math MAMMOTH

Grade 1-A Worktext

Addition concept and facts within 0 - 10

Subtraction within 0 - 10

Connection between addition and subtraction

Graphs

Two-digit numbers and place value within 0 - 100

Light Blue Series

By Maria Miller

Contents

Chapter 2: Subtraction Within 0-10

Chapter 3: Place Value Within 0-100

Foreword

Math Mammoth Grade 1-A and Grade 1-B worktexts comprise a complete math curriculum for the first grade mathematics studies. This curriculum is aligned to the Common Core standards. The four main areas of study for first grade are:

1. The concepts of addition and subtraction, and strategies for addition and subtraction facts (chapters 1-2 and chapter 4);

2. Developing understanding of whole number relationships and place value till 100 (chapter 3 and chapter 7);

3. Developing understanding of measuring lengths as iterating length units (chapter 6); and

4. Reasoning about attributes of geometric shapes, such as the number of sides and the number of corners, and composing and decomposing geometric shapes (chapter 6).

Additional topics we study in the first grade are the clock to the half hour (chapter 5) and counting coins (chapter 8).

This book, 1-A, covers the concepts of addition and subtraction (chapters 1 and 2), and place value with two-digit numbers (chapter 3). The book 1-B covers strategies for addition and subtraction facts, the clock, shapes and measuring, adding and subtracting with two-digit numbers, and counting coins.

When you use these two books as your only or main mathematics curriculum, they are like a "framework," but you still have a lot of liberty in planning your child's studies. While addition and subtraction topics are best studied in the order they are presented, feel free to go through the geometry, clock, and money sections in a different order. This might even be advisable if your child is "stuck" on some concept, or is getting bored. Sometimes the brain "mulls it over" in the background, and the concept he/she was stuck on can become clear after a break.

Math Mammoth aims to concentrate on a few major topics at a time, and study them in depth. This is totally opposite to the continually spiraling step-by-step curricula, in which each lesson typically is about a different topic from the previous or next lesson, and includes a lot of review problems from past topics.

This does not mean that your child wouldn't need occasional review. However, when each major topic is presented in its own chapter, this gives you more freedom to plan the course of study *and* choose the review times yourself. In fact, I totally encourage you to plan your mathematics school year as a set of certain topics, instead of a certain book or certain pages from a book.

For review, the download version includes an html page called *Make_extra_worksheets_grade1.htm* that you can use to make additional worksheets for computation or for number charts. You can also simply reprint some already studied pages. Also, the third chapter that practices addition and subtraction facts contains a lot of pages with problems, so you can choose to "save" some of them for later review.

I wish you success in your math teaching!

Maria Miller, the author

Chapter 0: Kindergarten Math Review
Introduction

This chapter is optional, and can be used to review the most important concepts of kindergarten math:

- writing the numerals 0 to 9;

- counting up to 20;

- position words, color words, and some shapes (circle, triangle, square)
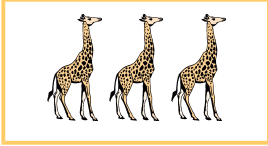
- simple patterns
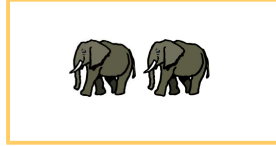
The Lessons in Chapter 0

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Counting

1. Count. Write the number in the box.

a. [ ]

b. [ ]

c. [ ]
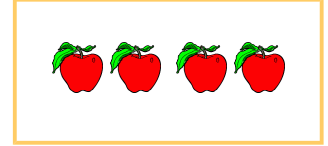
d. [ ]
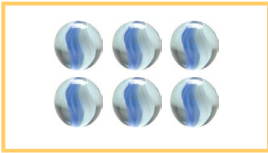
e. [ ]

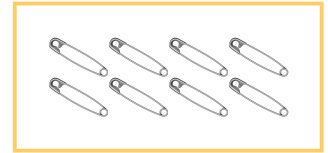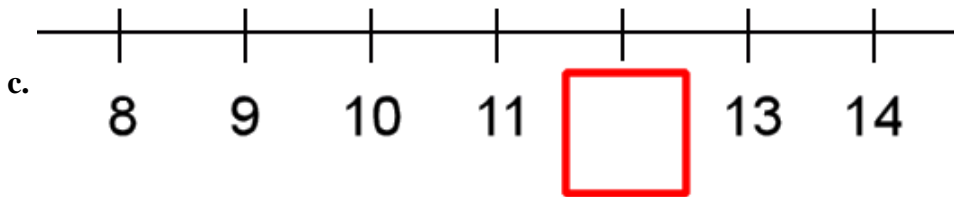f. [ ]
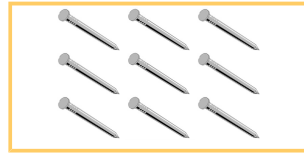
g. [ ]

h. [ ]
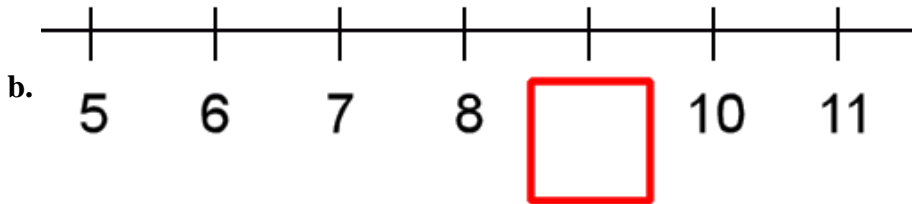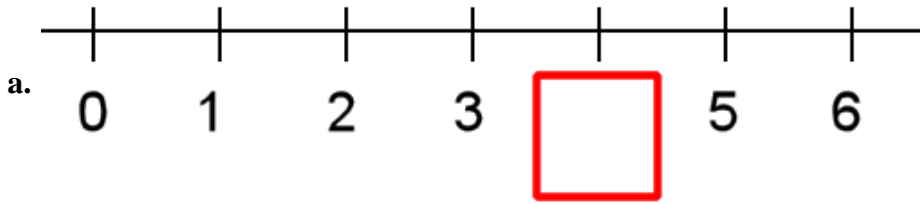
2. Count. Write the number. Then circle the number that is MORE.

a. [ ]   [ ]

b. [ ]   [ ]

c. [ ]   [ ]

d. [ ]   [ ]

3. Write the missing number below the number line.

a.

0   1   2   3   [ ]   5   6

b.

5   6   7   8   [ ]   10   11

c.

