

Pumpkin Puzzlers, part 2

Reporting Category Computation and Estimation

Topic Exploring magnitude of number

Primary SOL 1.4 The student, given a familiar problem situation involving magnitude, will

- a) select a reasonable order of magnitude from three given quantities: a one-digit numeral, a two-digit numeral, and a three-digit numeral (e.g., 5, 50, 500); and
- b) explain the reasonableness of the choice.

Related SOL 1.10b, 1.14, 1.15

Materials

- One medium pumpkin
- Bathroom scales
- Mystery box (cardboard box covered with question marks)
- Small pumpkin cutouts
- Classroom graphing chart

Vocabulary

heavier, lighter, estimate, predict, reasonable, about, weigh

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Note: Before beginning this activity, place the pumpkin in the mystery box.

1. Display a mystery box, and invite students to play “20 Questions.” Explain that they may ask you up to 20 “yes or no” questions to determine what is in the mystery box. Ask one student to keep a tally of the number of questions asked. Remind students that it is important to listen closely so as not to duplicate questions and waste a turn to ask a question. If after 20 questions no one has guessed the object, you may give some clues and/or allow more questions. When students have correctly guessed, reveal the pumpkin by setting it out in full view.
2. Ask students to guess about how many pounds the pumpkin will weigh. Pass around a one-pound can of food for students to hold. Ask them whether they think the pumpkin weighs closer to 5 lbs, 50 lbs, or 500 lbs (adjust these numbers to the weight of your pumpkin).
3. Give a small pumpkin cutout to each student. Ask each student to record his/her estimation on one side of the cutout and write his/her name on the other side.
4. Have students place their pumpkin cutouts in the proper columns on a classroom graph. Discuss the graph, and ask students to name the numbers they chose and explain the reasons for their choices.
5. Weigh the pumpkin, and write the results on the board. Discuss what objects might weigh about 50 pounds (ask a volunteer to step on the scales) and about 500 pounds (a giant tortoise).

6. Compare and discuss students' estimates to the actual weight of the pumpkin.

Assessment

- **Questions**
 - Write the numbers 1, 10, and 100 on the board. "If you were weighing a water bottle, a stack of textbooks, and a fifth grader, which would weigh about one pound? About ten pounds? About one hundred pounds? What is the reason for each of your choices?"
- **Journal/Writing Prompts**
 - "Show how your weight will change as you grow. Draw and describe your weight as a baby, as a first grader, and as an adult."
 - Provide pictures of objects (e.g., pencils, toy chest, elephant), and have students sort them into three piles: small, medium, and large. "Estimate how many pounds each item weighs and explain your reasoning."
 - Provide a balance scale and several light, medium, and heavy objects for students to weigh, using nonstandard units. "Weigh each object and record your results in your math journal."
- **Other**
 - As students write their estimates, circulate around the room and challenge them to support their decisions, offering assistance as needed and answering any questions.

Extensions and Connections (for all students)

- Display three jars of the same size on a table. In one jar place 10 beans, in another jar place 50 beans, and in the third jar place 100 beans. Ask students to identify which jar they think contains 50 beans. Which contains 100 beans. Which contains 10 beans. Ask them how they know without actually counting the beans.
- Frequently, provide estimation jars containing less than 10 objects, 10–90 objects, or more than 100 objects to give students practice determining magnitude of number. Have students draw the jar, estimate how many objects it contains, and explain their reasoning.
- Ask students whether it would take more energy (force) to move an object that is heavier or lighter. Have them explain their answers. Ask how they could prove this.

Strategies for Differentiation

- If students have difficulty distinguishing three very different weights, begin with two obviously lighter and heavier objects (e.g., an empty shoe box and a brick, a folded hand towel and a textbook, a feather and a marble). Provide balance scales if desired.
- If students are unable to write numbers, allow them to use number stamps.
- Provide sentence frame question prompts to assist students who have difficulty forming questions.