

Estimate the Number of Objects to 120

Strand: Number and Number Sense

Topic: Estimating the number of objects to 120

Primary SOL: **1.NS.2 The student will represent, compare, and order quantities up to 120.**

b) Estimate the number of objects (up to 120) in a given collection and justify the reasonableness of an answer.

Related SOLs: 1.NS.2a, 1.NS.2d, K.NS.2, 2.NS.2

Materials

- Estimation story book: *How Many Seeds in a Pumpkin?* by Margaret McNamara
- Different sized bags of candy (e.g., fun size, regular size, family size)
- Objects for estimating and counting
- Brown paper lunch bags
- 10 frames (see attached)
- Sorting cups/bowls
- Resealable bags (Sandwich size)
- 120 small objects or manipulatives in a jar (e.g., rocks for a classroom rock jar)
- Containers of various sizes
- Tub of objects that can be sorted (e.g., colored cubes, tiles, pattern blocks, beads, colored pom-poms)
- Classroom 120 number chart (filled in)
- Student 120 number chart (filled in)
- Handout: Estimating Collections around the Room
 - Include sentence starters: “This is my estimate because...” or “My estimate makes sense because...”
- Centers/Stations:
 - Collections Center: Estimate and Count to check to see how many
 - Scoop, Estimate, and Count Center
 - Mystery Bag Center: the number of objects hidden, students estimate how many using their reasoning skills. Then students check to see how close they are to their estimate.

Vocabulary

count, estimate, number chart, represent, total, reasonable, closer to, estimate, fewer, greatest, least, less, more, most, the same

Student/Teacher Actions: What should students be doing? What should teachers be doing?

1. Ask, *“What would you do if I asked you how many seats are in our lunchroom, but you couldn’t count them?”* Allow students to share their ideas. Ask, *“Who knows what it means to estimate?”* Explain to students, *“Estimating in math is very similar to making predictions when we are reading a story. When we make predictions in a story, we can use the title, the pictures we see, and what we know to help strengthen our understanding of a story. Today, we will look at a pile of objects and use what we know about numbers, groups, and what they represent to make our best guess, or estimate, of the number of objects. The idea is to get close to the real number using what we know about numbers, not just guess any number.”* Have students think about an estimate for the total number of seats in the lunchroom and tell why they think their estimate is reasonable.
2. Show a pile with one object, a second pile with 10 objects, and a third pile with 100 objects, so students get an idea of what each quantity looks like. It is important to use the same object for all groups. Ask students to look at the piles and tell how many are in the first pile. *“Now that we know this is one, think about how many may be in pile 2.”* Remind students not to count the objects in the second pile. *“Is it going to be more or less? Why do you think that?”* Allow students to make their estimation and record it on a graph or chart paper. Repeat for pile 3.
3. Ask, *“What is a good way for me to find out how many are in each pile?”* Allow students to share their ideas and guide them to grouping as a strategy to organize the materials to make counting easier. Count each pile together. When you get to the third pile of 100, make sure to make groups of 10 and then count them. Ask: *“Which pile had the most and which pile had the least?” “Does 100 look like a little bit more or a lot more than 10?”*
4. Show students a collection of objects and tell them, *“Today we are going to estimate how many objects are in different classroom containers.”*
5. Teachers can model how to determine a reasonable estimate of objects using an image displayed for the class. Discuss with the class what numbers would be too low of an estimate and the numbers that would be too high of an estimate. Give each student in the group a sticky note and ask them to write an estimate of how many objects they think are shown in the image. Students should write their name on their estimation sticky note and place it at the top of the table for the end of the lesson.
6. Lead the students by having them justify the reasonableness of their estimate. For example, ask *“Would this estimate be too high or too low?” “Why is your estimate reasonable?”*
7. Continue to give clues according to the exact number of objects shown.
8. Spread various containers with different amounts of collections around the room. At each center, have students make estimates about the number of objects in each collection. Next, students count the objects to check and see how close they are to their estimate. Then, students can tell a partner about their estimate, the actual amount, and

justify if the estimate was reasonable or not. Students can record their work on the Estimating and Counting Collections Recording Sheet.

Assessment

- **Questions**

- How can we use what we know about one pile to help us determine how much is in the other pile?
- What makes an estimate too small?
- What makes an estimate too large?
- What makes an estimate reasonable? How do you know?
- When I am estimating to see how many ice cream cones I need for all our first-graders, should I guess any number that comes to mind? What information should I think about when making an estimate?

- **Journal/writing prompts**

- Have students write/draw in their mathematics journals about the process of counting the collections and the final results.
- What's the difference between an estimate and an actual amount? Were you surprised by the results when you counted collections? Why or why not?

- **Other Assessments**

- Make and laminate construction-paper pumpkins with different amounts of seeds. At the bottom, give students three different possible answers. Without counting, students will use paper clips or clothespins to clip the answer they think is correct.
- Put some rocks you have counted into a jar. At the end of the lesson, present the jar to the students. Ask the students to look at the jar, think about how many items they think are in the jar. Pass out an index card to each student and ask them to put their name on it and write a number of how many they think are in the jar and explain how they came up with their answer. Collect the exit slips and create a small-group lesson on the data.

Extensions and Connections (for all students)

- Place a variety of seeds (e.g., pumpkin seeds, peach pits, orange seeds) in your science center for students to count and compare.
- Provide an estimation jar for students to estimate, count, and compare the number of various manipulatives required to fill the jar. Have students reflect on the following questions: *About how many ____ are in the container? Do you think there are more/fewer than 10? How do you know? Do you think there are more/fewer than 100? How do you know? How could we figure out how many are actually in the container?* (Show a group of 10 as a reference for estimating.)

- Ask students whether the number of seeds found in a pumpkin is related to its size. How about the number of seeds in an apple or orange? Lead students in an experiment to find out.
- Each group could have a container with the same number of objects but different objects in each (e.g., Group 1 has pom-pom balls, Group 2 has cotton balls, and Group 3 has cubes). The groups could then compare the similarities and differences among the objects in their containers.
- Have students create and solve addition and subtraction problems, using seeds and pumpkin boards (a picture of a pumpkin, cut out and glued to construction paper). White plastic cubes or lima beans may also be used to represent seeds.

Strategies for Differentiation

- Use smaller numbers of objects to count with and extend, as students are ready.
- Use sentence starters to help students justify their reasoning.
- Provide blank ten frames, cups, or other ways for students to group objects by ten.
- Provide various hundreds charts to support students' comprehension of numbers beyond 100, as needed.

Note: The following pages are intended for classroom use for students as a visual aid to learning.

120 Chart

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120

10 Frame

Estimating and Counting Collections Recording Sheet

Estimating and Counting Collections

Station A

What is your estimate? _____

How many objects are there? _____

Was your estimate reasonable? Why or why not?

Station B

What is your estimate? _____

How many objects are there? _____

Was your estimate reasonable? Why or why not?

Station C

What is your estimate? _____

How many objects are there? _____

Was your estimate reasonable? Why or why not?

Station D

What is your estimate? _____

How many objects are there? _____

Was your estimate reasonable? Why or why not?

Station E

What is your estimate? _____

How many objects are there? _____

Was your estimate reasonable? Why or why not?

Station F

What is your estimate? _____

How many objects are there? _____

Was your estimate reasonable? Why or why not?
