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Think Math! Common Core Resource Guide

This guide is your Think Math! road map for meeting the Common Core State Standards for Mathematics for your grade. It contains teaching resources that extend existing Think Math! chapters, deepening the program’s coverage of Common Core concepts and skills.

Think Math! and the Common Core State Standards

Think Math! is a comprehensive K–5 core curriculum created by Education Development Center (EDC) that builds strong computational skills, engages students and teachers in understanding mathematics, and prepares all learners to use mathematics to make sense of the world.

The Common Core State Standards for Mathematics provide clear statements of purpose, set high expectations for students, and emphasize mathematical habits of mind. This focus on mathematical ways of thinking fits EDC’s research-based approach to mathematics education. Members of EDC’s Science and Mathematics Programs staff craft their curriculum and professional development work accordingly, while establishing connections between topics and promoting multiple approaches to topics.

The authors of Think Math!, along with other EDC staff, provided commentary during the development of the Common Core State Standards and continue to be involved in identifying and addressing issues of curriculum design to support improved teaching and learning across the country.

Common Core Standards for Mathematical Content

Think Math! balances skill practice with developing conceptual understanding in the five Common Core domains:

- Operations and Algebraic Thinking
- Number and Operations in Base Ten
- Number and Operations—Fractions
- Measurement and Data
- Geometry

Common Core Standards for Mathematical Practice

Think Math! emphasizes problem solving and reasoning, supporting the Common Core practices:

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.
Using This Guide

Whenever you begin a new chapter in *Think Math!*, turn to the table of contents of this Common Core Resource Guide to see if additional teaching resources have been provided for that chapter. As necessary, familiarize yourself with those pages as you plan your lessons.

Teaching Resources pages in this guide always begin with a Lesson Planner page. This page includes Lesson Notes that tell you exactly how to use the Common Core teaching resource with your *Think Math!* teacher guide.

Two types of teaching resources are provided:

- **Extended lessons** include either an added or an extended Teach and Practice Activity and may include Activity and/or Explore masters.

- **Added lessons** contain all the features of existing *Think Math!* lessons, including student pages.

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**Extended Lesson — Lesson Planner Page**

**Lesson Notes** describe how and when to use the extended lesson.

**Teach and Practice Activities** in bold have been added or enhanced in the extended lesson.

**Standards and Objectives** are listed for the extended lesson.

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**Added Lesson — Lesson Planner Page**

**Lesson Notes** describe how and when to use the added lesson.

**Lesson Number** uses a dash to show the relationship of the added lesson to existing lessons.

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**Chapter 1**

**Lesson 13-1**

**Student Objectives**

- To know the names and values of numbers 11 to 19
- To understand and write numbers from 11 to 19 in two ways.

**Daily Activities**

1. Open Ended Problem Solving / Headline Story
   - Skills Practice and Review—Extra for Writing Numbers

2. Whole Class Math
   - Lesson 1.13-1
   - Using the current Whole Class Math Activity, “Comparing Rectangles,” the Talk Math feature has been rewritten to explore the idea that a single object can have several measurable attributes.

3. Center Time
   - Center 1: Ten and Some More Lab
   - Center 2: Telling Stories About Ten and Some More
   - Center 3: Game: Number Match

**Lesson Notes**

- Lesson Notes for Lesson 1.13-1 have been added. Use Lesson 1.13-1 after Lesson 1.13.

**About the Lesson**

In this lesson, children will recognize, name, and write numbers from 11 to 19. Children should be comfortable recognizing, naming, and writing numbers to 10 before learning numbers beyond 10. If you feel that your class is not ready to move on to the teen numbers, you may want to introduce this lesson in Chapter 3, before Lesson 10, or in Chapter 4, before Lesson 1.

**About the Mathematics**

Ten is an important benchmark in our number system. By thinking of the numbers 11 to 19 as 10 and some ones, children are introduced to the place value structure of our base-ten number system.

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**Chapter 8**

**Lesson 13**

**Student Objectives**

- To describe several measurable attributes of a single object
- To compare rectangles

**Materials**

- Flip Chart p. 52

**Lesson Notes**

- Replace the current Whole Class Math Activity “Comparing Rectangles” in Lesson 8.13 with this extended activity.

**Lesson Planner**

- **STUDENT OBJECTIVES**
  - To describe several measurable attributes of a single object
  - To compare rectangles

- **MATERIALS**
  - Flip Chart p. 52

- **Extended Activity**
  - NCTM Standards 1, 2, 3, 4, 6, 7, 8, 9, 10
  - Common Core State Standards K.MD.1

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**Overview**

Common Core Resource Guide CC v
Use the following Teaching Resources pages in conjunction with your *Think Math!* teacher guide. Be sure to refer to the Lesson Planner page at the start of each resource for important information about how and when to use it.
Lesson Planner

STUDENT OBJECTIVES
- To recognize even and odd numbers
- To write an equation to express an even number as the sum of two equal addends

Teach and Practice

MATERIALS

A. Exploring Half of a Number (TG p. 470–471)
B. Discussing Even and Odd (CCRG p. CC 3)
C. Half of Even and Odd Numbers (TG p. 473)
D. Playing a Game: Stand Up, Sit Down Silent Teaching (TG p. 474)

Lesson Notes

Replace the current Teach and Practice Activity B in Lesson 7.2 with this extended activity.

About the Activity

In Activity B, children are asked to express even numbers as the sum of two equal addends.
**Discussing Even and Odd**

**Purpose**  To discuss the difference between halving even and odd numbers

**Introduce**  Discuss the terms *even* and *odd*. Ask children if they have heard the words before, and have them explain the context in which they were used. You may wish to define the terms now or wait until they are used in context in the following Task.

**Task**  Refer to the completed table on the board from Activity A. Have children make generalizations about the numbers that can be halved without leftovers and those that can only be halved by splitting a leftover block in half.

**Talk Math**

1. **What do you notice about the table?** Possible answers: Some of the numbers can be divided into halves evenly and some can’t. It looks like even numbers can be divided into halves evenly; Half of odd numbers have “$\frac{1}{2}$” as part of the number.

2. **What numbers can be halved without any leftovers?** Possible answers: numbers that end in 0, 2, 4, 6, or 8; even numbers

3. **What numbers have a leftover when you find half?** Possible answers: numbers that end in 1, 3, 5, 7, and 9; odd numbers

At this point, you may wish to define the terms *even* and *odd* in relation to the numbers that can be halved (even numbers) and the numbers that have a leftover when they are halved (odd numbers). If children don’t bring it up, point out that all even numbers can be halved into two whole numbers while halves of odd numbers will contain $\frac{1}{2}$.

Look back at your table and make a list of all of the even numbers, or all the numbers that can be divided into halves evenly. Point out that all even numbers can be expressed as the sum of two equal halves. On the board, write an equation that represents this situation such as $48 = 24 + 24$. Ask for volunteers to write a similar equation for each of the other even numbers in the table.

**Differentiated Instruction**

**Basic Level**  Using one-digit numbers as examples of even and odd numbers may help to clarify this concept. For example, 4 is an even number, and half of 4 is $\frac{2}{2}$. 5 is an odd number, and half of 5 is $\frac{5}{2}$.
Lesson Planner

STUDENT OBJECTIVE

To tell and write time from analog and digital clocks, using A.M. and P.M.

Teach and Practice

<table>
<thead>
<tr>
<th>MATERIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doubling Halves (TG p. 486)</td>
</tr>
<tr>
<td>Doubling Times (TG p. 487)</td>
</tr>
<tr>
<td>Playing a Game: Race to Tomorrow (CCRG p. CC 5)</td>
</tr>
<tr>
<td>Halving and Doubling (TG p. 489)</td>
</tr>
<tr>
<td>TR: Activity, AM46–AM48</td>
</tr>
<tr>
<td>card stock or index cards</td>
</tr>
</tbody>
</table>

Lesson Notes

Replace the current Teach and Practice Activity C in Lesson 7.4 with this extended activity.

About the Activity

In Activity C, children are asked to use A.M. and P.M. when writing and telling time from analog and digital clocks.
Playing a Game: Race to Tomorrow

Purpose To practice telling time by adding times in a chain

Goal The object of the game is to be first to get past midnight or be closest to midnight when you reach the last clock. This game provides an opportunity for children to practice telling time and adding amounts of time. To introduce the game, you might want to play one or two rounds as a class, with each child filling in his or her own gameboard.

Prepare Materials Make a set of 24 game cards for each pair of children. Copy Activity Masters 47 and 48: Time Game Cards I and II, onto card stock or cut out the cards and glue them onto index cards.