8   9   10   11   [ ]   13   14

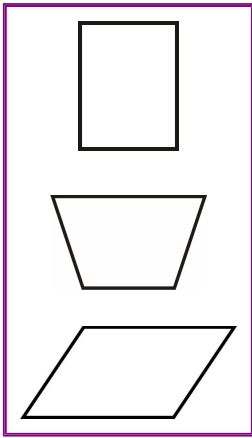4. Circle the group that has more things. Then count ALL (both groups).
   Write the number in the box below.

a. [ ]

b. [ ]

c. [ ]

d. [ ]

e. [ ]

f. [ ]

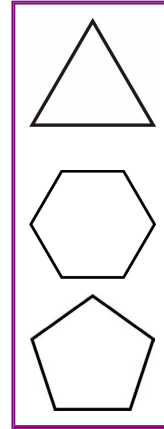# Position Words, Colors, and Shapes

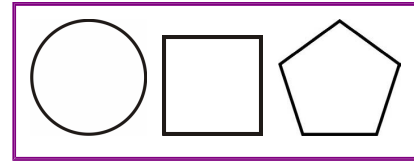1. **a.** Color RED
the top shape.

b. Color BLUE
the bottom shape.
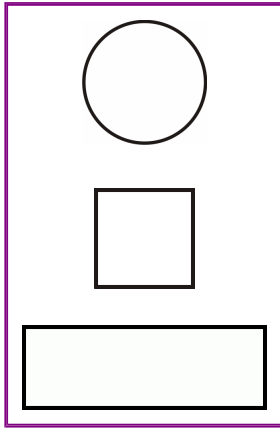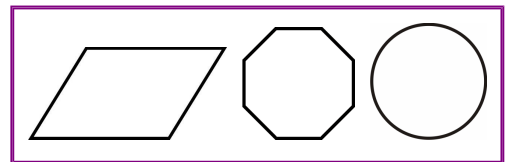
c. Color YELLOW
the middle shape.

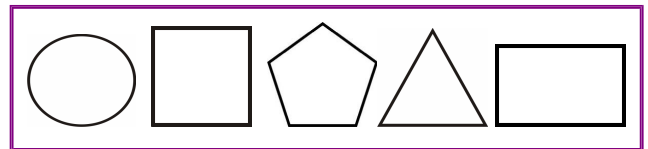2. **a.** Color GREEN the shape on the right.
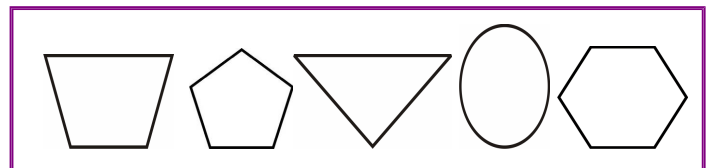
b. Color BLUE the shape in the middle.

c. Color YELLOW the shape on the left.

d. Color ORANGE two shapes
on the right.

e. Color PURPLE two shapes
on the left.

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Chapter 1: Addition Within 0-10
Introduction

The first chapter of *Math Mammoth Grade 1-A* concentrates on the concept of addition and addition facts within 0-10.

Keep in mind that the specific lessons mentioned below can take several days to finish. They are not "daily lessons."

The chapter starts out with very easy addition problems within 0-5 using pictures, where children can simply count the objects to add. You can also easily adapt these early lessons to be done with manipulatives (concrete objects such as blocks, beads, etc.).

If the student does not yet know the symbols " + " and " = ", you can introduce them *orally* at first. Use blocks or other objects to make addition problems and say: "*Three blocks and four blocks makes seven blocks. Three blocks PLUS four blocks EQUALS seven blocks.*" Then ask the child to make an addition with the objects, using those words. Play like that until the child can use the words PLUS and EQUALS in his/her own speech. This will make it easier for him/her to use the written symbols.

In the lesson <u>Which is More?</u> the symbols < and > are introduced, being like a "hungry alligator's mouth." In this lesson children only compare numbers, such as $5 < 7$. In later lessons, children will also learn to compare expressions, such as $2 + 3 < 4 + 4$.

The lesson <u>Missing Items</u> introduces missing addend or unknown-addend problems. This means problems such as $1 + \_\_\_ = 5$ or $\_\_\_ + 3 = 8$, where a number to be added is missing. First, we use pictures for these problems, and then gradually only symbols. Missing addend problems are very important, as they lead the students to learn the connection between addition and subtraction, develop the correct understanding of the equal sign, and lead towards algebraic thinking.

Children *may* confuse the problem $1 + \_\_\_ = 5$ with $1 + 5 = \_\_\_$. To help the children see the difference, you can word these problems like this: "*One and <u>how many</u> more makes five?*" You can model them by drawing. First draw one ball. Tell the child that we need a total of five balls. He/she needs to draw more until there are five balls.

In the missing addend problem $1 + \_\_\_ = 5$, however many balls the child draws is the number that goes on the empty line. So, first there is one ball, then we need to add (draw) some more to make 5. How many more were drawn?

Then, we come to the lesson <u>Sums with 5</u>. It practices the number combinations that add up to 5, which are 0 and 5, 1 and 4, and 2 and 3. Soon after that, we study sums with 6, sums with 7, and so on. Their goal is to help the child become fluent in addition within 10, or in other words memorize addition facts within 10.

However, your child does not need to memorize them yet. All these lessons are building toward that goal, but the final mastery of addition facts doesn't have to happen this early in 1st grade.

My approach to memorizing the basic addition facts within 10 is many-fold:

1. Structured drill, such as you see in the lessons <u>Sums with 5</u>, <u>Sums with 6</u>, and so on. This is not a random drill, because you will start by showing the pattern or the structure in the facts. This will help the student to tie the addition facts in with a context and help him/her understand the facts on a conceptual level, instead of merely memorizing them at random. The number combinations that add up to a certain number is the basis for the drills.

2. Using addition facts in games, in math problems, everyday life, or anywhere else. Games are especially useful because they help children to like mathematics.

3. Random drilling may also be used as a tool among others.

4. Memory helps such as silly mnemonics or writing math facts on a poster and hanging it on the wall. Not all children need these, but feel free to use them if you like.

These same addition facts are studied further and used in the next chapters about subtraction, and in all later math work since they are constantly used. I recommend children become fluent with addition facts within 0-10 by the end of first grade, as mentioned in the Common Core Standards. The first three chapters in Math Mammoth Grade 1-A constantly practice all these facts. If your child does not know them by heart by the time you start the 1-B book, keep up practicing them with games and other drills.

