

**Title:** Pumpkin Problems

**Grade Ranges:**

   X K-4

   5-8

   9-12

**Subject Tag:**

Math: Basic Math Skills

Math: Problem Solving

**Synopsis:**

This lesson is most appropriate from October through Thanksgiving. Students will work in pairs to estimate the circumference of a pumpkin and the number of seeds inside. They will use strips of orange paper to find the actual circumference of the pumpkin, and they will form a graph by taping their strips to a chart that contains the strips of all the groups. Before you slice open their pumpkins, students will estimate how many seeds are inside. Then they will count the seeds, and record the number on strips of green paper cut to represent ranges. They will tape the green paper on top of their orange graph strip, and compare their data with the rest of the class to see how the size of the pumpkin might be related to the number of seeds.

**Keywords:**

pumpkins, counting, estimating, comparing, graphing, measuring, circumference

**Body:**

1. Tell the class that they will use pumpkins to practice estimating and calculating the circumference of a pumpkin as well as the number of seeds inside. They will consider if there is any relationship between the size of the pumpkin and the number of seeds it contains by comparing data from the whole class.
2. Provide pumpkins of varying sizes to groups of two to four students. Provide each group with a strip of orange paper longer than the circumference of the largest pumpkin. Have the group estimate the circumference in inches and color the strip to show that length using a ruler and marker. Ask students how they could measure the distance around the pumpkin using the strips of paper.
3. When it is agreed that they could wrap the strip around the pumpkin and cut it off to fit the circumference, have students work together to do that. Caution them to cut off the end that is not colored.
4. Have one student from each group bring the strip to the chart or board to be taped up to make a class graph. Leave a space between the strips.
5. Have students estimate how many seeds their pumpkin has before you cut their pumpkins open. Have a pile of precut green strips ready and a scale listed on the board (1-5 seeds=one inch, 6-10 seeds=two inches, etc.) After the students count the seeds, they will pick out the green strip that represents their range, write their estimate on the strip, and tape it next to their orange strip on the board. You might also use two shades of green strips — one shade that represents the estimated amount

and the other shade to represent the actual amount. If you choose this option, be sure to leave space to include both strips with each orange strip.

For younger students, have them count off piles of five or ten seeds, and give them a one or one-half inch strip for each pile. When they construct the graph, help them make a vertical column by taping the pieces one above the other. Tell them to disregard any leftover seeds that do not add up to a pile.

6. Conclude with a class discussion. Rearrange the strips from shortest to tallest, and discuss whether there is any relationship between pumpkin circumference and number of seeds.

### **Related Links:**

#### **Bar Graphs**

<http://pittsford.monroe.edu/jefferson/califieri/graphs/BarGraph.html>

This site is geared for the lower elementary student, with a very simple explanation of how to make a bar graph and what types of information they can depict. It also has an opportunity to take a quiz.

### **Features:**

- Contains special education tips
- Quick Activity (less than 30 minutes; story starter)
- Requires Internet access for students to complete

### **Objective:**

By completing this lesson students will have used estimating, measuring, counting, and graphing skills while working with a pumpkin to determine the circumference and the number of seeds.

### **Standards:**

**NY: 3.3** Operations: Students use mathematical operations and relationships among them to understand mathematics. **3.5** Measurement: Students use measurement in both metric and English measure to provide a major link between the abstractions and mathematics and the real world in order to describe and compare objects and data. **3.6** Uncertainty: Students use ideas of uncertainty to illustrate that mathematics involves more than exactness when dealing with everyday situations.

**NYC: A5a.** Work with others to complete a task. **M2g.** Uses basic ways of estimating and measuring the size of figures and objects in the real world. **M4a.** Collects and organizes data to answer a question or test a hypothesis by comparing sets of data. **M4b.** Displays data in line plots, graphs, tables, and charts.

**CT: 1.** Number Sense: Students will use numbers to count, measure, compare, order, scale, locate and label, and use a variety of numerical representations to present, interpret, communicate and connect various kinds of numerical information. **3.** Estimation and Approximation: Students will make estimates and approximations, and judge the

reasonableness of results. **5. Measurement:** Students will make and use measurements in both customary and metric units to approximate, measure and compute length, area, volume, mass, temperature, angle and time.

**NJ: 4.8:** All students will understand, select, and apply various methods of performing numerical operations. **4.9:** All students will develop an understanding of and will use measurement to describe and analyze phenomena. **4.10:** All students will use a variety of estimation strategies and recognize situations in which estimation is appropriate.

**Prerequisite Skills:**

1. Students should be familiar with estimating, counting, measuring, and graphing
2. Students should be familiar with the procedures for working in small groups

**Time Required:**

45 minutes

**Technology and Materials Needed:**

1. One pumpkin for every group of two to four students
2. Tape measure
3. Precut strips of orange and green construction paper
4. Tape
5. Colored markers
6. Rulers
7. Knife to cut open the pumpkins
8. Old newspapers to open the pumpkins on.

**Assessment Criteria:**

1. Check for following directions in the groups.
2. Check for degree of cooperation within the group.

**Recommended Lesson Plan Review Date:**

**Review Comments:**

Check Web site