How to Play

1. Give each pair a deck of 24 game cards. Each child needs a copy of Activity Master 46: Race to Tomorrow Gameboard.

2. For each round, players take turns drawing a card from the deck. Each player reads the time on the card and adds this to the time on the next blank clock on their gameboard. For the first round, the time on the card is added to noon. Discuss that the times between 12 noon and midnight are referred to as p.m. Explain that the times between midnight and noon are referred to as a.m. For example, if a player selects the card for 50 minutes, he or she would draw the clock hands for 12:50 and write 12:50 p.m. in the box under the second clock.

3. Players continue playing rounds, each turn writing the new time on the next blank clock on the gameboard.

4. The first player to get a time past midnight exclaims, “It is tomorrow!” and wins the game. If neither player is past midnight when they reach the last clock, they should find how much more time is needed to get to midnight. Then the winner is the player closest to midnight.

Extension As children gain proficiency with the game, you may want to create a set of more advanced cards with times in 5-minute intervals. Put these advanced cards on a different-color card stock so children may choose to play the easier or harder version of the game.

Concept Alert

The task of telling time after midnight can be challenging for children who are unfamiliar with transitions into another day. For example, children trying to add 90 minutes to 11:30 p.m. might be unsure of what to do. Remind them that midnight is 12:00 and works just like noon. They can first add 30 minutes to get to midnight and then add the remaining 60 minutes to midnight. A demonstration clock can help children visualize the time intervals.

Teacher Story

“In my classroom, children began playing Race to Tomorrow during this lesson and continued playing it for the rest of the year. Initially, they played with the game cards. I watched as they became more comfortable with telling time to 10 minutes and then created more difficult cards with times to 5 minutes. Children enjoyed making tricky cards and invented Time Travel Cards that take hours and minutes off an opponent’s clock.”
Lesson Planner

STUDENT OBJECTIVES
- To create and solve two-step word problems
- To write number sentences to match two-step word problems

1 Daily Activities (CCRG p. CC 9)
- Open Ended Problem Solving/Headline Story
- Skills Practice and Review—Out from the Middle by 8s

2 Teach and Practice (CCRG pp. CC 8–CC 10)
- Missing Numbers (CCRG p. CC 8)
- Stories with Missing Pieces (CCRG p. CC 9)
- Working with Story Problems (CCRG p. CC 10)
- Materials
  - counters
  - LAB Masters, CCRG pp. CC 12–CC 13

3 Differentiated Instruction (CCRG p. CC 11)
- Leveled Problem Solving (CCRG p. CC 11)
- Intervention Activity (CCRG p. CC 11)
- Practice Master, CCRG p. CC 14
- Extension Activity (CCRG p. CC 11)
- Extension Master, CCRG p. CC 15

Lesson Notes
Lesson 8.10-1 has been added. Use Lesson 8.10-1 after Lesson 8.10.

About the Lesson
In this lesson, children continue their work with word problems, extending to problems with more than one step. They will see how a complete story, without any missing information, can be made into several different problems. Working with the same story, but with different numbers acting as the unknown, children will begin to see how important it is to make sense of the whole problem.

About the Mathematics
In the problems presented in this lesson, the unknown may be the beginning, the change, or the ending. Your children will solve most of these problems by modeling them with concrete objects. When the beginning number or the change is unknown, the Guess and Check strategy can be very helpful. Encourage children to think about the result they get from a first guess. They should be able to decide if their original guess was too large or too small. Some may be able to decide how much too large or small it is.
Common Core Resource Guide  CC 7

Developing Mathematical Language

Vocabulary: adding to, taking from, total, unknown

The problems in this lesson will involve situations in which numbers are added to or taken from a total. Children will need to interpret what they read to know whether addition or subtraction is taking place. The problems will also have an unknown value. That value may appear in any position in the statement of the problem—as a starting value, a number being added or subtracted, or as a final total. Encourage children to read the question carefully to identify the unknown for each problem.

Pair ELL children with fluent readers from your class. Encourage them to participate in acting out and modeling problems with concrete materials.

Beginning Write a simple word problem on the board. Read it aloud, tracking the print with your finger. Ask children to describe the action in the problem in their own words.

Intermediate Write a simple word problem on the board. Read it with your children. Ask whether the situation involves adding or subtracting.

Advanced Ask children to describe situations they know that involve addition and subtraction. For example, addition can involve items that are bought, made, or found. Subtraction can involve items that are lost, eaten, or given away.

1 Daily Activities

Open-Ended Problem Solving

Read the Headline Story to the class. Ask children to think about what they know and do not know about this situation. Is there anything they can say for sure? What might be true?

Headline Story

Zak collects marbles. He bought 7 new marbles today. Then he gave 2 marbles to his little brother.

Possible responses:
We don’t know how many marbles Zak had before today. If he had 20 marbles this morning, then he has 25 now. 7 are added and then 2 are taken away. He has 5 more than he started with.

Skills Practice and Review

Out from the Middle by 8s

Explain that you are going to make a list of numbers by skip-counting by 8s. Write a two-digit number such as 54 on the board. Call on a child and say, “Add 8.” Write the answer to the right of your number. Point again to the number you started with. Call on another child and say, “Subtract 8.” Write this answer to the left of your number. Continue the list by pointing to the rightmost number and asking a child to add 8 or by pointing to the leftmost number and asking a child to subtract 8.
2 Teach and Practice

A Missing Numbers

Purpose To complete a two-step mathematical story by filling in numbers so that the story makes sense

Introduce On the board, write a mathematical story involving two changes to an amount. Put boxes in place of the numbers in the story. Tell children that this is a math story, but all of the numbers are missing.

Problem Which numbers should we put in the boxes? Ask children to choose numbers to go in each of the boxes in order, and to explain their choices.

Talk Math

What number could go in the first box? How do you know? Possible answer: 14. Ana has some balloons so I can choose any number but 0 to start with.

What number will you pick for the second box? How did you decide? Possible answer: 6. I have to choose a number less than 14 because Ana can’t pop balloons she doesn’t have.

What number will you pick for the third box? How did you decide? Possible answer: 10. I can choose any number I want.

What number will you pick for the fourth box? How did you decide? Possible answer: 18. After Ana pops the balloons, she has 8 left. Then, when she blows up 10 more, she has to have 18.

Model the story that children have created with two number sentences. For the example above, the sentence would be $14 - 6 = 8$ and $8 + 10 = 18$. Talk with the class about how you know which operations to use.

Concept Alert

When asking children whether addition or subtraction is going on in each step, try not to focus only on key words. Instead, ask children to picture what is happening in the context of the problem.
**Stories with Missing Pieces**

**Purpose** To develop and share strategies for solving two-step word problems with one missing value

**Introduce** Write three problems like the ones below on the board and read them with your class.

| A squirrel has 12 acorns. He finds 9 more. Then he eats some acorns. Now he has 18 acorns. How many did he eat? |
| May has some toy cars. She gives 3 to her friend. She buys 5 new cars. Now she has 14 toy cars. How many did she have to start with? |
| Don built 8 towers. He knocked some down. He built 5 more. Now there are 6 towers. How many towers did he knock down? |

**Practice** Have children work in small groups, and assign each group one of the problems to work on first. Groups should be prepared to share their solution and the methods they used to find it. Have counters available for children who want to model the problems. Encourage groups to solve the other problems after they finish their first problem.

**Share** Have groups present their solutions and explain their strategy. Model each of the problems with a number sentence.

**Talk Math**

1. **How did you solve the first problem?** Possible answer: He starts with 12. After he finds 9, he has 21. If you take away the 18 acorns he did not eat, you can see he ate 3 acorns.
2. **How did you solve the second problem?** Possible answer: We didn't know how many cars to start with. We just picked 10. After she gave 3 cars to her brother, she had 7, and then after buying 5, she had 12. Our answer was too small by 2. We tried 12 next, and it worked.
3. **How did you solve the third problem?** Possible answer: We worked backward. He has 6 towers at the end. Before he builds the 5 towers, he must only have had 1 tower. That means that he knocked down 7 towers.
Rick had some grapes. He ate 3 grapes. His mom gave him 5 more. Now he has 7 grapes. Explain how to find out how many grapes Rick had to start with.

Possible answer: You can guess a number, like 10. Then he eats 3, so he has 7 left. Then he gets 5 more, so he has 12. But he should have 7. That means the guess was 5 too big. He must start with only 5 grapes. Then he eats 3 and has 2 left. Then he gets 5 more and has 7 grapes. He started with 5 grapes.
Leveled Problem Solving

Ki has 13 marbles. She loses some.

