write problems that require regrouping. Observe students as they work so that you can intervene if necessary.

BACKGROUND

Write the following whole numbers on the board horizontally 15,342; 367; 12; 45,098. In their notebooks, have students align the numbers vertically as they would for addition. Ask students to explain why they aligned the numbers in the way they have. Then place decimal points in the numbers to make them 153.42; 0.367; 1.2; 450.98. Ask students to re-align the numbers and explain their thinking.

GUIDED PRACTICE

o Add Decimals
o Subtract Decimals

CORE SKILL

Perform Operations

Ask a volunteer to identify the four basic math operations (addition, subtraction, multiplication, and division). Then have each them create for problems for their neighbors.
Then have pairs work on **Sidebar** activity.

Attend to Precision

Write the following on the board: 3.5 dollars and 2.05 dollars. Have students work through two ways of solving and then explain which way is more accurate.

EXTENSION

Use Real-World Examples

Have students list out prices of things they may have recently bought and find their total values.

Modify Decimals

Have students name several 'random' three-digit numbers. After doing so, have them to combine three numbers to come closest to 100. They are allowed to place a decimal anywhere in the number except to make it whole.

o Have a volunteer explain their reasoning
o Try again allowing subtraction.

LESSON REVIEW

Decimals

MATERIALS

o CCB Mathematics pages 60 - 63

CCR STANDARDS

o MP.5: Use appropriate tools strategically.
o Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

OBJECTIVES

o Multiply Decimals

KEY CONCEPT

o Multiplying Decimals is a process that is similar to multiplying whole numbers

VOCABULARY (PRIOR KNOWLEDGE)

Tier 2	o Product
Tier 3	o Factor o Multiplication
Test Words	o

INTERACTIVE STRATEGY

o Tic-Tac-Toe
o Place Value Grids

WRITING TOPIC

o "When working with decimals it is easy to see numbers less than one. What is a product of two numbers which are < 1? Experiment, Is it always <, >, = 1? Why is this?"

WRITING PRACTICE

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BEFORE LESSON

Have students multiply whole numbers in the hundreds. Observe students as they align numbers, find and write partial products, and regroup. Intervene, if necessary. Then have students add and subtract decimals through the hundredths to determine whether students understand how to align decimals before completing an operation.

BACKGROUND

Remind students that when they multiply whole numbers, they are finding a total amount. Then explain that they are also finding total amounts when they multiply decimals. Project a 100 grid on the board (see the example in lesson 2.1). Write the problem 0.2×0.3 and use the grid to model the product. Project two new grids, and work with students to find the product of 0.2×6. Then show students how to find the product of 0.4×0.4. Use as many grids as you think your students need to understand what they will be doing when they multiply decimals.

GUIDED PRACTICE

o Multiply Decimals

CORE SKILL

Apply Number Sense Concepts

Ask students to explain the relationship between multiplication and repeated addition, and why using multiplication is often easier and more efficient than using repeated addition.

o Challenge students to work in pairs to find a way to use repeated addition to find the product of another two decimals.

Represent Real-World Problems

Explain to students that decimals serve a purpose in many real-world problems. Ask students to describe the link between locations and decimals.

EXTENSION

LESSON REVIEW

Decimals	2.4: Divide Decimals

MATERIALS

o CCB Mathematics pages 64 - 69

CCR STANDARDS

o MP.8: Look for and express regularity in repeated reasoning.
o Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

OBJECTIVES

o Divide Decimals

KEY CONCEPT

o Dividing Decimals is similar to dividing whole numbers. The key difference is the placement of the decimal point in the quotient, or answer

VOCABULARY (PRIOR KNOWLEDGE)

Tier 2	o Dividend o Divisor o Quotient
Tier 3	o Reasoning
Test Words	o Evaluate o Summarize

INTERACTIVE STRATEGY

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WRITING TOPIC

o "Create a way for you to remember the rules for dividing decimals."

WRITING PRACTICE

o Summarize Ideas

BEFORE LESSON

Give students time to find quotients for a few long division problems, including those with remainders. Start with simple problems, such as two digits divided by one digit, and then make the problems increasingly complex to include two-digit divisors. Observe students as they work to determine if intervention is required.

BACKGROUND

Remind students that when they divide whole numbers, they are making equal groups. Explain that when they divide decimals, they are also making equal groups. Write the problem $16 \div 2$ on the board. Ask students to explain how to get the answer. Tell them that this same process will be used to divide decimals.

GUIDED PRACTICE

o Divide Decimals

CORE SKILL

Evaluate Reasoning

Remind students to evaluate, or check the details of their work, to determine if the solutions they get are reasonable, meaning they can be verified, or proven to be true.

Apply Number Sense Concepts

What does the operation of division do?   Why is it 'helpful' to do this with whole number?

Why is moving the decimal to both divisor and dividend important? What operation did you use to accomplish this result?

EXTENSION

Retell Problems and Solutions

Invite students to select a particular example from the lesson and explain the problem and steps of the solution in their own words.

Identify Patterns

Write the following problems on the board. Challenge students to identify a pattern as they solve the problems: $56 \div 7$, $56 \div 0.7$, $56 \div 0.07$. Ask students

to reveal the pattern they observed.

LESSON REVIEW

Fractions	**3.1: Introduction to Fractions**

MATERIALS

o CCB Mathematics pages 74 - 81

CCR STANDARDS

o Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

OBJECTIVES

o Understand fractions
o Name equivalent fractions
o Compare and order fractions

KEY CONCEPT

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VOCABULARY (WORD BENCH)

Tier 2	o Represent
Tier 3	o Common Multiple o Denominator o Equivalent Fraction o Fraction o Lowest Terms o Numerator
Test Words	o Diagram

INTERACTIVE STRATEGY

o Paper Folding

WRITING TOPIC

o Extension: Retell

WRITING PRACTICE

o Recognize Details

BEFORE LESSON

Draw or project three blank hundred grids on the board. Call out a decimal, such as 1.5, and ask a volunteer to shade the grids to represent the decimal. Ask another volunteer to explain the relationship between the decimal and the shaded area. Call out additional decimals, giving more students an opportunity to respond. Use students' responses to determine if intervention is required.

BACKGROUND

Hold up a piece of paper for students to see. Fold the paper in half and open it. Ask students to identify how much of the whole each part represents. Then refold the paper and fold it again to make fourths and then eighths. Open the paper and ask students to count how many parts make up the whole. Then shade or use a marker to mark a given number of fractional parts and ask students how many parts of the whole are shaded. Tell students that when they identify parts of a whole, they are naming fractions.

GUIDED PRACTICE

o Understand Fractions
o Name Equivalent Fractions
o Compare and Order Fractions

CORE SKILL

Interpret Data Displays

Guide students through the explanation of diagrams, asking them to explain the varied purposes a diagram can have. Then have them draw a diagram to represent the fraction 2/3 and explain how the diagram fulfills its purpose.

Perform Operations

Discuss the explanation of equivalent fractions as a class. Then give students an opportunity to solve the problem. Afterward, ask volunteers to show and explain their work.

EXTENSION

Retell

Have students explain the diagrams on page 76 again, using the term equivalent fraction in their explanations.

Make Observations about Fractions

Write the fraction 8/24 on the board. Ask students to use the fraction to explain the process of using common multiples to rewrite the fraction in its lowest terms. Challenge students to support their explanation with one or more diagrams.

LESSON REVIEW

Fractions	**3.2: Add and Subtract Fractions**

MATERIALS

o CCB Mathematics pages 82 - 87

CCR STANDARDS

o MP.8: Look for and express regularity in repeated reasoning.
o Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

OBJECTIVES

o Add and subtract fractions with like denominators
o Add and subtract fractions with unlike denominators

KEY CONCEPT

o Understand and apply strategies for finding the sums and differences of fractions that have like or unlike denominators

VOCABULARY (SEMANTIC MAP)

Tier 2	o Simplify
Tier 3	o Common Denominator o Like Denominator o Unlike Denominator
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

o Pair and Share

WRITING PRACTICE

BEFORE LESSON

Write the fraction 4/5 on the board and have students write a set of equivalent fractions ($e.g.\, 8/10, 10/15, 16/20$). Then write the fraction 9/12 on the board and ask students to rewrite the fraction in its lowest terms (3/4). Ask students to explain their thinking as they work. Use students' responses to determine if intervention is required.

BACKGROUND

Draw or project an image of a hundred grid. Shade and label 3/10 of the grid. Then tell students you want to add 5/10. Shade 5/10. Ask students to identify how much of the grid is shaded 8/10. Explain that when they identified the total shaded area, they added like fractions. Now, tell them you want to remove 2/10 of the grid. Ask students how much of the grid will be left shaded 6/10. Ask students to explain what operation they completed in order to answer your question.

GUIDED PRACTICE

o Add and Subtract Fractions with Like Denominators
o Add and Subtract Fractions with Unlike Denominators

CORE SKILL

Perform Operations

Have students read the text. Then invite them to share experiences in which they were first learning to add and subtract whole numbers.

Apply Number Sense

Ask students what they know about fractions, and how this understanding contributes to their general number sense. Identify three types of fractions, and then have students work in pairs to solve sidebar.

EXTENSION

Pair and Explain

Tell students to turn to page 84. Have students work in pairs.

o Have one student in each pair explain the procedure for adding fractions with unlike denominators.
o Then have the other student explain the procedure for subtracting

o

fractions with unlike denominators.

o Have them support each other if a partner is having difficulty with explanations

Apply a Plan to Solve a Multi-Step Problem

Write the following problems on the board $3/4 + 2/7 \: and \: 6/8 - 2/3$. Have students write a plan that can be applied to solve both problems.

LESSON REVIEW

Fractions	**3.3: Multiply and Divide Fractions**

MATERIALS

o CCB Mathematics pages 88 - 91

CCR STANDARDS

o Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

OBJECTIVES

o Multiply fractions
o Divide fractions

KEY CONCEPT

o Extend and develop ideas about multiplication and division to include multiplying and dividing fractions

VOCABULARY (PREDICT MEANING)

Tier 2	o Invert o Reciprocal
Tier 3	o Multiplicative Inverse
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

o "When multiplying two proper fractions, will the product ever be greater than 1? Explain?"

WRITING PRACTICE

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BEFORE LESSON

Write the fractions $8/10, 12/20, and$ 6/24 on the board. Ask students to simplify each fraction, or write it in its lowest terms. Walk among students to observe their work, intervening whenever necessary. Students will need to be able to simplify the products and quotients they find in this lesson.

BACKGROUND

Write the problem $1/2 \times 1/2$ on the board. Circle the operation symbol and read the problem as $1/2$ *of* $1/2$. Then distribute grid paper. Have students trace two 4 *by* 4 squares. Then tell them to shade 1/2 of the first grid horizontally, and shade 1/2 of the second grid vertically. Have students cut out the second rectangle, place it upon the first, and determine what fraction of the rectangle $1/2$ *of* $1/2$ represents (1/4). Then write the product next to the problem on the board $1/2 \times 1/2 = 1/4$

GUIDED PRACTICE

o Multiply Fractions
o Divide Fractions

CORE SKILL

Apply Number Sense

Have students work in groups on the sidebar. Encourage students to copy and use the diagram to help them find the answer. Challenge students to solve for a sum that Juan might earn in one day of snow shoveling or have students calculate how much Juan and each of his employees earned that day.

Perform Operations

Allow students time to read and copy the sidebar explaining the steps for dividing two fractions.

EXTENSION

Elaborate Using the Vocabulary Words

Explain to students that inverting a fraction creates its multiplicative inverse, or reciprocal. Have students practice inverting fractions. Ask them to explain the steps of the process using the vocabulary words.

Sketch Math Models

Challenge students to create visual models to demonstrate the process of multiplying and dividing fractions.

LESSON REVIEW

Fractions

3.4: Mixed Numbers

MATERIALS

o CCB Mathematics pages 92 - 97

CCR STANDARDS

o Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

OBJECTIVES

o Add and subtract mixed numbers
o Multiply and divide mixed numbers

KEY CONCEPT

o Understand mixed numbers and perform the basic operations of addition, subtraction, multiplication, and division with mixed numbers

VOCABULARY (WORD PARTS)

Tier 2	o Reduce o Rename
Tier 3	o Improper Fraction o Mixed Fraction o Proper Fraction
Test Words	o Detail

INTERACTIVE STRATEGY

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WRITING TOPIC

o Works with a partner, summarize the details presented within this unit.

