Lesson Planner

STUDENT OBJECTIVES
- To use logical reasoning to draw conclusions
- To solve two-step word problems involving putting together and taking apart

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)

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.
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.
**Concept Alert**

It can be more difficult for some children to understand that a group can be identified by an attribute that they do not have. You might physically group children who are wearing red on one side of the room, and children not wearing red on the other. Let everyone look at the two groups. Everyone in the class belongs in one group or the other.

**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 your chart 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.

**Ongoing Assessment**

As groups are working, check to see that they are drawing correct conclusions. Identify children who need more help with logical reasoning.
Solving Story Problems  
LAB Masters, CCRG pp. CC 22–CC 23

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

**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.

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

**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.

---

**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 children are in Mr. Lee’s class? How many boys walk to school?

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

   Possible answer: 12 + 14 = 26

3. How many children are 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.

   Show how you answered the question.

   26 - 9 = 17

---

**Lesson Activity Book Master, CCRG p. CC 23**

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 the story.

   - How many beads does Nan have in all?
   - How many beads does Nan have left?
   - How many of Tony’s toy cars are metal?

   Possible answer: 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?

---

**Reflect and Summarize the Lesson**

**Write Math**

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.
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 32 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? 6 goldfish are not white.

Sample work is shown.

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? 6
2. How many of the blocks are blue triangles? 2
3. How many of the squares are not red? 11
4. How many of the squares are red? 1
5. How many of the triangles are blue? 2
6. How many of the triangles are not blue? 2
7. How many of the blocks are green? 9
8. How many of the blocks are red? 5
9. How many of the blocks are not green? 12
10. How many of the squares are not blue? 10
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.
**Challenge**

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

<table>
<thead>
<tr>
<th>Mai has 31 beads. 8 beads are blue. 3 of the blue beads are square. She has 16 square beads.</th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
</tr>
<tr>
<td>---</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>---</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>---</td>
</tr>
</tbody>
</table>
Practice Lesson 10.2

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.

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 _____ 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?

   _____ 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? ______