Teacher Guide to Clarification

**2.OA.1**

**Represent and solve problems involving addition and subtraction.**

2.OA.1 use addition and subtraction within 100 to solve one- and two- step problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. See glossary, Table 1

**Problem Structure and Unknowns in all positions**

This is a standard to be working on throughout the year. Students need to be exposed to these different types of problem structure. It is not necessary for the students to know the problem type names but be able to see the differences in the problem structure. Traditional addition and subtraction problems tend to be a result unknown. This creates the tendency for students to just add or subtract the two numbers present in a story problem. The Standards ask for students to problem solve different types of problems and to understand what the word problem or question is asking.

Students should be able to identify where the unknown is located. The example below is the same content but asked three different ways with the variable changing positions. From here student can decide the operations they will need to preform and then set up the equation. Refer to the example below from the Grade 2 Flipbook



Ruhl, S. 1983. *Flip book: 2nd Grade.* Amherst, MA: Kansas Department of Education.
 Retrieved from: <http://katm.org/wp/wp-content/uploads/flipbooks/2FlipBookedited.pdf>

It is also important for the student to identify the problem structure. “What is happening in the problem?” The Standards glossary (pg.88) has a table that gives examples of each of the problem types. The Progression Document outlines which problem types grades K-3 are responsible for.

**(#) refers to the different kinds of problem structure and unknown positions**

**(3) Add to –** these are problems in which there are a number of objects and then more objects are added, students must then find the total number of objects.

**(3) Take from** – these are problems in which there are a number of objects and then some of those object are taken away.

**(3) Put Together/ Take Apart** – these are problems in which two totals need to be added together to find the sum or taken apart to find the difference.

**(6) Compare** – there are different ways to compare numbers, students should have experience and practice with each situation.

* Difference unknown – two totals get compared
	+ How many more?
	+ How many fewer?
* Bigger unknown – the Bigger is unknown as compared to the smaller number
	+ More – Ex., Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have?
	+ Fewer – Ex., Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have?
* Smaller unknown – The smaller number is unknown, the bigger number is given.
	+ More
	+ Fewer

Refer back to Table 1 on Pg.89 of the documents

**That is 15 Different types of problems we need to expose student to!**

The problem structure is subtle but it is important to see the reasoning involved when solving these types of situations. The Progression Document outlines which problem types grades K-2 are responsible for mastering. Knowing about this different type of problem structure will help teacher as they create supplemental practice work and assessments. Make sure to have a variety of these kinds of problems. Students will need to recognize when the unknown is not just the result but rather a piece of the problem.



K 1 & 2 2

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Common Core Standards Writing Team. (2013, September 19). *Progressions for the Common
 Core State Standards in Mathematics(draft). K-5 Counting and Cardinality and
 Operations and Algebraic Thinking.* Tucson, AZ: Institute for Mathematics and
 Educations, University of Arizona.

**Coherence and Connections: Need to Know**

|  |  |  |
| --- | --- | --- |
| Below Grade Level | At Grade Level | Above Grade Level |
| 1.OA.11.NBT.41.NBT.51.NBT.6 | **2.OA.1**2.NBT.52.MD.102.MD.52.MD.8 | 3.OA.8 |

In grade one, students work on the study of word problems and becoming fluent in addition and subtraction within 20 using such strategies as decomposing and composing to make ten.

“The study of word problems in grade 1 (1.OA.1, 1.OA.2) can be coordinated with students’ growing proficiency with addition and subtraction within 20 (1.OA.6) and their growing proficiency with multi-digit addition and subtraction (1.NBT).

Word problems can also be linked to students’ growing understanding of properties of addition and the relationship between addition and subtraction. For example, put together/take apart problems with addend unknown can show subtraction as finding an unknown addend.”

pg. 12 Grade 1

 **“2.OA.1** Using situations (from word problems, from classroom events or experiences, and from discovered mathematical patterns) as a source of problems can help students make sense of and contextualize the operations they are learning. There is a tremendous variety of basic situation types in addition and subtraction.”

pg. 19 Grade 2

*PARCC Draft Model Content Frameworks: Mathematics Grades K-2* (2013, December).
 Retrieved May 10, 2014, from <http://parcconline.org/sites/parcc/files/PARCCMCFMathematicsNovember2012V3_FINAL_0.pdf>

In grade 2 students will continue to build up their fluency and problem solving. Students will need to become proficient at solving word problems and figuring out addition and subtraction problems up to 100.

**Classroom Resources**

Use the Power Point to have discussions about how students use strategies in order to solve one- and two- step problems with unknowns in different positions and different problem structures.

**HOT Questions**

1. Tommy and Jill both want to solve the word problem below. Tommy wants to use subtraction and Jill wants to use addition. Show Tommy’s subtraction equation he used to solve the problem and show Jill’s addition equation to solve the problem.

There are 25 cupcakes. A dog ate some of them. There are now 14 cupcakes. How many did the dog eat?

Tommy Jill

25 – x = 14 x + 14 = 25

The dog ate 11 cupcakes

2. Tell a story that will match this number sentence.

? + 16 = 27 Answers will vary

3. I had 14 pencils at the beginning of the school year. Now I only have 2 left. How many pencils did I use?

14 – 2 = x or x + 2 = 14

4. Some students were on the playground. Four students had to go inside. Then there were a total of 14 students on the playground. Then another class of 12 students came out. How many students were on the playground before the four students had to go inside? How many students were on the playground in total.

18

18 + 12 – 4 = 26

**Additional Resources**

Check out 2.OA.1 resources for different problem structure and unknowns in all positions.
<http://www.k-5mathteachingresources.com/2nd-grade-number-activities.html>

Problem Structure with a Tape Diagram
<https://www.illustrativemathematics.org/illustrations/1>

Culminating activity that incorporates the NBT Domain Standards
<https://www.illustrativemathematics.org/illustrations/1309>

Inside Mathematics - Problem of the month and performance assessment tasks for 2.OA.1
<http://www.insidemathematics.org/common-core-resources/mathematical-content-standards/standards-by-grade/2nd-grade>

Bridges in Mathematics – Nice Numberline work for addition and subtraction. Black line masters Free
<http://catalog.mathlearningcenter.org/files/pdfs/SecB2SUP-A1_NumAddSub-201304.pdf>