

Pumpkins, Squash and Other Cucurbits

Objective

Students will learn about the group of vegetables known as cucurbits and use cucurbits in a variety of creative activities—writing plays using cucurbits as characters, playing a hiding game in which students must perform math and reading activities, writing haikus and interpreting cucurbit-related poetry. Students will use cucurbits in mapping activities. Students will use cucurbits in math activities—as nonstandard units of measure, practice with fractions, estimation, graphing, probabilities. Students conduct scientific experiments with squash. Students will use squash as the subject for still life works of art.

Background

Squash, melons, pumpkins, and cucumbers are all part of the Cucurbitaceae, or gourd, family. They belong to the group of vegetables known as cucurbits.

Cucurbits were among the foods first cultivated by ancient farmers in much of what is now the US. Archaeologists believe ancient people farming along river banks may have cultivated some form of squash, sunflowers and other seed plants even before they learned to cultivate maize. After maize was introduced, farmers continued to grow squash with maize and beans, in the “three sisters” system.

Species of cucurbits are usually monoecious, with separate pollen-bearing (staminate) male flowers and seed-bearing (pistillate) female flowers on the same plant.

Cucurbits are still a staple in Oklahoma gardens and in Oklahoma agriculture. Watermelons and pumpkins are important Oklahoma field crops, and farmer’s markets display a wonderful variety of squashes and cucumbers throughout the growing season.

Squash is usually divided into two categories - summer and winter. Summer squashes are harvested and eaten while their skin is still tender. Winter squash grows a thick skin, which helps it keep longer.

The term "winter squash" dates back to a time when refrigeration and cross country transportation was not as readily available as it is now. "Good keepers" became known as winter vegetables if they would "keep" until December. Winter squash have hard, thick skins and will keep for months if stored in a cool, dark, well-ventilated place.

The best tasting winter squash is available in early fall. Purchase acorn squash that is almost solid dark green. The best butternut squash has a thick neck and small round base. Ornamental squash, also plentiful during the holiday season, is edible but normally not as flavorful as acorn, butternut and spaghetti squash.

The most common summer squashes are scallop, or pattypan, constricted

Standards

GRADE 1

P.A.S.S.

Science Process—1.2; 2.1;
3.1,2,4

Life Science—2.1,2

Social Studies—2.3; 5.1

COMMON CORE

Language Arts—1.RL.4,10;
1.RI.10; 1.L.5; 1.W.3

Math Process—

MP.1,2,3,4,5,6,8

Math Content—1.MD.2,4;
1.G.3

GRADE 2

P.A.S.S.

Science Process—2.1;
3.1,2,4; 4.3

Life Science—2.1

Social Studies—2.3; 3.4;
4.2

COMMON CORE

Language Arts—2.RF.3;
2.SL.6; 2.L.1,3

Math Process—

MP.1,2,3,4,5,6,8

Math Content—2.G.3;
2.MD.1,2,9,10

GRADE 3

P.A.S.S.

Life Science—2.1,2

Social Studies—1.1; 3.2

COMMON CORE

Language Arts—3.RL.10;
3.RI.2,5,7; 3.L.3

Math Process—

MP.1,2,3,4,5,6,8

Math Content—
3.MD.1,2,3; 3.NF.1,2,3

Continued on next page.

Standards (Cont.)

GRADE 4

P.A.S.S.

Science Process—1.1,2;

2.1; 3.1,3,4

Life Science—3.1,2

Social Studies—2.2; 4.1,2;

5.2,3

COMMON CORE

Language Arts—4.RL.9;

4.W.1,2,3,7,8

Math Process—

MP.1,2,3,4,5,6,8

Math Content—

4.NF.1,2,3,4,5,7;

4.MD.1,2,3,4,7; 4.NBT.2

GRADE 5

P.A.S.S.

Science Process—1.1,2;

2.1; 3.1,3,4

Life Science—2.1,2

Social Studies—2.2; 3.1;

7.5

COMMON CORE

Language Arts—5.RL.2,5;

5.RI.10; 5.W.7,8,9

Math Process—

MP.1,2,3,4,5,6,8

Math Content—5.NBT.7

neck and zucchini. Pattypan is round and flattened, like a plate with scalloped edges. It is usually white. Constricted neck squash is thinner at the stem end than the blossom end, and is classified as either "crookneck" or "straightneck." It is usually yellow. Zucchini squash is cylindrical to club-shaped and is usually green. Zucchini can grow quickly to the size of a baseball bat if not picked frequently. Zucchini and other summer squash taste best when picked between five and eight inches long. One zucchini plant can produce as many as 30 zukes per plant. Zucchini is so prolific in gardens that some people in Pennsylvania have designated an official "Sneak a Zucchini onto your Neighbor's Porch" night (August 8).