WRITING PRACTICE

o Summarize Supporting Details

BEFORE LESSON

Invite volunteers to write, solve, and explain the processes involved in adding, subtracting, multiplying, and dividing fractions. Continue the activity until students demonstrate proficiency.

BACKGROUND

Use students' familiarity with adding and subtracting whole numbers and adding and subtracting fractions to introduce adding and subtracting mixed numbers. Have students predict how adding and subtracting mixed numbers will be similar to what they already know. Have students practice changing mixed numbers to improper fractions in preparation for multiplying and dividing mixed numbers.

GUIDED PRACTICE

o Add and Subtract Mixed Numbers
o Multiply and Divide Mixed Numbers

CORE SKILL

Represent Real-World Problems

Ask students to visualize themselves in a grocery or hardware store. Ask: What can you buy in the store that has a per-pound cost?   How often does your purchase weigh a whole number amount?

o Have students create word problems for the class to solve
o Then, work in pairs to solve sidebar

Evaluate Arguments

What questions should you ask before accepting a claim or argument?

EXTENSION

Use Visuals

Use pictures of real objects to help students understand mixed numbers. For example, show pictures of three pizzas and say: Suppose we ordered three pizzas. Each pizza had eight slices, and we ate 19 slices. How many pizzas would we have eaten?

Compare Mixed Numbers

Write the following mixed numbers on the board 1 1/4, 1 3/8, 1 2/5, 1 1/2 ?

o Determine which of the mixed numbers, when multiplied by itself, comes closest to but does not exceed 2.
o Order from least to greatest
o Change to decimals

LESSON REVIEW

Integers

4.1: Introduction to Integers and Absolute Value

MATERIALS

o CCB Mathematics pages 104 - 107

CCR STANDARDS

o Apply and extend previous understandings of numbers to the system of rational numbers.

OBJECTIVES

o Identify integers
o Compare and order integers
o Find the absolute value of an integer

KEY CONCEPT

o Identify, compare, and order integers, as well as find their absolute value, in order to better understand the meaning and value of integers

VOCABULARY(PRIOR KNOWLEDGE)

Tier 2	o Infinite o Opposite
Tier 3	o Absolute Value o Integer
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

In this lesson, students learn that integers are positive and negative whole numbers. They will compare and order them and find their absolute value. To check for readiness, have students mark 0 and the first few positive whole numbers on a number line. To demonstrate readiness for absolute value, have students practice finding the distance between two numbers on the number line.

BACKGROUND

Explain that integers are the set of whole numbers and their opposites. As the class progresses through the chapter, have them research marine organisms. Students should find three organisms that live at different depths. Have students write the depths from least to greatest negative number on a vertical number line.

GUIDED PRACTICE

o Understand Integers
o Absolute Value

CORE SKILL

Apply Number Sense

After reading the section, explain to students that they will learn about absolute value on the next page. Tell them to consider what absolute value means and how it could apply to real life as they read the next page.

Represent Real-World Problems

Give students time to read the sidebar. To help them answer the assignment at the end, ask them if they have ever purchased something and then returned it the following month. Discuss reasons why credit card companies use positive numbers to represent the balance of money loaned.

EXTENSION

Interpret a Model

Show students a thermometer, or an illustration of a thermometer. Ask students to explain how a thermometer works as a model of positive and

negative integers. Encourage students to use the words integers, opposites, and absolute value in their discussions. Provide students with more real-world examples if they are having difficulty with these terms.

Collect and Display

Have students use print or online resources to find real-world examples of positive and negative numbers, such as the elevation of landforms relative to sea level or the loss and gain of yards during play in a football game. Ask students to create a printed or digital display of the example and explain its relevance to positive and negative numbers.

LESSON REVIEW

Integers

4.2: Add Integers

MATERIALS

o CCB Mathematics pages 108 - 113

CCR STANDARDS

o MP.2: Reason abstractly and quantitatively.
o Apply and extend previous understandings of numbers to the system of rational numbers.
o Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

OBJECTIVES

o Use a number line to find the sum of two integers
o Use integer addition rules to find the sum of two integers

KEY CONCEPT

o Two ways to find the sum of two integers include using a number line and using a sequence of rules

VOCABULARY (ACT THEM OUT)

Tier 2	o Negative o Positive o Sign
Tier 3	o Addend
Test Words	o Illustrate o Sequence

INTERACTIVE STRATEGY

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WRITING TOPIC

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BEFORE LESSON

Draw or have volunteers draw number lines from 0 to positive 25 on the board. Ask students to use the number lines to add positive whole numbers. Observe their work, intervening if necessary.

BACKGROUND

Remind students that a number line continues infinitely in opposite directions, representing both negative and positive integers. Also remind them that absolute value is the distance between 0 and a number on the number line, whether positive or negative.

GUIDED PRACTICE

o Use A Number Line to Add Integers
o Use Rules to Add Integers

CORE SKILL

Reason Abstractly

Allow students time to read and think about the sidebar. Ask if they can think of other math examples that are abstract. One example is a number line. It is an abstraction that students can use to manipulate numbers, but it doesn't really exist as an object. Ask students to brainstorm other examples of abstractions they can use to work with numbers and values. Students may say, for example, that coordinate grids don't really exist, but they are abstractions that show the relationships between pairs of numbers.

Perform Operations

Have students read the sidebar independently. Remind them to refer to the number line in Example 3 as they read, to help them understand the text. After students have written their explanations, ask them to share their ideas.

For students who need an alternative to a number line to illustrate integer addition, give students counters in two colors. Let one color represent positive numbers and the other color represent negative numbers. Have students use the counters to practice finding zero sums. You can use small objects such as paper clips and erasers if counters are not available.

WRITING PRACTICE

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EXTENSION

Build Vocabulary

Invite students to play a game. Use tape to draw a number line along one edge of a table. Mark the center of the tape 0. Mark numbers to the right as positive integers and numbers to the left as negative integers. Have a volunteer stand in front of the 0 and push a paper clip or counter in a positive direction. Ask the student to announce the distance the counter moved. Then have the volunteer push it back in the opposite direction, again announcing how far the counter moved. Have a volunteer record the measurements on the board. Then ask the player to determine how far the counter moved in all while explaining the problem solving process using the vocabulary words. Invite other students to play.

Classify Concepts

Have students research the use of submersibles to explore the layers or zones of the ocean, from the surface, or Sunlight Zone, to the trenches, or Hadalpelagic Zone. Have students use their research to explain the concept of positive and negative integers.

LESSON REVIEW

Integers	4.3: Subtract Integers

MATERIALS

o CCB Mathematics pages 114 - 117

CCR STANDARDS

o Apply and extend previous understandings of numbers to the system of rational numbers.
o Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

OBJECTIVES

o Use a number line to subtract integers
o Use addition of opposite integers to find the difference between two integers Key Concept

KEY CONCEPT

o Subtract two integers by adding the opposite of the integer that is being subtracted

VOCABULARY (EVERYDAY WORDS)

Tier 2	o Point
	o Solve
Tier 3	o Tic Mark
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

Give students opportunities to demonstrate proficiency in adding positive and negative integers before starting this lesson.

BACKGROUND

Help students begin to recognize that subtracting integers is an extension of adding integers. Ask students what the relationship is between addition and subtraction (they are opposite operation). Have them predict how subtracting integers will relate to adding integers.

GUIDED PRACTICE

o Use a Number Line to Subtract Integers
o Use Addition to Subtract Integers

CORE SKILL

Perform Operations

Read the text with students, helping them understand that subtracting one number from another is the same as adding the opposite of the number. For example, write the problems $5 - 2$ and $5 + -2$ on the board. Draw a number line from 0 to 5 beneath the problems. Use the number line to demonstrate how the second problem is the same as the first, and the answer is the same. Next, have students complete the activity presented in the last paragraph of the sidebar. Encourage students to share their number lines and explanations with the class.

Represent Real-World Problems

After reading the sidebar, encourage students to work together to solve the problem. Have them draw a number line from -15 to $+15$ to model the solution. Allow students to find another way to solve the problem, too, such as drawing a picture. Afterward, encourage students to share the model they used to solve the real-world problem.

EXTENSION

Make Connections

Pair English language learner with fluent English speakers to discuss how subtracting integers is similar to and different from adding integers and

subtracting whole numbers. Encourage students to use lesson vocabulary as much as possible.

Explain Phenomena in Terms of Concepts

Have students' research weather records in any location of interest that has records going back at least five decades. Ask students to determine the record highs and lows for each decade, and calculate the variation between the two. Then have them explain the variations in the context of the principle of positive and negative integers.

LESSON REVIEW

Integers	**4.4 Multiply and Divide Integers**

MATERIALS

o CCB Mathematics pages 118 - 129
o Tic-Tac-Toe Integers

CCR STANDARDS

o MP.5: Use appropriate tools strategically.
o Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

OBJECTIVES

o Multiply two integers
o Divide two integers

KEY CONCEPT

o Use rules to find products and quotients of integers

VOCABULARY (VISUALIZE)

Tier 2	o Repeated
Tier 3	o Column o Inverse o Row o Table
Test Words	o Title

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

In this lesson, students multiply and divide positive and negative whole numbers. To demonstrate readiness, have students review multiplying and dividing whole numbers by finding 1-digit by 1-digit products and the corresponding quotients.

BACKGROUND

Remind students that multiplication can be thought of as repeated addition. Demonstrate $-2 \times 4 = (-2) + (-2) + (-2) + (-2)$ on a number line. Ask: What is the sign of the sum? What will be the sign of the product? Have students predict the sign in the division of negative integers.

GUIDED PRACTICE

o Multiply Integers
o Read a Table
o Divide integers

CORE SKILL

Interpret Data Displays

Give students time to read the text in the sidebar. Then, together, discuss the features of the table. Ask the question that follows, and invite volunteers to answer. Students may say, for example, that it would be helpful to expand the table to include more months, or they may even want to insert more columns to show how many adult men and women also visit the park in the same months.

Use Appropriate Tools Strategically

Allow students time to read the sidebar and answer the questions that follow. Explain that a table is a way to show information, and just like word problems, it is important to understand the given information first before solving problems based on the table.

EXTENSION

Make a Table

Ask students to think about how many minutes they spend watching television or online during the school week and on the weekends. Record

and average their answers as they observe. Then ask students to explain how you can organize the data you have collected in a table to make it easier to read and understand. Direct students to tell you exactly what to do, one step at a time. Respond to their commands, making changes as students become aware of their necessity. Discuss the features of the final table.

Compare Operations

Have students work in small groups to create Venn diagrams. Provide them with copies of an empty diagram (see the Graphic Organizer section of the Instructor Resource Binder). Have students label one circle: Adding and Subtracting Integers. Have them label the second circle: Multiplying and Dividing Integers. Have them use the Math Links and text in the chapter to fill in as many details as possible in the diagram.

LESSON REVIEW

Integers	4.5: The Coordinate Grid

MATERIALS

o CCB Mathematics pages 124 - 129

CCR STANDARDS

o MP.1: Make sense of problems and persevere in solving them.
o Apply and extend previous understandings of numbers to the system of rational numbers.

OBJECTIVES

o Plot and identify points on a coordinate grid

KEY CONCEPT

o Coordinate grids are a method of locating points in the plane by means of directions and numbers

VOCABULARY (EXAMPLES)

Tier 2	o Origin
Tier 3	o Coordinate Grid o Perpendicular Lines o X-Axis o Y-Axis o X-Coordinate o Y-Coordinate
Test Words	o Grid

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

Students will learn about the coordinate grid and how to identify and plot points using ordered pairs. To determine readiness, have students draw and label horizontal and vertical number lines that display both positive and negative integers.

BACKGROUND

Gather some examples of maps that use coordinate grids, or print sample maps from an online search. Show the examples to students, and encourage them to figure out the purpose of the lines that run north and south and east and west. Explain to students that those arrangements of lines form a coordinate grid. By finding where horizontal and vertical lines intersect, they can locate specific features or locations.

GUIDED PRACTICE

o The Coordinate Plane

CORE SKILL

Interpret Data Displays

Allow students time to read the sidebar. Then give partners graph paper to complete the activity. If any groups are struggling, provide remediation by reviewing how to draw the axes, which axis is which, and how to locate points and write ordered pairs. Or you may wait to assign this activity until students have worked through Examples 1 through 3.

Make Sense of Problems

Read the sidebar as a class. Ask students questions as they draw a coordinate grid to match the problem: Which axis represents east to west? Which axis represents north to south? Label the directions. In terms of the grid, how can you represent one mile in your drawing?

