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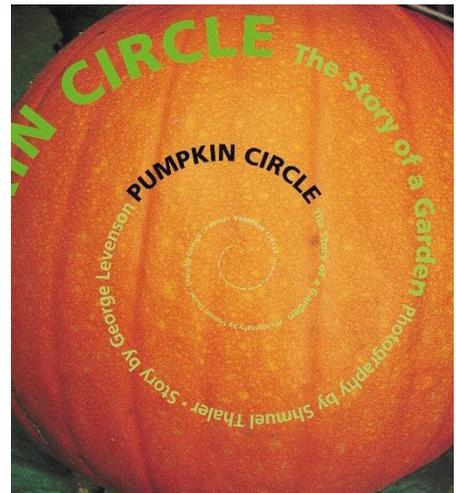
October 2021

Pumpkin Circle: The Story of a Garden

By: George Levenson

This educational exploration of a pumpkin's life cycle is a must for any aspiring scientist or farmer!

We can be sure of this: It is a circle without end. Its pumpkin seeds to pumpkins to pumpkin seeds again! This treat of a picture book comes cloaked in the colors of fall. Bouncy verse and glowing photographs show a backyard pumpkin patch move through its natural cycle—a bug's eye and a bird's high view of seeds sprouting, flowers blooming, bees buzzing, pumpkins growing . . .and then going back to earth.²



Did You Know? (Ag Facts) ²

- Illinois is the top pumpkin producing state in the nation with nearly 500 million pounds of pumpkins harvested each year.
- The size of a pumpkin depends on water, temperature, insects, diseases, pollination, fertility, soil type, plant population and weeds.
- Pumpkins are ready to harvest when they are the right color and have the right rind readiness. However, remember, they can be many different colors.

Discussion Questions

- What happens to a pumpkin over time?
- What is causing the pumpkin to change?
- Why did the author choose the title, *Pumpkin Circle*, for the book?

Grade Level(s): K-3

Purpose: Students will investigate the phenomenon of decomposing pumpkins as a part of the plant's life cycle.

Vocabulary:

- **bacteria:** a group of single-celled living things that cannot be seen without a microscope that reproduce rapidly and sometimes cause diseases
- **decomposer:** an organism that feeds on and breaks down dead plant or animal matter
- **decomposition:** the breakdown of plant or animal matter, the process of decay
- **fungus:** any one of a group of living things (such as molds, mushrooms, or yeasts) that often look like plants but have no flowers and that live on dead and decaying things
- **humus:** a brown or black material in soil that is formed when plants and animals decay
- **nutrient:** a substance that plants, animals, and people need to live and grow
- **phenomenon:** an observable event which is not man-made; plural form is phenomena
- **pumpkin:** a large, rounded fruit with a thick rind, edible flesh, and many seeds

Background Agricultural Connections: ²

The **pumpkin** is one of only a few foods native to North America that is still eaten today. Native Americans used pumpkins for food and medicine. Dried pumpkin shells served as bowls or containers for storing grains and seeds. Flattened strips of pumpkin were dried and made into mats.

Pumpkins were a main part of the Pilgrims' daily diet. If left uncut and stored in a cool, dry place, pumpkins can keep for several months. Colonists made pumpkin pies by slicing off pumpkin tops, removing the seeds, filling the pumpkin with milk, spices, and honey, and then baking it all in hot ashes.

Today, the majority of pumpkins grown are sold for decorating and carving. The tradition of carving pumpkins at Halloween started with the Irish. The original jack-o-lanterns were made from turnips. When the Irish immigrated to the US, they found that pumpkins were in large supply and were much easier to carve.

The pumpkin is a member of the cucurbit family which includes gourds, squash, cucumbers, and melons. Pumpkins come in a variety of shapes, sizes, and colors. Most pumpkins are orange, but they can also be yellow, red, white, gray, or pale green. Pumpkins range in size from less than a pound to over 2,000 pounds.

A pumpkin is a fruit that grows on a vine. They are typically planted in late spring or early summer for an October harvest. After a pumpkin seed sprouts, large leaves begin to grow on vines. Eventually, the vine blooms with yellow flowers. Following pollination, the female flower begins to grow a small green pumpkin that will turn orange as it continues to grow. When the vines turn brown, the pumpkins are ready to harvest.