1. **Basic Level**
   Now Ki has 8 marbles. How many did she lose? Ki lost 5 marbles.

2. **On Level**
   Then her brother gives her 6 more marbles. Now Ki has 8 marbles. How many did she lose? Ki lost 11 marbles.

3. **Above Level**
   Then her brother gives her 6 more marbles. Now Ki has 5 fewer marbles than she started with. How many marbles did she lose? Ki lost 11 marbles.

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**Practice Master, CCRG p. CC 14**

**Solving Two-Step Story Problems**

Solve the problem. Complete the number sentences.

1. Mr. Kim has 8 eggs. He uses 6 of them. How many eggs does Mr. Kim have now? Mr. Kim has 2 eggs.

   $8 - 6 = 2$

2. Eva has 19 beads. She buys 14 more beads. Then she makes a bracelet with 20 beads. How many beads does Eva have now? Eva has 13 beads now.

   $19 + 14 - 20 = 13$

**Extension Master, CCRG p. CC 15**

**Stories with Many Solutions**

Find three different solutions to this story.

Jan has 6 stuffed animals. She gives some stuffed animals to her little sister. Then Jan gets some more stuffed animals for her birthday. Now she has 8 stuffed animals.

1. Jan gave 5 stuffed animals to her sister. Jan got 7 stuffed animals for her birthday. $6 - 5 + 7 = 8$

2. Jan gave 4 stuffed animals to her sister. Jan got 6 stuffed animals for her birthday. $6 - 4 + 6 = 8$

3. Jan gave 3 stuffed animals to her sister. Jan got 5 stuffed animals for her birthday. $6 - 3 + 5 = 8$

4. What is the same about all of your solutions? Jen gets two more animals than she gives.

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**Intervention Activity**

**Two-Step Number Sentences**

Give children a two-step number sentence with a missing value in any position. Have them tell or write a story about the sentence. Then have children act out the story with counters to find the missing value and complete the number sentence.

**Extension Activity**

**Who’s on the Bus?**

Have a small group of children cooperate to write a story problem about a bus driver. Have them start with an unknown number of passengers. Then at each stop, people can get on and/or get off the bus. Allow them to have as many stops as they like. When the story is finished, have them come to you for the final number of passengers on the bus. Then have them solve their problem.
NOTE: Your child is learning to solve story problems with two steps. Ask your child to act out one of the problems for you and explain how to solve it.

CC 12  Common Core Resource Guide
Solve the problem. Show your work.

3. At 12:00, the bakery has some pies.
   Then Rob sells 4 pies.
   He bakes 10 new pies.
   Now there are 18 pies.
   How many pies does the bakery have at 12:00?
   The bakery has ____ pies at 12:00.

4. Kelly counts 23 peas on her plate.
   Her mother gives her more peas.
   Then Kelly eats 19 peas.
   Now she has 32 peas on her plate.
   How many peas does Kelly’s mother give her?
   Kelly’s mother gives her ____ peas.

Challenge

Summer has 19 shells.
She finds some shells on the beach.
She gives some shells to her sister.
Now she has 24 shells.

5. If Summer finds 12 shells, how many shells does she give to her sister? _____

6. If Summer gives 8 shells to her sister, how many shells does she find? _____
Solving Two-Step Story Problems

Solve the problem. Complete the number sentences.

1. Mr. Kim has 8 eggs.
   He uses 6 of them.
   Then he buys 12 more eggs.
   How many eggs does Mr. Kim have now?
   Mr. Kim has ______ eggs.

   \[ 8 - 6 = \square \]
   \[ \square + 12 = \square \]

2. Eva has 19 beads.
   She buys 14 more beads.
   Then she makes a bracelet with 20 beads.
   How many beads does Eva have now?
   Eva has ______ beads now.

   \[ \square + \square = \square \]
   \[ \square - \square = \square \]
Stories with Many Solutions

Find three different solutions to this story.

Jen has 6 stuffed animals.
She gives some stuffed animals to her little sister.
Then Jen gets some more stuffed animals for her birthday.
Now she has 8 stuffed animals.

1. Jen gave ______ stuffed animals to her sister.
   Jen got ______ stuffed animals for her birthday.
   
   \[
   6 - \square + \square = 8
   \]

2. Jen gave ______ stuffed animals to her sister.
   Jen got ______ stuffed animals for her birthday.
   
   \[
   6 - \square + \square = 8
   \]

3. Jen gave ______ stuffed animals to her sister.
   Jen got ______ stuffed animals for her birthday.
   
   \[
   6 - \square + \square = 8
   \]

4. What is the same about all of your solutions?
Lesson 10-2

Story Problems: Putting Together, Taking Apart

NCTM Standards 1, 2, 6, 7, 8, 9, 10
Common Core State Standards 2.OA 1, 2.NBT 5, 7

Lesson Planner

1 Daily Activities (CCRG p. CC 17)
Open Ended Problem Solving/Headline Story
Skills Practice and Review—Mental Math

2 Teach and Practice (CCRG p. CC 18–CC 20)
A Drawing Conclusions (CCRG p. CC 18)
B Finding Facts (CCRG p. CC 19)
C Solving Story Problems (CCRG p. CC 20)

MATERIALS
• counters (optional)
• LAB Masters, CCRG pp. CC 22–CC 23

3 Differentiated Instruction (CCRG p. CC 21)
Leveled Problem Solving (CCRG p. CC 21)
Intervention Activity (CCRG p. CC 21)
Extension Activity (CCRG p. CC 21)

Practice Book Master, CCRG p. CC 24
Extension Book Master, CCRG p. CC 25

Lesson Notes

Lesson 8.10-2 has been added. Use this lesson after Lesson 8.10-1.

About the Lesson
Lesson 8.10-2 is the second in a series of three lessons on two-step word problems. You might wish to save this lesson and the one that follows to use later in the year. You might also use these lessons when you have a short week and prefer not to introduce new material.

If you do move the lessons to later in the year, you can substitute greater numbers in the problems or relate the topics of the example problems to the surrounding lessons.

About the Mathematics
There are several ways to think about addition and subtraction. In the previous lesson, addition and subtraction were modeled by adding and taking away. Children model this type of problem readily with counters or other small objects, adding or taking away objects one by one as they count.

In this lesson, addition is thought of as putting together two groups of objects. Subtraction is seen as taking apart. Children model these problems with counters, too, using a different type of action. To model addition, a child will form two groups of counters and then push them together. Similarly, they will model subtraction by forming a subgroup of counters and then pulling it away from the main group.
Developing Mathematical Language

Vocabulary: put together, take apart, group, sort

In this lesson, children will sort themselves into groups. They will put together two groups to make a larger group, modeling addition, and they will take apart a group to make separate smaller groups, modeling subtraction.

While working on word problems, pair ELL children with fluent readers. Encourage them to use concrete materials, such as counters, to work out problems.

**Beginning** Think of simple ways to sort the children in your group. For example, you might ask all the children with sweaters on to stand on one side, and all the children without sweaters to stand on the other. When children are in place, restate the rule for the grouping.

**Intermediate** Sort your children into two groups, without telling them the rule you are using. Ask them to look closely and guess what rule you used. Have children justify their guesses.

**Advanced** Ask a student to sort the rest of the children into two groups using a rule. Then have the children guess the rule, and justify their guesses.

Open-Ended Problem Solving

Share this headline story with your class. Ask children to think about what they can conclude about Ms. Toma’s class from this information.

**Headline Story**

In Ms. Toma’s class, there are 12 girls and 8 boys.
6 boys are wearing sneakers.
The rest of the boys are wearing boots.

Possible responses:
There are 20 children in Ms. Toma’s class. 2 boys are wearing boots. We don’t know what kind of shoes the girls are wearing.

Skills Practice and Review

**Mental Math**

Explain that you want children to solve the problems you will write on the board using mental math. Write an addition or subtraction problem that does not involve regrouping on the board. Call on a student for the answer. If your class enjoys silent teaching, just hand the chalk to the student you wish to answer. At the end of the practice, ask children what was the same about all of the problems. See if they noticed that none of the problems required regrouping. Have them share their strategies for solving these problems quickly.
A Drawing Conclusions

Purpose To explore drawing conclusions from limited information

Introduce Tell the class that you are going to ask some questions. Then after you learn each new fact, you’re going to see if there are any other facts you can figure out. Draw a vertical line on the board. Label the left side, “What We Know” and the right side “What We Can Figure Out.”