Please also see the following page for a few games that I recommend using while studying this chapter. Games are important at this level, as they help children practice the addition facts and also make math fun.

Another important thread running through the chapter is to develop children's understanding of the signs $+, <$ and $>$. Children need to get used to equations such as $9 = 5 + 4$ or $2 < 5 + 4$. They need to understand the equation $2 + \_\_\_ = 6$ correctly as an unknown addend problem, and not as the addition problem $2 + 6$, as I mentioned before. This is all done to prevent the misconception of the equal sign being an "operator", as if it means that you need to add/subtract/multiply/divide, or "operate" on the numbers in the equation. A child with such misconception will treat the equation $9 = \_\_ + 4$ as an addition problem $9 + 4$.

We also study addition on a number line, which is an important way to model addition. Children also encounter adding many numbers, addition tables, number patterns, word problems, and get used to a symbol for the unknown number (a geometric shape, such as in $\boxed{} + 5 = 10$). So, while it looks on the surface like all we do is add small numbers, actually a lot happens and is learned in this chapter!

Games for Addition and Subtraction Facts

10 Out (or *5 Out* or *6 Out etc.)*

You need: lots of number cards with numbers 1-10, such as regular playing cards without the picture cards, Uno cards without the special cards, etc.

Rules: Deal seven cards to each player. Place the rest in a stack in the middle, face down.

At his turn, each player *may* first take one card from the deck. Then, each player *may* ask for one card from the player on his right (like in 'Go Fish'), and the person has to give him the card if he has it. Then the player may discard any two cards in his hand that add up to 10, or the card 10 itself.

The player who first discards all cards from his hand, wins.

Adaptations:
* Deal more cards instead of seven.
* Deal fewer cards if there are very many players or the players are young.
* Allow players to discard three cards that add up to 10.
* Instead of ten, players discard cards that add up to 9, 8, 11, or some other number.
  Use the picture cards for 11, 12, and 13.

Some Went Hiding

You need: As many small objects as is the sum you are studying. For example, to study the sums with 5, you need 5 marbles, or 5 blocks, etc.

Rules: The first player shows the objects, and quickly hides SOME behind his/her back without showing how many. Then he/she shows the remaining objects to the next player, who has to tell how many went hiding. If the player gives the right answer, it is then his/her turn to hide some and ask the next player to answer. If he gives the wrong answer, he misses his turn. This game appeals best to young children.

Adaptations:
* Instead of getting a turn, the player may gain points or other rewards for the right answer.

Addition (or Subtraction) Battle

You need: A standard deck of playing cards from which you remove the picture cards, and perhaps also some of the other higher number cards such as tens, nines, and eights. Alternatively, a set of dominoes works well for children who don't yet know their numbers beyond 12.

Rules: In each round, each player is dealt two cards face up, and has to calculate the sum (add/subtract). The player with the highest sum gets all the cards from the other players. After enough rounds so that all of the cards are used, the player with the most cards wins.

If there is a tie, such as two players have the sum of 11, those players get an additional two cards and "battle" with those to resolve the tie.

Adaptations:
* This game is easily adapted for subtraction, multiplication, and fractions.
  You can also use dominoes instead of two playing cards.

Any ***board game*** where you move the piece by rolling two dice also works to practice addition.

The Lessons in Chapter 1

Helpful Resources on the Internet

Use these free online resources to supplement the "bookwork" as you see fit.

Addition Exercise from Dositey.com
Write how many worms are on each of two leaves, and how many together.
http://www.dositey.com/addsub/addex1.htm

Children's Addition Quiz
A set of five interactive addition problems that you answer online.
http://www.thegreatmartinicompany.com/Math-Quick-Quiz/addition-kid-quiz.html

Number Bond Machines
Practice which two numbers add up to a given number.
http://www.amblesideprimary.com/ambleweb/mentalmaths/numberbond.html

Save the Whale
Find how much the given "pipe" length is missing from 10 and save the whale.
http://www.ictgames.com/save_the_whale_v4.html

Fun 4 The Brain
Practice your basic facts with these kid-appealing simple games.
http://www.fun4thebrain.com/addition.html

Children' Compare Numbers from Mr. Martini's Classroom
Compare two numbers. Press the number below to choose the biggest number that will appear.
http://www.thegreatmartinicompany.com/Children-Math/compare-number.html

Addition and Subtraction Game from The Little Animals Activity Centre
Solve simple addition and subtraction problems by clicking on the ladybug with the right answer.
http://www.bbc.co.uk/schools/laac/numbers/chi.shtml

Number Line Arithmetic
Use this virtual manipulative to illustrate addition on a number line.
http://nlvm.usu.edu/en/nav/frames_asid_156_g_1_t_1.html

Line Jumper
Addition questions on a number line.
http://www.funbrain.com/funbrain/linejump/index.html

Sum Stacker
Drag dice from stack to stack until the sums of each stack equal the sums given.
http://www.carstensstudios.com/mathdoodles/sumsstacker.html
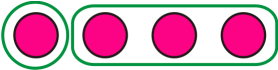
Tux Math
A versatile arcade game for math facts with many options. Includes all operations. You need to shoot falling comets that can damage penguins' igloos. **Price:** Free.
http://sourceforge.net/projects/tuxmath
See also my review: http://homeschoolmath.blogspot.com/2011/05/tux-math.html

Two Groups and a Total

1. Make two groups.

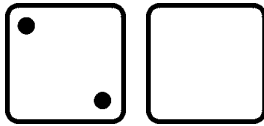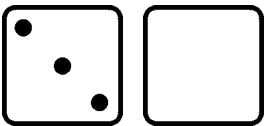|		
a. 4 ●● ● ● ● 1 and 3	**b.** 4 ● ● ● ● 2 and 2	**c.** 4 ● ● ● ● 3 and 1
d. 5 ● ● ● ● ● 3 and 2	**e.** 5 ● ● ● ● ● 2 and 3	**f.** 5 ● ● ● ● ● 1 and 4
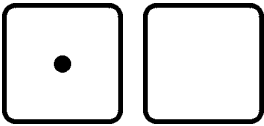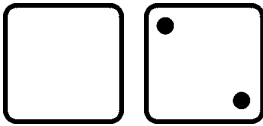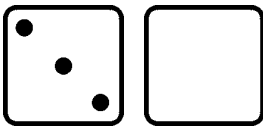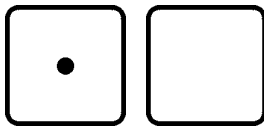
2. Make two groups. Write how many are in the second group.

