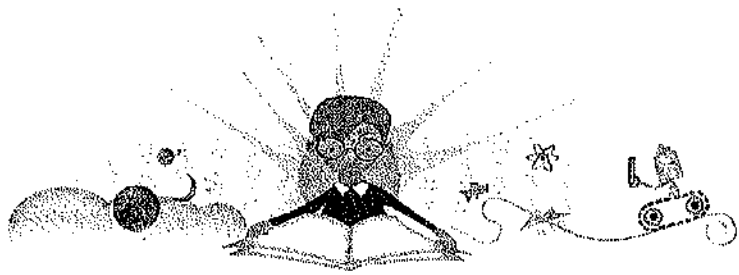


Chapter 25

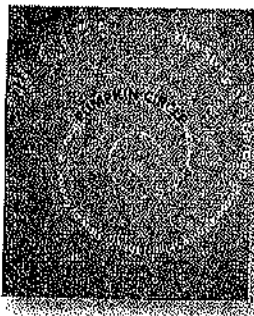


Pumpkins!

By Karen Ansberry and Emily Morgan

Walk through any elementary school in the fall and you are bound to see students learning about pumpkins. Kids of all ages are fascinated by these versatile, edible members of the gourd family. Pumpkins are interesting and inexpensive and can be found in a variety of colors, shapes, and sizes, so they're terrific for using in hands-on math and science lessons. The activities described here use two picture books about pumpkins as well as some real pumpkins to engage students in the processes of scientific inquiry.

Trade Books



Pumpkin Circle: The Story of a Garden

By George Levenson, photographs by Shmuel Thaler

Tricycle Press, 2002

ISBN 978-1-58246-078-9

Grades K-2

SYNOPSIS

Poetic text and photographs follow a pumpkin patch as it grows and changes, from seeds to plants to pumpkins ready to harvest, to jack-o-lanterns and then to seeds again.



How Many Seeds in a Pumpkin?

By Margaret McNamara, illustrated by G. Brian Karas

Schwartz and Wade Books, 2007

ISBN 978-0-375-84014-2

Grades K-4

SYNOPSIS

Charlie and his classmates investigate to see which pumpkin has the most seeds: the smallest or the largest.

Curricular Connections

According to the *National Science Education Standards*, "students at all grade levels should have the opportunity to use scientific inquiry and develop the ability to think and act in ways associated with inquiry" (NRC 1996, p. 105). The following lessons use pumpkins as a springboard into inquiry. The lesson for grades K–2 focuses on making observations, asking questions, and designing a simple investigation. In the lesson for grades 3–6, students learn that some questions are best answered through investigation and others through research.

Grades K–2: Pumpkin O–W–L

Materials

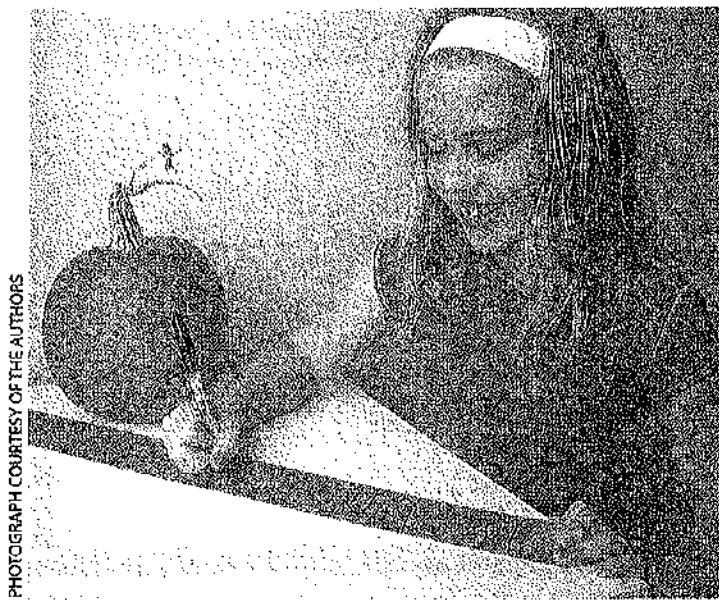
- Small pumpkin in a brown, paper bag
- Wide variety of pumpkins
- Poster paper
- Markers

Engage

Before students enter the classroom, hide a pumpkin in a brown paper bag. Tell the class that you have something special in the bag and that you will be asking them to make some scientific observations about the "mystery object." Remind students that an observation is information that they get through their senses. An observation describes how something looks, feels, sounds, smells, and tastes (but in science class it is not safe to taste!). Invite a student to put his hand in the bag and make some observations of how it feels, without inferring or guessing what it is. Invite another student to hold the bag to feel how heavy it is. Ask another student to close her eyes and smell inside the bag. Cut out a small hole in the back of the bag and ask a student to describe the color. Write all of the students' observations on the board. Then have the class guess what the mystery object is.

Explore

Create a three-column O–W–L (Observations–Wonderings–Learnings) Chart about pumpkins on poster paper. Bring in several different varieties, sizes, colors, and shapes of pumpkins for students to explore. Divide students into groups and give each group a pad of large sticky notes. Tell students that throughout this lesson, they are invited to write their observations of their pumpkins on the sticky notes (so they can easily be placed onto the chart). You may want to cut open one of the pumpkins so that students can experience what the inside of a pumpkin feels like. After students have had sufficient time to explore the pumpkins, have them post their observations in the "O" column of the pumpkin O–W–L.