Squash is a good source of fiber, Vitamin C, betacarotene and potassium. Betacarotene—becomes Vitamin A, which helps your eyes adjust to light changes when you come in from outside and helps keep eyes, skin and mucous membranes moist. Winter squash is a better source of betacarotene than summer squash.

Vitamin C—helps heal wounds, prevents cell damage, promotes healthy gums and teeth, and strengthens the immune system.

Potassium—is an electrolyte and is critical to maintaining a person's heartbeat. It also plays a major role in maintaining water balance (with sodium) and cell integrity.

The world's largest fruits belong to the cucurbit family. Pumpkins range in size from less than a pound to over 1,000 pounds.

According to *Cucurbits*, the official newsletter of the World Pumpkin Confederation, a 2005 record-breaking pumpkin weighed in at 1,469 pounds and a giant squash tipped the scales at just over 962 pounds (436 kg).

The town of Roffstown, New Hampshire, holds an annual pumpkin regatta each October, in which giant pumpkins are hollowed out to make room for a single passenger, then fitted with trolling motors and paraded on the Piscataquog River.

The tradition of carving pumpkins at Halloween started with the Irish, but the original jack-o-lanterns were made from turnips. When the Irish immigrated to the U.S., they found pumpkins a plenty, and they were much easier to carve than turnips.

The pumpkin is one of only a few foods we still eat today that is native to North America. American Indians used them as food and medicine. Dried pumpkin shells served as bowls or containers for storing grains and seeds. The Indians also flattened strips of pumpkins, dried them and made mats from them.

Pumpkins were a main part of the Pilgrims' daily diet because they would keep for several months, if left uncut and stored in a cool, dry place.

Colonists made the first pumpkin pies by slicing off pumpkin tops, removing the seeds, filling the insides with milk, spices and honey, then baking it all in hot ashes.

Language Arts

1. Bring samples of summer squash to class.
 - Students write and act out plays with the squashes as superheroes having the characteristics of the nutrients listed in the background.
2. Celebrate “Zucchini Sneak” week.
 - Start with five zucchini, and place them in five students’ desks with a secret message wrapped around each one.
 - Students who get the zucchini must complete the tasks printed on the message before getting permission from you to sneak the zucchini into the desks of another five students, with instructions to complete additional tasks.
 - Tasks could include defining words related to zucchini (cucurbit, gourd, prolific, etc.) creating zucchini math problems, writing three adjectives to describe “zucchini,” finding three zucchini history facts online, finding zucchini nutrition information, finding the name for zucchini in Spanish (calabacita) and French (courgette), etc.
 - Finish the week with a Family Cucurbit Night with all cucurbit activities and curcurbit snacks. Late August through early October, parents with gardens may have zucchini to share.
3. For each 4-5 students provide one winter squash or ornamental gourd and a list of the vocabulary words.
 - Discuss haiku.
 - Each student will write a haiku about the squash, using at least three of the vocabulary words.
4. What does this poem tell us about the importance of pumpkins in the lives of the Pilgrims?

For pottage and puddings and custards and pies,
Our pumpkins and parsnips are common supplies,
We have pumpkins at morning and pumpkins at noon,
If it were not for pumpkins we should be undone.

—Pilgrim verse, circa 1630

Social Studies: Mapping Cucurbits

1. Squash is a game similar to racquetball that began in England and is popular there and around the world. Students will research the game online and learn to play.
2. Bring in an assortment of winter squashes and hide them in plain sight around the room.
 - Show one of the squash to students and ask them to guess what it is.
 - Tell students there are more of the squash hidden around the room, and tell them how many.
 - Students will stay in their seats while searching for the hidden squash and draw maps showing where the squash is located as they find them.
 - Use a timer to signal “Time’s up.”
 - Divide students into groups. Groups will take turns hiding the squash and mapping their locations for other groups to find.
3. Read the following information about cucumbers to your students.