a. 4 ● ● ● ● 1 and _____	**b.** 4 ● ● ● ● 2 and _____	**c.** 4 ● ● ● ● 3 and _____
d. 5 ● ● ● ● ● 4 and _____	**e.** 5 ● ● ● ● ● 3 and _____	**f.** 5 ● ● ● ● ● 2 and _____
g. 5 ● ● ● ● ● 1 and _____	**h.** 5 ● ● ● ● ● 5 and _____	**i.** 5 ● ● ● ● ● 0 and _____

3. Draw as many dots as the number shows. Then make two groups however you like.
   Write how many are in each group.

a. 3 _____ and _____	**b.** 5 _____ and _____	**c.** 4 _____ and _____
d. 2 _____ and _____	**e.** 6 _____ and _____	**f.** 8 _____ and _____

4. The number at the top is the total. Draw the missing dots on the empty die face.
   Write on the lines how many dots are on each die face.

a. 3 _____ and _____	**b.** 6 _____ and _____	**c.** 5 _____ and _____
d. 4 _____ and _____	**e.** 6 _____ and _____	**f.** 5 _____ and _____
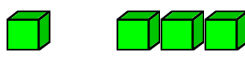
2 and 2 \[4\]	1 and 4 \[5\]
"Two and two makes four."	"One and four makes five."

5. Write how many are in each group. Write the total in the box.
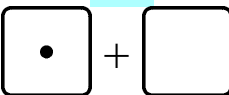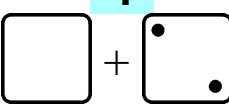
a. ____ and ____ ☐	**b.** ____ and ____ ☐	**c.** ____ and ____ ☐
d. ____ and ____ ☐	**e.** ____ and ____ ☐	**f.** ____ and ____ ☐
g. ____ and ____ ☐	**h.** ____ and ____ ☐	**i.** ____ and ____ ☐

6. Draw circles for each number. Write the total in the box.
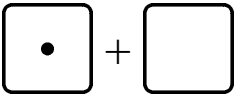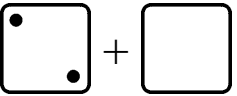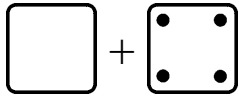
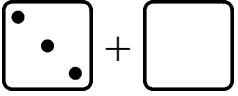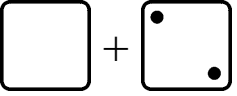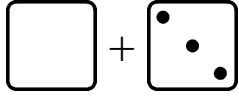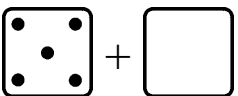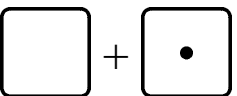|	
a. 2 and 2 ☐	**b.** 3 and 1 ☐
c. 3 and 3 ☐	**d.** 1 and 4 ☐

22

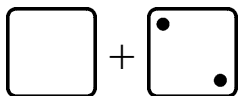(This page intentionally left blank.)

Missing Items

Something is missing from the addition.
The TOTAL is not missing. The total is 5.

How many are in the second group? That's what is missing!

There should be a total of 5 dots. Draw 4 in the second die face.

5

$\boxed{\bullet}$ + $\boxed{}$

1 + _____

There should be a total of 4 dots. The second die face has two.
There are none in the first die face, so you need to draw them.

Read: "2 plus what number makes 4?"
  or, "2 and how many more makes 4?"
  or, "What number and 2 makes 4?"

4

$\boxed{}$ + $\boxed{\bullet\bullet}$

_____ + 2

---

1. Draw more dots for the addition. Write the missing number. The total is on top.

3

$\boxed{\bullet}$ + $\boxed{}$

a. 1 + _____

3

$\boxed{\bullet\bullet}$ + $\boxed{}$

b. 2 + _____

5

$\boxed{}$ + $\boxed{\bullet\bullet\bullet\bullet}$

c. _____ + 4

5

$\boxed{\bullet\bullet\bullet}$ + $\boxed{}$

d. 3 + _____

5

$\boxed{}$ + $\boxed{\bullet\bullet}$

e. _____ + 2

4

$\boxed{}$ + $\boxed{\bullet\bullet\bullet}$

f. _____ + 3

5

$\boxed{\bullet\bullet\bullet\bullet\bullet}$ + $\boxed{}$

g. 5 + _____

4

$\boxed{}$ + $\boxed{\bullet}$

h. _____ + 1

4

$\boxed{}$ + $\boxed{\bullet\bullet}$

i. _____ + 2

30

$3 + \underline{\qquad} = $ **5**
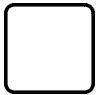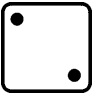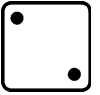
The **TOTAL** is now written after the equal sign " = ".
The answer is $3 + \underline{2} = $ **5**

$\underline{\qquad} + 3 = $ **4**

See the **TOTAL** written after the equal sign " = ".
The answer is $\underline{1} + 3 = $ **4**
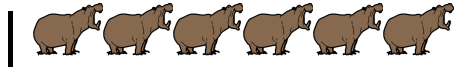
2. Draw more dots to show the missing number. Write the missing number.

a.

$2 + \underline{\qquad} = 4$

b.

$1 + \underline{\qquad} = 1$

c.

$\underline{\qquad} + 1 = 5$

d.

$3 + \underline{\qquad} = 5$

e.

$\underline{\qquad} + 1 = 4$

f.

$2 + \underline{\qquad} = 3$

g.

$5 + \underline{\qquad} = 5$

h.

$\underline{\qquad} + 1 = 3$

i.

$2 + \underline{\qquad} = 5$

j.

$1 + \underline{\qquad} = 5$

k.

$\underline{\qquad} + 2 = 2$

l.

$3 + \underline{\qquad} = 4$

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Sums with 6

1. Six hippos are grouped into two groups, in different ways. Write the addition sentences.

_____ + _____ = _____	_____ + _____ = _____
_____ + _____ = _____	_____ + _____ = _____
_____ + _____ = _____	_____ + _____ = _____

_____ + _____ = _____

2. Play "6 Out" *and/or* "Some Went Hiding" with 6 objects (see the introduction).

3. **Drill.** Don't write the answers but just think them in your head.

