

Translation of Compare Word Problems – Bigger, Smaller, or Difference Unknown

Student Probe

1. Max had 13 fish. Steve had 9 fish. How many more fish did Max have than Steve? Write a number sentence that represents this problem. Use for the unknown number of fish.
2. Maria has 12 hair bows. Suzanne has 3 more hair bows than Maria. How many hair bows does Suzanne have? Write a number sentence that represents this problem. Use for the unknown number of hair bows Suzanne has.

Lesson Description

This lesson is intended to help students rewrite a compare word problem as a mathematical number sentence with one of three quantities unknown—difference, bigger, and smaller. This lesson does not require students to solve the problem only translate into a mathematical statement.

Rationale

In real life, students will be expected to solve contextual problems. The first step required to solve a problem in context is to translate the problem into a mathematical expression. To translate the problem, the student might first determine if the problem has action or no action. Problems with action are easier for young children to solve than problems with no action. Compare problems have no direct or implied action: i.e., there is no change over time. Unlike taking apart problems, compare problems involve relationships between quantities rather than a joining or taking apart action. Compare problems involve the comparison of two distinct, disjoint sets rather the relationship between a set and its subset. In compare problems, one set is the bigger quantity and the other set is the smaller quantity. The third quantity in compare problems is the difference, or the amount by which the bigger quantity exceeds the smaller quantity.

In a compare problem, any one of the three—bigger quantity, smaller quantity, or difference can be unknown. This lesson includes all three types.

At a Glance

What: Translation of compare word problems into number sentences involving subtraction with bigger, smaller, or difference unknown.

Standard:

AR.Math.Content.2.OA.A.1

- Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions.
- Represent a strategy with a related equation including a symbol for the unknown number.

Mathematical Practices:

SMP1: Make sense of problems and persevere in solving them.

SMP2: Reason abstractly and quantitatively

SMP4: Model with mathematics

Who: Students who have difficulty (or cannot) translate from words to a subtraction expressions

Grade Level: 2

Prerequisite Vocabulary: more, fewer, compare, quantity, bigger quantity, smaller quantity, difference.

Prerequisite Skills: none

Delivery Format: Individual or small group

Lesson Length: 30 minutes

Materials, Resources, Technology: None

Student Worksheets: None

Preparation

Prepare printed problems for students to view as they solve each problem and/or answer questions.

Have the following template available to use after each problem is solved:

$$\boxed{\text{BIGGER}} - \boxed{\text{SMALLER}} = \boxed{\text{DIFFERENCE}}$$

Two questions can be asked in this type of problem.

- How many fewer is the “smaller quantity” than the “bigger quantity”?
- How many more is the “bigger quantity” than the “smaller quantity”?

Lesson

The teacher says or does...	Expect students to say or do...	If students do not, then the teacher says or does...
<p>1. Ask students to write number sentence or math problem for the following problem:</p> <p>Danny had 9 apples. Carl had 12 apples. How many fewer apples did Danny have than Carl? Write a number sentence that represents this problem. Use <input type="text"/> for the unknown number of apples.</p> <p>Teacher Note: This problem has a bigger number, smaller number, and a difference.</p>	$12 - 9 = \square$	<p>Ask student to:</p> <p>Restate the problem in your own words. <i>answers varies</i></p> <p>The problem involves what objects? <i>apples</i></p> <p>Does this problem have any action? <i>no</i></p> <p>What numbers are in the problem? <i>9, 12</i></p> <p>What is the bigger quantity? <i>12</i></p> <p><i>What is the smaller quantity?</i> <i>9</i></p> <p>What does the question ask us to find? <i>How many fewer apples is the smaller quantity than the larger quantity.</i></p> <p>Ask student to now write a number sentence that can be used to solve the problem.</p> $12 - 9 = \square$ <p>If needed, use the cards to “write” the number sentence.</p>