EXTENSION

Describe a Coordinate Grid

Have students refer to the vocabulary words. Then invite students to select a coordinate grid from the lesson and use the vocabulary words to describe its parts.

Investigate Descartes

Have students research Descartes, inventor of the Cartesian plane. After reading about his life and work in mathematics, have students write one or two questions about Descartes' work that they would like to answer through further research. Afterward, ask students to share their research in a digital presentation.

LESSON REVIEW

Expressions and Equations	5.1: Expressions

MATERIALS

o CCB Mathematics pages 134 - 139

CCR STANDARDS

o MP.1: Make sense of problems and persevere in solving them.
o Use properties of operations to generate equivalent expressions.

OBJECTIVES

o Translate between verbal and symbolic representations of expressions
o Simplify expressions
o Evaluate expressions

KEY CONCEPT

o Mathematical and real-world situations can be represented by expressions that can be amplified and evaluated.

VOCABULARY

Tier 2	o Variable
Tier 3	o Algebraic Expression o Coefficient o Constant Term o Mathematical Expression o Symbolic Expression o Verbal Expression
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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BEFORE LESSON

To simplify and evaluate expressions, students will need to know and apply the order of operations. Ask a volunteer to remind the class of the order of operations (parentheses, exponents, multiplication, division, addition, subtraction). Then practice a few two- and three-step problems. For example $5 - 8 \div 2$; $4 + 5x - 6$; $-2.3 - 4x\ 1.2$.

BACKGROUND

Tell students that mathematical expressions are phrases or parts of sentences, just as verbal expressions are phrases and parts of sentences. Write a sentence and an equation on the board, such as The red fox leaped among the flowers in the meadow and $(2x4) + \frac{16}{8} = x$. Circle among the flowers and in the meadow in the sentence. Circle (2 x 4) and 16/8 in the equation. Explain that all four are expressions, and ask students to describe the difference among them. Then explain that the mathematical expressions can be simplified or evaluated. Ask: How can you simplify $\frac{16}{8}$?

GUIDED PRACTICE

o Verbal and Symbolic Representations of Expressions\
o Identify Key Words
o Evaluate Expressions

CORE SKILL

Evaluate Expressions

After reading the sidebar, discuss with students how these steps for writing an expression are similar to or different from the steps they used in the Five-Step Approach. A similarity is that they need to be completed in order. They need to clearly explain how the problem is solved. Discuss the importance of each step in the examples.

Make Sense of Problems

After students read the sidebar, lead a class discussion on how they have used key words to help solve problems so far. Then have pairs use key words to write simple math problems for each other, exchange, and solve.

EXTENSION

Write Verbal Statements

Have students work in pairs to write verbal situations for the problems in the Think about Math activity on page 137. Have volunteers read them aloud.

Interpret Variables

Have students use print and online resources to answer the question: What is a variable? Have students create a presentation to explain the concept of a variable to students who have never studied the algebraic concept. Encourage students to use free online tools to create their presentations.

LESSON REVIEW

Expressions and Equations	5.2: Solve One-Step Equations

MATERIALS

o CCB Mathematics pages 140 - 143

CCR STANDARDS

o MP.1: Make sense of problems and persevere in solving them.
o Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

OBJECTIVES

o Understand and write equations
o Solve one-step equations

KEY CONCEPT

o Use equations to represent situations, and use inverse operations to solve one-step equations.

VOCABULARY

Tier 2	o Solution
Tier 3	o Equal Sign o Equation o Equivalent Equations o Inverse Operations
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

In this lesson, students solve one-step equations. To determine their readiness, write the expressions $12x + 2x$ and $27 \div 3$ on the board. Ask students to simplify the first expression and evaluate the second. Invite students to suggest more expressions that the class can simplify or evaluate.

BACKGROUND

Tell students that equations are mathematical sentences. They can be closed, that is have no variables, such as $2 + 10 = 12$, or they can be open sentences that contain one or more variables, such as $12 - x = 17$. While a closed equation is either true or false, an open equation cannot be determined as true or false until it is solved. Point out that students know $2 + 10 = 12$ because $12 = 12$, but they do not know whether $12 - x = 7$ because they do not know what value x is.

GUIDED PRACTICE

o Understand and Write Equations
o Solve Equations

CORE SKILL

Make Sense of Problems

Allow students time to read the sidebar and ask any questions. Then guide students to understand the importance of the question sentence in a problem, usually the last sentence in a word problem. It can act as an anchor or compass when working through the solution to help keep from getting off track or stopping before the final answer is reached. Some students find it helpful to use the question to write an answer sentence with a blank before starting to solve. For example: Mariska's school spent _____ to buy the lunches.

Represent Real-World Arithmetic Problems

After students read the text, ask volunteers for examples of when they have used math operations to solve problems in their daily lives. Examples may be calculating the cost of purchases, making a budget, and calculating a tip. Then have students solve the problem at the end. Here is a possible solution $Let\ c\ =\ the\ cost\ of\ the\ copies$ Multiply the cost of each copy by the

total number of copies to get the total cost.

$$c = \$0.10 \; x \; 150$$
$$c = \$15$$

EXTENSION

Read Aloud

Have students work in groups. Have one person read Skill Practice question 1, 3, or 4 aloud, while the other group members identify key vocabulary that suggest the operations and values needed to write the equation. Have students define key vocabulary in their own words.

Formulate Routine Problems

Have students write real-life problems that can be solved by using one-step equations such as using an hourly rate to determine how much a person will earn per day, per week, or per month. Refer students to Example 1 on page 140 for an example. Have students write their equations and solutions on separate pieces of paper, exchange problems with a partner, and solve.

LESSON REVIEW

Expressions and Equations	5.3: Solve Two-Step Equations

MATERIALS

o CCB Mathematics pages 144 - 149

CCR STANDARDS

o MP.1: Make sense of problems and persevere in solving them.
o Use properties of operations to generate equivalent expressions.

OBJECTIVES

o Translate verbal sentences into two-step equations
o Solve two-step equations

KEY CONCEPT

o Use two inverse operations to solve two-step equations.

VOCABULARY

Tier 2	o
Tier 3	o Affect
	o Isolate
Test Words	o Two-Step Equation

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

In this lesson, students learn to solve two-step equations. Have students show readiness by applying order of operations to simplify expressions with integers. For example $18 + 6 \div 6, -4x - 2 + 4, -9 - 5 + 3$.

BACKGROUND

Explain to students that two-step equations involve two different operations, such as multiplication and addition. Ask students why it's helpful to take time before beginning the solution process to decide which different operations they must apply to solve an equation.

GUIDED PRACTICE

o Translate Verbal Sentences into Two-Step Equations
o Solve Two-Step Equations

CORE SKILL

Make Sense of Problems

Allow students time to read the sidebar. Then have them complete the activity at the bottom by making a deliberate mistake when solving Example 4. Tell students that dropping negative signs is an extremely common mistake. Explain that this is something to check for if they got the wrong answer, and if they find they make it repeatedly, it can help to circle the number and the negative sign throughout the solution process to make sure it is not dropped. **Evaluate Expressions**

Remind students that they can use inverse operations in the opposite order of operations to solve an equation. The first inverse operation would be to subtract 4 to get the equation $5x = 20$. Then divide by 5 to determine that $x = 4$.

EXTENSION

Fill in the Blanks

Write the following Cloze passage and word choices on the board. Have students fill in the blanks. Tell them that a word can be used more than once (answer, inverse, isolate, operation, two-step).

In order to solve _____ equations, I must _____ the variable. This involves

using operations to undo the _____ on one side. I must perform the correct _____, otherwise I will get the wrong _____.

Use Concepts to Solve Challenging Problems

Give students equations with three or more steps, such as $4 + x/5 - 2 = 2$. Have them solve the problems and describe how the order of operations helped them know which operations to do in which order.

LESSON REVIEW

Expressions and Equations	5.4: Solve One- and Two-Step Inequalities

MATERIALS

o CCB Mathematics pages 150 - 155

CCR STANDARDS

o MP.8: Look for and express regularity in repeated reasoning.
o Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

OBJECTIVES

o Translate verbal statements into inequalities
o Solve one-step inequalities
o Solve two-step inequalities

KEY CONCEPT

o Use inverse operations to solve one- and two-step inequalities.

VOCABULARY

Tier 2	o Infinite o Reverse
Tier 3	o Inequality
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

To determine student readiness for this lesson, have them demonstrate their ability to solve 1- and 2-step equations. For example $x + 5 = 9, x - 10 = 2, 2x + 35 = 115, \frac{x}{8} - 1 = 2$.

BACKGROUND

Tell students that solving one- and two-step inequalities is similar to solving one- and twostep equations. They both use inverse operations and the inverse order of operations. The one difference is when you multiply or divide by a negative number. Explain that equations are relationships showing that two expressions are equal, and inequalities compare expressions that may or may not be equal. Have students think of unequal relationships in real-life situations.

GUIDED PRACTICE

o Translate Verbal Statements into Inequalities
o Solve One-Step inequalities
o Solve Two-Step Inequalities

CORE SKILL

Solve Inequalities

Allow students time to read the text. Have students write the rule for multiplying and dividing in their notebook. Explain that it is usually simplest to just memorize the rule. Have students solve the problems at the bottom of the sidebar and compare the solution sets.

Evaluate Reasoning

Have students read the sidebar. Explain to students that if they forget to flip the inequality symbol when they check their answer, the inequality will not be true. Explain that like in the story, this is something to look for when looking for a mistake. Emphasize how important it is to check the solution set, as this is one type of error that can be caught.

EXTENSION

Restate Examples

Invite students to select any example from the lesson to explain in their

own words. Invite them to have other students ask questions. Assist them, if necessary, in answering those questions. Encourage discussion of concepts or processes that seem to cause confusion.

Assess Costs with Inequalities

Have students imagine they are taking a vacation. Their vacation budget is $7,000. Have them write an inequality that includes the price of a hotel per night, cost of a rental car per day, and an estimate of food expenses per day. Have them use the inequality to decide how many days long their vacation can be. Encourage students to choose a variety of destinations, organizing all of the information and results.

LESSON REVIEW

Expressions and Equations

5.5: Identify Patterns

MATERIALS

o CCB Mathematics pages 156 - 161

CCR STANDARDS

o Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.
o Use functions to model relationships between quantities.

OBJECTIVES

o Write expressions to represent patterns
o Write equations to represent patterns

KEY CONCEPT

o Identify, represent, and generalize patterns using expressions and equations.

VOCABULARY

Tier 2	o Generalize
Tier 3	o Common difference o Input Variable o Numerical Pattern o Output Variable
Test Words	o Sequence

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

In this lesson, students learn to identify patterns in sets of data. To determine their readiness, have students use a multiplication chart or mental math to share simple patterns of multiples, such as 2, 4, 6, 8, 10, … and 5, 10, 15, 20, 25, …

BACKGROUND

Explain to students that patterns may be visual, auditory, or mathematical. Give them examples such as the beat in a song or the cycle of the moon. Have them identify and explain other the patterns. Ask them how the pattern is repeated, and if they can find a rule that works for each part of the pattern.

GUIDED PRACTICE

o Write Expressions to Represent Patterns
o Make a Table

CORE SKILL

Solve Real-World Arithmetic Problems

Have students read the text and complete the table. After they have confirmed that there is a common difference of 15 degrees, ask students why this is likely. (It was chance, dependent entirely on the weather.) Ask them if they can use the data in the table to predict temperatures the following week. Explain that weather can change from day to day, making it difficult, even for scientists with the most advanced tools, to predict weather accurately.

Build Lines of Reasoning

Have students read the first paragraph and discuss why it's important to understand what makes each step in a solution process important. Help students understand that memorizing a series of steps may be useful in some cases, but the same steps can't apply to all problems. Next, have students work with partners to complete the activity. This is the square number sequence. While students may not be familiar with squares, they may solve it by seeing that the value of the term is the location of the term times itself 1×1, 2×2, 3×3, *etc*.

EXTENSION

Make Connections

Organize students into small groups and discuss real-world patterns. Offer an example of hourly wages as an example to start the conversation: For every delivery Joe makes, he earns $2.00. After his first delivery, he has $2.00; after his second delivery, he has $4.00, after his third delivery he has $6.00, and so on. Have students offer their own examples of real-world patterns, and challenge them to use those patterns to solve problems.

Construct Concept Maps

Challenge students to find real-world examples of input-output relationships, such as those that exist in computer science, mathematics, life science, and physical science. Ask students to construct concept maps to explain the relationships between inputs and outputs in the real world.

