

Pumpkins... Not Just Part of Halloween

Science, Math

Materials

- ◆ Pumpkins (one per group)
- ◆ String
- ◆ Large spoons
- ◆ Paper towels
- ◆ Cotton balls
- ◆ Copy of “The Great Pumpkin Story” (one per student)
- ◆ Rulers
- ◆ Knife
- ◆ Newspaper
- ◆ Clear plastic cup
- ◆ Craft/popsicle stick

Background

One great reason to get into pumpkins is that they are an original all-American (New World) food product. Pumpkins have been cultivated for at least 9,000 years in North and South America. They are part of a large family of vined plants that includes cucumbers, squash, gourds, melons, and others. Pumpkins were a staple in the diet of American Indians who raised pumpkins as one of the three main crops—maize (corn), beans, and squash. They baked or boiled the pumpkin flesh, toasted the seeds for tasty snacks, and ground the seeds into flour or meal for making bread and gruel—and they dried the seeds for planting next year’s crop.

When European settlers arrived in the Americas, American Indians showed them how to plant, grow, and use pumpkins. “We had pumpkins in the morning and pumpkins at noon. If it were not for pumpkins, we’d be undone soon,” one settler wrote in 1683. Pumpkin pudding was a real treat for the early settlers. They sliced off the top of the pumpkin removed the seeds, and filled it with milk. They baked it until the milk was absorbed, then scooped out the pumpkin flesh for good eating.

Pumpkins are actually a fruit. The botanical definition of a fruit is “the edible fleshy part of a plant that surrounds the seeds”—a seed package. Fruits, including pumpkins, develop from a fertilized blossom or flower. An interesting thing about pumpkin plants is their separate male and female flowers. You can identify the female blossoms by a bulge in the stem behind the blossom. The male flowers provide the pollen. Blossoms can be eaten raw in salads, fried, or added as a “sweet” vegetable to soups.

Why are pumpkins a fruit and not a vegetable? That’s just one of the questions your students may ask you while they work on “The Great Pumpkin Story” worksheet. There are numerous activities ranging from music, art, social studies, science, and nutrition that you can do with an orange gourd. Here are a few suggestions:

Activity 1: Pumpkin Predictions

1. Divide your class into groups of four. Provide each group with a pumpkin (do your best to get pumpkins that are quite different from one another).
2. Ask the groups to speculate and predict the height, diameter, and weight of their pumpkin.



Time: 1½

Grade Level: 3, 5

Grade 3

Social Studies Standard 2 – Students will understand cultural factors that shape a community.

Objective 2 – Explain how selected indigenous cultures of the Americas have changed over time.

Indicator a – Describe and compare early indigenous people of the Americas (e.g. Eastern Woodlands, Plains, Great Basin, Southwestern, Arctic, Incan, Aztec, Mayan).
Indicator b – Analyze how these cultures changed with the arrival of people from Europe, and how the cultures of the Europeans changed.

Science Standard 2 – Students will understand that organisms depend on living and nonliving things within their environment.

Objective 1 – Classify living and nonliving things in an environment.

Indicator a – Identify characteristics of living things (i.e. growth, movement, reproduction).

Math Standard 5 – Students will collect and organize data to make predictions and identify basic concepts of probability.

Objective 1 – Collect, organize, and display data to make predictions.

Indicator a – Collect, read, represent, and interpret data using tables, graphs, and charts, including keys (e.g. pictographs, bar graphs, frequency tables, line plots).

Grade 5

Social Studies Standard 1 – Students will understand how the exploration and colonization of North America transformed human history.

Objective 1 – Describe and explain the growth and development of the early American colonies.

Indicator f – Analyze contributions of American Indian people to the colonial settlements.

3. Ask students to guess which group has the largest pumpkin. Which pumpkin weighs the most? Do they think the largest pumpkin will weigh the most? Will the smallest pumpkin weigh the least? Which two pumpkins are the closest in size? Which two pumpkins are the closest in weight?
4. Next, provide each group with a ruler, some string (for measuring the diameter), and a scale (a bathroom scale will work). Ask each group to weigh and measure their pumpkin.
5. Where their predictions correct?

Activity 2: Goopy, Goopy Seeds

1. Part of being a fruit means that seeds will be found inside. Ask you students to predict how many seeds they might find inside their pumpkin.
2. Place newspapers underneath each pumpkin, then cut the pumpkin's tops off so students can dig out the seeds. You may want to provide metal spoons for this. Students should take turns digging out the seeds. As the seeds are removed other students in the group should remove the seeds from the fleshy fibers, dry them using a paper towel, and then count them and place them on another paper towel.
3. Where their predictions accurate? Did larger pumpkins have more seeds that the smaller pumpkins. How about weight? Did weight have an influence on the number of seeds?
4. Graph the results of each group's seed count.