Materials

pumpkins and assorted winter and summer squash

world maps

box

sharp knife and mallet or
small hand saw

cutting board

Roasted Pumpkin Seeds

If you're scooping out pumpkins to make jack-o-lanterns, don't forget to save the seeds to eat. Rinse the seeds in a colander and separate them as much as possible from the pulp. Soak them overnight in salt water. Drain and place on a baking sheet. Bake for 10-15 minutes in a 400 degree oven. Eat them like sunflower seeds. You can roast all kinds of squash seeds, using the same method. Called *pepitas* in Spanish, the seeds are packed with protein, fiber, iron, copper, magnesium, manganese, and phosphorous, as well as the amino acids arginine and glutamic acid.

Provide copies of the World Map included with this lesson. As you name the places (in bold print) where cucumbers have travelled, students will work in teams to find the locations on the map.

—The cucumber is believed native to **India**, and evidence indicates it has been cultivated in **western Asia** for 3,000 years.

—From India it spread to **Greece** and **Italy**, where the Romans were especially fond of the crop, and later into **China**. It was probably introduced into other parts of **Europe** by the Romans.

—Records of cucumber cultivation appear in **France** in the 9th century, **England** in the 14th century, and in **North America** by the mid-16th century.

—The Spaniards brought cucumbers to **Haiti** in 1494. In 1535 Cartier found "very great cucumbers" grown on the site of what is now **Montreal** in Canada. Captains Amidas and Barlow found cucumbers in Native American gardens in **Virginia** in 1584. They were also being grown by the Iroquois (on the east coast of the US) when the first Europeans visited them.

4. Pumpkins are so big they can be used to represent the world. (From Illinois Ag in the Classroom)

—Using a world map or globe, discuss longitude, latitude and hemispheres.

—Divide students into groups of 2-3 and give each group a pumpkin.

—Ask the students to pretend their pumpkin is the earth and draw latitude lines on their pumpkin at 10 degree increments.

—Tell the students the vertical lines on pumpkins are similar to the longitude lines on a map or globe. Ask the students to draw longitude lines on their pumpkins at 10 degree increments.

—The students should find the north, south, east and west hemispheres on their pumpkins, now that they have latitude and longitude lines

—Have the students paint continents on their pumpkins with tempera paint and let it dry for one hour.

—Ask the students to paint the bodies of water on the pumpkins and let them dry overnight.

—Discuss how the pumpkin globes are similar/different from manufactured globes.

Math (Measurement, Geometry, Number Sense, Data Analysis)

1. Use zucchini or cucumbers as a nonstandard unit of measure to measure the perimeter of student desks.
2. Use zucchini or cucumber for practice in fractions. (Cut into halves, fourths, etc.) Make sure students wash their hands and use clean cutting utensils. Eat as a nutritious raw snack, with or without dip.
3. Students will estimate how far they can roll zucchini, then have a zucchini roll. Measure and record the length of each student's roll, and have students calculate the average. Estimate and count rotations as well

4. Place assorted winter squash in a box where students cannot see them, with more of one kind than the rest.
 - Review the kinds of winter squash.
 - Students take squash from the box without looking.
 - Students record the kinds of squash as they are drawn from the box.
 - Students determine which kind of squash they are most likely to draw from the box.
 - Students list all the ways the different squash can be combined. (acorn/ acorn/ butternut, butternut/ turban/ spaghetti, etc.)

Science (Observe and Measure, Compare, Predict, Experiment, Plants)

1. Bring acorn squash to class.
 - Students write descriptions of the squash and predict what they will find inside. (What color will it be? Will there be seeds? Where will the seeds be located? What will it smell like? How will it feel?)
 - Students design charts that will allow them to compare their predictions with results.
 - Use a very sharp knife and a mallet or a small handsaw and a cutting board to slice each squash in half. (Winter squash is difficult to cut, so take safety precautions. **DO NOT ALLOW STUDENTS TO CUT.**)
 - Students smell, feel and taste the squash.
 - Students record observations on their charts.
 - Discuss results.
2. Summer squash grows to maturity in 40-50 days and can be planted for a fall garden as late as September 1 in Oklahoma.
 - Students make hills in a sunny spot and plant 4-5 seeds per hill.
 - After the plants have acquired their second set of leaves, students pull all but three per hill.
 - As an alternative, start plants in large container in the classroom and send home with students.
 - Students keep journals to record the growth of their squash plants and watch for:
 - Leaves—The first leaves of squash plants are very large and robust compared with other seedlings.
 - Flowers—Species of cucurbits are usually monoecious, with separate pollen-bearing (staminate) male flowers and seed-bearing (pistillate) female flowers on the same plant. Squash blossoms are edible. Find a recipe and let students try eating them, or just offer them raw.
 - Insects—The spiny, sticky pollen is not windborne and requires insects for pollination. The most common pollinator insects appear to be beetles and bees. As an alternative you may provide Q-tips or small paint brushes and have students carefully transfer pollen from the male flower to the female.
3. Some insects are harmful to the squash plant.
 - Students research to learn about squash pests (cucumber beetle, squash vine borer, squash bug).