LESSON REVIEW

Linear Equations and Functions

6.1: Linear Equations

MATERIALS

o CCB Mathematics pages 166 - 175

CCR STANDARDS

o Understand the connections between proportional relationships, lines, and linear equations.
o Analyze and solve linear equations and pairs of simultaneous linear equations.

OBJECTIVES

o Plot a line that represents the linear relationship between two sets of numbers
o Graphically determine the value of the dependent variable
o Determine whether an independent and a dependent variable are linearly related
o Write the equation of a line from a verbal description

KEY CONCEPT

o A variable is something you are trying to measure. There are two kinds of variables, independent and dependent. An independent variable has a value that remains the same. That is, it is not affected by a dependent variable. A dependent variable is a value that depends on other factors.

VOCABULARY

Tier 2	o Dependent Variable o Independent Variable o Rise o Run o Slope
Tier 3	o Linear Relationship

BEFORE LESSON

In this lesson, students learn to identify linear relationships. To determine student readiness, draw or project a coordinate grid on the board. Assign coordinate pairs to volunteers, and have them go to the board to plot them on the grid. Use students' responses to determine if intervention is required.

BACKGROUND

Ask students to visualize an arcade filled with pinball machines. Each quarter that players put into a machine gives them three minutes of playing time. The amount of time never changes, but the number of quarters that players put in the machines does. Explain that the value that never changes is the independent variable, and the value that does is the dependent variable. Ask students to identify the variables in the example.

GUIDED PRACTICE

o Linear Relationships
o Complete a Data Table
o Linear Equations

CORE SKILL

Solve Real-World Arithmetic Problems

Before reading the text as a class, explain that mathematical concepts, including linear relationships, are applied to many real-world situations. Read this section as a class and help students understand the data in the data table. Invite a volunteer to answer the problem.

Solve Linear Equations

Explain to students that the problem in the main section of the page works hand-in-hand with the sidebar activity. Read the problem for students. Then direct attention to the Core Skill sidebar.

You may want to pair students of different abilities to work through the steps outlined in the activity to calculate the slope of the suspension springs. Otherwise, read each step and give

EXTENSION

	o Y-Intercept
Test Words	o Linear Equation

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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Restate Definitions

Have students look at the graph at the top of page 171 again. Have them underline the words rise and run. Invite students to share what they know about these words and to model the words in pictures or actions. Then ask students to explain the meaning of each word in the context of the graph.

Investigate a Multi-step Problem that Involves Planning and Reasoning

Since this lesson contains examples of linear relationships whose slopes are positive, have students investigate, describe, and solve real-world linear relationships for which the slope is negative, so that students appreciate their relevance. Share the example of how the elevation

LESSON REVIEW

Linear Equations and Functions	6.2: Graphing Linear Equations

MATERIALS

o CCB Mathematics pages 176 - 183

CCR STANDARDS

o Use functions to model relationships between quantities.

OBJECTIVES

o Use the point-slope form to graph the equation of a line
o Use the slope-intercept form to graph the equation of a line
o Use the two-point form to graph the equation of a line

KEY CONCEPT

o There are two ways to graph a linear equation. (1) If two coordinate pairs that lie on the line are known, then the graph of the line can be constructed, or (2) if one coordinate pair that lies on the line and the slope of the line are known, then the graph of the line can be constructed.

VOCABULARY

Tier 2	o Intersect o Subscript
Tier 3	o Point-Slope Form o Slope-Intercept Form o Two-Point Form
Test Words	o

INTERACTIVE STRATEGY

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BEFORE LESSON

In this lesson, students learn to graph linear equations. To determine student readiness, give students an opportunity to explain a graphical representation of a linear relationship. Project the graphs on pages 170-171 onto the board, or have students examine the graphs in their books. Ask questions about the graphs, using the terms y-intercept, slope, rise, and nm in your questions. Use students' responses to determine whether students need additional practice using graphs to explain linear relationships before beginning this lesson

BACKGROUND

Explain to students that the methods for graphing a linear equation on the coordinate plane described in the Key Concept depend on obtaining two coordinate pairs. Those two pairs make it possible to draw a line on which both the points lie. If only one coordinate pair is known, it is possible to use that pair and the slope of the line to find the second coordinate pair.

GUIDED PRACTICE

o Graphing Linear Equations
o Point-Slope Form
o Slope-Intercept Form

CORE SKILL

Perform Operations

Before reading the text, review the task students completed on the page. Ask them to identify the multiple operations they performed to find a second coordinate pair. Then read the Core Skill sidebar as a class. Ask students to explain the relationship between the following statements:

$$Slope = \frac{rise}{run}; \ and \ m = \frac{x_2 - x_1}{x_2 - x_1}$$

Interpret Graphs and Functions

The exercise in the Core Skill sidebar gives students an opportunity to apply the point-slope formula to graph a real-world linear relationship. Guide students through the exercise step-by-step, inviting volunteers to

WRITING TOPIC

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WRITING PRACTICE

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create a checklist of important information that they can use to graph and solve the problem.

EXTENSION

Retell with Visuals

Invite students to choose one of the forms for finding the equation of a straight line-point-slope form, slope-intercept form, or two-point form. Ask students to explain the form to you in their own words and to include related visuals in their explanations. Offer support if students are struggling to understand these concepts.

Identify Patterns in Data

Have students find a stock market chart in a newspaper or online. Explain to students that the market index or price of a particular stock can change from hour to hour or day to day. Ask students to calculate the slope of line segments that indicate these changes. Remind students to include correct units when calculating the slope, for example, dollars per day.

LESSON REVIEW

Linear Equations and Functions

MATERIALS

o CCB Mathematics pages 184 - 189

CCR STANDARDS

o Analyze and solve linear equations and pairs of simultaneous linear equations.

OBJECTIVES

o Solve systems of two linear equations
o Interpret graphs of two linear equations
o Use linear equations to solve problems

KEY CONCEPT

o A pair of linear equations forms a system of two simultaneous linear equations. The solution to a system of two linear equations in two variables corresponds to a point of intersection of their graphs, because points of intersection satisfy both equations simultaneously.

VOCABULARY

Tier 2	o Simultaneous
Tier 3	o Addition Method o Substitution Method o System of Linear equations
Test Words	o Eliminate

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

BEFORE LESSON

In this lesson, students learn to graph two simultaneous linear equations. To determine student readiness, distribute graph paper and have students draw a coordinate plane. Give them two points on the plane and have students to use the points to determine and graph an equation of the line. Observe students as they work to determine if more practice would be helpful before beginning the lesson

BACKGROUND

Tell students that two variables have a linear relationship if their corresponding points lie on the same line in a coordinate plane. Every pair of coordinate points on a line is a solution to a linear equation that represents the line. Have students graph a line ($for\ example, y = 3x - 1$). Then have students find a point that is on the line ($(2, 5), for\ example$) and have them substitute the value of x and y into the equation to see that the point is a solution to that equation.

GUIDED PRACTICE

o Simultaneous Linear Equations
o Combining Methods to Solve Pairs of Linear Equations

CORE SKILL

Solve Pairs of Linear Equations

Complete the exercise in applying the substitution method for solving a pair of equations without graphing as a class, or have students work through the process independently or in small groups as you observe. Have students apply the substitution method to the equations at the bottom of the sidebar. Then ask them to explain how they applied the method to find the solution to the pair.

Solve Simple Equations by Inspection

Read the text with students to help them recognize two special cases in which a single solution for a pair of simultaneous equations cannot be obtained. Emphasize that inspection alone is enough to reach this conclusion. In the first example, the left-hand side of both equations is the same (3p + 2q), but the right-hand side is different. Plotting these equations would result in parallel lines. Because the lines do not intersect,

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there is no solution. In the second example, the first equation is a multiple of the second equation, thus making the equations equivalent. This results in identical equations, which have infinite solutions. Guide students through a discussion of the third case.

EXTENSION

Identify Multiple Meanings

Write the word equilibrium on the board. Ask students to use a print or online dictionary to define the word. Then explain the word's meaning as it applies to children on opposite sides of a seesaw or a circus performer on a high wire. Also explain how equilibrium applies to one's mental health or between two sides of an argument. Finally, ask students to explain the word's meaning as it applies to mathematics.

Use Concepts to Solve Non-Routine Problems

Have students work collaboratively to generate examples of when the intersection of two graphs has practical relevance, such as the point at which the orbit of the earth and the orbit of a meteorite intersect, indicating a point at which the meteorite falls to Earth. Encourage students to research their topic and graph lines to indicate an equilibrium point.

LESSON REVIEW

Linear Equations and Functions	6.4: Scatter Plots

MATERIALS

o CCB Mathematics pages 190 - 199

CCR STANDARDS

o Investigate chance processes and develop, use, and evaluate probability models.

OBJECTIVES

o Describe the information that a trend line provides about two correlated variables
o Describe various aspects of the correlation between two variables

KEY CONCEPT

o We can use the concept of correlation to describe the relationship between two variables that generally follow a linear pattern but cannot be described by a linear equation. Plotting data on a scatter plot and constructing a trend line can determine the strength and direction of the correlation between such variables.

VOCABULARY

Tier 2	o Cluster o Correlation
Tier 3	o Outlier o Trend Lines
Test Words	o Scatter Plots

INTERACTIVE STRATEGY

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WRITING TOPIC

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BEFORE LESSON

In this lesson, students learn to plot data on a scatter plot and construct trend lines to determine the direction and strength of the correlation between the variables. To determine student readiness for the lesson, write a set of points on the board and have students plot them on a coordinate plane. Observe students as they work to offer guidance, if necessary.

BACKGROUND

Tell students that correlation is described in terms of direction and strength. Linearly correlated data that has a trend line with a positive slope is positively correlated, whereas if the trend line has a negative slope, the data are negatively correlated. Data that are strongly correlated are located, on average, close to a trend line. Data that are weakly correlated are located farther away from a trend line.

GUIDED PRACTICE

o Scatter Plots
o Linear Correlations
o Nonlinear Correlations
o Outliers and Clusters

CORE SKILL

Represent Real-World Problems

Read this exercise together, emphasizing that data have no value unless they are analyzed to look for relationships among variables. Examine the scatter plot as a class, and ask a volunteer to describe the relationship among the data in terms of correlation strength and direction.

Interpret Data Displays

Give students time to draw trend lines in the scatter plots and use the lines they draw to explain the relationship between each pair of variables.

EXTENSION

Retell

Invite volunteers to identify the scatter plot in the lesson that they found most interesting. Have them explain the scatter plot's variables and the trend line's strength and direction. Invite them to explain why they found this scatter plot so interesting. Assist students if they are having trouble understanding what a trend line represents.

Two Sources of Information

Have students use print or online materials to find two real-world examples of scatter plots. Ask students to describe the scatter plots' common characteristics and what conclusions can be drawn from trend lines.

LESSON REVIEW

Linear Equations and Functions	6.5: Functions

MATERIALS

o CCB Mathematics pages 200 - 205

CCR STANDARDS

o Define, evaluate, and compare functions.
o Use functions to model relationships between quantities.

OBJECTIVES

o Identify a function
o Determine whether an equation represents a function

KEY CONCEPT

o You can look at a function as a set of instructions that tells you what to do with the input, or values you put in. The result of the instructions is called the output. Functions are equations that provide only one output for each input.

VOCABULARY

Tier 2	o Function o Input o Output
Tier 3	o Linear Function o Nonlinear Function o Vertical Text
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

BEFORE LESSON

In this lesson, students develop their understanding of the concept of a function. To determine student readiness, write examples of simple equations, such as $2x = 18$, on the board and ask students to solve for the variable. Ask students to work in pairs to generate more simple equations, exchange problems with their partners, and solve for the variables. Observe students as they work, intervening if necessary.

BACKGROUND

A function has both an input and an output. A function can be viewed as a set of instructions in which an input value makes it possible to calculate an output value. Functions can be either linear or nonlinear. The vertical line test can be used to determine whether a graph represents a function. Have students graph capital letters of the alphabet to see if any of the letters can be thought of as functions (only V and W are, possibly M depending on how it is drawn).

GUIDED PRACTICE

o What Is a Function?
o Is It a Function?
o Function Categories
o Perimeter of a Square
o Area of a Square

CORE SKILL

Build Lines of Reasoning

To reinforce the concept of a function as a set of instructions, have students read the text and think through the process of writing instructions for the function that converts temperature from Fahrenheit to Celsius. Next, have students share their instructions and explain their thinking. Discuss students' solutions as a class, ask relevant questions, and form a consensus about the best instructions. Have students test the instructions for accuracy.