$1 + \boxed{} = 6$ $\qquad$ $4 + \boxed{} = 6$ $\qquad$ $\boxed{} + 2 = 6$ $\qquad$ $\boxed{} + 3 = 6$

$2 + \boxed{} = 6$ $\qquad$ $3 + \boxed{} = 6$ $\qquad$ $\boxed{} + 0 = 6$ $\qquad$ $\boxed{} + 1 = 6$

$6 + \boxed{} = 6$ $\qquad$ $5 + \boxed{} = 6$ $\qquad$ $\boxed{} + 4 = 6$ $\qquad$ $\boxed{} + 5 = 6$
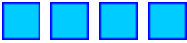
4. Add the numbers and write the total on the line.

a. $1 + 5 = $ _____	**b.** $2 + 3 = $ _____	**c.** $4 + 2 = $ _____

5. Draw more little boxes to illustrate the missing number.

a. $2 + \boxed{} = 6$	**b.** $2 + \boxed{} = 5$	**c.** $4 + \boxed{} = 6$
d. $3 + \boxed{} = 6$	**e.** $1 + \boxed{} = 6$	**f.** $5 + \boxed{} = 6$
g. $1 + \boxed{} = 5$	**h.** $0 + \boxed{} = 6$	**i.** $3 + \boxed{} = 5$

6. Jack and Jill share 5 cucumbers and 6 lemons in different ways. Find how many Jill gets.
   You can cover the cucumbers or lemons with your hand to help.

a. 5

Jack gets:	Left for Jill:
2	
1	
5	
3	
0	
4	

b. 6

Jack gets:	Left for Jill:
1	
4	
5	
0	
2	
3	

7. Add.

$2 + 3 =$ _____

$4 + 1 =$ _____

$3 + 3 =$ _____

$4 + 2 =$ _____

$1 + 3 =$ _____

$1 + 5 =$ _____

$2 + 2 =$ _____

$2 + 4 =$ _____

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Chapter 2: Subtraction Within 0-10
Introduction

The second chapter of *Math Mammoth Grade 1-A* covers the concept of subtraction, its various meanings, and the relationship between addition and subtraction. Keep in mind that the specific lessons mentioned below can take several days to finish. They are not "daily lessons."

In the first lesson, <u>Subtraction is Taking Away</u>, the child learns the basic meaning of subtraction as taking away objects, and learns to write subtractions from an illustration where some objects are crossed out. The child can figure out the subtraction problems by simply counting how many objects are left.

If your child does not yet know the word "minus", it is a good idea to introduce it first *orally*. Use blocks or other concrete objects. For example, show the child eight blocks, and take away three blocks. Then use both kinds of wordings: "*Eight blocks, take away three blocks, leaves five blocks. Eight blocks **minus** three blocks **equals** five blocks*." Then let the child do the same. Play with concrete objects until the child can use the words "minus" and "equals" in his/her own speech.

In the next lesson, the child counts down to subtract, also tying in that concept with the number line. This is a transitional strategy to solve subtraction problems, because later on students will learn more efficient ways to subtract, but it is important conceptually. For now, the student can solve $9 - 3$ by counting down three steps from nine: eight, seven, six. So the answer is six.

In the next lesson, <u>Subtraction and Addition in the Same Picture</u>, we start to study the relationship between addition and subtraction. This concept will span several lessons. This first lesson presents two sets of objects, such as blue and white balls, and the student writes both an addition sentence and a subtraction sentence from this illustration.

The lesson <u>When Can You Subtract?</u> concentrates on the idea that some subtractions, such as $4 - 5$ are meaningless when you think of taking away. The child also makes subtraction patterns in this lesson.

Then we continue studying the connection between addition and subtraction in the lesson <u>Two Subtractions from One Addition</u>. Writing two subtractions from one addition means for example writing both $8 - 3 = 5$ and $8 - 5 = 3$ from the addition $3 + 5 = 8$. This idea ties in with *fact families*, a concept that is coming up soon.

In the lesson <u>Two Parts — One Total</u> we study word problems that don't involve the idea of taking away, but have two parts making up a total. For example, if there are 10 white and red flowers, and seven of them are white, how many are red? We know the "parts" (the red and white flowers) add up to 10, so we can write a missing addend addition $7 + \_\_ = 10$. This can be solved by subtracting $10 - 7$, or by knowing the addition fact $7 + 3 = 10$. Then we study <u>Fact Families</u>. This means writing two additions and two subtractions using the same three numbers. Fact families will be used extensively in the next chapter.

In the lesson <u>How Many More?</u> students solve problems of how many more or how many fewer objects one person has than the other by drawing the objects. You can also adapt this lesson to be done with manipulatives.

In the very next lesson (<u>"How Many More" Problems and Difference</u>) we continue the theme, this time writing a missing addend addition for "how many more" problems. For example, Veronica has 4 marbles and Ann has 6. We can write a missing addend addition: $4 + \_\_\_ = 6$, to find how how many more Ann has. In the next lesson (<u>"How Many More" Problems and Subtraction</u>) we finally write a subtraction for problems that ask "how many more."

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The Lessons in Chapter 2

Helpful Resources on the Internet

Use these free online resources to supplement the "bookwork" as you see fit.

Kids' Subtraction Quiz from Mr. Martini's Classroom
Five problems to solve online. You can choose the highest number used from the list of numbers below the quiz.
http://www.thegreatmartinicompany.com/Math-Quick-Quiz/subtraction-kid-quiz.html

Subtraction Mystery Picture
Find out the picture behind the tiles by solving subtraction questions within 0-10.
http://www.dositey.com/addsub/Mystery4.htm

Matching Pictures to Number Sentences
Find the correct number sentence to go along with the picture.
http://www.haelmedia.com/html/mc_m1_001.html

Match Pictures to Number Sentences
Match pictures to either addition or subtraction number sentences.
http://www.haelmedia.com/html/mc_m1_001.html

Addition and Subtraction Game from The Little Animals Activity Centre
Solve simple addition and subtraction problems by clicking on the ladybug with the right answer.
http://www.bbc.co.uk/schools/laac/numbers/chi.shtml

Subtraction Game from Count Us In
Subtract two numbers which bowls a ball down a bowling alley lane.
http://www.abc.net.au/countusin/games/game8.htm

Take It Away
Subtract and click on the correct answer.
http://www.primarygames.com/takeaway/start.htm

Subtraction Pinball
When the ball hits numbers, it defines a problem. Next you choose the correct answer.
http://www.playkidsgames.com/games/pinball/subtraction/defaultk1.htm

Simple Subtraction
Help the duck fly faster by clicking on the cloud with the correct answer.
http://www.toonuniversity.com/flash.asp?err=513&engine=12