Pumpkins left in the field will be eaten by animals or they will decompose. The phenomenon of **decomposition** is a natural process through which nutrients are recycled back into the soil. Insects, **fungus**, and **bacteria** are decomposers that eat the dead tissue from the pumpkin and excrete it in a form that helps live plants grow.

In nature, dead plants and animals decompose and become **humus**. Humus acts like a sponge to help soil hold water. It also traps air in the soil and provides nutrients. Plants need air, water, light, and nutrients to grow. When farmers plant crops in the soil, the growing crops take out nutrients. The farmers can replace those nutrients by tilling decomposing plants back into the soil. The surviving seeds left by a decomposing pumpkin have the ability to sprout and grow into a new pumpkin plant, continuing the pumpkin life cycle.

Decomposing Pumpkin ²

Materials:

- Jack-o-lantern with seeds and fibrous strands intact
- *Pumpkin Jack* by Will Hubbell
- Decaying Halloween Pumpkin Time Lapse video
- *Rotten Pumpkin: A Rotten Tale in 15 Voices* by David M. Schwartz
- Aquarium
- Soil
- Pumpkin Science Journal
- How Does Mold Grow? video

Procedures:

1. Ask the students, "What happens to a pumpkin over time?"
2. Read the book *Pumpkin Jack* by Will Hubbell. Use information from the book and the *Background Agricultural Connections* section of this lesson to discuss the phenomenon of decomposition.
3. Show the students the Decaying Halloween Pumpkin Time Lapse video. Ask the students, "What is causing the pumpkin to change?"
4. Read the book *Rotten Pumpkin: A Rotten Tale in 15 Voices* by David M. Schwartz. Lead a discussion about the role animals, insects, fungi, and bacteria play in the process of decomposition.
5. Tell the students that they are going to have the opportunity to observe the decomposition of a pumpkin. Show the students the aquarium or "decomposition tank." Explain to the students that the decomposition tank needs fresh soil from nature that contains decomposers (insects, fungus, and bacteria). Take them outside to collect soil from an area on or near the school, or obtain compost from a local nursery. Collect enough soil to fill 3-4 inches of the aquarium.
6. Ask the students how they will measure the observable changes that will occur in their pumpkin. Have the students record the characteristics of the pumpkin before it is placed in the decomposition tank. Students can draw a picture of the pumpkin and record the date, size, shape, and color of the pumpkin in their Pumpkin Science Journals.
7. Place the pumpkin into the soil so that it is partially buried. Moisten the contents of the aquarium with a spray bottle to simulate rain and cover the tank with several layers of plastic cling wrap. Tape the edges with packing tape.
8. Each week, the students will record observations in their journals. Instruct them to make note of any significant changes, such as mold growth or a pumpkin seed that begins to sprout. Have the students work in small groups to interpret the results of their observations and draw conclusions about the decomposition process.
9. Discuss interesting changes as they occur. When mold begins to appear on the pumpkin, ask the students, "What is the fuzzy stuff growing on the pumpkin?"

10. Show the video [How Does Mold Grow?](#) (stop at the 2:12 minute mark) to help students discover that mold is a fungus, mold spores live in the air, and mold spores feeds off of the food on which they land.
11. During the later stages of decomposition, ask the students, "Why does the pumpkin seem to disappear over time?"
12. Lead a class discussion about decomposition. Integrate the following points into the discussion:
 1. The pumpkin doesn't actually disappear.
 2. The pumpkin matter is eaten or broken down by other organisms.
 3. Decomposers get the food they need by feeding on, breaking down, and absorbing parts of once living things.
13. As the investigation draws to a close, brainstorm ways the decomposition process could be sped up or slowed down. As an extension activity, have students design their own investigations, such as comparing the decomposition rate of different organic substances or observing how the decomposition process is affected by altering the variables of temperature, light, or water.