Activity 3: Sprouting Pumpkin Seeds

1. Provide each student in the group with a clear cup, a paper towel, some cotton balls, a craft stick, and four pumpkin seeds—the ones they cleaned out in Activity 2 will work just fine. (Try to schedule this activity for a Friday, as the seeds won't sprout over the first two days).
2. Students should tear or cut a 3 inch-wide strip from the paper towel. This strip should be placed around the inside of the cup. Student should trim the towel if there is a lot of excess so that there is only one layer around the inside.
3. Next, have students fill the center of the cup with cotton balls. Tell them to thoroughly dampen the cotton by setting the cup under a dripping faucet. The cotton will moisten the paper towel. No water should drip to the bottom of the cup.
4. Ask the students to insert the pumpkin seeds between the cup and the paper towel. They should place some of the seeds with the pointed end up and some with the pointed end down. Label each cup. Set the cups on a sunny windowsill. Instruct groups to water as necessary and to watch for the seeds to grow. You may want them to record, by drawings, how the seedlings look on each day once they sprout.

Additional Resources

Pumpkin, Pumpkin by Jeanne Titherington (grades K-1)
Squanto and the First Thanksgiving by Joyce Kessel (grades 1-5)
In a Pumpkin Shell by Jenifer Storey Gills (grades 1-6)
Harvest Year by Chris Peterson (grades K-6)

Teacher Notes:



The Great Pumpkin Story

Pumpkins are not vegetables... they're fruits!

Pumpkins, gourds, and other varieties of squash are all members of the family Cucurbitaceae, which also includes cucumbers, gherkins, and melons.

Pumpkins have been grown in America for over 5,000 years. They are indigenous to the western hemisphere and were completely unknown in Europe before the time of Columbus.

There was probably some kind of pumpkin served at the first Thanksgiving Feast. Pumpkins and other forms of squash made up one leg of the triad—maize, beans, and squash—that once formed the basic diet of American Indians. Pumpkins grow in the field on plants which have long sprawling vines that cover the ground. Pumpkin seeds are planted in the field from the last week of May to the middle of June. After seeds are planted, they will sprout (germinate) in 7 to 10 days, depending on the variety. During this time, seeds need moisture and warmth. Once seeds have germinated, they will send up their first leaves, called seed leaves.

Next, the true leaves will appear. Yellow flowers (blossoms) begin to appear after the first three weeks of

growth. Male flowers, which produce pollen, are seen first. About a week later, the female blossoms bloom. Female blossoms are easy to spot because they have tiny pumpkins at their base. Blossoms live for only a half day, and will not open in cold, rainy weather. When both male and female blossoms appear on the vine, bees transfer the pollen from the males to the females—this is called pollination.

Once pollinated, the fruit at the base of the female blossom develops into a full-sized pumpkin. During this time, the plant continues to produce blossoms. The pumpkin contains seeds which can be saved to grow new pumpkins the following year. While growing, pumpkins require a lot of moisture and sunlight. It takes about 90-120 days for a pumpkin to grow after it has been planted. Pumpkins are picked in October when they are bright orange in color.

Pumpkins are a good source of nutrition. They are low in calories, fat, and sodium and high in fiber. They are loaded with vitamins A and B and potassium. The seeds are very high in protein and are an excellent source of B vitamins.

Pumpkin Patch Problems

The kids at Discovery Elementary have been given 1 acre (an acre is about the size of a football field, including the end zones) to plant a pumpkin patch. The pumpkins are going to be sold as part of a fund raiser for P.E. equipment. The pumpkin seeds have been donated, but there are still plenty of questions...

1. If the field is 280 feet long, and each pumpkin seed is 4 feet apart, how many pumpkin seeds will be planted per row? _____
2. If the field is 156 feet wide and each row is 6 feet apart, how many rows of pumpkins can be planted? _____
3. How many total seeds will be planted? _____
4. If each pumpkin plant yields (produces) six pumpkins, how many pumpkins should they have for sale? _____
5. If the pumpkins can be sold for 25¢ per pound, how much money will they raise for new P.E. _____
6. _____



What would happen if someone forgets to water the patch?
How might they increase the number of pumpkins per plant?
What could lower the number of pumpkins per plant?
What happens if there is an early frost?