Task Have the class draw conclusions from facts they know. Start with the question, “How many children are in this class?” Have your children raise their hands and count them out loud. Write the information on the left side of the line. Model your thinking, by saying something like, “Is there anything else I know? I don’t think so. I’ll ask another question.”

Next ask, “How many girls are in the class?” The girls raise their hands. When this new fact is on the board, say “I think I know something else without even asking.” Children may realize that they can now figure out the number of boys in the class. Write this fact on the right side of the board with the number sentence that allowed you to compute it.

Choose a color that some boys in your class are wearing. Now ask, for example, “How many boys are wearing red?” Record the new fact on the left side of the board.

Practice Is there anything else we can figure out? Work out the logic with your class. If necessary, explain that if you subtract the number of boys wearing red from the total number of boys, you will know the number of boys not wearing red. Write the number of boys who are not wearing red on the right side of the board with the number sentence you used. Whenever you write a new fact on the right side of the board, show the number sentence that allows you to find it.

Next ask, “How many children are wearing red?” and put that fact on the left side of the board.

Talk Math

What else can we figure out? Possible answer: We can figure out how many children are not wearing red, how many girls are not wearing red, and how many girls are wearing red.

Is there anything else to figure out about boys and girls and wearing red or not wearing red? Possible answer: No, we know how many boys are wearing red or not wearing red and how many girls are wearing or not wearing red.
Finding Facts

Purpose  To practice drawing conclusions from limited information

Introduce  Tell children that you are going to start a new chart that they will
complete. Choose two attributes to think about, such as riding the bus to school and
playing soccer. Here is a sample chart, with sample student responses shown in the
What We Can Figure Out column:

<table>
<thead>
<tr>
<th>What We Know</th>
<th>What We Can Figure Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are ___ children in the class.</td>
<td>___ children in the class are boys</td>
</tr>
<tr>
<td>___ children in the class are girls.</td>
<td>___ children in the class are boys</td>
</tr>
<tr>
<td>___ children ride the bus.</td>
<td>___ children do not ride the bus.</td>
</tr>
<tr>
<td>___ children play soccer.</td>
<td>___ children in the class do not play soccer.</td>
</tr>
<tr>
<td>___ girls play soccer</td>
<td>___ boys play soccer</td>
</tr>
<tr>
<td>___ girls do not play soccer</td>
<td>___ girls do not play soccer</td>
</tr>
</tbody>
</table>

Each of the sentences in the chart has a blank where the number will go. Explain that
you will fill in the blanks after everyone has had a chance to think about what facts
they can figure out. Explain that children should also leave blanks for the numbers on
their side of the chart.

Problem  What Can We Figure Out? Have children work in small groups to think
about what facts they will be able to figure out when the information on the left side
of the chart is completed. If they have trouble getting started, you might clarify the
problem by saying, “If you know the total number of children in the class, and you
know how many ride the bus, what else do you know?”

Talk Math

1.  If we know how many children play soccer, what can we figure out?
   Possible answer: We can figure out how many children do not play
   soccer.

2.  What can we figure out once we know how many girls in the class
   play soccer? Possible answer: We will know how many boys in the
   class play soccer.

Share  Ask the questions necessary to fill in the left side of the chart. As you fill in the
left side of each row, stop and ask groups what they have been able to figure out so
far. If you like, check some of the answers by asking the appropriate children to raise
their hands and be counted directly.
Solving Story Problems  
LAB Masters, CCRG pp. CC 22–CC 23

Purpose To solve two-step word problems involving putting together and taking apart

**Lesson Activity Book Master, CCRG p. CC 22**

1. Circle a question that you can answer from the story. How many girls walk to school? How many boys walk to school?
2. Write a number sentence to match the question you circled.
3. How many children are in Mr. Lee's class? There are 26 children in Mr. Lee's class.
4. How many children in Mr. Lee's class do not walk to school? 17 children in Mr. Lee's class do not walk to school.
   
**Lesson Activity Book Master, CCRG p. CC 23**

1. Answer each question. Show your work.
   5. Nan has 13 blue beads. She also has 18 green beads. Nan uses 25 of her beads to make a bracelet. How many beads does Nan have left? Possible answer: 13 + 18 = 31 31 - 25 = 6
   6. Tony has 23 toy cars. 12 of his toy cars are plastic. His other toy cars are metal. 6 of Tony's metal cars are not red. How many metal cars are not red? Possible answer: 23 - 12 = 11 11 - 6 = 5

**Challenge**

7. Write three questions you can answer from this story.
   a. Mai has 31 beads. 8 beads are blue. 3 of the blue beads are square. She has 16 square beads. How many beads are not blue? How many beads are not square? How many blue beads are not square?
   b. Cho had 15 blue blocks and 7 green blocks. Then her brother gave her some red blocks. Now Cho has 30 blocks. What can you figure out from this information?
   - Possible answer: I can figure out that Cho had 22 blocks, and that her brother gave her 8 red blocks.

**Teaching Notes for LAB Master, CCRG page CC 22**

Children identify a question they can answer from the story. This answer is the first step in answering Problem 4.

**Ongoing Assessment** Children who are not able to identify the questions they can answer from the given information may need to make a more concrete representation of the problem. Suggest that they draw a set of circles to represent the children in the class, and mark them to match the facts.

**Teaching Notes for LAB Master, CCRG page CC 23**

In Problems 5 and 6, the first question is the first step in answering the second question.

**Challenge Problem** This problem asks children to find several questions they can answer from the given information.
Intervention Activity

Writing and Solving Story Problems
Provide small objects, such as buttons, for children to sort by color, shape, and size. Have them write and solve one-step and then two-step problems about their sorted objects. Put the problems for a given set of buttons into an envelope with the buttons. Then another student can solve the problem and check their work using the buttons in the envelope.

Extension Activity

Working in Pairs
Have children work in pairs to write a story problem. They can take turns writing sentences. Both children should check to make sure that their information goes together. Have them provide a solution. You may want to collect these problems together to give to other children who finish early.

Leveled Problem Solving

There are 8 children at a birthday party. 3 of them have red balloons. The others have blue balloons.

1. Basic Level
How many children have blue balloons? 5 children have blue balloons.

2. On Level
Two of the children with blue balloons are boys. How many children with blue balloons are girls? 3 children with blue balloons are girls.

3. Above Level
What is the largest possible number of boys who have blue balloons? Explain how you know. 5 is the largest possible number of boys who have blue balloons. 5 children have blue balloons. If none of those children are girls, then 5 boys could have blue balloons.

Practice Master, CCRG p. CC 24

Solving Story Problems
Solve the problem.

1. Mike has 19 small marbles. He has 13 large marbles. How many marbles does Mike have now?
   Mike has 25 marbles.

2. Ed buys 5 apples, 4 pears, and some oranges. He buys 12 pieces of fruit in all. How many oranges does Ed buy?
   Ed buys 3 oranges.

3. Donna has 9 fish. 3 of them are angelfish. The rest are goldfish. 2 goldfish are white. How many of the goldfish are not white?
   6 goldfish are not white.

Extension Master, CCRG p. CC 25

A Story with Many Questions
Answer the questions about this story.
Ani is playing with 21 blocks. The blocks are red, blue, or green. The blocks are triangles or squares. 15 of the blocks are squares. 7 blocks are blue. Ani has 1 red triangle. She has 5 blue squares. She has 6 green squares. Ani has 3 green triangles.

1. How many of the blocks are triangles?
2. How many of the blocks are blue triangles?
3. How many of the squares are not red?
4. How many of the squares are red?
5. How many of the triangles are blue?
6. How many of the triangles are not blue?
7. How many of the blocks are green?
8. How many of the blocks are red?
9. How many of the blocks are not green?
10. How many of the squares are not blue?
Lesson 10-2

**Story Problems: Putting Together, Taking Apart**

NCTM Standards 1, 2, 6, 7, 8, 9, 10
Common Core State Standards 2.OA 1, 2.NBT5, 7

There are 12 boys and 14 girls in Mr. Lee’s class. 9 children in the class walk to school.

1. Circle a question that you can answer from the story.
   - How many girls walk to school?
   - How many children are in Mr. Lee’s class?
   - How many boys walk to school?

2. Write a number sentence to match the question you circled.

3. How many children are in Mr. Lee’s class?

4. How many children in Mr. Lee’s class do not walk to school?

   Show how you answered the question.