Pumpkin – How Does It Grow? ²

Materials:

- *Pumpkin Circle* by George Levenson
- White paper plates, 2 per student
- Black and orange markers or crayons
- Green yarn, 1 arm-length per student
- Brown, green, yellow, and orange construction paper
- [Great Pumpkin Paper Patterns](#)
- Hole punch
- Stapler
- Scissors

Procedures:

1. Read the book *Pumpkin Circle* by George Levenson.
2. Use the students' experiences to discuss the life cycle of a pumpkin plant. Include the following points in the discussion. First, the seed is planted. From the seed a plant sprouts, growing leaves and then flowers. From the flowers, small green pumpkins form. When the pumpkins are ripe, they turn orange and can be harvested. Inside of the ripe pumpkin are many seeds which can be planted to start the cycle again. Pumpkins left in the field will decompose leaving seeds that can sprout and grow into a new pumpkin plant the following year, continuing the pumpkin's life cycle.
3. Provide each student with the art items listed in the *Materials List*. Explain to the students that they will be creating a model of the pumpkin's life cycle.
4. Have each student draw a Jack-o-lantern face with a black marker or crayon on the back of one of the paper plates. Color the rest of the plate and the back of the second plate orange.
5. Trace the [paper patterns](#) onto the construction paper using the appropriate colors. Another option is to copy the pattern directly onto the construction paper. Cut the shapes out and punch a hole in the top of each one.
6. Thread the yarn through the holes of the seed, leaf, flower, green pumpkin, and orange pumpkin in the correct order of their formation on the pumpkin plant. Tie a simple knot at the top of each plant part.

7. Staple the end of the yarn closest to the orange pumpkin shape to the front of the plate without the face.
8. Staple the paper plates together around the edges with the orange sides facing out. Leave a gap on one side of the pumpkin to pull the seed, leaf, flower, and growing pumpkins out with the piece of yarn. Slide the string of plant parts into the center of the Jack-o-lantern.
9. The students can practice describing the life cycle of the pumpkin by slowly pulling the seed, leaf, flower, and growing pumpkins from the Jack-o-lantern.



Extension Activities:

- Watch a giant pumpkin grow from a tiny seed in the video [Giant Pumpkin Time Lapse](#) or watch a time lapse video of pumpkins growing on a farm in the video, [A Pumpkin's Life](#). Create your own time lapse video of pumpkin seeds sprouting or a pumpkin decomposing.
- Create a compost pile on the school grounds. Add different types of organic substances to see which items decompose the fastest. Discuss how composting is a way to recycle food waste and limit the amount of garbage that is sent to the landfill. (Note: Do not use meat, dairy products, or any fatty material in the compost pile.) See [Backyard Composting](#), [Worms Eat My Garbage](#), or [How to Compost](#) for more guidance on starting your own compost pile.
- Discuss options for reusing leftover pumpkins. Make a pumpkin bird feeder.
- Have the students act out the play [Rotten Pumpkin: A Play in 15 Voices](#) by David M. Schwartz.

Suggested Companion Resources:

- [Compost Stew](#)
- [How Many Seeds in a Pumpkin?](#)
- [Leaf Litter Critters](#)
- [Pumpkin Jack](#)
- [Rotten Pumpkin: A Rotten Tale in 15 Voices](#)
- [Seed, Sprout, Pumpkin, Pie](#)
- [Sophie's Squash](#)
- [The Life Cycle of a Pumpkin](#)
- [The Pumpkin Book](#)
- [Pumpkin Reader](#)
- [All About the Pumpkin Video](#)
- [Epic Pumpkin Collapse Timelapse](#)
- [Pumpkin: How Does it Grow?](#)
- [Phenomenon](#)

Sources/Credits:

1. Levenson, George. *Pumpkin Circle: The Story of a Garden*, Tricycle Press, 1999.
2. National Center for Agricultural Literacy

Suggested SC Standards Met:

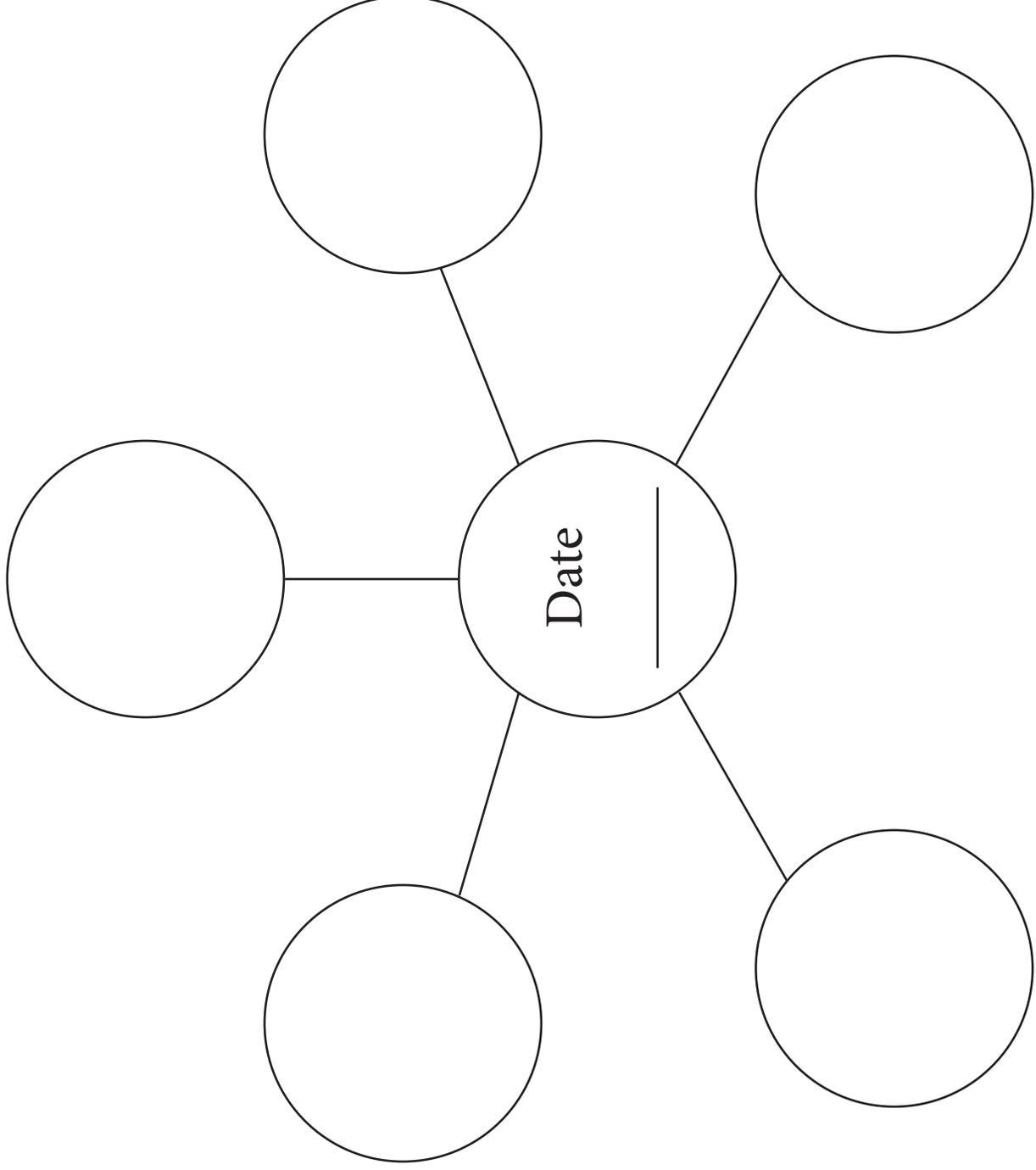
English/Language Arts:

- K.RI.1 Demonstrate understanding of the organization and basic features of print.
- K.RI.2 Demonstrate understanding of spoken words, syllables, and sounds.
- K.RI.6 Summarize key details and ideas to support analysis of central ideas.
- 1.RI.1 Demonstrate understanding of the organization and basic features of print.
- 1.RI.2 Demonstrate understanding of spoken words, syllables, and sounds.
- 1.RI.6 Summarize key details and ideas to support analysis of central ideas.
- 2.RI.10.1 Identify and analyze the author's purpose
- 3.RI.5.1 Ask and answer literal and inferential questions to determine meaning; refer explicitly to the text to support inferences and conclusions.
- 3.RI.8.1 Explain how the author uses words and phrases to inform, explain, or describe.