Save the Apples!
Click on the correct basket to get the monkey to carry the apple basket. A crocodile is waiting!
http://www.playkidsgames.com/games/apples/savetheApples.htm

Busy Bees
Figure out how many of the 10 bees went inside the hive.
http://www.hbschool.com/activity/busy_bees/index.html

Soccer Subtraction
Click to make the players disappear until the subtraction sentence is true.
http://www.ictgames.com/soccer_subtraction.html

Math Carts
A downloadable racing game for young students to memorize addition and subtraction facts. Children choose various animal themed carts and unlock new carts and race tracks as they progress through the facts. There are three difficulty levels.
Price: Free
http://sandbox.yoyogames.com/games/163070-math-carts

Tux Math
A versatile arcade game for math facts with many options. Includes all operations. You need to shoot falling comets that can damage penguins' igloos. See also my review.
Price: Free
http://sourceforge.net/projects/tuxmath

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Subtraction and Addition in the Same Picture

<table>
<tr>
<td>
How many colored circles?
How many white ones?

●●●●○○○○○○

__4__ + __6__ = 10
</td>
<td>

●●●○○○○

__3__ + __4__ = 7
</td>
</tr>
<tr>
<td>
Cover the colored circles.
Write a subtraction sentence.

●●●●○○○○○○

10 – __4__ = __6__
</td>
<td>
Cover the colored circles.

●●●○○○○

7 – __3__ = __4__
</td>
</tr>
</table>

1. Make an addition sentence and a subtraction sentence from the same picture.

<table>
<tr>
<td>
a. ●●●○○○○

_____ + _____ = _____

7 – _____ = _____
</td>
<td>
b. ✿✿✿✿✿✿

_____ + _____ = _____

6 – _____ = _____
</td>
</tr>
<tr>
<td>
c. ●○○○○

_____ + _____ = _____

5 – _____ = _____
</td>
<td>
d. ✿✿✿✿✿✿

_____ + _____ = _____

6 – _____ = _____
</td>
</tr>
<tr>
<td>
e. ☐☐☐☐☐▨▨▨

_____ + _____ = _____

8 – _____ = _____
</td>
<td>
f. ☐☐☐▨▨▨

_____ + _____ = _____

6 – _____ = _____
</td>
</tr>
</table>

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2. Make an addition sentence and a subtraction sentence for the same picture.

a.

_____ + _____ = _____

_____ – _____ = _____

b.

_____ + _____ = _____

_____ – _____ = _____

c.

_____ + _____ = _____

_____ – _____ = _____

d.

_____ + _____ = _____

_____ – _____ = _____

3. In each problem, draw circles and then color some circles to fit the addition
   sentence. Then cover the **COLORED** circles and make a subtraction sentence.

a. 7 + 1 = _____

_____ – _____ = _____

b. 6 + 3 = _____

_____ – _____ = _____

c. 2 + 3 = _____

_____ – _____ = _____

d. 2 + 5 = _____

_____ – _____ = _____

e. 7 + 4 = _____

_____ – _____ = _____

f. 3 + 3 = _____

_____ – _____ = _____

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Two Parts — One Total

<table>
<tr>
<td>
There are ten marbles. Some are blue and seven are green. How many are blue?

You can write an addition sentence. You can ALSO write a subtraction sentence, even though nothing is taken away.
</td>
<td>

_____ + 7 = 10

10 − 7 = _____

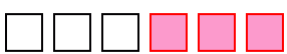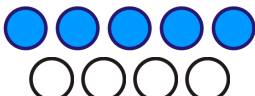Cover part of the total (the green marbles), and you will see the other part (the blue marbles).
</td>
</tr>
<tr>
<td>
There are five blue marbles and some green marbles in a bag. There is a total of nine marbles. How many are green?

Draw the marbles. Write an addition sentence AND a subtraction sentence.
</td>
<td>
_____ + _____ = _____

_____ − _____ = _____
</td>
</tr>
</table>

1. Solve the word problems. Write an addition sentence AND a subtraction sentence.

<table>
<tr>
<td>
a. Mom put some blue and red flowers in a vase. Jen counted five red flowers, and a total of ten flowers. How many of the flowers are blue?
</td>
<td>
_____ + _____ = _____

_____ − _____ = _____
</td>
</tr>
<tr>
<td>
b. There are nine children on a team, and four of them are boys. How many are girls?
</td>
<td>
_____ + _____ = _____

_____ − _____ = _____
</td>
</tr>
</table>

c. Jack has ten socks in his basket. Eight of them
are white, and the rest are black.
How many are black?

_____ + _____ = _____

_____ − _____ = _____

d. Mary saw eight chairs on the lawn,
and two had blown over.
How many were still sitting upright?

_____ + _____ = _____

_____ − _____ = _____

2. For each picture, make a word problem that is solved by subtraction.

a.
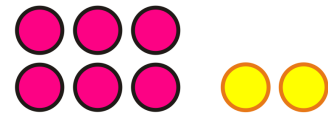
b.

3. Write an addition sentence for the pictures.

a. _____ + _____ + _____ = _____

b. _____ + _____ + _____ = _____

c. _____ + _____ + _____ = _____

d. _____ + _____ + _____ = _____

4. Draw the missing marbles to match the addition sentence.

a.   3 + 2 + _____ = 8

b.   1 + 5 + _____ = 10

5. Draw a picture to solve these problems.

a. Jane had some red, blue, and yellow roses
in a vase. Two roses were blue, and two
were red. If she had a total of ten roses,
how many of them were yellow?

b. Seven birds sat in a tree. One of
them was black, two were blue,
and the rest were brown.
How many were brown?

c. Mary has two long pencils, two medium-
size pencils, and the rest of her pencils
are short. If she owns nine pencils, how
many of her pencils are short?

Fact Families

Two addition facts and two subtraction facts form a <u>fact family</u> if they use the same three numbers.