PHOTOGRAPH COURTESY OF THE AUTHORS

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Pumpkins!

*Explain*

Show students the cover of *Pumpkin Circle*. Tell students that good readers ask themselves questions while they read. Tell them you are going to share with them some of your questions while you read just to let them know what you are wondering. As you read, share some wonderings, such as, "I wonder why the author called this book *Pumpkin Circle*. I wonder what it would feel like to touch the inside of a pumpkin. I wonder if all pumpkin seeds sprout two fat green leaves. I wonder if small seeds grow small pumpkins. I wonder if larger pumpkins have more lines on them than smaller pumpkins do." After reading, ask students to use their sticky notes to record some of their own wonderings about pumpkins from the reading and from their observations. Invite them to post their wonderings in the "W" column of the Pumpkins O-W-L chart.

Elaborate

Discuss ways that students could find answers to some of these questions. Students should understand that some questions can be answered by making observations or doing an experiment and others are best answered by reading a book, searching the internet, or asking an expert. Choose a simple, testable question from the wonderings column of the O-W-L Chart and guide students through an investigation to find the answer. For example, "Do larger pumpkins have more seeds than smaller pumpkins do?" could be answered by cutting open the pumpkins and counting and graphing the number of seeds inside.

Evaluate

Have students post their learnings about pumpkins in the "L" column of the Pumpkin O-W-L Chart. For example, "Pumpkins have slimy seeds inside," "Pumpkin plants have flowers," "Pumpkins come in many shapes and sizes," and "Pumpkins aren't always orange."

Grades 3–6:

Pumpkin Investigations

Materials

- Several pumpkins of different sizes
- Newspaper
- Bowls
- Spoons
- How Many Seeds in a Pumpkin? student page (p. 141)

Engage

Hold up a pumpkin and pose the question, "How many seeds do you think are in this pumpkin?" Have students make some estimates. Then read aloud *How Many Seeds in a Pumpkin?* stopping at page 5 where the teacher asks the class, "How many seeds in a pumpkin? Does anybody know?" Then ask students how they could find out. Students should suggest opening up the pumpkins and counting the seeds.

Explore

Provide several pumpkins of different sizes for students to explore. In advance, cut the tops off of the pumpkins. Divide students into groups of three or four and give each group a pumpkin and a copy of the *How Many Seeds in a Pumpkin?* student page (p. 141). Ask them to collect the data in the table and then predict which pumpkin they think has the most seeds. Tell students that the goal for the day is to get all of the seeds out of the pumpkins. It is difficult to count the seeds when they are covered in slime. They will count the seeds the following day after they have dried out. Cover student work areas with newspaper and provide a large bowl and a spoon for scooping out the seeds. After the student areas are cleaned up and all of the seeds are in the bowls, read pages 6–13 of *How Many Seeds in a Pumpkin*, where the teacher says, "Tonight your homework is to think about how we should count all the seeds." Tell students that tonight you will be



drying the seeds and that *their* homework is to think of a quick, efficient way to count the seeds.

Explain

The next day, give students time to discuss their ideas on the most efficient and accurate way to count the pumpkin seeds. Then, read pages 13–19 where the students decide to count the seeds by twos, fives, and tens. Suggest that students may want to consider grouping their seeds by twos, fives, or tens. After students have had time to count their seeds, have them write the total number of seeds on the outside of their pumpkin with permanent marker. Display the pumpkins side by side so that students can see the results. Read the rest of *How Many Seeds in a Pumpkin?* Ask students how their results compare to those from the reading. In the book, the smallest pumpkin happens to have the most seeds, but your students' results may be different. Students learn from the book that for every line on a pumpkin, there is a row of seeds inside and that pollination, pumpkin variety, and time on the vine determine how many lines are on a pumpkin—and how many seeds are inside.

Elaborate

Next, ask students what other questions they have about pumpkins. Ask each pair of students to write down a pumpkin question. Collect all of the questions and read them aloud to the class. Explain that the type of investigation a scientist does depends on the questions he or she asks. As a group, sort the students' questions into "researchable questions" that can be answered using reliable sources of scientific information and "testable questions" that can be answered by observing, measuring, or doing an experiment, such as "Do larger pumpkins have larger seeds than smaller pumpkins do?"

Evaluate

Have each group of three to four students select one of the testable questions and discuss ways to investigate the question. After investigating the question, they can brainstorm ways to communicate their results (pictures, data tables, graphs, poster presentations, etc.), and then share their findings with the class.

Reference

National Research Council (NRC). 1996. *National science education standards*. Washington, DC: National Academies Press.



Name: _____

How Many Seeds in a Pumpkin?

1. Record the following data for your pumpkin:

PUMPKIN NAME (Name your own.)	DESCRIPTION	WEIGHT	CIRCUMFERENCE	NUMBER OF LINES

2. Observe the other pumpkins in your classroom. Which one do you think has the most seeds? Why? _____

3. Record the class pumpkin data below:

PUMPKIN NAME	WEIGHT	CIRCUMFERENCE	NUMBER OF LINES	NUMBER OF SEEDS

4. Circle the pumpkin that had the most seeds.