**NOTE:** Your child is learning to solve story problems with logical reasoning. Ask your child to explain how to solve Problem 4.
Answer each question. Show your work.

5. Nan has 13 blue beads. She also has 18 green beads. Nan uses 25 of her beads to make a bracelet. How many beads does Nan have left?

How many beads does Nan have in all? _____

How many beads does Nan have left? _____

6. Tony has 23 toy cars. 12 of his toy cars are plastic. His other toy cars are metal. 6 of Tony’s metal cars are not red. How many metal cars are not red?

How many of Tony’s toy cars are metal? _____

How many metal cars are not red? _____

Challenge

7. Write three questions you can answer from this story.

Mai has 31 beads. 8 beads are blue. 3 of the blue beads are square. She has 16 square beads.

____________________________________

____________________________________

____________________________________

Common Core Resource Guide  CC 23
Solving Story Problems

Solve the problem.

1. Mike has 19 small marbles. He has 13 large marbles. Mike loses 7 of his marbles. How many marbles does Mike have now? Mike has ______ marbles now.


3. Donna has 9 fish. 3 of them are angelfish. The rest are goldfish. 2 goldfish are white. How many of the goldfish are not white? ______ goldfish are not white.

CC 24  Common Core Resource Guide
A Story with Many Questions

Answer the questions about this story.

Ani is playing with 21 blocks. The blocks are red, blue, or green. The blocks are triangles or squares. 15 of the blocks are squares. 7 blocks are blue. Ani has 1 red triangle. She has 5 blue squares. She has 6 green squares. Ani has 3 green triangles.

1. How many of the blocks are triangles? ______
2. How many of the blocks are blue triangles? ______
3. How many of the squares are not red? ______
4. How many of the squares are red? ______
5. How many of the triangles are blue? ______
6. How many of the triangles are not blue? ______
7. How many of the blocks are green? ______
8. How many of the blocks are red? ______
9. How many of the blocks are not green? ______
10. How many of the squares are not blue? ______
Lesson 8.10-3 has been added. Use after Lesson 8.10-2.

About the Lesson
Lesson 8.10-3 is the third in a series of three lessons on two-step word problems. If you are using this lesson later in the year, after Chapter 10, you may want to use three-digit numbers in the classroom part of the lesson.

About the Mathematics
The comparison model is another way for children to think about subtraction. To compare two numbers to find their difference, children can form two separate groups of counters to represent the numbers. Then they line up the counters in the two groups, matching them one-to-one. When no more matches can be made, the counters left over in the larger number represent the difference.

In solving word problems involving comparing, the critical skill is identifying which operation to use. For example, if you know that Jake has 3 more marbles than Dana, and then find out that Jake has 15 marbles, how do you know whether to add or subtract the 3 to find out how many marbles Dana has? Help your children think about this by asking them to identify the larger of the two numbers. Jake has more marbles, so to find out how many Dana has, you will want to subtract the difference, 3, from Jake’s total.
Open-Ended Problem Solving

Share this headline story with your class. Encourage children to think about all the possible numbers of cars that Jack might have, and to compare those numbers to the number that Amy and Rory have.

**Headline Story**

Amy has 23 toy cars. Rory has 32 toy cars. Jack has more cars than Amy, but fewer cars than Rory.

Possible responses:
Jack might have 24 cars. That is 1 more than Amy but 8 fewer than Rory. He could have 28 toy cars. That is 5 more than Amy and 5 fewer than Rory. He could have anywhere from 24 to 31 toy cars.

Skills Practice and Review

**Mental Math**

Write an addition or subtraction problem on the board. Call on a student for the answer. Explain that you want children to use mental math to solve the problems. If your children enjoy silent teaching, you can do this activity silently by handing the chalk to the student you wish to answer. Start by presenting problems that do not require regrouping. If children are successful, try some with regrouping in one place. At the end of the practice, ask children to share their strategies for solving these problems.
A Comparing Secret Numbers

**Purpose** To explore problems involving comparing

**Introduce** Without letting your children see what numbers you are writing, write three two-digit numbers on the board such as 28, 37, and 41. Cover each number with a sticky note. Label the sticky notes A, B, and C. Tell your class that these are your secret numbers.

Give the following clues to the secret numbers:
- A is 9 less than B
- C is 13 more than A
- B is 4 less than C

Work with your class to rephrase each of the three clues, until you have this list:
- A is 9 less than B; B is 9 more than A
- C is 13 more than A; A is 13 less than C
- B is 4 less than C; C is 4 more than B

**Problem** Is there anything else we can figure out? Let children work on this for a bit. Hopefully, they will come up with more than one solution. Possible solutions include A = 5, B = 14, C = 18; A = 68, B = 77, C = 81. As a class, decide that you don’t have enough information to figure out the numbers. Reveal any one of the three numbers, for example, show that B = 37. Have children figure out what the other two are.

**Talk Math**

1. I know that B is 4 less than C. Should I add or subtract 4 from B to find C? Possible answer: C has to be greater than B, so you should add 4 to get 41.

2. Once you know all three numbers, what questions could you ask about them? Possible answer: We could ask for the sum of the three numbers. We could ask which one is the greatest.

Write a word problem using your numbers. Let children help you decide about what objects will be counted in the problem and the names you will use. Here is a sample problem for these numbers:

Jesse has 13 more marbles than Sophie. Sophie has 4 fewer marbles than Dale. Dale has 37 marbles. How many marbles does Jesse have?

Help children see that they can solve this problem with only two comparing sentences. Children should already realize that they have to reveal at least one number for the problem to be solvable. Discuss how you would solve this problem if you didn’t already know the secret numbers.
Creating and Solving Story Problems

**Purpose** To write and solve two-step word problems involving comparing.

**Introduce** Tell children that you want them to write their own comparing problems. Give each student a copy of Activity Master: Writing Your Own Story Problem. Go through the instructions for the page with the class.

**Task** Write your own story problem. Using Activity Master: Writing Your Own Story Problem, each student writes a comparison story problem. When the word problem is complete, children should fold the top edge of the paper down to the dotted line on the activity master to hide the solution. You may need to demonstrate how to fold the paper.

Next, children exchange papers with a partner and solve the problem they get on a separate piece of paper. They can check their work by unfolding the paper to see the solution.

**Talk Math**

1. How do you know whether to add or subtract? Possible answer: I just think about which number is supposed to be greater. If the number I want to find is less than the number I know, I subtract. If the number I want to find is greater than the number I know, I add.

**Share** Ask children to share any strategies they have developed for solving these problems. Children may also want to share problems they thought were funny or especially tricky. You can keep this collection of story problems for children to use for practice. Since the solutions are included, children will be able to practice independently.

**Concept Alert**

As children are working, check to see that they are writing problems with enough information to be solvable. For example, if they don’t include a comparison sentence that mentions one of the numbers, it may not be possible to find that number later.
Reflect and Summarize the Lesson

There are 12 bicycles in the rack. 7 are blue. The rest of the bicycles in the rack are red. How many more blue bicycles than red bicycles are in the rack?

Possible answer: I know that there are 12 bicycles and 7 of them are blue. That means that 5 bicycles are red. That means that there are 2 more blue bicycles than red bicycles.
**Differentiated Instruction**

### Leveled Problem Solving

<table>
<thead>
<tr>
<th>Level</th>
<th>Problem Statement</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Basic Level</strong></td>
<td>How many golf balls did Mark find? Mark found 9 golf balls.</td>
<td>Mark found 9 golf balls.</td>
</tr>
<tr>
<td><strong>2. On Level</strong></td>
<td>Kofi found 12 more than Mark. How many golf balls did Kofi find? Kofi found 21 golf balls.</td>
<td>Kofi found 21 golf balls.</td>
</tr>
</tbody>
</table>

### Intervention Activity

**Number Match**

Give children index cards. Have them make several pairs of cards: one with a number, such as 9, and the other with a comparison clue to the number, such as “4 less than 13,” or “5 more than 4.” Check their pairs of cards. Then have them play a memory game with the cards. Children lay out all the cards face down, and then turn two cards face up. If the cards match they get to take the pair and go again. If they don’t match, they turn both cards face down again.

### Extension Activity

**Stories About Comparing**

Challenges children to write comparison word problems using three-digit numbers. If you like, you can make extra copies of Activity Master: Writing Your Own Problems for children to use. Give children access to base-ten blocks to support both writing and solving the problems.
NOTE: Your child is learning to solve story problems involving comparisons. Play a game where you and your child guess numbers from clues, such as, “My number is 18 more than 53.”
Answer each question. Show your work.