Pumpkin Pottage (Soup)

Pumpkin has all the nutritional benefits of squash and can be eaten as a vegetable, although most of us only eat it in pie. Try this pumpkin soup.

Place 3 cups canned or 2 pounds cooked pureed fresh pumpkin in 3 cups scalded milk or chicken broth. Blend together and add 1 tablespoon butter and 1 tablespoon flour. Add 1 tablespoon white sugar or 2 tablespoons brown sugar and 1/2 cup finely diced ham. Season as desired with salt, pepper, ginger and cinnamon. Heat but do not boil. This makes about 6 cups.

Vocabulary

botanical—relating to the science of plants

constricted—made narrow

cucurbit—any of various mostly climbing or trailing plants of the family Cucurbitaceae, which includes the squash, pumpkin, cucumber, and melons

fruit—the ripened ovary of a seed plant

gourd—any of a family of tendril-bearing vines (as the cucumber, melon, squash, and pumpkin)

monoecious—A plant species in which male and female organs are found on the same plant but in different flowers

ornamental—something that adds beauty

ovary—the enlarged rounded lower part of the pistil of a flower in which seeds are formed

ovule—an outgrowth of the ovary of a seed plant that after fertilization develops into a seed

pollen—a mass of tiny particles in the anthers of a flower that fertilize the seeds and usually appear as fine yellow dust

pottage—a thick soup of vegetables or vegetables and meat

prolific—producing in large numbers

scallop—one of a continuous series of rounded half-circles forming a border

vegetable—a leafy plant (as the cabbage, bean, or potato), usually without woody tissue, grown for an edible part that is usually eaten as part of a meal

—Students research to learn non-chemical means for controlling cucurbit pests. (row covers before flowers appear, removing insects from plants, planting before or after prime time for insects)

4. Will your jack-o-lantern sink or float? If it floats add various objects to see how much weight it will hold afloat.

Visual Arts

1. Students arrange the squash and/or gourds and do still life drawings, paintings or digital photographs.
—Use the works of art to illustrate haiku from Language Arts Activity #3.

Extra Reading

Eclare, Melanie, *A Harvest of Color: Growing a Vegetable Garden*, Ragged Bears, 2002.

Farmer, Jacqueline, *Pumpkins*, Charlesbridge, 2004.

Gibbons, Gail, *The Pumpkin Book*, Live Oak, 2004.

Levenson, George, and Shmuel Thaler, *Pumpkin Circle: The Story of a Garden*, Tricycle, 2002.

McKy, Katie, and Pablo Bernasconi, *Pumpkin Town! or, Nothing is Better and Worse Than Pumpkins*, Sandpiper, 2008.

McNamara, Margaret, and G. Brian Karas, *How Many Seeds in a Pumpkin?*, Schwartz and Wade, 2007.

Pfeffer, Wendy, and James Graham Hale, *From Seed to Pumpkin*, Collins, 2004.

Robbins, Ken, *Pumpkins*, Square Fish, 2007.

Smath, Jerry, *I Like Pumpkins*, Cartwheel, 2003.

Stone, Lynn, *Fruit (Plant Parts)*, Rourke, 2007.

Name _____

Fruit or Vegetable

In common terms, some cucurbits are fruit and some are vegetables. We usually think of fruits as sweet and vegetables as not sweet. Melons, another kind of cucurbits, are fruits; squash and cucumber are vegetables. Pumpkin is also a vegetable, but since we usually add sugar to it and bake it in a pie, we think of it as fruit.