Interpret Graphs and Functions

Ask students to read the text and summarize the value of examining the form of a function, that is, whether it is represented by $y = mx + b$, to

WRITING PRACTICE

o

determine whether a function is linear or nonlinear.

EXTENSION

Picture Dictionary

Review Ask students to show and explain the picture dictionary entries they created before the lesson. As students talk about their entries, prompt them to discuss what revisions they might want to make to better explain the words the pictures represent now that they have learned more about functions.

Interpret Information from a Complex Graph

Have students research and find graphical representations of exponential functions. Have students use two-column charts to calculate data points and then plot the data points on a graph.

LESSON REVIEW

Ratios, Proportions, and Percents	**7.1: Ratios and Rates**

MATERIALS

o CCB Mathematics pages 212 - 217

CCR STANDARDS

o Understand ratio concepts and use ratio reasoning to solve problems.

OBJECTIVES

o

KEY CONCEPT

o Understand how to write ratios to understand the meaning of a unit rate.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

To determine student readiness for this lesson, write a variety of fractions on the board and have students use greatest common factors to simplify them. Observe students as they work, and ask questions to determine if intervention is required.

BACKGROUND

Explain to students that they probably use ratios and unit rates regularly. For example, they may use ratios when they follow a recipe. They may pay attention to unit rates when they purchase food in a grocery store, or pump gas at a gas station. Both ratios and unit rates use the word per in their descriptions. For example, a recipe may call for one egg per cup of flour. Gasoline may cost $3.87 per gallon. Have students suggest other familiar examples of ratios and unit rates.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Ratios, Proportions, and Percents

MATERIALS

o CCB Mathematics pages 218 - 223

CCR STANDARDS

o MP.8: Look for and express regularity in repeated reasoning.
o Understand ratio concepts and use ratio reasoning to solve problems.
o Analyze proportional relationships and use them to solve real-world and mathematical problems.
o Understand the connections between proportional relationships, lines, and linear equations.

OBJECTIVES

o

KEY CONCEPT

o A unit rate is a special example of a ratio. When it is expressed in fractional form, the denominator equals one. When expressed verbally, a ratio is an example of a unit rate if the second value being compared is one.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

This lesson helps students understand the concept of a unit rate, which is a special kind of ratio. To determine student readiness, use words to describe ratios, such as three oranges for every five apples. Have student students translate words into numbers, writing ratios and simplifying them to write them in lowest terms.

BACKGROUND

Proportional relationships are related to ratios, which students examined in the previous lesson. Like ratios, unit rates are used to compare two different types of quantities. Write an example of a unit rate in words on the board, such as 33 miles per gallon. Then rewrite the rate in fraction form $\frac{33 miles}{1 gallon}$.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Ratios, Proportions, and Percents	**7.3: Solve Proportions**

MATERIALS

o CCB Mathematics pages 224 - 229

CCR STANDARDS

o Analyze proportional relationships and use them to solve real-world and mathematical problems.

OBJECTIVES

o

KEY CONCEPT

o Understand how to use proportions to solve problems.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students learn to solve proportions. To determine their readiness, organize students into pairs. Assign the pairs the fractions 3/4 and 1/12. Ask students to determine whether or not they are equivalent. Ask students to tell you how they know. Then have them write equivalent fractions for both fractions. Provide more practice problems, if necessary.

BACKGROUND

A proportion is a statement of the equality of two ratios. Present a real-life example of a proportion to students. Say: 36 slices of bread will make 12 club sandwiches. How many slices of bread do I need to make 8 club sandwiches? Tell students that they don't have to solve the problem now, but after completing this lesson, they will be able to write and solve a proportion to find the answer. Revisit the problem at the end of the lesson, and invite a volunteer to write a proportion and solve the problem.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Ratios, Proportions, and Percents

7.4: Introduction to Percents

MATERIALS

o CCB Mathematics pages 230 - 235

CCR STANDARDS

o MP.3: Construct viable arguments and critique the reasoning of others.
o Understand ratio concepts and use ratio reasoning to solve problems.

OBJECTIVES

o

KEY CONCEPT

o Percents, like decimals and fractions, represent part of a whole.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students learn what a percent represents. They also learn how to write fractions and decimals as percents. To determine their readiness for the lesson, have students solve simple division problems using whole numbers and decimals.

BACKGROUND

Tell students that a percent is a ratio that compares a number to 100. The symbol for percent is %. 10% Represents as a fraction, and 0.1 as a decimal. Say: Suppose 100 people took a survey on exercise habits. If 10 of the 100 people stated they exercised three times each week, then 10%, $\frac{10}{100}$, or 0.1 of the people surveyed exercised three times each week.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Ratios, Proportions, and Percents

7.5: Solve Percent Problems

MATERIALS

o CCB Mathematics pages 236 - 241

CCR STANDARDS

o MP.8: Look for and express regularity in repeated reasoning.
o Understand ratio concepts and use ratio reasoning to solve problems.
o Analyze proportional relationships and use them to solve real-world and mathematical problems.

OBJECTIVES

o

KEY CONCEPT

o Decimals, fractions, and proportions can be used to solve percent problems.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students learn how to find the percent of a number, and how to use proportions to solve percent problems. To determine student readiness, write proportions on the board, leaving a numerator or denominator in either fraction empty. Ask students to find the missing values.

BACKGROUND

Explain to students that they can use proportions to solve problems involving percents. The basic form of a percent proportion is $\frac{part}{whole} = \frac{\%}{100}$. Point out that if someone scores 95 points out of 100 points on a quiz, his or her score can be written as $\frac{95}{100}$ or 95%.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

| Ratios, Proportions, and Percents | **7.6: Use Percent in the Real-World** |

MATERIALS

o CCB Mathematics pages 242 - 245

CCR STANDARDS

o MP.1: Make sense of problems and persevere in solving them.
o Analyze proportional relationships and use them to solve real-world and mathematical problems.

OBJECTIVES

o

KEY CONCEPT

o Simple interest can be calculated using a formula and percents.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students continue their work with percents. To determine student readiness, write 60%, 6.6%, and 16% in a column on the board. Write 0.066, 0.16, and 0.6 in a second column on the board. Ask a volunteer to match one of the percents to its equivalent decimal. Then give students an opportunity to match the remaining pairs of numbers. Use students' answers to determine if a review is necessary

BACKGROUND

Explain that when you deposit money into a savings account you are actually lending that money to the bank. In return, the bank pays you money, called interest, for the use of your money. Have students discuss the experiences they have had with interest.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Exponents and Roots

MATERIALS

o CCB Mathematics pages 250 - 253

CCR STANDARDS

o Work with radicals and integer exponents.

OBJECTIVES

o

KEY CONCEPT

o Extend understanding of numbers to exponents and arithmetic expressions that contain exponents.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students learn to evaluate exponents. To determine student readiness, write problems of repeated multiplication, such as $2 \times 2 \times 2$ on the board, and ask students to find the product.

BACKGROUND

Exponents are a shorthand way of writing the same factor several times. For example, $3 \times 3 \times 3 \times 3$ can be written as 3^4. A common error is to multiply the base by the exponent. Make students aware that $3^4 \neq 3 \times 4$.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Exponents and Roots

MATERIALS

o CCB Mathematics pages 254 - 259

CCR STANDARDS

o MP.8: Look for and express regularity in repeated reasoning.
o Know that there are numbers that are not rational, and approximate them by rational numbers.
o Work with radicals and integer exponents.

OBJECTIVES

o

KEY CONCEPT

o Develop and extend understanding of numbers to include the concepts of square roots and cube roots.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students learn find roots. To determine student readiness, write the following expression on the board and ask students to find its value $4 + 3x(10 \div 2) - 18(1)$. Ask students to explain how they found the value, encouraging explanations of the order of operations.

BACKGROUND

Finding square roots and cube roots is the opposite of finding the value of a power. Consider the area of a square and volume of a cube. If those values are known, the square root can be used to find the length of the sides of the square and the cube root can be used to find the length, width, and height of the cube.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Exponents and Roots

MATERIALS

o CCB Mathematics pages 260 - 263

CCR STANDARDS

o MP.6: Attend to precision.
o Work with radicals and integer exponents.

OBJECTIVES

o

KEY CONCEPT

o Develop understanding of large numbers to include scientific notation and how to translate between numbers written in scientific notation and standard notation.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students learn to write large numbers using scientific notation. To determine student readiness, write the following expressions on the board, and ask students to evaluate them 10^1; 10^2; 10^3.

BACKGROUND

Scientific notation is a convenient way of writing very large and very small numbers, although this lesson teaches only how to use scientific notation with very large numbers. Scientists use scientific notation to express very large and very small numbers in a simpler way. At the end of the lesson, have students list the reasons that scientific notation is convenient to use.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Data

9.1: Measure of Central Tendency and Range

MATERIALS

o CCB Mathematics pages 270 - 273

CCR STANDARDS

o MP.4: Model with mathematics.
o Summarize and describe distributions.

OBJECTIVES

o

KEY CONCEPT

o Understand how data are collected and then analyzed using measures of central tendency and range.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students learn to identify measures of central tendency in a set of data. To determine student readiness, ask students to collect, sort, and organize data. For example, ask students to generate questions related to student interests, such as favorite Saturday afternoon pastimes, favorite environmental causes, or preferred music styles. Give students time to build data tables, survey students, and record results. Without attempting to analyze the data, invite students to make general observations about what they see, such as which pastime received the most votes.

BACKGROUND

Students can order data to identify trends, or inclinations. They can use data to find patterns, consistencies, and data that lay outside trends. They can use data to come to conclusions and make predictions. For example, weather forecasters use temperature data from previous years as well as the current weather to help make predictions for weather forecasts in the future.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Data	9.2: Graphs and Line Plots

MATERIALS

o CCB Mathematics pages 274 - 281

CCR STANDARDS

o Summarize and describe distributions.
o Use random sampling to draw inferences about a population.

OBJECTIVES

o

KEY CONCEPT

o Understand how to analyze data presented in a bar graph, line graph, circle graph, or line plot.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students learn to use graphs to display data. To determine student readiness, organize students into groups. Assign each group a topic, such as favorite cars, movies, TV shows, books, websites, or desserts. Ask students to collect data among themselves and others in the class. Have them organize the data into data tables that they share with the class. Ask volunteers in each group to identify and explain the labels they used in their tables.

BACKGROUND

Show examples of print and online graphs that your students are likely to find interesting, such as graphs created by other students. In particular, show examples of bar graphs, line graphs, circle graphs, and line plots. Encourage students to compare the graphs to determine similarities and differences.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Data

9.3: Plots and Misleading Graphs

MATERIALS

o CCB Mathematics pages 282 - 287

CCR STANDARDS

o MP.3: Construct viable arguments and critique the reasoning of others.
o Use random sampling to draw inferences about a population.

OBJECTIVES

o

KEY CONCEPT

o Understand how to analyze stem-and-leaf plots and misleading graphs.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students learn to interpret stem-and-leaf plots and to identify misleading graphs. To determine student readiness, display a bar graph from a newspaper, magazine, or online source. Ask students to identify the features of the graph, such as the title, axes, labels, number intervals, and bars. Have students work in small groups to use the graph to find measures of central tendency. Give students time to share their work and discuss and resolve any discrepancies that may occur.

BACKGROUND

Ask a volunteer to describe the relationship between a plant's stem and its leaves (the leaves form along the stem; the stem supports the leaves). Explain that the same relationship applies to a stem-and-leaf plot. Data points are "leaves" supported by a stem.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Probability	**10.1: Counting Methods**

MATERIALS

o CCB Mathematics pages 292 - 295

CCR STANDARDS

o MP.2: Reason abstractly and quantitatively.
o Use random sampling to draw inferences about a population.
o Investigate chance processes and develop, use, and evaluate probability models.

OBJECTIVES

o

KEY CONCEPT

o Counting methods can be used to determine the sample space and the number of possible outcomes in experiments.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students apply counting methods to determine possible outcomes. To determine student readiness, ask students to solve simple multiplication problems that contain three or more factors, such as $2 \times 3 \times 4 \times 5$.

