Teacher Guide to Clarification

**K.CC.5**

**Count to tell the number of objects**

K.CC.5 Count to answer “how many?” questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 0-20, count out that many objects.

**Counting Strategies**

Kindergarten students often struggle with recognizing a set of objects is the same as another set when the objects have been moved (spacing can cause confusion).

For example:

 3 cylinders Also, 3 cylinders

**Conservation of Cardinality** means maintaining cardinality despite rearrangement.

**Rectangular array** is a rectangle formed by columns and rows.

Students may struggle to not repeat rows or columns when counting things arranged in a rectangular array.

From the research in early childhood mathematics, (Kathy Richardson),
students go through a progression of four general ways to count. These
counting strategies progress from least difficult to most difficult:
 1) students move objects and count them as they move them, 2) students line up the objects and count them, 3) students have a scattered arrangement and they touch each object as they count and 4) students have a scattered arrangement and count them by visually scanning without touching them. Since the scattered arrangements are the most challenging for students, K.CC.5 calls for students to only count 10 objects in a scattered arrangement, and count up to 20 objects in a line, rectangular array, or circle. Out of these 3 representations, a line is the easiest type of arrangement to count.

Students should develop counting strategies to help them organize the counting process to avoid re-counting or skipping objects.

 Examples:

* If items are placed in a circle, the student may mark or identify the starting object.
* If items are in a scattered configuration, the student may move the objects into an organized pattern.
* Some students may choose to use grouping strategies such as placing objects in twos, fives, or tens (note: this is not a kindergarten expectation).
* Counting up to 20 objects should be reinforced when collecting data to create charts and

graphs. (A student may use a clicker (electronic response system) to communicate his/her count to the teacher).

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>

Remember these are teacher words and not vocabulary for students. Students should not be assessed on this vocabulary.

**Coherence and Connections: Need to Know**

Counting items arranged in a straight line easiest; with more practice, students learn to count objects in more difficult arrangements, such as rectangular arrays (they need to ensure they reach every row or column and do not repeat rows or columns); circles (they need to stop before the object they started with); and scattered configurations (they need to make a single path through all of the objects). Later, students can count out a given number of objects, which is more difficult than just counting that many objects, because counting must be fluent enough for students to have enough attention span to remember the number of objects that is being counted out.

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.

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

In addition to laying the groundwork for place value in grade 1, working with numbers 11-19 (K.NBT) provides opportunities for cardinal counting beyond 10 (**K.CC.5**) and for writing two-digit numbers (K.CC.3). Ten frames can be helpful for this work.

K.MD.3 provides opportunities for cardinal counting (**K.CC.5**) and for comparing numbers (K.CC.6).

Cardinal counting is a focus in itself as needed and is a main component of other work in the kindergarten classroom. Opportunities to develop students’ understanding of cardinality about, both within the instructional time devoted specifically to mathematics and elsewhere in the instructional day. For example, how many plants did the class plant for the science project? What if we planted one more?”

*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.CC.4**K.CC.5**K.CC.6 | 1.NBT.3 |

Show students 2-4 pictures each day and discuss the cardinality. You can take pictures of objects around your school or classroom to help students have more interest.

**Classroom Resources**

K.CC.5.pptx

In slides 2 & 3 and 4 & 5, the cardinality did not change, but the image did. Do students understand that the number of cars in the picture is not defined by the placement of the cars?

In slides 6-8, the cardinality and the spatial orientation change. Can students explain how they answered the question? Do they have to count one puppy at a time? Do they struggle counting in a circle? Do they find it difficult not to count in a straight line?

If students count 5 puppies in the first picture, one at a time, then make sure they are phrasing a complete answer. For example, “There are 1, 2, 3, 4, 5 puppies. There are 5 puppies in the picture.”

The slides 9-17 look at rectangular arrays. Show 2-3 a day and discuss. Differentiate by prepping slides and determining appropriate level of difficulty for students. Students may struggle, but eventually should be successful. Can students successfully count all the objects in the array? Does one orientation of the rectangular array appear easier? How are students counting items in an array? Does the number of items affect the ability to successfully count?

Finally, slides 18-26 have items in a scattered configuration (1 is in a circle). Show 2-3 a day and discuss. Again, differentiate by preparing appropriate level of difficulty in each slide. Are students successful at counting the items? How do they count the items? Do they struggle with repeating items as they count? What strategy do they use? Is anyone’s strategy helpful to others? Does it matter if the items are alike or different?

Dominoes to print: <http://www.k-5mathteachingresources.com/support-files/domino-jigsaws.pdf>

**HOT Questions**

1. Show students a set of objects and ask them how many there are. Mix up the order of the objects and ask again. Change the number of objects and ask again.
2. Have students create groups of objects. The teacher will say a number and write that number on the board for students to see. Students then, either alone or in pairs, create small groups of objects that correctly contain the number of objects stated by the teacher.
3. Let students take pictures/draw pictures of items around the room that represent specific numbers.
4. Provide one-on-one time (interview can be used as an observational assessment) between teacher and student to answer questions of “how many..”. Include groups of items that are in rectangular arrays, lines, circles (up to 20 items), and scattered configuration (up to 10 items).

**Additional Resources**

<http://www.illustrativemathematics.org/illustrations/1420>

<http://standardstoolkit.k12.hi.us/gr-k-recognizing-representing-comparing-numbers-2/>

http://education.illinoisstate.edu/downloads/casei/math/4.%20K%20Letters%20in%20your%20Name%20Task2.pdf

<http://standardstoolkit.k12.hi.us/mystery-bags-q1-q2-k-cc-3-k-cc-4-k-cc-5-k-cc-6/>

<http://standardstoolkit.k12.hi.us/mystery-bag-q3-q4-k-cc-3-k-cc-4-k-cc-5/>

<http://standardstoolkit.k12.hi.us/graphing-sort-k-md-3k-cc-3k-cc-5k-cc-6/>