K:14 Animals from Land and Sea

Teacher Notes

Central math concepts

Counting always involves a choice about what objects we will "count as the same." For example, if we say that there are 9 *animals* in this task, then we are ignoring all differences between the animals: where they live, how big they are, how many legs they have, and so on. Often these choices are instinctive; for example, when a kindergarten student counts a collection of pennies on a table, the student may not even reflect that they are ignoring the difference between pennies that are heads-side-up and pennies that are tails-side-up. What counts—the category for counting; the unit—is simply "pennies." In task **K:14 Animals from Land and Sea**, thinking about the categories for counting is central to the task. As such, this task signals the beginning of a student's study of categorical data, and more importantly the task foreshadows later grades, when choosing a unit will become a prominent element of success in arithmetic reasoning and problem solving.

Relevant prior knowledge

The following mathematics knowledge may be activated, extended, and deepened while students work on the task: counting to tell the number of objects; and identifying whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, for example by using matching and counting strategies.

Extending the task

How might students drive the conversation further?

- Students might ask (or you might ask the students), "What else could we count?" Students might wonder, "How many animals in all? How many eyes are there?" Students could then use counting to find the answers.
- Students could relate categories and units: for example, they could say, "4 land animals + 5 sea animals = 9 animals."

Answer

There are more sea animals than land animals.

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

This task is designed so that students could work with cutouts of the animal images as they classify and count.

Refer to the Standards

K.MD.B.3; MP.2. 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.

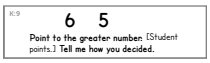
Aspect(s) of rigor:

Application

Related Math Milestones tasks

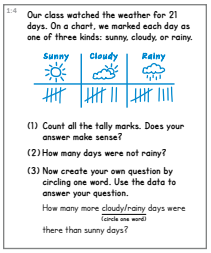
K:6

K:9

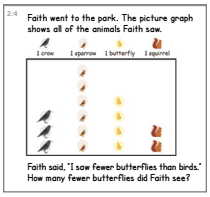


Other tasks for kindergarten that involve comparisons are **K:6 More Shells or More Stars?** and **K:9 Compare 6 and 5**.

1:4



2:4



Task **1:4 Analyzing Weather Data** continues the story of categorical data into grade 1, and task **2:4 Animals in the Park** develops the story further in grade 2.

Additional notes on the design of the task

- The task does not require students to read the animal name words.
- The task does not require students to know facts about the animals ahead of time. Note that the images provide some clues about the animals' habitats. For other cases, students could be informed of the animal's habitat, or students' varied funds of knowledge could be leveraged. The task could also be integrated with science units (see NGSS, Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment).
- In whatever way students classify the animals, what is important mathematically is for students to proceed from that classification to compare the number of animals in each category.

Curriculum connection

1. In which unit of your curriculum would you expect to find tasks like K:14? Locate 2–3 similar tasks in that unit. How are the tasks similar to each other, and to K:14? In what specific ways do they differ?
2. Thinking about the curriculum unit you identified, at what point in the unit might a task like K:14 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?*

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

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?