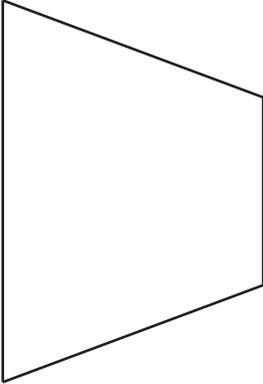
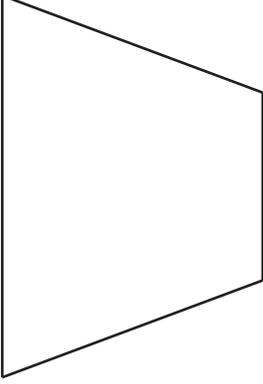
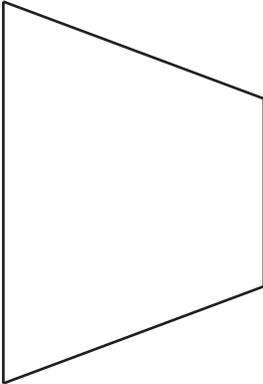
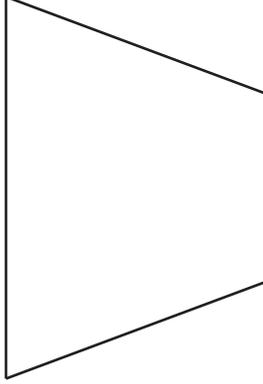
Science (2021 standards):

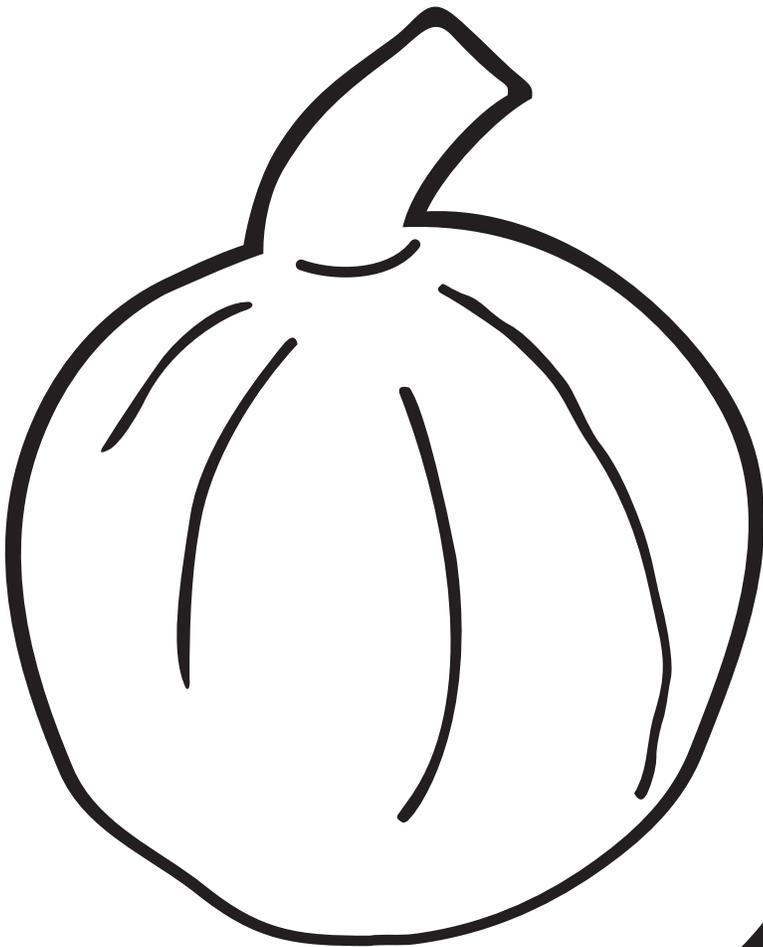
- K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.
- 1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year
- 2-LS2-1. Plan and conduct an investigation to determine what plants need to grow.
- 3-LS1-1. Develop and use models to describe how organisms change in predictable patterns during their unique and diverse life cycles.