4. Bev found 23 plastic bottles. Tom found 9 fewer plastic bottles. The two children recycled all the bottles they found. How many bottles did they recycle?

   How many bottles did Tom find? _______

   How many bottles did they recycle? _______ bottles

5. Kyle planted 7 roses and 8 tulips. Maya planted 9 roses and 4 tulips. How many more flowers did Kyle plant than Maya?

   How many flowers did Kyle plant? _______

   How many more flowers did Maya plant? _______

Challenge

6. Find three different solutions to this problem.

   Kerry has 21 more raisins than Jo. Eric has 12 fewer raisins than Kerry. How many raisins does each have?

<table>
<thead>
<tr>
<th></th>
<th>Solution 1</th>
<th>Solution 2</th>
<th>Solution 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eric</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Emma buys 3 shirts at one store and 2 shirts at another store. She buys 1 more shirt than Gail did. How many shirts does Gail buy? Gail buys ______ shirts.

2. Julio reads 9 books this summer. Kate reads 3 fewer books than Julio. Together, how many books do they read? Together they read ______ books.

3. Wes has 5 marbles in his hand and 8 marbles in his pocket. Luc has 10 marbles. How many more marbles does Wes have than Luc? Wes has ______ more marbles.
Stories with Many Steps

Solve the problem.

1. Anna ate 26 carrot sticks. Anna ate 13 more carrot sticks than Bret. Bret ate 18 fewer carrot sticks than Dana. Carly ate 15 fewer carrot sticks than Dana. Eliot ate 10 more carrot sticks than Carly.

Who else ate the same number of carrot sticks as Anna?

_______ ate the same number of carrot sticks as Anna.

Show your work.

2. Five friends were jumping rope. Anna jumped 48 jumps. Anna jumped 31 fewer jumps than Dana. Bret jumped 32 fewer jumps than Carly. Eliot jumped 8 more jumps than Carly. Dana jumped 23 more jumps than Bret.

How many jumps did Eliot jump?

Eliot jumped ________ jumps.

Show your work.
Writing Your Own Story Problem

Choose 3 secret numbers.

A  B  C

Write some sentences comparing the numbers.

_____________________________________________________

_____________________________________________________

_____________________________________________________

Which secret number will you tell? _________

Write a question you can ask about your numbers.

_____________________________________________________

After you write your story, fold the top edge of your paper down to the dotted line to cover the answers.

Write a story problem about your numbers.

_____________________________________________________

_____________________________________________________

_____________________________________________________

_____________________________________________________

_____________________________________________________

CC 36  Common Core Resource Guide
Lesson Notes

Lesson 10.8-1 has been added. Use after Lesson 10.8-1 after Lesson 10.8.

About the Lesson

In this lesson, children investigate the effect of adding and subtracting 10 and 100. They look closely at both the number they start with and the sum or difference, and see what changes. For example, in the sentence $346 + 100 = 446$, the starting number, 346, and sum, 446, have the same tens and ones digits. Adding 100 increases only the hundreds digit by 1.

Children see this pattern on the number line and with base-ten blocks. They use this pattern to do quick mental calculations.

This work reinforces and builds children’s understanding of base-ten place value. It also prepares them for Lesson 10.9, in which they will add and subtract three-digit numbers mentally by separating the numbers into hundreds, tens, and ones.
Developing Mathematical Language

Vocabulary: digit, hundreds place, ones place, tens place, mental math

Introduce the term mental math, and invite children to share their own definitions and experiences. Write a three-digit number on the board. Have children say the number and then identify the digit in the hundreds, tens, and ones place. Make the distinction between number and digit clear in your own language and in your restatements of children’s language.

**Open-Ended Problem Solving**

Read the Headline Story to children, and have them use the information in the story to create interesting problems. The goal of Headline Stories is for children to translate situations and information into problems that can be answered mathematically.

**Headline Story**

We are collecting plastic bottles. We have 325 so far. Dana brought some more.

Possible responses:
If Dana brought 5 more there would be 330. Maybe Dana brought 10 more, so there are 335.

**Skills Practice and Review**

**Counting Backward by Hundreds or Tens**

Choose a three-digit number, and have children count backward by hundreds. Stop when the number is less than 100. Pick a different number and have children count backward by tens. Expect that children may have difficulties when moving to a new decade, as in 312, 302, 292.....

Writing the sequences of numbers on the board can help children keep track and work along even if they are not being called on at the moment. You can also look back at the sequence and talk about patterns you see.

**Developing Mathematical Language**

**Vocabulary:** digit, hundreds place, ones place, tens place, mental math

Introduce the term mental math, and invite children to share their own definitions and experiences. Write a three-digit number on the board. Have children say the number and then identify the digit in the hundreds, tens, and ones place. Make the distinction between number and digit clear in your own language and in your restatements of children’s language.

**Open-Ended Problem Solving**

Read the Headline Story to children, and have them use the information in the story to create interesting problems. The goal of Headline Stories is for children to translate situations and information into problems that can be answered mathematically.

**Headline Story**

We are collecting plastic bottles. We have 325 so far. Dana brought some more.

Possible responses:
If Dana brought 5 more there would be 330. Maybe Dana brought 10 more, so there are 335.

**Skills Practice and Review**

**Counting Backward by Hundreds or Tens**

Choose a three-digit number, and have children count backward by hundreds. Stop when the number is less than 100. Pick a different number and have children count backward by tens. Expect that children may have difficulties when moving to a new decade, as in 312, 302, 292.....

Writing the sequences of numbers on the board can help children keep track and work along even if they are not being called on at the moment. You can also look back at the sequence and talk about patterns you see.
**Teach and Practice**

### Adding and Subtracting 10 and 100

**Purpose** To explore the effects of adding and subtracting 10 and 100 on the number line and with base-ten blocks.

**Introduce** Draw a very long number line on the board and mark a three-digit number, such as 182 on it. Ask a volunteer to model the number 182 for the class with base-ten blocks. Show a small jump forward on the number line and write the problem 182 \( + 10 = \) _____ on the board. Have the volunteer show the addition with base-ten blocks. Then call on another child for the sum. Label the landing point and complete the addition sentence.

**Problem** How can we learn to add and subtract 10 and 100 using mental math? Ask children to compare the starting point and the landing point for the jump of 10 spaces. Have them tell you which digits are the same for both numbers and which are different. They will see that the tens digit is different. Underline the tens digit in each of the numbers in the addition sentence.

Show a few more forward jumps of 10, being sure to go beyond 200. Model each addition with the base-ten blocks and with number sentences, comparing the starting and landing points.

**Talk Math**

1. **How do we show adding 10 with base-ten blocks?** Possible answer: Add a rod. If there are 10 rods, trade for a flat.
2. **How are the numbers for the starting and landing points different for a forward jump of 10 spaces?** Possible answer: The tens digit for the landing point is one more than the tens digit of the starting point. The hundreds and ones digits are the same for both numbers.

**Practice** Now show forward jumps of 100, modeling with blocks and sentences. Compare the starting and landing points for these jumps. Have children describe what changes.

Repeat the process starting at a number such as 923 and jumping backward by 10 and then backward by 100.
Playing a Game: Tug of War

Purpose  To practice adding and subtracting 10 and 100

Goal  The two players each have their own goal. The Subtracter tries to end up with a number less than 500, and the Adder tries to end up with a number greater than 500. The game provides an opportunity for children to practice adding and subtracting 10 and 100 mentally, with base-ten blocks as support where needed. You may want to play a brief round with a partner to demonstrate the game.

Prepare Materials  Each pair of students gets the Activity Master: Tug of War, a cup, and a coin.

How to Play
1. Players decide who will be the Adder and who will be the Subtracter. The Adder goes first, and the Subtracter gets the last coin flip of the game.
2. The game starts at 500. Using the cup, a player flips the coin. If it lands on heads, the Adder will add 100, writing “+ 100,” in the second column. If it lands on tails, the Adder will add 10, writing “+ 10,” in the second column. Similarly, the Subtracter subtracts 100 for a heads result, and subtracts 10 for a tails result, recording the change in the second column. To help players remember what numbers to use, H stands for “heads” and “hundred,” and T stands for “tails” and “ten.” Allow players to use base-ten blocks as support if they wish.
3. If, at any time, the Adder’s turn would result in a total greater than 1,000, the game is over and the Adder wins. Similarly, if the Subtracter’s turn would result in a total less than 0, the game is over and the Subtracter wins.
4. Players play until time is called. Then, after the Subtracter’s last turn, they look at the total. If the final total is less than 500, the Subtracter wins. If it is greater than 500, the Adder wins.
5. Players switch roles and play the game again with a new Activity Master: Tug of War.