For example, with 5, 3, and 2 we get a fact family on the right:

5

●● / ●●●

$2 + 3 = 5$ $5 - 3 = 2$

$3 + 2 = 5$ $5 - 2 = 3$

1. Write the fact families to match the pictures.

a.   6

● / ●●●
  ●●

$1 + 5 = 6$

$5 + 1 = 6$

$6 - \text{\_\_\_\_} = \text{\_\_\_\_}$

$6 - \text{\_\_\_\_} = \text{\_\_\_\_}$

b.   8

●● / ●●●
●   ●●

$\text{\_\_\_\_} + \text{\_\_\_\_} = \text{\_\_\_\_}$

$\text{\_\_\_\_} + \text{\_\_\_\_} = \text{\_\_\_\_}$

$\text{\_\_\_\_} - \text{\_\_\_\_} = \text{\_\_\_\_}$

$\text{\_\_\_\_} - \text{\_\_\_\_} = \text{\_\_\_\_}$

c.   9

●● / ●●●
●   ●●●

$\text{\_\_\_\_} + \text{\_\_\_\_} = \text{\_\_\_\_}$

$\text{\_\_\_\_} + \text{\_\_\_\_} = \text{\_\_\_\_}$

$\text{\_\_\_\_} - \text{\_\_\_\_} = \text{\_\_\_\_}$

$\text{\_\_\_\_} - \text{\_\_\_\_} = \text{\_\_\_\_}$

d.   10

●●● / ●
●●●●   ●●

$\text{\_\_\_\_} + \text{\_\_\_\_} = \text{\_\_\_\_}$

$\text{\_\_\_\_} + \text{\_\_\_\_} = \text{\_\_\_\_}$

$\text{\_\_\_\_} - \text{\_\_\_\_} = \text{\_\_\_\_}$

$\text{\_\_\_\_} - \text{\_\_\_\_} = \text{\_\_\_\_}$

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Chapter 3: Place Value Within 0-100
Introduction

In the third chapter of *Math Mammoth Grade 1*, students learn two-digit numbers and a little beyond (to 120). Students compare whole numbers to 100, and learn to think of whole numbers between 10 and 100 in terms of tens and ones.

The initial lessons that introduce tens and ones use a 100-bead abacus extensively. A 100-bead abacus or school abacus simply contains 10 beads on 10 rods with a total of 100. It is *not* a special abacus such the Chinese or the Russians use. In the school abacus, each bead simply represents one. It can look, for example, like the picture on the right. The 100-bead abacus lets children both "see" the numbers and use their touch while making them.

Amazon has many abaci, for example this Melissa & Doug Classic Wooden Abacus:
http://www.amazon.com/exec/obidos/ASIN/B00005BVRQ/?tag=homeschoolmath-20

Browse Amazon's selection of abaci here:
http://www.amazon.com/gp/search?ie=UTF8&keywords=abacus&tag=homeschoolmat-20

Other stores carry abaci as well. If you cannot obtain a real abacus, you can use this virtual abacus:
http://illuminations.nctm.org/ActivityDetail.aspx?ID=8

Besides the abacus, we also use a visual model of blocks where ten of them "snap" together to form a stick. If you already have these so-called base-ten blocks, you can use them along with the visual exercises, if you prefer.

Then, we also use the 100-chart and number lines. Number lines help visualize how the numbers continue indefinitely and also connect with the concept of measuring. The 100-chart helps the child to be familiar with the numbers below 100 and find patterns in the number system.

When children count, they basically just learn numbers as some kind of continuum that continues and continues. With simple counting, your child might not catch on to the inherent structure and how it goes into groups of tens and hundreds and thousands.

For children to understand place value, they first need to know their numbers up to 10, do simple addition with small numbers, and understand about counting in groups. Our whole number system is based on the idea that if you have lots and lots of objects, the efficient way is to count them in groups of tens, hundreds, and thousands - not individually.

The crucial point in understanding the concept of place value is that a **certain position** *represents* a **<u>certain size group</u>**. Then the digit in that position tells you how many of that size group there are. For example, in the number 2,381, we adults already know that 8 represents eight tens, and not just "8". The number 3 represents three hundreds, and not just "3". The placing or positioning of the digit tells us what size the group is that we mean, and the digit itself tells how many of those groups.

In this chapter, children learn this idea for just two digits, or two place values.

For that matter, we could start a different system of writing numbers where font size tells you the place value: for example $7_8{}_2$ would be 7 tens, 8 hundreds, and 2 ones = 872. Please note that this idea is NOT developed here. It is just an example to let *you* see that the place value concept is about something abstract (certain positioning) representing a certain size group.

The Lessons

Helpful Resources on the Internet

Use these free online resources to supplement the "bookwork" as you see fit.

Base Blocks from National Library of Virtual Manipulatives
Place enough ten-sticks and one-blocks into the work area to show given numbers. Choose "Columns = 2" to restrict the program to two-digit numbers.
http://nlvm.usu.edu/en/nav/frames_asid_152_g_1_t_1.html?from=category_g_1_t_1.html

Electronic Abacus
Use this to illustrate two-digit numbers. It shows the amount of beads with a number and with a format "2-ten 5".
http://illuminations.nctm.org/ActivityDetail.aspx?ID=8

Tens and Ones Exercise
Enter the two-digit number displayed by the ten-bags and one-counters
http://www.dositey.com/addsub/tenoneex.htm

Shark Pool Place Value
Click on the number shown by the ten-stacks and individual blocks.
http://www.ictgames.com/sharknumbers.html

Count to 99!
Enter the number shown by the colored blocks of a hundred chart.
http://www.thegreatmartinicompany.com/Kids-Math/kids-count-99.html

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Bar Graphs

This is a **bar graph**. Read it this way: look at the TOP of each column (bar), and look towards the left. How high does the top of the bar reach? Read the number.

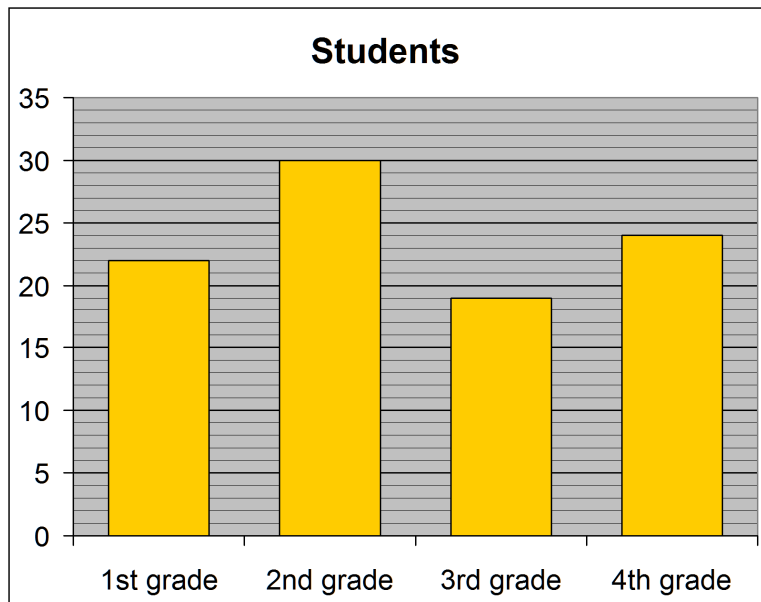Look at the first bar, for short pencils. Where does the top of that bar reach?