BACKGROUND

In order for students to determine the probability of an event, or the results of an experiment, they must be able to find the total number of possible outcomes. There are two ways to do this. One is the use of a tree diagram. Another is the use of the Counting Principle. Tree diagrams and applying the Counting Principle summarize all of the possible events, or outcomes. Point out to students that when they go to an ice cream, yogurt, or sandwich shop, there are often many possible outcomes. For example, at an ice cream shop, they may choose 1, 2, or 3 scoops of ice cream put in either a plain cone, waffle cone, or cup, and topped with nuts, sprinkles, or nothing at all. Each unique combination of ice cream, container, and topping represents a possible outcome.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Probability	**10.2: Introduction to Probability**

MATERIALS

o CCB Mathematics pages 296 - 301

CCR STANDARDS

o MP.8: Look for and express regularity in repeated reasoning.
o Investigate chance processes and develop, use, and evaluate probability models.

OBJECTIVES

o

KEY CONCEPT

o Understand and use concepts of probability to find probabilities and make predictions.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students distinguish between theoretical and experimental probability. To determine student readiness, hold a number cube in your hands and ask students to identify the total number of possible outcomes. Continue adding more number cubes and asking students to find the total number of possible outcomes.

BACKGROUND

Probability is the likelihood or chance that an event will occur. A probability ratio may be expressed as a fraction or decimal between 0 and 1, or as a percent. Students can use math to determine theoretical probability, while they must conduct trials, or experiments, to determine experimental probability. Ask students to define the word chance, as it's used to describe the likelihood that something will happen. Explain that the chance of an outcome is the same as the probability of an outcome.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Probability	**10.3: Compound Events**

MATERIALS

o CCB Mathematics pages 301 - 306

CCR STANDARDS

o MP.2: Reason abstractly and quantitatively.
o Draw informal comparative inferences about two populations.
o Investigate chance processes and develop, use, and evaluate probability models.

OBJECTIVES

o

KEY CONCEPT

o Extend your understanding of probability to finding the probability of compound events.

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students distinguish between mutually exclusive and overlapping (or inclusive) events, as well as independent and dependent events. To determine student readiness, have students work in pairs. Give each pair a number cube or spinner. Assign probability problems related to the objects students have in hand. For example, if students have number cubes, ask them to find the probability of rolling an even number (3/2 or ½)

BACKGROUND

Independent events occur independently of each other. For example, tossing a coin and a number cube simultaneously doesn't affect the outcome of either toss, so the events are independent. Dependent events do affect outcomes. For example, pulling a blue marble out of a bag of blue, red, green, and yellow marbles and not returning the marble to the bag afterward affects the likelihood of getting a blue marble on the next draw. The two events are dependent. At the conclusion of this lesson, have students use real-life examples to explain the differences between independent and dependent events.

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Measurement	11.1: Customary Units

MATERIALS

o CCB Mathematics pages 312 - 215

CCR STANDARDS

o Understand ratio concepts and use ratio reasoning to solve problems.

OBJECTIVES

o Change from one customary unit to another
o Change from mixed units
o Change to mixed units

KEY CONCEPT

o Understand how to use division and multiplication to change from one customary unit of length, capacity, weight, or time to another, and how to change to and from mixed units.

VOCABULARY

Tier 2	o capacity o length o time o weight
Tier 3	o unit
Test Words	o abbreviation

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students convert units of customary measures, a task that requires the use of two mathematical operations-multiplication and division. To determine student readiness for the lesson, ask students to solve simple multiplication and division problems that you write on the board. Observe students as they work, intervening whenever necessary to correct students' solutions.

BACKGROUND

In the United States, people generally use customary units to measure length, weight, and capacity. Inches, feet, yards, and miles are examples of customary units of length. Ounces, pounds, and tons are examples of customary units of weight. Cups, pints, quarts, and gallons are customary units of capacity. Have students tell which units they would use to measure the width of the room, the weight of a piece of furniture, and the amount of lemonade in a glass.

GUIDED PRACTICE

Change Units of Customary Measure

Change To and From Mixed Units

CORE SKILL

Evaluate Expressions

Ask volunteers to point to examples of expressions on the board. For example, students might refer to the expression 480 minutes -:- 60. Ask students to identify the elements in the expression, which are two numbers, a division symbol, and a unit of measurement. Have students read the expressions and work with partners to simplify and evaluate them.

Represent Real-World Problems

Organize students into pairs. Before they read the text, explain that they are going to be presented with a real world problem related to measuring the length of a fence. Invite students to share similar experiences related to measuring spaces in and around their homes. Then give students time to read the text and complete the problem. Afterward, discuss students'

solutions.

EXTENSION

Fill in the Blanks

Write the following Cloze passage on the board. Ask students to help you fill in the blanks.

o I use inches to measure _____ but I use pounds to measure _____.
o _____ is measured in minutes and hours, and _____ is measured in gallons and cups.

Solve Measurement Problems

Tell students that 1 pint of water weighs about 1 pound. Have students determine the weight of 1 quart, 1 cup, and 1 gallon of water. Then have them determine how many gallons are in 1 ton of water, and how many cups are in 5 pounds of water.

LESSON REVIEW

Measurement	11.2: Metric Units

MATERIALS

o CCB Mathematics pages 316 - 321

CCR STANDARDS

o Understand ratio concepts and use ratio reasoning to solve problems.

OBJECTIVES

o Change from one metric unit to another
o Understand the basic metric unit for length
o Understand the basic metric unit for capacity
o Understand the basic metric unit for mass

KEY CONCEPT

o Understand how to change from one metric unit of length, capacity, or mass to another.

VOCABULARY

Tier 2	o gram o liter o meter
Tier 3	o power of 10
Test Words	o prefix

INTERACTIVE STRATEGY

o

WRITING TOPIC

o

WRITING PRACTICE

o

BEFORE LESSON

In this lesson, students convert units of metric measures, a task that, like converting customary units of measure, requires the use of two mathematical operations - multiplication and division. To determine student readiness for the lesson, ask students to solve simple standard unit conversion problems, such as 24 inches = feet, that you write on the board. Observe students as they work, intervening whenever necessary to correct students' solutions.

BACKGROUND

The metric system of measurement, based on multiples of 10, is used internationally and by scientists in the United States. It is different from the customary system in that it uses a measure of mass rather than weight. Weight is a measure of mass affected by gravity, so weight and mass are related. Units of mass are based on the gram. Units of length are based on meters. Units of capacity are based on the liter. Have students identify objects that can be measured in grams, meters, and liters

GUIDED PRACTICE

The Metric System

Use Prefixes

CORE SKILL

Build Solution Pathways

Ask students to read the text and complete the task. Afterward, ask volunteers to summarize the solution pathway they can use to convert metric units of measure from one unit to another. Challenge students to test their solution pathways by asking them to convert simple units of measurement, such as 100 meters into centimeters.

Use Ratio Reasoning

Read the first paragraph as a class. Write the directions "Convert 1 mile to inches" on the board. Challenge students to apply reasoning to suggest a strategy for solving the problem. Say: As we think about how we might solve this problem, let's consider how we can use ratios in the solution. For example, let's compare miles to feet. Write the ratio $\frac{1\ mile}{5,280\ feet}$ on the

board. We want to know how many inches are in one mile, but our ratio compares miles to feet. So, we need to consider another ratio. Write the ratio $\frac{1\ foot}{12\ inches}$ on the board. Point out the same ratios in the Core Skill activity, and ask students why the arrangement of each ratio is important, emphasizing the need to cancel all units but those that students are being asked to find. Discuss the answer as a class.

EXTENSION

Pronounce Metric Words

Have students practice reading units of measurement and their prefixes. Pay special attention to the word kilometer, because the pronunciation varies from the pronunciation of other metric-measurement words. Ask students to give examples of when each kind of unit is used. Write abbreviations for units of measure, and have students read the words they represent.

Relate the Conversion Process

Have students work individually or with partners to explain the process of metric conversions through the use of a chart. The chart should indicate when to multiply or divide, what power of 10 to use, and the decimal point's direction of movement. Have students compare their charts and combine the best elements across the charts to create a single chart that someone unfamiliar with metric conversions could use successfully.

LESSON REVIEW

Geometry	12.1: Geometric Figures

MATERIALS

o CCB Mathematics pages 326 - 331

CCR STANDARDS

o MP.8: Look for and express regularity in repeated reasoning.
o Draw, construct, and describe geometrical figures and describe the relationships between them.
o Understand congruence and similarity using physical models, transparencies, or geometry software.

OBJECTIVES

o Identify geometric figures
o Identify and classify angles
o Identify and classify triangles and quadrilaterals
o Identify the parts of circles

KEY CONCEPT

o Learn how to identify and classify two-dimensional shapes by their properties.

VOCABULARY

Tier 2	o circle o rectangle o segment o square
Tier 3	o angle o parallel lines o perpendicular lines o quadrilateral
Test Words	o classify

BEFORE LESSON

Draw triangles, circles, squares, and rectangles on the board. Have students identify real-world examples of items that are in these shapes. Have volunteers identify each shape by name.

BACKGROUND

By studying geometry, students develop spatial thinking and awareness of the similarities and differences between real-world shapes and solids. Have students identify several objects in the room as parallel, perpendicular, square, or any other geometric terms they already know.

GUIDED PRACTICE

Basic Geometric Terms

Contributions of Ancient Civilizations

Angles

Triangles and Quadrilaterals

Circles

CORE SKILL

Analyze Events and Ideas

Discuss with students what pi represents. Some students may know that it is used in formulas for calculations with circles. Pi is equal to the ratio of a circle's circumference to its diameter. It is not a whole number or even a rational number, which is why only approximations can be found. Have students search for an interactive representation of Archimedes' calculations to help them visualize it.

Evaluate Reasoning

Have students read the sidebar. Point out that sometimes in the lesson, details are given in the problem, and sometimes they are included on the diagram. Then have them flip through the lesson, identifying the given information in diagrams.

EXTENSION

Ask Questions

Have students ask each other questions about angles, triangles, and

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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quadrilaterals: How many triangle types are there? How can you tell if an angle is a right angle? What is the difference between a square and a rectangle?

Classify Lines

Place and label four points in a plane. No three points can lie in a single line. Ask students: How many lines can be formed? Have students sketch intersecting, perpendicular, and parallel lines to the line segments. They should label the points and use the correct symbols and vocabulary to name each figure. Then have them classify each line by type in a list.

LESSON REVIEW

Geometry	12.2: Perimeter and Circumference

MATERIALS

o CCB Mathematics pages 332 - 337

CCR STANDARDS

o MP.4: Model with mathematics.
o Solve real-life and mathematical problems involving angle, measure, area, surface area, and volume.

OBJECTIVES

o Find the perimeter of polygons
o Find the circumference of circles

KEY CONCEPT

o Understand and apply concepts of perimeter and circumference.

VOCABULARY

Tier 2	o perimeter
Tier 3	o circumference o diameter o pi o radius
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

Draw a square and a rectangle on the board. Label the square "square" and the rectangle "rectangle." Then have volunteers label the sides of the figures with tick marks to show congruency. Note that students will need to use a single tick mark on one pair of congruent sides of the rectangle, and double tick marks on the other pair of congruent sides. Single tick marks can be used on the square because all the sides are the same length. Explain to students that knowing these properties of a square and rectangle will help them find missing lengths.

BACKGROUND

Explain to students that the perimeter is the distance around a polygon. The circumference is the distance around a circle. The perimeter can be found simply by adding the lengths of the sides or by using a formula. The circumference of a circle is found by using a formula.

GUIDED PRACTICE

Perimeter

Mathematical Practices

Circumference

CORE SKILL

Model with Mathematics

Have students read the passage and work in pairs to complete the activity at the end. It may be tricky because it is abstract-the actual dimensions of the garden are not given. Students can choose an actual value for the length and width to help them identify the steps needed. A possible solution is: 1) Measure the length and width of the plot. 2) Use the formula to find the perimeter of the plot. This is the amount of fencing needed. 3) Divide the perimeter by the number of families, 25, to find the amount of fencing each family gets to paint.

Build Lines of Reasoning

Have the students read the text and then complete the activity in pairs. Make sure students identify the end goal (perimeter of the square) first, and then show logical steps toward the solution.

EXTENSION

Rephrase Finding Circumference

Review the section on finding circumference, paying special attention to the relationship between the radius and the diameter. Have students explain the relationship to partners in their own words.

Revise a Formula

Tell students that there is another formula for circumference that uses radius instead of diameter. Explain that they can revise the diameter formula to find it. See if students can figure out what it is ($C = 2nr$) and then develop a logical argument explaining why it is true.

LESSON REVIEW

Geometry	12.3: Scale Drawings and Measurement

MATERIALS

o CCB Mathematics pages 338 - 345

CCR STANDARDS

o MP.5: Use appropriate tools strategically.
o Analyze proportional relationships and use them to solve real-world and mathematical problems.
o Draw, construct, and describe geometrical figures and describe the relationships between them.

