Direct Model the Language of a Problem

Student Probe

Luke had 8 pencils. His mother gave him 3 more pencils. How many pencils does Luke have now?

Lesson Description

Students will direct model the language of a problem under the guidance of the teacher. This lesson is only an example of direct modeling of a problem. It may be necessary to follow this format for various problem types over time for students to develop expertise.

Rationale

Initially, children will direct model the action in problems using their intuitive knowledge of mathematics. Over time, children should move to more efficient strategies such as counting or number facts. These facts should be learned through direct modeling and counting strategies not as a rote skill.

Preparation

Linking cubes, base ten blocks, or other types of counters should be available for direct modeling. Chart paper and markers or other display for problems and for direct modeling, as well as pencil and paper for students should be available. Additional addition, subtraction, multiplication, and division probes will be needed.

At a Glance

What: Direct model the language of a problem.

Standard:
AR.Math.Content.1.OA.A.1
Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions (e.g., by using objects, drawings, and *equations* with a symbol for the unknown number to represent the problem).

Standards for Mathematical Practices:
SMP1: Make sense of problems and persevere in solving them.
SMP4: Model with mathematics.

Who: Students who do not understand the language of the problem.

Grade Level: 1

Prerequisite Vocabulary: None

Prerequisite Skills: None

Delivery Format: Individual or small group

Lesson Length: 15-20 minutes

Materials, Resources, Technology: base ten blocks, linking cubes, or other types of counters, paper, pencil

Student Worksheets: None

Lesson

The teacher says or does…	Expect students to say or do…	If students do not, then the teacher says or does…
1. Luke had 8 pencils. His mother gave him 3 more pencils. How many pencils does Luke have now?	11	To begin, the problem says Luke had 8 pencils. Use base ten blocks to show Luke's 8 pencils.
2. Count the blocks you used to represent Luke's 8 pencils.	1, 2, 3, 4, 5, 6, 7, 8	Touch each block and slide it as you count by ones.
3. Next, the word problem says that Luke's mother gave him 3 more pencils. How many pencils did Luke's mother give him?	3	Use base ten blocks to show the 3 pencils Luke's mother gave him.
4. Count the blocks you used to represent the 3 pencils Luke's mother gave him.	1, 2, 3	Touch each block and slide it as you count by ones.
5. Finally, the problem asks you, "How many pencils does Luke have now?" If Luke had 8 pencils and his mother gave him 3 more pencils, what should you do with your group of 8 and your group of 3 to find out how many pencils Luke has in all?	Count them together or join them to get 11.	How many pencils did Luke have? 8 You used base ten blocks to show this and you counted by ones. I heard you say. 1, 2, 3, 4, 5, 6, 7, 8 Next, you used base ten blocks to show that his mother gave him 3 more pencils. I heard you say 1, 2, 3.
6. If you have a group of 8 and a group of 3, what should you do to find how many pencils Luke has in all?	Put them together or join them.	Here is your group of 8 and your group of 3. If you follow the language of the problem, will you join them or separate them? Join them
7. How will you join your group of 8 and your group of 3?	Put them together.	When you join groups together you will put the groups together. Put your

		group of 8 and your group of 3 together.

The teacher says or does…	Expect students to say or do…	If students do not, then the teacher says or does…
How many pencils does Luke have now?	11	Count all your base ten blocks together to find how many pencils Luke has now.

Teacher Notes
None

Variations
Separate Result Unknown
Sarah had 8 pencils. She gave away 5 pencils to her friends. How many pencils does Sarah have now?
(Expect to find your students separating from to solve this problem)
Multiplication
Nick has 3 boxes. He has 5 stickers in each box. How many stickers does Nick have in all?
(Expect to find your students grouping to solve this problem)
Measurement Division
Lori had 12 slices of bread. She used 2 slices of bread to make each sandwich. How many sandwiches did Lori make?
(Expect to find your students putting two slices of bread together six times (measuring) to solve this problem.)
Partitive Division
Eric has 7 packages of baseball cards with the same number of cards in each box. All together he has 21 baseball cards. How many baseball cards are in each box?
(Expect to find your students dividing 21 cubes into 7 groups with the same number of cubes in each group.)

Formative Assessment
Select a problem for students to direct model the language of the problem using manipulative or drawings.

References
Thomas P. Carpenter, Elizabeth Fennema, Megan Loef Franke, Linda Levi, Susan B. Empson (1999). Children's Mathematics Cognitively Guided Instruction, Heinemann: Portsmouth, NH.
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.