The teacher says or does...	Expect students to say or do...	If students do not, then the teacher says or does...
<p>2. Ask students to write number sentence or math problem for the following problem:</p> <p>Carole has 12 stickers. Bobbie has 19 stickers. How many more stickers does Bobbie have than Carole has? Write a number sentence that represents this problem. Use <input type="text"/> for the unknown number of stickers.</p> <p>Teacher Note: This problem has a bigger number, smaller number, and a difference.</p>	$19 - 12 = \square$	<p>Ask student to:</p> <p>Restate the problem in your own words. <i>answers varies</i></p> <p>The problem involves what objects? <i>stickers</i></p> <p>Does this problem have any action? <i>no</i></p> <p>What numbers are in the problem? <i>12, 19</i></p> <p>What is the bigger quantity? <i>19</i></p> <p><i>What is the smaller quantity?</i> <i>12</i></p> <p>What does the question ask us to find? <i>How many more stickers does Bobbie have than Carole has?</i></p> <p>Ask student to now write a number sentence that can be used to solve the problem. $19 - 12 = \square$</p> <p>If needed, use the cards to “write” the number sentence.</p>

The teacher says or does...	Expect students to say or do...	If students do not, then the teacher says or does...
<p>3. Ask students to write number sentence or math problem for the following problem:</p> <p>Misha has 14 cookies. Tonya has 6 more cookies than Misha. How many cookies does Tonya have? Write a number sentence that represents this problem. Use <input type="text"/> for the unknown number of cookies Tonya has.</p> <p>Teacher Note: This problem has a bigger number, smaller number, and a difference.</p>	$14 + 6 = \square$	<p>Ask student to: Restate the problem in your own words. <i>answers varies</i> The problem involves what objects? <i>cookies</i> Does this problem have any action? <i>no</i> What numbers are in the problem? <i>14, 6</i> What is the bigger quantity? <i>number of Tonya cookies</i> How do I know Tonya has the bigger number of cookies? <i>She has 6 more than Misha</i> What is the smaller quantity? <i>14</i> What does the question ask us to find? <i>How many cookies does Tonya have?</i> How many more cookies does Tonya have than Misha? <i>6 more</i> Ask student to now write a number sentence that can be used to solve the problem. $14 + 6 = \square$ If needed, use the cards to “write” the number sentence.</p>

The teacher says or does...	Expect students to say or do...	If students do not, then the teacher says or does...
<p>4. Ask students to write number sentence or math problem for the following problem:</p> <p>Jarod has 4 more crayons than Dylan. Dylan has 11 crayons. How many crayons does Jarod have? Write a number sentence that represents this problem. Use <input type="text"/> for the unknown number of crayons that Jarod has.</p> <p>Teacher Note: This problem has a bigger number, smaller number, and a difference.</p>	$11 + 4 = \square$	<p>Ask student to:</p> <p>Restate the problem in your own words. <i>answers varies</i></p> <p>The problem involves what objects? <i>crayons</i></p> <p>Does this problem have any action? <i>no</i></p> <p>What numbers are in the problem? <i>4, 11</i></p> <p>What is the bigger quantity? <i>number of Jarod's crayons</i></p> <p>How do I know Jared has the bigger number of crayons? <i>He has 4 more than Dylan</i></p> <p>What is the smaller quantity? <i>11</i></p> <p>What does the question ask us to find? <i>How many crayons does Jarod have?</i></p> <p>How many more crayons does Jarod have than Dylan? <i>4 more</i></p> <p>Ask student to now write a number sentence that can be used to solve the problem.</p> $11 + 4 = \square$ <p>If needed, use the cards to "write" the number sentence.</p>

The teacher says or does...	Expect students to say or do...	If students do not, then the teacher says or does...
<p>5. Ask students to write number sentence or math problem for the following problem:</p> <p>Jamie has 6 more beads than Mary. Jamie has 13 beads. How many beads does Mary have? Write a number sentence that represents this problem. Use <input type="text"/> for the unknown number of beads Mary has.</p> <p>Teacher Note: This problem has a bigger number, smaller number, and a difference.</p>	$\square + 6 = 13$	<p>Ask student to: Restate the problem in your own words. <i>answers varies</i> The problem involves what objects? <i>beads</i> Does this problem have any action? <i>no</i> What numbers are in the problem? <i>6, 13</i> What is the bigger quantity? <i>number of beads Jamie has: 13 cookies</i> How do I know Jamie has the bigger number of beads? <i>Jamie has six more beads than Mary</i> <i>What is the smaller quantity? number of beads Mary has; the unknown number of beads</i> What does the question ask us to find? <i>How many beads does Mary have?</i> How many more beads does Jamie have than Mary? <i>6 more</i> Ask student to now write a number sentence that can be used to solve the problem. $\square + 6 = 14$ If needed, use the cards to “write” the number sentence.</p>