1. In the common sense of the words, which of the following is a vegetable (not sweet) and which is a fruit (sweet)?

tomato	potato	squash	lettuce	onion
broccoli	apple	strawberry	carrot	spinach
	cauliflower		watermelon	

In botanic terms, all cucurbits are fruit. A fruit is the ripened ovary—together with seeds—of a flowering plant.

2. Which of the vegetables above is botanically a fruit?

Look up the words “fruit” and “vegetable” in a dictionary. On the back of this page, draw a Venn diagram to show how they are different and how they are the same.

Write the list of fruits and veggies above in alphabetical order.

3. Look at the list of fruits and veggies and identify the blends, digraphs and diphthongs

ANSWERS:

1. vegetables—tomato, potato, squash, lettuce, onion, broccoli, carrot, spinach, cauliflower;
fruit— apple, strawberry, watermelon

2. tomato, apple, strawberry, squash, watermelon

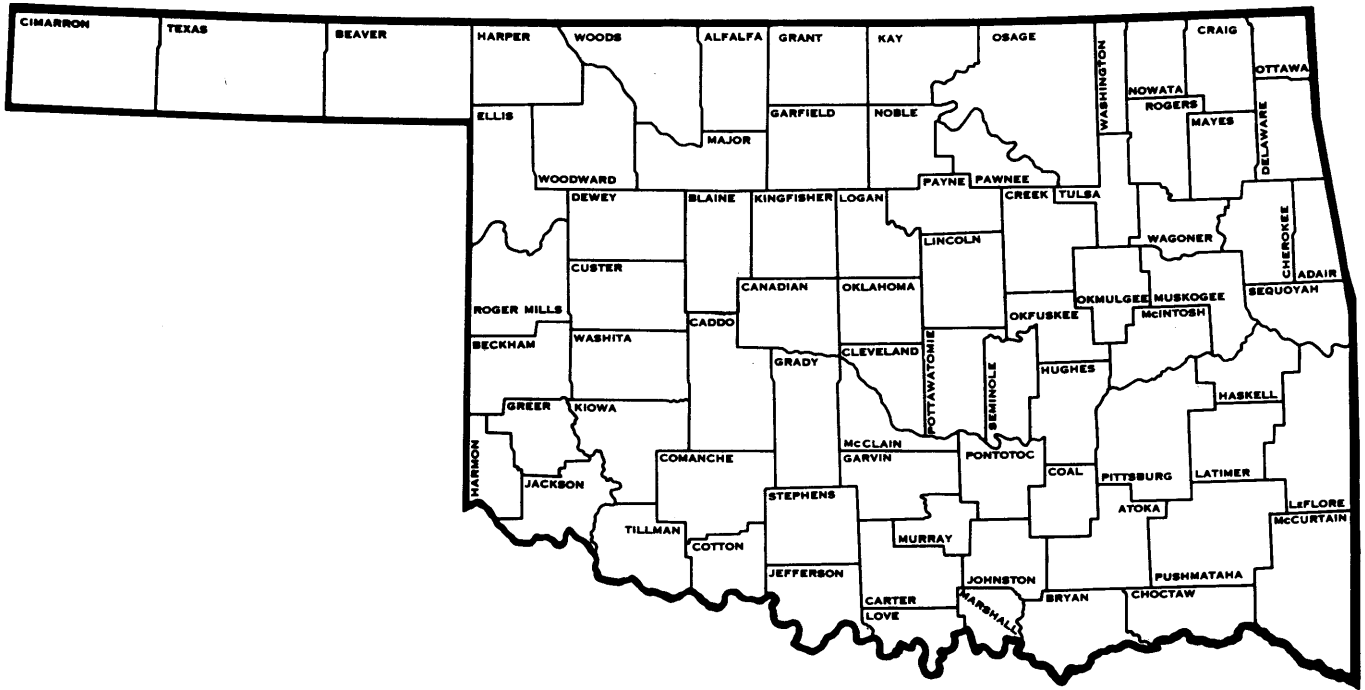
3. blends: squash, broccoli, strawberry, spinach, cauliflower).

digraphs: squash, spinach

diphthongs. (answers: cauliflower, strawberry)

Name _____

Where Do They Grow?*



Color in the counties where the cucurbits grow in Oklahoma.

Cucumbers grow on farms in Cleveland, Payne and Pottawatomie. Color the counties that grow cucumbers green.

