

Counting Collections Primer

Counting Collections: What is it?

In Counting Collections, children are given a collection of objects to count. Children often begin by using early strategies like counting each item one-by-one and move toward increasingly sophisticated and efficient strategies, like counting by tens. After they count, children are then asked to record how they counted.

While students are working the teacher will circulate, observing children's strategies, problem solving with students, highlighting efficient strategies that are being used, discussing recordings, and supporting partners to work together meaningfully. Often the teacher will first launch the task, guiding students to attend to something in particular or offering a strategy based on what students have been doing, and at the end of the session, they might conclude with ideas that emerged from students during the task.

This activity can be used for many different mathematical purposes (see the *what kids are working on* section below), but many teachers find it helpful to begin the year by asking students to count their collection in a way that makes sense to them. This provides the teacher with an opportunity to see what ideas students already have.

This instructional activity is a powerful tool for novices and practicing teachers in that it has a predictable structure, engages children in rich mathematics, and can continue to be refined and modified to pursue a broad range of mathematical goals. Teachers with varying levels of expertise can enact this task and continue to learn about student thinking and the mathematics involved as they engage with students in the activity.

What are kids working on: What's the math?

The important skills and understandings that make up counting are developed through many opportunities to count. As adults who count with ease, it is hard to recall all of the component skills involved in learning to count and making sense of quantity. Some of the important concepts of number that children develop include:

- Number names: What do I say?
- Order of numbers: What order do the number names go in?
- Name-symbol relation: How do I write that number?
- One-to-one correspondence: Saying one number name for each object counted.
- Cardinality: The last number said is the total amount of objects.
- Relative size: Which is bigger?
- Base-ten structure: How do these numbers (written and verbal) go together? How can I group objects to count and record more efficiently?
- Representations: How do I communicate my ideas in words, numbers, and drawings?

In *Counting Collections*, children have the opportunity to make sense of these concepts and practice counting in a real context. This experience with counting lays the foundation for understanding of the base-ten system and operating on numbers. In addition to foundational number concepts, many teachers are finding *Counting Collections* to be a useful context for operating on numbers and solving problems. For example:

- After counting a collection, find out: how many more to 100?
- Understanding multiplication as a number of equal size groups of objects
- Dividing a collection: How many groups? How many objects in each group?

The Counting Collections Instructional Activity is adapted by the University of Washington based on the work of Megan Franke, UCLA and "Counting Collections" by Schwerdtfeger & Chan (2007).

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What are teachers working on: What practices of ambitious teaching are embedded?

Counting Collections seems less teacher-centered, in that children are actively engaged in doing the activity and the teacher acts as observer and facilitator. This is not to say that the teacher is doing less teaching in this activity! One way that teachers make themselves available to consult with pairs of students during the task is by first *setting and maintaining clear expectations for participation*. In this activity, teachers will be required to think through the ways in which they communicate appropriate ways to participate, help students become independent, hold students accountable for participating according to these expectations.

Counting Collections is also a great opportunity to work on *teaching toward an instructional goal*. Novices can practice identifying a goal, launching the activity, following up with pairs of students, and closing the activity around this goal without pressure to make sure students learn something productive—if they are counting, they already are!

Another important practice that teachers have the opportunity to work on in Counting Collections is assessing students' understanding. Listening closely to students' ideas and using these as building blocks for future sessions allows teachers to select appropriate instructional goals and move children toward increasingly sophisticated understandings of number, quantity, and the base-ten system.

Counting Collections is a social task: children generally work in pairs and must negotiate roles, consider each other's strategies, and share responsibilities. This aspect of the activity provides a natural context for teachers to *orient students to one another's ideas and the math content*. In this activity, the teacher has opportunities to work on this practice in a whole group setting during the launch and closing discussions and also in a small group setting while students are working together in pairs. A major role teachers learn to take up in this activity is to listen and select student ideas that emerge from the class or from a partner and invite other students to learn from them.

Resources

Schwerdtfeger, J., & Chan, A. (2007). Counting Collections. *Teaching Children Mathematics*, (March).

Investigations, elementary math curriculum published by TERC: "Inventory Bags" activity, grades K-2