Decomposing Pumpkin Observations

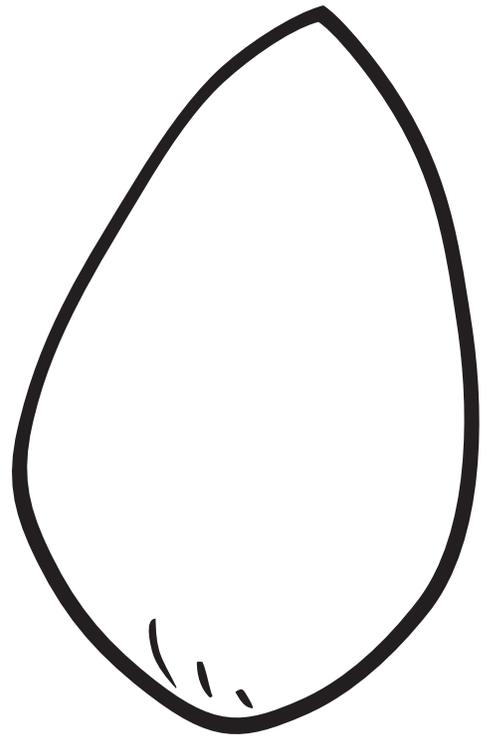


Pumpkin Plant Growth Chart

<p>Date _____</p> <p>Height _____</p> <p>Observations _____ _____ _____</p> 	<p>Date _____</p> <p>Height _____</p> <p>Observations _____ _____ _____</p> 
<p>Date _____</p> <p>Height _____</p> <p>Observations _____ _____ _____</p> 	<p>Date _____</p> <p>Height _____</p> <p>Observations _____ _____ _____</p> 