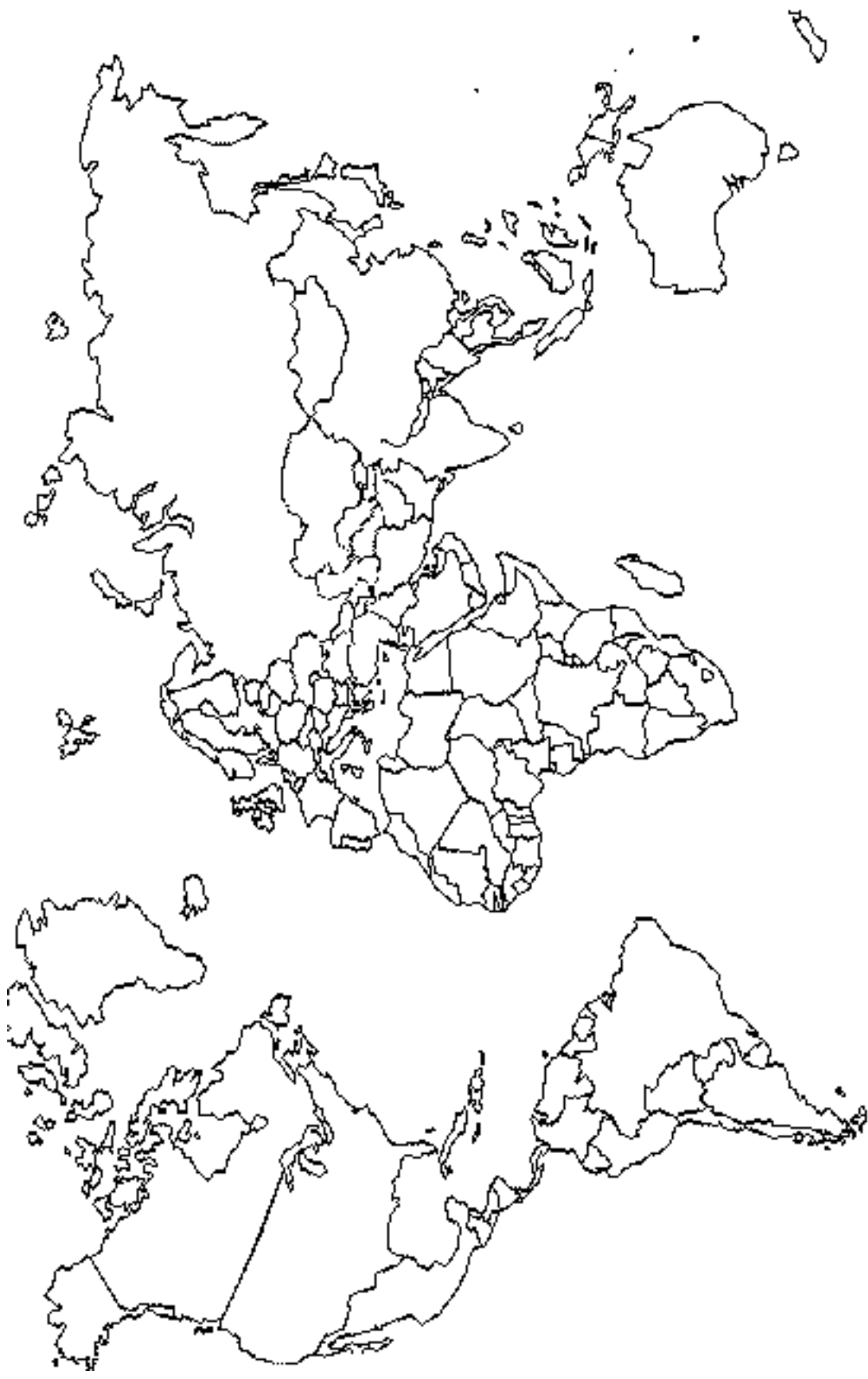
Pumpkins grow on farms in Pottawatomie, Caddo, McClain, and Grady Counties. Color the counties that grow pumpkins orange.

Squash grows on farms in Adair, Pottawatomie and McIntosh County. Color the counties that grow squash yellow.

Which county grows more than one kind of cucurbit?

*Based on most recent US Census in 2002

World Map



Oklahoma Ag in the Classroom is a program of the Oklahoma Cooperative Extension Service, the Oklahoma Department of Agriculture, Food and Forestry and the Oklahoma State Department of Education.