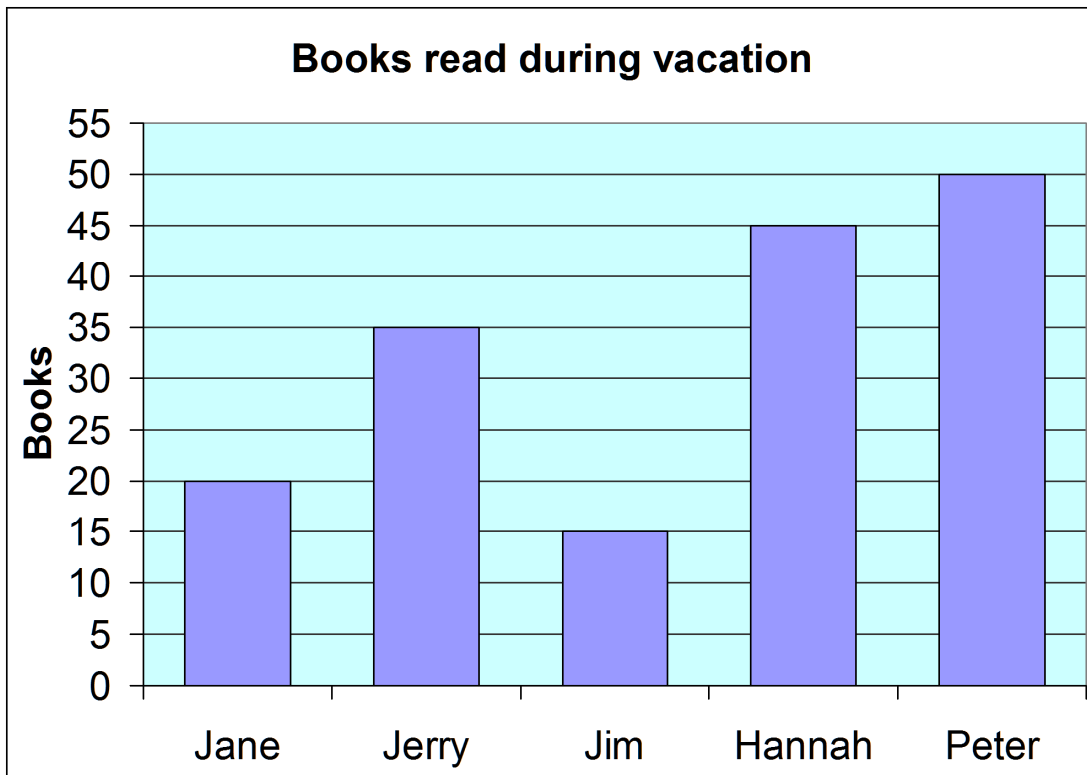It reaches to 7. So, Henry has 7 short pencils.

Henry's Pencils

(Bar graph: short pencils = 7, medium pencils = 5, long pencils = 10)
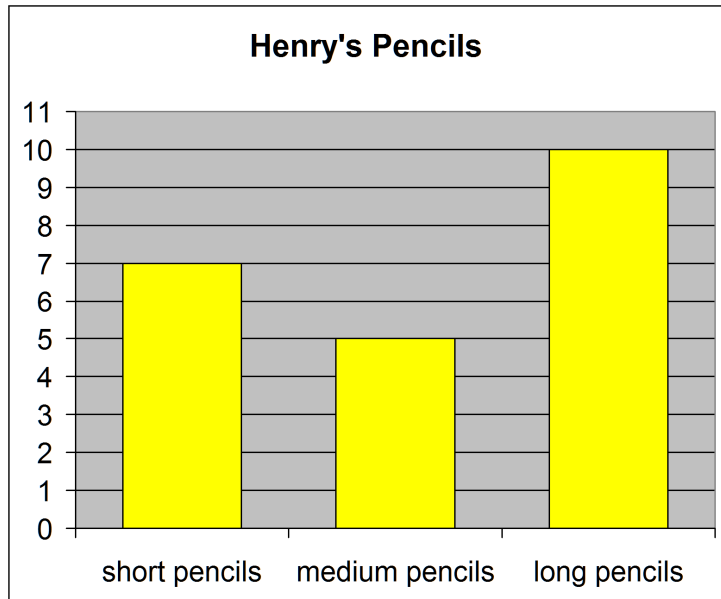
1. **a.** How many medium pencils does Henry have?

   b. How many long pencils does Henry have?

   c. How many short and medium pencils does Henry have in total?

   d. How many more long pencils does he have than short ones?

2. Here, the bar for first grade students reaches two little lines past 20. It is 22 students.

   a. How many students are in 2nd grade?

   b. How many students are in 3rd grade?

   c. How many students are in 4th grade?

Students

(Bar graph: 1st grade = 22, 2nd grade = 30, 3rd grade = 19, 4th grade = 24)

Books read during vacation

3. **a.** How many books did each child read?

Jane _____   Jerry _____   Jim _____   Hannah _____   Peter _____

b. _____ read the least books.

_____ read the most books.

c. The two children who read the most books were _____

and _____.

The two children who read the least books were _____

and _____.

d. How many books did Jane and Peter read together? _____ books

(Challenge) How many books did Jim and Hannah read together? _____ books

Tally Marks

1. Tally marks. Tally marks are counting marks. When people count they make one tally mark for each thing they count. For one thing, draw one tally mark as " | " . The fifth tally mark is drawn across the four others like " ⊬⊬ ".

Write the number that the tally marks mean.

⊬⊬ I	⊬⊬ ⊬⊬ I I	⊬⊬ ⊬⊬ ⊬⊬ I I I I	⊬⊬ ⊬⊬ ⊬⊬ ⊬⊬ I I I
a. _____	**b.** _____	**c.** _____	**d.** _____

2. Draw tally marks for these numbers.

a. 7	**b.** 14
c. 16	**d.** 32
e. 41	**f.** 28

3. Count the fish. Use tally marks. Mark the fish you are counting, and write a tally mark for it. That way you won't count the same fish twice. Then write the number under "Count".

	Tally Marks	Count
Red		
Blue		
Yellow		