The teacher says or does...	Expect students to say or do...	If students do not, then the teacher says or does...
<p>6. Ask students to write number sentence or math problem for the following problem:</p> <p>Jake has 8 fewer guppies than Zack. Zack has 23 guppies. How many guppies does Jake have? Write a number sentence that represents this problem. Use <input type="text"/> for the unknown number of guppies Jack has.</p> <p>Teacher Note: This problem has a bigger number, smaller number, and a difference.</p>	$23 - 8 = \square$	<p>Ask student to: Restate the problem in your own words. <i>answers varies</i> The problem involves what objects? <i>guppy</i> Does this problem have any action? <i>no</i> What numbers are in the problem? <i>8, 23</i> What is the bigger quantity? <i>number of guppies Zack has: 23 guppies</i> How do I know Zack has the bigger number of guppies? <i>Jake has 8 fewer guppies than Zack</i> What is the smaller quantity? <i>number of guppies Jake has; the unknown number of guppies</i> What does the question ask us to find? <i>How many guppies does Jake have?</i> How many fewer guppies does Jake have than Zack? <i>8 fewer</i> Ask student to now write a number sentence that can be used to solve the problem. $23 - 8 = \square$ If needed, use the cards to “write” the number.</p>

Variations

Problems to use with students for guided practice and/or independent practice are listed below.

Difference Unknown:

- Justin has 16 baseball cards. Michael has 23 baseball cards. How many more baseball cards does Michael have than Justin? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.

2. Savannah has 12 cookies. Mary has 18 cookies. How many fewer cookies does Savannah have than Mary has? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.
3. Austin has 25 comic books. Jose has 16 comic books. How many more comic books does Austin have than Jose? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.
4. Erykah has 15 stickers. Her brother has 23 stickers. How many fewer stickers does Erykah have than her brother? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.

Bigger Number Unknown

1. Jarius has 7 more marbles than Lee. Lee has 19 marbles. How many marbles does Jarius have? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.
2. Laura has 24 cupcakes. Suzie has 5 more cupcakes than Laura. How many cupcakes does Suzie have? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.
3. Ashley has 5 fewer beads than Joyce. Joyce has 18 beads. How many beads does Ashley have? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.
4. Laura has 22 hair bows. Her best friend Bobbie has 4 more hair bows than Laura. How many hair bows does Laura have? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.

Smaller Quantity Unknown

1. Jarius has 9 fewer toy cars than David. David has 23 toy cars. How many toy cars does Jarius have? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.
2. Vicki has 21 color loops. Janice has 8 fewer color loops. How many color loops does Janice have? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.
3. Billy has 25 building blocks. His brother has 8 fewer building blocks. How many building blocks does Billy's brother have? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.

4. Terry baked 24 cookies for the class party. Sharon has 6 fewer cookies. How many cookies did Sharon bring for the class party? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.

Formative Assessment

1. Jim has 17 toy cars. His best friend has 11 toy cars. How many more toy cars does Jim have than Roy? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.
2. Jacoby has 16 crayons. Charles has 9 more crayons than Jacoby. How many crayons does Charles have? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.
3. Don has 27 balls. His best friend has 12 fewer balls. How many balls does his friend have? Write a number sentence that represents your thinking. Use for the unknown number of baseball cards.

References

Marjorie Montague, P. (2005, 4 19). *Math Problem Solving for Primary Elementary Students With Disabilities*. Retrieved 2 24, 2011, from The Iris Center:
http://iris.peabody.vanderbilt.edu/resource_infoBrief/k8accesscenter_org_training_resources_documents_Math_Primary_Problem_Solving_pdf.html