OBJECTIVES

o Compute actual lengths from a scale drawing
o Draw geometric shapes with given conditions
o Reproduce a scale drawing at a different scale

KEY CONCEPT

o You can use scale drawings to discover information about the actual objects those drawings represent.

VOCABULARY

Tier 2	o proportion o scale drawing
Tier 3	o scale factor
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

BEFORE LESSON

Draw sketches of one dog and two cats on the board. Ask students to write the ratios of dogs to cats, cats to dogs, cats to animals, and dogs to animals, both with a colon and as a fraction.

BACKGROUND

This lesson covers scale drawings and how these are used to model real objects that are too large to represent on paper. Tell students that they will learn how to interpret and produce scale drawings using mathematical concepts that were developed in earlier lessons. Explain that a scale drawing of an object can be constructed to represent the object on a convenient (usually smaller) scale. The scale factor of a scale drawing is the key to interpreting and creating scale drawings. The scale factor is expressed as a ratio, but may be written in various formats, e.g., $\frac{1 in}{100 miles} = 100\, miles$ or it may be displayed graphically.

GUIDED PRACTICE

Scale Factor

Scale Drawings

Draw Geometric Shapes with

Given Conditions

Reproduce a Scale Drawing of a

Different Scale

CORE SKILL

Use Appropriate Math Tools

This section discusses various types of tools for measuring length. The type of tool used is highly dependent on the size of the object to be measured, e.g., a micrometer or calipers would be used to make very small measurements (on the order of 1~0 of 10 1 00 of an inch), whereas a yardstick could be used to make medium-sized measurements (anywhere from 1 to 36 inches.) Have students read the section. Then ask them to perform an Internet search to learn about different measurement tools for measuring length. Ask them to categorize them according to the size of measurements that need to be made, e.g., for measuring the perimeter of

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a room, it would be more practical to use a tape measure or a yardstick as opposed to a 12-inch ruler.

Solve Problems Involving Scale Drawings of Geometric Figures

This section covers times in which students needs to use both geometry and algebra to obtain measurements of actual objects from a scale drawing. Have students read the text. Allow students to work in pairs or groups to solve the problem. Make sure students understand that the ratio they are working with is length to width.

EXTENSION

Find Multiple Meanings

Have students look up the word "scale" and examine its various meanings and usages (it can be used as a noun and a verb). Ask students to use these meanings and usages in different sentences to develop a better understanding of the concept of scale. Support student understanding with pictures, if necessary.

Investigate Angles and Scale Drawings

Have students investigate whether angles remain the same when converting from the measurements of a real object to that of a scale drawing. Using a scale drawing of simple geometric shapes, such as triangles, trapezoids, etc., have students measure the angles associated with these shapes using a protractor. Then have them draw these shapes to a specified scale and measure the angles again. The angles should remain the same.

LESSON REVIEW

Geometry	12.4: Area

MATERIALS

o CCB Mathematics pages 346 - 351

CCR STANDARDS

o Solve real-life and mathematical problems involving angle, measure, area, surface area, and volume.

OBJECTIVES

o Find the area of squares, rectangles, and triangles
o Find the area of circles
o Find the area of complex shapes

KEY CONCEPT

o Develop and apply the concept of area to find the areas of simple and complex shapes.

VOCABULARY

Tier 2	o area o complex shape o height o length o width
Tier 3	o base
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

Draw the four shapes from the top of the student lesson on the board. Label the measurements. Have students identify the length and width of the square and rectangle, the base and height of the triangle, and the radius and diameter of the circle.

BACKGROUND

Explain to students that area is the amount of space a two-dimensional surface covers. It has many real-life applications. Applications include building and container construction. Have students describe situations in which they would need to find the amount of space something covers (area).

GUIDED PRACTICE

Area of Rectangles, Squares, and Triangles

Area of Triangles

Area of Circles

Area of Complex Shapes

CORE SKILL

Build Lines of Reasoning

Give students time to read the sidebar. Have them discuss the activity in small groups. They should come to the conclusion that the area of a triangle is equal to half the area of a rectangle with the length and width equal to the base and height. Tell students that they can remember this if they forget the formula for the area of a triangle, and it will help them to remember to multiply by 1/2

Build Solution Pathways

Have students read the sidebar and compare the list of steps to the list they made for perimeter. Have students work in groups to solve the problem at the end. It may be tricky because they have not solved this type of problem before. If students need help, lead them to understand that the first step is to use the circumference to find the radius. Then they can use the radius to calculate the area. Because the circumference equals two times pi times radius, divide 25.12 by 2π, or set up an equation to solve for r. Since the radius is 4, the area is approximately 50.24 cm^2

EXTENSION

Use a Graphic Organizer

Have students draw or complete copies of a Venn diagram (see the Graphic Organizer section of the Instructor Resource Binder for a blackline master) for circles with one section labeled "Area" and the other section "Circumference." Have students fill in as much information as they can in the diagram.

Investigate the Area of Parallelograms

Have students develop a formula for finding the area of a parallelogram. Have them research online or investigate on their own with drawings or graph paper. They can apply what they know about the area of a rectangle and the area of triangles. Have them develop a logical argument for their formula. (The area of a parallelogram is found by multiplying the base by the height.)

LESSON REVIEW

Geometry	12.5: Pythagorean Theorem

MATERIALS

o CCB Mathematics pages 352 - 359

CCR STANDARDS

o Understand and apply the Pythagorean Theorem.

OBJECTIVES

o Explain the Pythagorean theorem
o Apply the Pythagorean theorem to solve problems

KEY CONCEPT

o The Pythagorean Theorem shows a special relationship between the sides of a right triangle.

VOCABULARY

Tier 2	o congruent o proof
Tier 3	o Pythagorean theorem o quadratic equations o theorem
Test Words	o hypotenuse o leg

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

To determine student readiness, have students classify triangles by their angles (acute, right, and obtuse) and have them practice computing squares and square roots of numbers.

BACKGROUND

This lesson covers the Pythagorean theorem, its proof, and several of its applications in mathematics. It begins with the properties of right triangles and the relationships between its sides, which are governed by the Pythagorean theorem. Tell students that right triangles are a special class of triangles, in which one of its angles measures 90 degrees, i.e., it is a right angle. The side of the triangle opposite the right angle is the hypotenuse. The remaining sides are called legs, which are adjacent to the right angle in the triangle. Discuss with students that the terms legs and hypotenuse only refer to right triangles, and no other types of triangles.

GUIDED PRACTICE

Right Triangles

Pythagorean Theorem

The Proof of the Pythagorean Theorem

Identifying Right Triangles

Recognizing Pythagorean Triples

Missing Side Lengths

The Distance between Two Points

on a Coordinate Graph

CORE SKILL

Analyze Events and Ideas
This sidebar introduces the philosopher Pythagoras and his work in mathematics. Have students read the text. Then allow them to work in groups to research the life of Pythagoras and how his theories had a profound effect on science and mathematics that has lasted into modern times. Have them summarize their findings and share them with the class.
Solve Quadratic Equations
This section guides students through the solution of a simple quadratic

equation that has the form $x^2 = c$ where c is a constant. This solution method can be used to determine the length of the hypotenuse of a right triangle, given the lengths of its legs. Have students read the text. Then have a volunteer explain why the value of x is 5.

EXTENSION

Make Word Comparisons

Provide definitions, and then have students compare the words "theorem" and "theory." While these words seem similar, they have different meanings.

Apply the Pythagorean Theorem

Have students research on the Internet the generalization of the Pythagorean theorem to the areas of squares and other similar figures that have one boundary coincident with the side of a right triangle. Students should find that the same relationship is still true of the area of the similar shapes touching the corresponding sides.

LESSON REVIEW

Geometry	12.6: Geometric Solids and Volume

MATERIALS

o CCB Mathematics pages 360 - 365

CCR STANDARDS

o Solve real-life and mathematical problems involving angle, measure, area, surface area, and volume.

OBJECTIVES

o Identify three-dimensional figures
o Identify rectangular solids and cubes
o Find the volume of rectangular solids and cubes

KEY CONCEPT

o Extend understanding of geometric figures to include solids and the concept of volume.

VOCABULARY

Tier 2	o cube o edge o face o volume
Tier 3	o rectangular prism o rectangular solid o three-dimensional o vertex
Test Words	o

INTERACTIVE STRATEGY

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BEFORE LESSON

Write several multiplication problems with three factors on the board and have students solve them. For example $10 \times 8 \times 6$; $13 \times 7 \times 4$; $10 \times 10 \times 10$. Encourage students to use any strategies they have learned in the lessons.

BACKGROUND

Geometric solids are three dimensional geometric figures. They have length, width, and height. The geometric solids in this lesson are also known as right solid figures because all sides that intersect are perpendicular. The measurement most associated with solids is volume: the number of cubic units that fit into the solid. Have students identify rectangular solids in the room and describe the edges, faces, and vertices. Define any of these terms, if necessary.

GUIDED PRACTICE

Solids

Volume of Rectangular Solids

Volume of Cubes

CORE SKILL

Solve Real-World Problems
Have students read the text. Then have them work in small groups to answer the question at the end. To determine whether there is enough concrete, students will need to find how many pounds one cubic foot of concrete weighs, and then divide the pounds of concrete by that number and see if it is at least the number of square feet needed for the cube.

Calculate Volume
Have students read the text. Then have them work in small groups to solve the problem. They will need to know that 3 feet equal 1 yard. Encourage them to draw pictures and provide them with small cubes to model the problem. One way to think about it is to imagine slicing the large cube into three slices that are 1 foot high. Each slice is 1 yard by 1 yard, which equals 3 feet by 3 feet. So each slice can make nine 1 ft. 3 cubes, and the entire large cube could be made into 3 times 9 or 27 cubic foot cubes.

EXTENSION

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Visualize Solids

Most students will have seen many examples of rectangular solids in their lives. Have them visualize the solids they already know as they learn the geometric terms related to them. Have them make a list of the rectangular solids they think of and verbally explain the use of the solids.

Construct Prisms

Ask students: What are the dimensions of two different rectangular prisms you could make using 24 cubes? Then ask: How many different rectangular prisms can you make using 30 cubes? Have students describe the prisms in terms of dimensions and volume.

LESSON REVIEW

Geometry	12.7: Volume of Cones, Cylinders, and Spheres

MATERIALS

o CCB Mathematics pages 366 - 371

CCR STANDARDS

o MP.4: Model with mathematics.
o MP.7: Look for and make use of structure.
o Solve real-life and mathematical problems involving angle, measure, area, surface area, and volume.

OBJECTIVES

o Calculate the volumes of cones, cylinders, and spheres
o Calculate the volumes of complex 3-D objects

KEY CONCEPT

o The volume of a cone, cylinder, or sphere is the amount of measurable space inside the object. These objects are three-dimensional, meaning they have length, width, and height. So, their units of measurement are cubed, such as
in³, ft³, and m³.

VOCABULARY

Tier 2	o apex o base o cone o cylinder o sphere
Tier 3	o frustum
Test Words	o

INTERACTIVE STRATEGY

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BEFORE LESSON

Review with students the method for calculating the areas of composite and complex objects. This will set the stage for calculating the volumes of composite and complex 3-D shapes. For example, a washer is an object placed on a bolt, between the end of the bolt, and a nut. It is used to help distribute the weight of the bolt. The area of the flat side of a washer with an outer radius 1 inch and an inner radius 0.5 inches is $pi\ x\ 1^2 - pi\ x\ 0.52 = 0.75pi$ square inches.

BACKGROUND

This lessons covers volume calculations for common 3-D shapes, applications of these calculations, and the manipulation of volume calculations to determine the volume of composite and more complex 3-D shapes. For instance, a cube with sides 1 inch by 1 inch by 1 inch has a volume of 1 cubic inch, just as a square with sides 1 inch by 1 inch has an area of 1 square inch.

GUIDED PRACTICE

Volume and 3-D Shapes

Volume of a Cylinder

Volume of a Cone

Volume of a Sphere

CORE SKILL

Model with Mathematics
Have students read the text. Then have students work in small groups to find the volume of the frustum. Volumes of complex 3-D shapes can be calculated by subtracting volumes. In this case, cutting off the top of a cone results in a smaller cone and a frustum. Thus, the volume of a frustum is the difference in volume between the two cones.
Make Use of a Structure
This section guides students to recognize that the area of a circle, $A = \pi r^2$, is a factor that is common to the formulas for a cone, sphere, and cylinder. It then reinforces this notion geometrically by guiding students to recognize that a circle is common to each of these 3-D shapes. Have students read the text. Then have small groups see how many different

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ways they can relate the three formulas. Have them complete the activity independently in their notebooks.

