



Pumpkin Probability

National Standards > Mathematics

- Numbers, Number Sense and Operations
- Data Analysis and Probability
- Mathematical Processes

Kentucky Standards > Mathematics

Numbers/Computation

MA-E-1.1.1

- Whole numbers (0 to 100,000,000), fractions, mixed numbers, and decimals through thousandths

MA-E-1.2.3

- Add, subtract, multiply, and divide whole numbers using a variety of methods (e.g., mental, paper and pencil, calculator)

Probability/Statistics

MA-E-3.2.1

- Pose questions that can be answered by collecting data

Ohio: Mathematics > Measurement Standards and Benchmarks

Numbers, Number Sense and Operations

- Use place value concepts to represent whole numbers using numerals, words and physical models.
- Recognize, classify, compare and order whole numbers.
- Count using numerals
- Model, represent and explain addition as combining sets and counting on.

Ohio Mathematics > Data Analysis and Probability Standard

- Pose questions and gather data about everyday situations and familiar objects.
- Represent data using objects, picture graphs and bar graphs.

Ohio: Mathematics - Mathematical Processes Standard

- Evaluate the reasonableness of predictions, estimations and solutions.

Objective

Students will use the seeds in a pumpkin to explore estimation, addition and charting the data.

Vocabulary

- Compare
- Classify
- Sets
- Picture graph
- Bar graph
- Predict
- Estimation
- Count

Materials

- One pumpkin for the class (about the size of a basketball)
- Scale
- Knife or hacksaw blade for carving pumpkin
- Spoon or scoop to clean out pumpkin
- Newspaper
- Optional: clean pumpkin seeds
- Teacher created graph template

Activity

Teacher will:

- Show the pumpkin to the students and ask them to share what they know about pumpkins.
- If the students do not mention it, ask them what is inside the pumpkin. (Looking for the answer: seeds)
- Ask students to predict how many seeds might be in the pumpkin (before cutting into it). Use chart paper to record each student's or small group's estimate of how many seeds they believe to be in the pumpkin.
- Weigh the pumpkin and record the weight (to be used later).
- Cut around the top of the pumpkin so that you may remove the area with the stem and observe the inside of the pumpkin.
- Allow students to observe the inside of the pumpkin.
- Ask students if they want to change their estimate after looking inside the pumpkin.
- If any students wish to change their answer, record it on the chart paper.
- Scoop out the insides of the pumpkin and place them on newspaper that has been previously spread out on a table. (This time, while the insides are being scooped out, could be used to ask questions about The Legend of Sleepy Hollow or tell a spooky story.)
- Once all of the insides have been removed, direct students' attention to the pile that has been scooped out from the inside of the pumpkin.
- Again, ask students if anyone wants to change their estimate on the number of seeds. If there are any changes, record them on the chart paper.
- Pose the following question to the students: How do you think we could count all of these seeds?
- If no one suggests it, offer the idea that every one will grab a handful of seeds and count them. Once every one has counted their seeds, the numbers will be added together to find the entire amount. (Teacher counts whatever is left over after each student has taken a handful.)
- Each student should place newspaper on their desk where they can place their handful of seeds.
- Have each student grab a handful of seeds.
- Have each student count his or her seeds.

- Teacher should ask students one at a time how many seeds they have and record the numbers.
- Wash off seeds and set them out of the way so that they may dry.
- All numbers including the teacher's should be added together to find the total number of seeds...but do not tell the students yet.
- Have the students observe all of the estimates.
- Have students identify the lowest estimate and the highest estimate.
- Have students work to order the rest of the estimates so they can be placed in order from least to greatest.
- Reveal the total number of seeds.
- Have student compare the total number of seeds to the ordered estimates.
- Ask students to make conclusions based on the data they observe.
- Place the lid back on the pumpkin and ask the students if the weight of the pumpkin would be different if it was weighed now. If they answer yes, ask them how it would differ.

Performance Assessment

Teacher will evaluate student's abilities to:

(If you choose to have clean, dry pumpkin seeds prepared ahead of time, the assessment and activity can be completed the same day. If you use the seeds removed from the pumpkin that had been cleaned, it may be necessary to wait a day or two until they dry.)

- Make sure that each student knows how many seeds they have when they take a handful of seeds.
- Have each student count out that number of seeds and bring them back to their desk.
- Have students make a pictograph showing the number of seeds in their handful by gluing their pumpkin seeds to a piece of paper, (It may be helpful to pass out paper to the students that have the axis and some labels already on a graph.)
- If enough pumpkin seeds are left over, have each student add two more columns to their pictograph. Find one person in the class that has a higher number of seeds in their handful and one person in the class that has a lower number of seeds in their handful. (If the student happens to have the largest or smallest number of seeds have them find the number of seeds closest to their number and the number of seeds that is the farthest from their number.
- Glue the number of seeds on the paper equal to each one of these people's handfuls and label them with each student's name.

Other pumpkin related material

- Sort the pumpkins in the pumpkin patch:
<http://www.meddybemps.com/halloween/pumpkin03.html>
- Activities covering many subject areas related to the children's book Pumpkin, Pumpkin by Jeanne Titherington
http://www.ri.net/schools/Central_Falls/ch/heazak/pumpkin.html
- Lesson: Pumpkin Observation
<http://www.eduref.org/cgi-bin/printlessons.cgi/Virtual/Lessons/Science/Agriculture/AGR0008.html>
- Activities related to the book The Biggest Pumpkin Ever by Steven Kroll
<http://www.eduplace.com/tview/tviews/b/biggestpumpkinever.html>