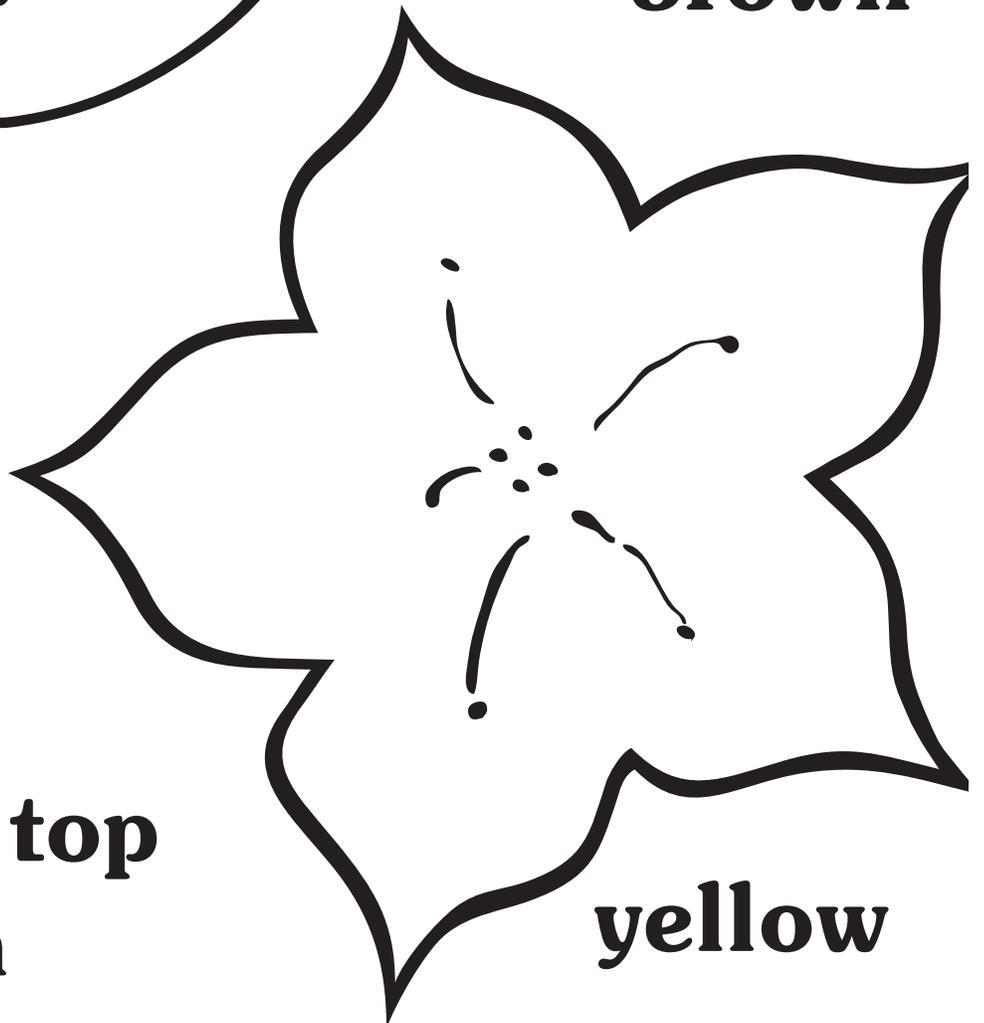
green



brown



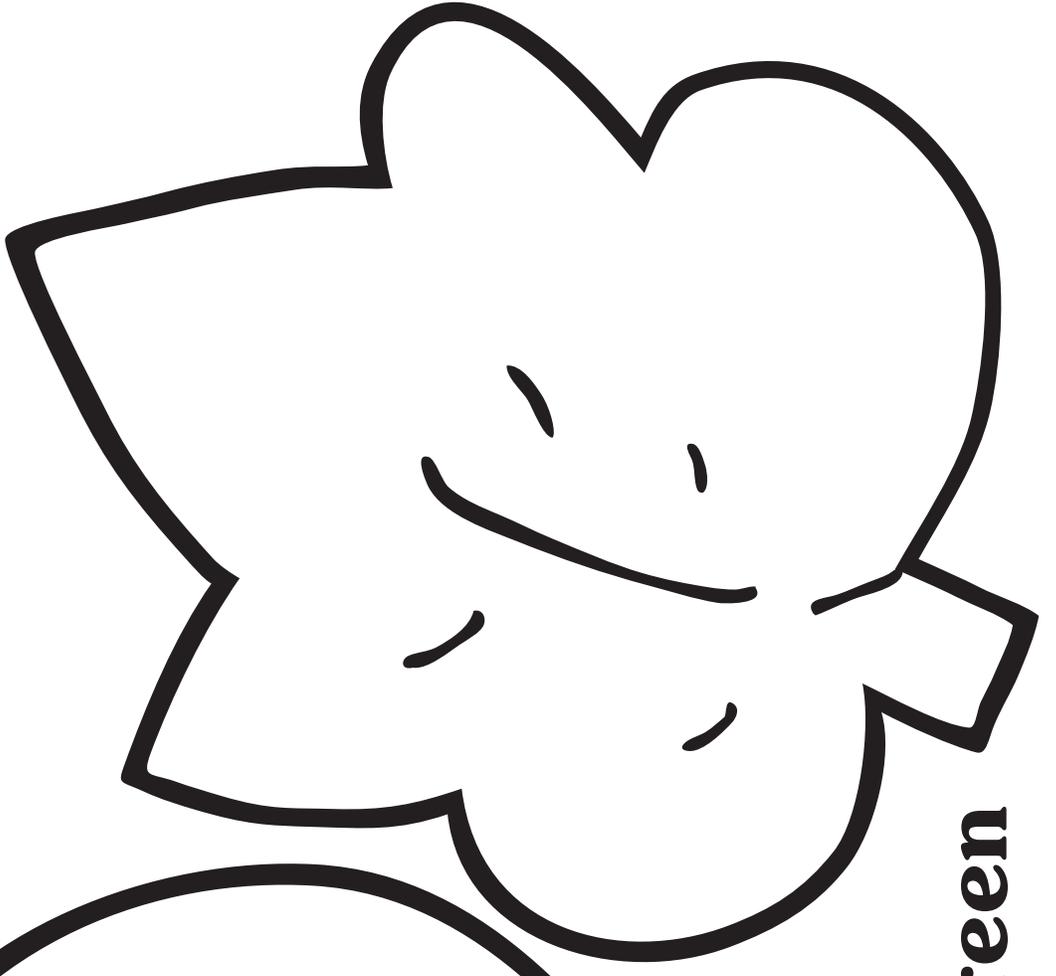
**pumpkin top
brown**



yellow



orange



green