EXTENSION

Find Multiple Meanings

Have students look up the various definitions of the word volume and ask them to use the word in separate sentences illustrating the different meanings. Provide support if they have trouble understanding any of the definitions. Ask them where they see similarities in meanings among the various definitions, particularly those that directly pertain to mathematics.

Compare Formulas

Have students compare the similarities and differences among the volume formulas covered in this lesson with those of 3-D objects that have straight edges, such as a cube, a pyramid, and a triangular prism. Have them create a Venn diagram comparing these two types of solids (see the Graphic Organizer section of the Instructor Resource Binder for a blackline master).

LESSON REVIEW

COMMON CORE ACHIEVE

	PRE-TEST POST-TEST
Number Sense and Operations	**1.1: ORDER RATIONAL NUMBERS** **1.2: APPLY NUMBER PROPERTIES** **1.3: COMPUTE WITH EXPONENTS** **1.4: COMPUTE WITH ROOTS** CHAPTER 1: REVIEW AND CHECK YOUR UNDERSTANDING
Ratio, Proportion, and Probability	**2.1: APPLY RATIOS AND PROPORTIONS** **2.2: CALCULATE REAL-WORLD PERCENTAGES** **2.3: USE COUNTING TECHNIQUES** **2.4: DETERMINE PROBABILITY** CHAPTER 2: REVIEW AND CHECK YOUR UNDERSTANDING
Linear Equations and Inequalities	**3.1: EVALUATE LINEAR EXPRESSIONS** **3.2: SOLVE LINEAR EQUATIONS** **3.3: SOLVE LINEAR INEQUALITIES** **3.4: USE EXPRESSIONS, EQUATIONS, AND INEQUALITIES TO SOLVE REAL-WORLD PROBLEMS** CHAPTER 3: REVIEW AND CHECK YOUR UNDERSTANDING
Polynomials and Rational Numbers	**4.1: EVALUATE POLYNOMIALS** **4.2: FACTOR POLYNOMIALS** **4.3: SOLVE QUADRATIC EQUATIONS** **4.4: EVALUATE RATIONAL EXPRESSIONS** CHAPTER 4: REVIEW AND CHECK YOUR UNDERSTANDING
Linear Equations in the Coordinate Plane	**5.1: INTERPRET SLOPE** **5.2: WRITE THE EQUATION OF A LINE** **5.3: GRAPH LINEAR EQUATIONS** **5.4: SOLVE SYSTEMS OF LINEAR EQUATIONS** CHAPTER 5: REVIEW AND CHECK YOUR UNDERSTANDING

Functions	**6.1: IDENTIFY A FUNCTION** **6.2: IDENTIFY LINEAR AND QUADRATIC FUNCTIONS** **6.3: IDENTIFY KEY FEATURES OF A GRAPH** **6.4: COMPARE FUNCTIONS** **CHAPTER 6: REVIEW AND CHECK YOUR UNDERSTANDING**
Geometry and Measurement	**7.1: COMPUTE PERIMETER AND AREA OF POLYGONS** **7.2: COMPUTE CIRCUMFERENCE AND AREA OF CIRCLES** **7.3: COMPUTE SURFACE AREA AND VOLUME** **7.4: COMPUTE PERIMETER, AREA, SURFACE AREA AND VOLUME OF COMPOSITE FIGURES** **CHAPTER 7: REVIEW AND CHECK YOUR UNDERSTANDING**
Data Analysis	**8.1: CALCULATE MEASURES OF CENTRAL TENDENCY** **8.2: DISPLAY CATEGORICAL DATA** **8.3: DISPLAY ONE-VARIABLE DATA** **8.4: DISPLAY TWO-VARIABLE DATA** **CHAPTER 8: REVIEW AND CHECK YOUR UNDERSTANDING	KHANACADEMY.ORG**

Number Sense and Operations

1.1: Order Rational Numbers

MATERIALS

o CCA Mathematics pages 12 - 19

OBJECTIVES

o Identify rational numbers
o Order fractions and decimals on a number line
o Calculate absolute value

KEY CONCEPT

o Rational numbers include whole numbers, fractions, decimals and their opposites. A number line is a useful math tool for comparing and ordering rational numbers

VOCABULARY

	o Absolute Value
	o Integers
Tier 2	o Rational Numbers
	o Denominator
	o Numerator
	o Order
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

Rational Numbers

Working with Fractions and Decimals

Absolute Value

CORE SKILL

Use Math Tools Appropriately

Apply Number Sense

EXTENSION

LESSON REVIEW

Number Sense and Operations

MATERIALS

o CCA Mathematics pages 20 - 27

OBJECTIVES

o Determine LCM and GCF of two positive numbers (not necessarily different)
o Apply number properties (distributive, and Associative Properties) to rewrite numerical expressions
o Determine when a numerical expression is undefined

KEY CONCEPT

o The least common multiple and greatest common factor of a pair can be used to solve problems. Awareness of number properties can be helpful in evaluating numerical expressions, although some expressions are undefined.

VOCABULARY

Tier 2	o Greatest Common Factor o Least Common Multiple o Order of Operations
Tier 3	o Addend o Factor o Undefined
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

Factors and Multiples
Properties of Numbers
Order of Operations

CORE SKILL

Apply Number Sense Concepts
Perform Operations

EXTENSION

LESSON REVIEW

Number Sense and Operations

1.3: Compute with Exponents

MATERIALS

o CCA Mathematics pages28 - 35

OBJECTIVES

o Apply rules of exponents to expressions
o Perform operations on numbers written in scientific notation
o Solve real-world problems involving squares and cubes

KEY CONCEPT

o Exponents can be used to represent and solve problems, such as those involving squares and cubes or scientific notation. You can rewrite and simplify expressions involving exponents.
o

VOCABULARY

Tier 2	o Cube o Scientific Notation o Square
Tier 3	o Order of Operations o Reciprocals o Standard Notation
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

Exponential Notation

Rules of Exponents

Scientific Notation

CORE SKILL

Represent Real-World Problems

Make Use of Structure

EXTENSION

LESSON REVIEW

Number Sense and Operations

1.4: Compute with Roots

MATERIALS

o CCA Mathematics pages 36 - 43

OBJECTIVES

o Perform computations with square and cube roots
o Solve Real-World problems involving square and cube roots
o Simplify expressions involving roots using the properties of rational exponents

KEY CONCEPT

o Numerical expressions involving roots (often called radicals) can be written using rational exponents and then simplified using the rules of exponents.

VOCABULARY

Tier 2	o Cube Root o Rational Exponent o Square Root
Tier 3	o Index o Irrational Numbers o Prime Factorization
Test Words	o

INTERACTIVE STRATEGY

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

Square Roots and Cube Roots

Approximating Square and Cube Roots

Radicals and Rational Exponents

CORE SKILL

Represent Rea-World Arithmetic Problems

Attend to Precision

EXTENSION

LESSON REVIEW

Ratio, Proportion, and Probability	2.1: Apply Rations and Rates

MATERIALS

o CCA Mathematics pages 48 - 53

OBJECTIVES

o Compute unit rates
o Use scale factors
o Apply ratios and proportions to solve real-world problems

KEY CONCEPT

o A ratio, which is often written as a fraction, is a comparison of the relative sizes of two numbers. Operations on ratios follow the same rules as operations on fractions. When two ratios are equivalent, they are called proportional.

VOCABULARY

Tier 2	o Proportion o Ratio o Scale Factor o Unit Rate
Tier 3	o Equivalent o Similar
Test Words	o

INTERACTIVE STRATEGY

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

Ratios

Proportions

CORE SKILL

Compare Unit Rates

Use Ratio Reasoning

EXTENSION

LESSON REVIEW

Ratio, Proportion, and Probability	2.2: Calculate real-World Percentage

MATERIALS

o CCA Mathematics pages 54 - 61

OBJECTIVES

o Relate fractions, decimals, and percents
o Compute percent change
o Find a discount
o Calculate simple interest
o Use percent to solve real-world problems

KEY CONCEPT

o A percent is a ratio of a number to 100. In fact, the word percent comes from the Latin term *per centum*, meaning "by the hundred," and it is represented by the symbol %. Fractions and decimals are also ratios, and they are related to percents.

VOCABULARY

Tier 2	o Discount o Percent o Simple interest
Tier 3	o Benchmark o Interest Rate o Principal
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

Percent of a Number

Percent Change

Simple Interest

CORE SKILL

Use Tools Strategically

Use Percent

EXTENSION

LESSON REVIEW

Ratio, Proportion, and Probability	2.3: Use Counting Techniques

MATERIALS

o CCA Mathematics pages 62 - 69

OBJECTIVES

o Apply the Fundamental Counting Principle
o Recognize and calculate factorials
o Determine permutations and combinations

KEY CONCEPT

o Certain events can allow for uncertainty. When this occurs, it can be possible to determine the number of possible outcomes by using permutations and combinations.

VOCABULARY

Tier 2	o Combination o Experiment o Factorial o Outcome o Permutation
Tier 3	o Tree Diagram
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

Factorials

Permutations

Combinations

CORE SKILL

Use Counting Techniques

Model with Mathematics

EXTENSION

LESSON REVIEW

Ratio, Proportion, and Probability	**2.4: Determine Probability**

MATERIALS

o CCA Mathematics pages 70 - 77

OBJECTIVES

o Determine the probability of simple events
o Determine the probability of compound events

KEY CONCEPT

o The probability of a chance event uses a number between 0 and 1 to describe the likeliness that the event will occur. You can use the number of total and favorable outcomes of an event to determine the probabilities of simple or compound events.

VOCABULARY

Tier 2	o Compound Event o Probability o Tree Diagram
Tier 3	o Complement o Dependent Event o Independent Event
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

Probability of Simple Events

Probability of Compound Events

CORE SKILL

Determine Probabilities

EXTENSION

LESSON REVIEW

Linear Equations and Inequalities	**3.1: Evaluate Linear Expressions**

MATERIALS

o CCA Mathematics pages

OBJECTIVES

o

KEY CONCEPT

o

VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Linear Equations and Inequalities

3.2: Solve Linear Equations

MATERIALS

o CCA Mathematics pages

OBJECTIVES

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KEY CONCEPT

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VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Linear Equations and Inequalities

3.3: Solve Linear Inequalities

MATERIALS

○ CCA Mathematics pages

OBJECTIVES

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KEY CONCEPT

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VOCABULARY

Tier 2	○
Tier 3	○
Test Words	○

INTERACTIVE STRATEGY

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WRITING TOPIC

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WRITING PRACTICE

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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Linear Equations and Inequalities	3.4: Use Expressions, Equations, and inequalities to Solve Real-World Problems

MATERIALS
o CCA Mathematics pages

OBJECTIVES
o

KEY CONCEPT
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VOCABULARY

Tier 2	o
Tier 3	o
Test Words	o

INTERACTIVE STRATEGY
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BEFORE LESSON

BACKGROUND

GUIDED PRACTICE

CORE SKILL

EXTENSION

LESSON REVIEW

Polynomials and Rational Numbers	4.1: Evaluate Polynomials

MATERIALS
o CCA Mathematics pages

OBJECTIVES
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KEY CONCEPT
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Polynomials and Rational Numbers

4.2: Factor Polynomials

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4.3: Solve Quadratic Equations

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4.4: Evaluate Rational Expressions

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Linear Equations in the Coordinate Plane	**5.1: Interpret Slope**

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Linear Equations in the Coordinate Plane	5.2: Write the Equation of a Line

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Linear Equations in the Coordinate Plane	5.3: Graph Linear Equations

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Linear Equations in the Coordinate Plane	**5.4: Solve Systems of Linear Equations**

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Functions	**6.1: Identify a Function**

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Functions	**6.2: Identify Linear and Quadratic Functions**
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Functions	6.3: Identify Key Features of a Graph

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Functions	6.4: Compare Functions

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Geometry and Measurement	**7.1: Compute Perimeter and Area of Polygons**
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Geometry and Measurement	**7.2: Compute Circumference and Area of Circle**

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Geometry and Measurement	**7.3: Compute Surface Area and Volume**

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Geometry and Measurement	7.4: Compute Perimeter, Area, Surface Area, and Volume of Composite Figures

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Data Analysis	**8.1: Calculate Measures of Central Tendency**

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Data Analysis	**8.2: Display Categorical Data**

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