Here is a sample of a possible chart after each player has taken two turns.

<table>
<thead>
<tr>
<th>So far, we have…</th>
<th>On my turn, I will…</th>
<th>Our new total is…</th>
</tr>
</thead>
<tbody>
<tr>
<td>H 500</td>
<td>100</td>
<td>600</td>
</tr>
<tr>
<td>T 600</td>
<td>10</td>
<td>590</td>
</tr>
<tr>
<td>H 590</td>
<td>100</td>
<td>690</td>
</tr>
<tr>
<td>H 690</td>
<td>100</td>
<td>590</td>
</tr>
</tbody>
</table>

Ongoing Assessment
Observe children as they play the game.
- What method do they use to add the numbers?
- What method do they use to subtract the numbers?
How would you find the difference 352 − 100 using mental math? Explain.

Possible answer: I would take away 1 from the hundreds digit. The tens and ones digits stay the same. The difference is 252.
Doing More with 10 and 100

Purpose To prepare for finding the sum or difference of any three-digit numbers using mental math

Introduce Summarize the lesson by saying that children can add one, ten, and one hundred to any number in their heads. Remind them that all three-digit numbers have ones, tens, and hundreds. Write the problem 486 + 200 on the board. Ask children how they might solve this problem in their heads. Accept children's ideas, and solve the problem together.

Talk Math
- How could you subtract 352 — 30 in your head? Possible answer: I could count back by tens three times. 342, 332, 322.
- How could you check your answer? Possible answers: I could subtract with paper and pencil; I could use base-ten blocks.

Practice Have children work in pairs to practice using the mental math strategy from this lesson in more than one step. Put some problems on the board involving adding and subtracting multiples of 10 and 100.

681 300 381 205 110 95 749 111 860

Have children complete the problems and check their answers with a partner.

Share Invite children to explain their strategies. Some children might solve the first problem by counting 581, 481, 381. Others may realize that they can decrease the hundreds digit by 3 in a single step. In the third problem, children might choose to add ones, tens, and then hundreds, going from 749 to 750 to 760 to 860. Others might add the hundreds first and then tens and ones, going from 749 to 849 to 859 to 860.
**Differentiated Instruction**

**Leveled Problem Solving**

**Basic Level**
Doug is adding 100. He adds 100 to 387. What digit in his sum will be different from the digits in 387? The hundreds digit will be different.

**On Level**
He adds 100 to 231. How could you use mental math to find Doug’s sum? I could increase the hundreds digit by 1, to get 331.

**Above Level**
Doug adds 100 to 496. Then he adds 100 again to his sum to get his final answer. What one number could you add to 496 to get Doug’s final answer in one step? Explain. Doug first got 596, then 696. I could add 200 to 496 to get Doug’s final answer in one step.

---

**Practice Master, CCRG p. CC 48**

**Adding and Subtracting with 10 and 100**

Add and subtract.

1. $143 + 10 = 153$
2. $286 - 100 = 186$
3. $397 + 100 = 497$
4. $402 - 10 = 392$
5. $540 - 100 = 440$
6. $204 - 10 = 194$
7. $688 + 10 = 698$
8. $116 + 100 = 216$
9. $687 + 100 = 987$
10. $995 + 10 = 955$
11. $954 + 100 = 954$
12. $612 - 100 = 512$
13. $460 - 100 = 360$
14. $906 - 10 = 896$
15. $329 + 10 = 339$
16. $777 + 100 = 877$

---

**Extension Master, CCRG p. CC 49**

**Add and Subtract in Two Steps**

What is missing? Put the same number in every box with the same label.

1. $376 + 10 = 386$
2. $408 + 100 = 508$
3. $295 + 100 = 395$
4. $812 - 10 = 802$

---

**Intervention Activity**

**Model with Base Ten Blocks**

Children may find it helpful to make a quick sketch of the base-ten blocks representing a number. Then they can cross out parts of the picture or add to it to solve the problem. Since the goal of the lesson is to move to using mental math to solve problems like these, encourage children to look back at their work. Have children compare the number they started with and their answer. Let them see for themselves that adding or subtracting 100 affects only the hundreds digit, and adding or subtracting 10 affects only the tens digit.

---

**Extension Activity**

**Numbers Close to Hundreds**

Have children work with a partner to develop and describe mental math strategies for adding and subtracting numbers close to hundreds, such as 301, 110, 90, and 499.
## Tug of War

<table>
<thead>
<tr>
<th>So far we have...</th>
<th>On my turn, I will...</th>
<th>Our new total is...</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>
Mental Math with 10 and 100

Add 10 to each number. Do all the work in your head. Write only the answers.

1. \(138 + 10\)
2. \(223 + 10\)
3. \(506 + 10\)
4. \(391 + 10\)

Subtract 10 from each number. Do all the work in your head. Write only the answers.

5. \(138 - 10\)
6. \(223 - 10\)
7. \(506 - 10\)
8. \(391 - 10\)

Add 100 to each number. Do all the work in your head. Write only the answers.

9. \(138 + 100\)
10. \(223 + 100\)
11. \(506 + 100\)
12. \(391 + 100\)

Subtract 100 from each number. Do all the work in your head. Write only the answers.

13. \(138 - 100\)
14. \(223 - 100\)
15. \(506 - 100\)
16. \(391 - 100\)

NOTE: Your child is learning to add and subtract 10 and 100 using mental math. Ask your child to describe how to add 100 without using pencil and paper.
Add or subtract.

17. 654 + 100
18. 592 + 10
19. 141 − 100
20. 589 − 10

21. 793 + 100
22. 203 − 10
23. 996 − 100
24. 545 + 10

25. Explain how to add 100 using mental math.

Challenge

26. You want to jump forward 90 spaces on the number line. You may use only jumps of 10 and 100. Show how to do it.

385 + 90 =
### Adding and Subtracting with 10 and 100

Add and subtract.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>143 + 10 =</td>
<td>2.</td>
<td>286 - 100 =</td>
</tr>
<tr>
<td>3.</td>
<td>397 + 100 =</td>
<td>4.</td>
<td>402 - 10 =</td>
</tr>
<tr>
<td>5.</td>
<td>540 - 100 =</td>
<td>6.</td>
<td>254 - 10 =</td>
</tr>
<tr>
<td>7.</td>
<td>688 - 10 =</td>
<td>8.</td>
<td>116 + 100 =</td>
</tr>
<tr>
<td>9.</td>
<td>687 - 100 =</td>
<td>10.</td>
<td>895 + 10 =</td>
</tr>
<tr>
<td>11.</td>
<td>964 - 10 =</td>
<td>12.</td>
<td>542 + 100 =</td>
</tr>
<tr>
<td>13.</td>
<td>460 - 100 =</td>
<td>14.</td>
<td>906 - 10 =</td>
</tr>
<tr>
<td>15.</td>
<td>329 + 10 =</td>
<td>16.</td>
<td>777 + 100 =</td>
</tr>
</tbody>
</table>
Add and Subtract in Two Steps

What is missing? Put the same number in every box with the same label.

1. 
   
   \[
   \begin{array}{c}
   376 \\
   + 10 \\
   \end{array}
   \rightarrow
   \begin{array}{c}
   \text{A} \\
   \text{B} \\
   \end{array}
   \rightarrow
   \begin{array}{c}
   - 100 \\
   - \text{C} \\
   \end{array}
   \rightarrow
   \begin{array}{c}
   \text{B} \\
   \text{C} \\
   \end{array}
   \]

2. 
   
   \[
   \begin{array}{c}
   408 \\
   + 100 \\
   \end{array}
   \rightarrow
   \begin{array}{c}
   \text{D} \\
   \text{E} \\
   \end{array}
   \rightarrow
   \begin{array}{c}
   - 10 \\
   + \text{F} \\
   \end{array}
   \rightarrow
   \begin{array}{c}
   \text{E} \\
   \text{F} \\
   \end{array}
   \]

3. 
   
   \[
   \begin{array}{c}
   295 \\
   - 100 \\
   \end{array}
   \rightarrow
   \begin{array}{c}
   \text{G} \\
   \text{H} \\
   \end{array}
   \rightarrow
   \begin{array}{c}
   + 10 \\
   - 100 \\
   - \text{J} \\
   \end{array}
   \rightarrow
   \begin{array}{c}
   \text{H} \\
   \text{I} \\
   \text{J} \\
   \end{array}
   \]

4. 
   
   \[
   \begin{array}{c}
   812 \\
   - 10 \\
   \end{array}
   \rightarrow
   \begin{array}{c}
   \text{K} \\
   \text{L} \\
   \end{array}
   \rightarrow
   \begin{array}{c}
   + 100 \\
   - 10 \\
   + \text{N} \\
   \end{array}
   \rightarrow
   \begin{array}{c}
   \text{L} \\
   \text{M} \\
   \text{N} \\
   \end{array}
   \]
About the Activity
In Activity E, children measure objects to the nearest inch using a ruler. Then, they compare the lengths of objects, determining how much longer one object is than another.

