**K.OA.1**

Teacher Guide to Clarification

**Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.**

**K.OA.1** Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions or equations.

(Drawings need not show details, but should show the mathematics in the problem.)

**Multiple Modes of Communication**

There are a variety of ways people learn, process, and remember information. These learning styles can be categorized into 7 learning strategies: visual, aural, verbal, physical, logical, social, and solitary. Frequently learning styles are often focused on the top 3: visual, aural, and physical. K.OA.1 defines a variety of options students can use to communicate their attempts at addition and subtraction. These options fall into the top 3 learning styles.

* Visual: objects, fingers, mental images, drawings, expressions and equations
* Aural (auditory): sounds, verbal explanations.
* Physical (kinesthetic/ tactile): objects, fingers, acting out situations.

Some of these overlap, but it is important that students are exposed to and given the opportunity to use the style that works best for them. Exposing students to the strategies that are outside their comfort zone of learning styles helps them develop stronger relationships with these strategies. It is important not to target a student’s preferred learning strategy and exclude the others.

Teachers should provide ample opportunity to all students to become comfortable expressing their addition and subtraction with all modes of communication.

Students should be exposed to expressions and equations and encouraged to write them, but are not required to write equations in Kindergarten.

Although students are not required to write expressions and equations in Kindergarten, teachers should consistently write them for students to see. This repetition will help students transition to writing and understanding expressions and equations.

The language teachers use to discuss addition and subtraction is also important. Students will need to become familiar with terms and understand how the context of the terms implies the mathematical operation. This does not mean to teach students that specific words mean specific operations. There are, of course, some terms that frequently imply a specific operation, but the goal is to help students understand which operation to use based on the context of each problem.

Teachers should use the word “total” instead of “sum” as sum sounds like some. Sum and some have opposite meanings. Some is used to describe situations when one or two addends are unknown.

“*What is the fundamental message that kids get when told to look for the key/clue word?* **Don’t read the problem. Don’t imagine the situation. Ignore the context. Abandon your prior knowledge….You don’t have to read; you don’t have to think. Just grab the numbers and compute.**”

Hyde, Comprehending Math, 2006

**Coherence and Connections: Need to Know**

Using addition and subtraction in a word problem context allows students to develop their understanding of what it means to add and subtract. Students should use objects, fingers, mental images, drawing, sounds, acting out situations and verbal explanations in order to develop the concepts of addition and subtraction. Then, they should be introduced to writing expressions and equations using appropriate terminology and symbols which include **+**, **–**, and **=.**

Kansas Association of Teachers of Mathematics (KATM) Flipbooks. Questions or to send feedback: melisa@ksu.edu. Retrieved from: <http://katm.org/wp/wp-content/uploads/flipbooks/KFlipBookedited.pdf>

Students act out adding and subtracting situations by representing quantities in the situation with objects, their fingers, and math drawings (MP.5). To do this, students must mathematize a real-world situation (MP.4), focusing on the quantities and their relationships rather than non-mathematical aspects of the situation. Situations can be acted out and/or presented with pictures or words. Math drawings facilitate reflection and discussion because they remain after the problem is solved. These concrete methods that show all the objects are called Level 1 methods.

Students learn and use mathematical and non-mathematical language, especially when they make up problems and explain their representation and solution. The teacher can write expressions (e.g., 3-1) to represent operations, as well as writing equations that represent the whole situation (e.g., 3-1= ) or after (e.g., 3-1=2). Expressions like 3-1 or 2+1 show the operation, and is helpful for students to have experience just with the expression so they can conceptually chunk this part of an equation.

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.

**K.OA.1** is connected directly to:

K.OA.2 Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.

K.OA.3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation. (e.g., 5=2+3 and 5=4+1)

K.OA.4 From any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.

K.OA.5 Fluently add and subtract within 5.

“Much of the learning in kindergarten – K.CC.6, all of **K.OA** and K.NBT, and K.MD.3 – depends on the foundational ability to count to answer “how many?” (K.CC.5), which itself is grounded in K.CC.4.

Even within mathematics itself, understanding, for example, that 18 is ten ones and eight more ones (K.NBT.1) requires, but also supports, understanding what it means to combine 10 and 8 or take apart 18 (**K.OA**).”

*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>

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| Grade-Level | Grade Above |
| **K.OA.1**K.OA.2 | 1.OA.11.OA.31.OA.4 |

**Classroom Resources**

Resource for teachers to review before teaching K.OA.1 <https://www.teachingchannel.org/videos/visualizing-number-combinations>

Start students with numbers less than or equal to 5. Over time increase the numbers with a goal of adding to 10 or subtracting from 10.

This standard is about understanding, not procedural skill.

Powerpoint

**HOT Questions**

1. Have students roll two dice and add the numbers together. They can explain their answer using any of the communication strategies listed in the standard. You can pair students together to see if they can come up with 2 different ways to express the answers.
2. Provide students with drawings/ pictures of objects. Ask them to add these together. Ask them to subtract one from the other. Allow for multiple ways of expressing the answer.

**Additional Resources**

Illustrative Mathematics
<http://www.illustrativemathematics.org/illustrations/1405>

Hawaii Tasks
<http://standardstoolkit.k12.hi.us/crayons-and-markers-k-oa-1k-oa-2/>

<http://standardstoolkit.k12.hi.us/escaping-bugs-k-oa-1k-oa-2/>

<http://standardstoolkit.k12.hi.us/cookies-k-oa-1k-oa-2/>

Inside Mathematics
<http://www.insidemathematics.org/index.php/kindergarten>