K:9 Compare 6 and 5

Teacher Notes

Central math concepts

Several tasks in kindergarten focus directly on the domain of counting and cardinality, which is students' all-important entry point to number and operations. At a high level, counting and cardinality (how many there are) involves:†

- Knowing number names and the count sequence;
- Counting to tell the number of objects; and
- Comparing numbers.

The learning in this progression is a blend of fluency and conceptual learning. Consider counting to tell the number of objects—sometimes called "cardinal counting." Cardinal counting is both procedural and conceptual. Cardinal counting a group of objects uses the procedure of saying the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object. This procedure depends on students becoming fluent in saying the count sequence, so that they have enough attention to focus on the pairings involved in counting objects. And conceptually, cardinal counting involves principles of cardinality:

- Understanding that the last number name said tells the number of objects counted.
- Understanding that each successive number name in the count sequence refers to a quantity that is one larger.
- Understanding that the number of objects is the same regardless of their arrangement or the order in which they were counted.

As for comparing numbers, the focus in kindergarten is on comparing the amounts in two collections of objects. Students "Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies" (CCSS K.CC.C.6). After extensive experiences of this kind, students compare two numbers between 1 and 10 presented as written numerals. Listening to students as they tell how they decided which number was greater can provide information about their knowledge and skill in the counting and cardinality domain, such as recognizing written numerals, being able to count forward beginning from a given number within the known sequence, or understanding that each successive number name refers to a quantity that is one larger.

Relevant prior knowledge

The following mathematics knowledge may be activated, extended, and deepened while students work on the task: recognizing written numbers; saying the count sequence; counting forward beginning from 5; relating the symbols 5 and 6 to the cardinalities they refer to; and communicating mathematical reasoning about numbers.

K:9

6 5

Point to the greater number. [Student points.] **Tell me how you decided.**

Answer

Pointing to 6 or communicating in some other way that 6 is the greater number. Explanations may vary but could involve: discussing the quantities involved (as in, "If you have six things, you have more than five"); counting out or drawing a group of 5 objects and comparing it to (or continuing to build) a group of 6 objects; the addition idea that $5 + 1 = 6$ (you have to add 1 to 5 to make 6, so 6 must be more than 5); the subtraction idea that $6 - 1 = 5$ (if we take 1 away from 6 we get 5, then 6 must be more than 5); observing that we say "six" after "five" in the count sequence; or other approaches.

Click here for a student-facing version of the task.

Refer to the Standards

K.CC.B.4c, K.CC.C.7; MP.2, MP.3. Standards codes refer to www.corestandards.org. One purpose of the codes is that they may allow a task to shed light on the Standards cited for that task. Conversely, reading the cited Standards may suggest opportunities to extend a task or draw out its implications. Finally, Standards codes may also assist with locating relevant sections in curriculum materials, including materials aligned to comparable standards.

Aspect(s) of rigor:

Concepts, Procedural skill and fluency

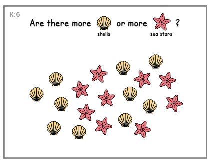
Extending the task

How might students drive the conversation further?

- Two students who gave different explanations could listen to each other's explanations, and each could tell each other if they understood.
- Students could write their own version of task K:9 using numbers that are within their known count sequence and for which they have cardinal-counting experience and experience comparing groups of objects.
- Students who can count out 5–6 objects with support could turn task K:9 into a "puzzle" analogous to task **K:6 More Shells or More Stars?** by drawing two collections of objects (or pasting objects to a sheet of paper, etc.). Students could ask a parent or caregiver to solve their puzzle.

Related Math Milestones tasks

K:6

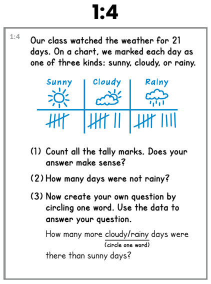

K:6 Are there more [shells] or more [sea stars] ?

K:14


K:14 Are there more land animals or more sea animals?

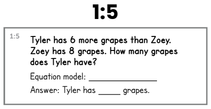
Task **K:6 More Shells or More Stars?** involves procedural fluency in the use of counting to determine which of two groups has more objects. Task **K:14 Animals from Land and Sea** involves a comparison of two groups (groups which the student forms by classifying the animals).

1:4


1:4 Our class watched the weather for 21 days. On a chart, we marked each day as one of three kinds: sunny, cloudy, or rainy.

(1) Count all the tally marks. Does your answer make sense?
(2) How many days were not rainy?
(3) Now create your own question by circling one word. Use the data to answer your question.
How many more cloudy/rainy (circle one word) days were there than sunny days?

1:5


1:5 Tyler has 6 more grapes than Zoey. Zoey has 8 grapes. How many grapes does Tyler have?
Equation model: ______________
Answer: Tyler has _____ grapes.

In later grades, task **1:4 Analyzing Weather Data** (part (3)) involves the situation type "Compare with Difference Unknown," in which students compare two amounts in context by calculating the difference between them. Task **1:5 Tyler's Grapes** involves the situation type "Compare with Bigger Unknown," in which students use information about a comparison in context to deduce the bigger of two numbers being compared.

Additional notes on the design of the task

Completing the task doesn't require students to write a comparison statement such as 6 > 5, because writing comparisons that include the symbols > and < is introduced in grade 1.

Curriculum connection

1. In which unit of your curriculum would you expect to find tasks like K:9? Locate 2-3 similar tasks in that unit. How are the tasks you found similar to each other, and to K:9? In what specific ways do they differ from K:9?
2. Thinking about the curriculum unit you identified, at what point in the unit might a task like K:9 help students converge toward grade-level thinking about the important mathematics in the task? What factors would you consider in choosing when to use such a task in the unit?*

† For additional discussion, see pp. 4, 5 of *Progressions for the Common Core State Standards in Mathematics (draft): K, Counting and Cardinality; K–5, Operations and Algebraic Thinking* (Common Core Standards Writing Team, May 29, 2011. Tucson, AZ: Institute for Mathematics and Education, University of Arizona).

* Math Milestones™ tasks are not designed for summative assessment. Used formatively, the tasks can reveal and promote student thinking.

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Teacher Notes

Anticipating and responding to student thinking about the task

Imagine how students might think about the task, and what you might see and hear while they work.

On this page, you can write your thoughts on the following questions.

Solution Paths

- What solution paths might you expect to see?
- What representations might you see? What correspondences between those representations might be noticed by students (or be worth pointing out to students) and discussed by them?
- What misconceptions or partial understandings might be revealed as students work on the task? How could you respond to these positively and productively?

Language

- What might you expect to hear from students engaged with the task? What does that language reveal about their mathematical thinking, and how might you respond to different ways of thinking?
- If students are using early English or using multiple languages in an integrated communication system, how might you help their classmates see those mathematical ideas as valuable?
- Even when using nascent language, students are thinking and communicating their thinking. What might it look like to respond positively and productively to the mathematics in their thinking before giving feedback on the language used?

Identity, Agency, and Belonging

- How can you engage students' interests, experiences, or funds of knowledge?
- How can you build students' self-confidence as learners, thinkers, and doers of mathematics?
- What choices are there for a student to make in the task? How can you build students' agency to the point where they notice and make these choices to solve problems?
- How might one use feedback to build student agency? Where might there be opportunities to build students' self-confidence?