About the Mathematics
Now that children know how to measure objects to the nearest inch, they are ready to compare the lengths of objects. When children are determining how much longer one object is than another, it is important that they recognize that before they can use strategies such as counting on or subtracting lengths, the lengths must be recorded using the same measuring units. Children will explore the conversion of units in Lesson 12.4.
### Teach and Practice

#### Comparing Lengths

**Purpose** To measure to determine how much longer one object is than another.

**Introduce** Give each pair a copy of Activity Master: Comparing Lengths, and ask them to measure the length of each object to the nearest inch. They should record their measurements below each pencil. Once all pairs have measured the four lengths, share results as a group to ensure that all pairs have the correct lengths.

**Task** Have pairs determine the difference in length between the longest object and the shortest object. Ask each pair to determine which object on Activity Master: Comparing Lengths is the longest and which is the shortest. Have them color the longest pencil blue and the shortest pencil red. Next, ask them to find the difference in length between the two objects.

**Talk Math**

**How can you figure out how much longer one object is than another?** Possible answer: I can measure the length of each object and subtract the length of the shorter object from the length of the longer object.

Discuss with children the methods they used to record their thinking. Show children two objects and tell them, for example, that one is about 8 inches long and one is about 3 inches long. Ask children to tell you how to find the difference in length between the two objects. On the board, write a subtraction sentence that may be used to find the difference in length. The subtraction sentence might look like this:

\[ 8 - 3 = \]

**Talk Math**

**Is there another number sentence you could write to describe this problem?** Yes; I can also write an addition sentence; \[ 3 + \square = 8.\]

**Is the difference in the lengths of these two objects exactly 5 inches?** No; The objects were about 8 inches long and about 3 inches long, so the difference in their lengths is about 5 inches.

**Practice** Have children answer the two problems at the bottom of Activity Master: Comparing Lengths. Then, ask pairs to share their results and the number sentences they used.
Comparing Lengths

1. How long is the picture of each pencil? Measure to the nearest inch.

   about ___ inches
   about ___ inches
   about ___ inches
   about ___ inches

2. About how much longer is the blue pencil than the red pencil?

   about ______ inches longer

3. Kara has two pieces of ribbon. The yellow ribbon is 9 inches long. The purple ribbon is 2 inches long. How much longer is the yellow ribbon?

   \[ 9 - 2 = \]

   The yellow ribbon is ______ inches longer.

4. Nate has two crayons. The green crayon is 5 inches long. The brown crayon is 6 inches long. How much longer is the brown crayon?

   \[ 6 - 5 = \]

   The brown crayon is _____ inch longer.
Teacher's Notes

Daily Notes . . .

Quick Notes

More Ideas

Common Core Resource Guide 53
Lesson Planner

Lesson Notes

Replace the current Teach and Practice Activity B in Lesson 12.3 with this extended activity.

About the Activity

In Activity B, children make and read a line plot of their measurement data.
Estimating and Measuring in Feet and Yards

**Purpose** To estimate the length of classroom objects or distances in feet and yards using benchmarks and then measure to the nearest unit.

**Introduce** Work together to create a list of classroom objects and distances that may be measured in feet or yards. Record the list on the board or on a transparency of Activity Master 102: Recording Feet and Yards. Possible objects or distances include:
- Length or width of the meeting area in class
- Length of a desk or table
- Length or width of classroom
- Height of a cubby
- Distance to the pencil sharpener from the teacher’s desk
- Distance to the office from class doorway
- Width or height of the chalkboard
- Width or height of the door

**Task** Have children work with a partner to estimate and then find the length of each item on the class list. As a first step for each object or distance, help children decide whether feet or yards would work better as the unit of measure. Have them estimate the length with a benchmark object or a personal referent for that unit, using their benchmark to measure the object or distance. Finally, children should confirm the measurement with a ruler (to measure feet) or yardstick (to measure yards) and round to the nearest whole unit. Partners record the measurements on AM102 using one master to record objects measured in feet and the other master to record objects measured in yards. It might help children to use the abbreviations for yard (yd) and foot (ft) on their recording sheets.

**Share** After all of the pairs have completed their measurements, bring children together and share the results. Ask volunteers to tell how they recorded parts of yards (for example, “1 and a half feet” or “a little less than 1 yard”). If there are two measurements of the same distance or object, discuss how and why the measurements are the same or different.

**Talk Math** Ask questions such as the following to enhance the discussion.
- What was easy and what was difficult in the activity?
- What benchmarks did you use for 1 foot and 1 yard?
- What strategies did you use to estimate? What strategies do you use to measure?

**Extend** As a class, make line plots of the data on the activity master. Tell children that a line plot shows information along a number line. On the board, draw a horizontal number line. Title it *Lengths in Feet*. Discuss how to label the line. Point out that, to draw the line plot, you put Xs above each number to show how many objects have that length. Talk about how a line plot makes it easy to find the least length, the greatest length, and the most common length. Repeat the process to draw a line plot showing the lengths of objects measured in yards.

**Materials**
- For the teacher: transparency of AM102 (optional)
- For each pair: inch ruler, yardstick, 2 copies of AM102

NCTM Standards 1, 4, 6, 7, 8, 9, 10
CCSS 2.MD 9

**Differentiated Instruction**

**On Level** If you do not have enough yardsticks for all pairs to measure at once, have half the class work on the LAB pages while half the class measures, and then have the groups switch.

**Ongoing Assessment**

Observe pairs as they work to check their skill using a yardstick or a ruler.
- Do they remember how many times the yardstick (or ruler) is used to measure a length?
- Do they lose track of where to place the stick each time after it is picked up?

Some pairs may use teamwork by having one child mark the spot where the yardstick should be placed and the partner move the yardstick.
### Lesson Planner

#### Teach and Practice

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>MATERIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Feet to Inches and Yards to Feet (TG p. 926)</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Playing a Game: What’s My Length? (TG p. 927)</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Working with Inches, Feet, and Yards (TG p. 928)</td>
<td></td>
</tr>
</tbody>
</table>
| **D**    | Using Different Units of Measure (CCRG p. CC 57) | \* CCRG: Activity Master, Measuring in Inches and Feet  
\* classroom objects (measuring from about 12” to about 36”)  
\* inch rulers  
\* yardsticks |

### Lesson Notes

Activity D has been added to Lesson 12.4. Introduce Activity D after children complete Activity C.

### About the Activity

In Activity D, children will discover that the number that they get for the measurement of an object depends on the size of the unit they are using.
2 Teach and Practice

D Using Different Units of Measure

**Purpose** To recognize that it takes more smaller units than larger units to measure the same length

**Introduce** Display a collection of classroom objects. Choose one object and have volunteers measure the object to both the nearest inch and the nearest foot. Display the information in a table. Use Activity Master: Measuring in Inches and Feet or copy the table onto the board.

**Task** Have children measure the displayed objects to the nearest inch and to the nearest foot. Each pair should measure the objects and record their data in the table on Activity Master: Measuring in Inches and Feet.

**Share** After all pairs have completed their measurements, bring children together and share the results.

**Talk Math**

1. Why do you always need more inches than feet to measure the same object? Possible answer: An inch is shorter than a foot, so it takes more of them to measure the same object.

2. For the objects we measured today, why might we want to measure to the nearest inch instead of to the nearest foot? Possible answer: Measuring to the nearest inch will come closer to the exact measurement.

**Ongoing Assessment**

- Can children accurately measure an object to the nearest inch, foot, and yard?
- If they need to move the ruler, do children accurately mark their place, move the ruler, and continue measuring?
Measuring in Inches and Feet

<table>
<thead>
<tr>
<th>Object</th>
<th>Length to the Nearest Inch</th>
<th>Length to the Nearest Foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>My Desk</td>
<td>26 inches</td>
<td>2 feet</td>
</tr>
</tbody>
</table>

CC 58  Common Core Resource Guide