HARVEST LESSONS

THIS MONTH'S THEME:

CABBAGE

Lesson Plan

HARVEST LESSONS ARE A FUN WAY FOR K–4 CLASSROOMS TO EXPLORE, TASTE AND LEARN ABOUT EATING MORE FRUITS AND VEGETABLES EVERY DAY.

ACTIVITY SUMMARY

ACTIVITY	GRADE LEVEL	CURRICULUM CONNECTION	TIME
Introduction	**all**	**Literacy:** speaking, listening **Science, social studies:** evaluating claims to determine whether they are true	**10 min.**
Taste Test	**all**	**Literacy:** speaking, listening **Math:** measurement, graphing/tallying responses	**20 min.**
#1: Comparing Cabbages Observation & Leaf Rubbings	**all**	**Science:** classification, observation	**15 min.**
#2: Creating a Cabbage Timeline	**3-4**	**Social studies:** comparing the past and the present **Literacy:** reading & listening comprehension	**15 min.**
#3: Cabbage Chemistry	**4+**	**Science:** determining whether a liquid is acidic or basic - can relate to ecosystems (aquatic or soil), adaptations	**30 min.**
#4: Cabbage vs. Cabbage Worms Game	**all**	**Science:** biological unity and diversity, ecosystems, adaptations **Health/PE:** movement!	**30 min.**
#5: Mapping the History of Cabbage	**3-4**	**Social studies:** geography, past and present	**20 min.**
#6: Brasica Family Matching	**3-4**	**Science:** classification, observation **Literacy:** reading comprehension	**10 min.**
#7: Cabbage Literature	**all**	**Literacy:** listening comprehension	**20 min.**

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(activity summary, continued)

ACTIVITY	GRADE LEVEL	CURRICULUM CONNECTION	TIME
#8: Measuring Cabbage	**all**	**Math:** measurement and data	**10-30 min.**
#9: Mapping Cabbage Dishes Across Cultures	**3-4**	**Social studies:** geography, understanding other cultures	**20 min.**

INTRODUCTION (10 MINUTES)

INTRO TO CABBAGE

Begin with a fun interactive true or false activity to hook students' interest. When a statement is true, students will stand up. When they believe a statement is false, they will sit down. After all students have guessed, reveal the answer.

1. The heaviest cabbage ever grown weighed over 125 pounds!
True. In places that have extra long days in the summer, like Alaska, cabbages can grow to be HUGE!

2. Cabbages grow underground like carrots.
False. Cabbages grow above the ground. Cabbage heads are clusters of leaves that grow tightly together. Leaves need sunlight so they couldn't grow underground. Although cabbages are not roots like carrots, they can be stored in a root cellar over the winter, just like carrots.

3. The word cabbage comes from the french word for head.
True! The word cabbage comes from the french word "caboche," which is one word for head.

4. Cabbage is in the same plant family as potatoes.
False. Although lots of people like to eat cabbage and potatoes together, cabbages are in a different family from potatoes. Cabbages are related to broccoli, cauliflower, brussel sprouts and kale. All these veggies are in the Brassica family.

5. If you eat cabbage, you are less likely to get cancer.
True! Cabbage has been proven to help prevent cancer. Cabbage also has lots of Vitamin C (about 50% of the Vitamin C you need in a day per cup of raw cabbage)

6. Before band-aids, cabbage was used to cover and protect wounds.
True! Cabbage has antibacterial qualities and was used on wounds like a bandaid.

(intro, continued)

Ask these focusing questions throughout the lesson:

- Why is cabbage healthy?
- How do cabbages vary?
- Where do cabbages come from?

TASTE TEST

Compare cabbage prepared in different ways; raw, pickled, steamed, or sauteed. Or, purchase or make cabbage dishes from different cultures (see Mapping Cabbage Dishes Across Cultures for ideas).

See Harvest Lesson Activities to Use Again and Again for more information and ideas on taste tests, and other Harvest of the Month materials for recipes to use in taste tests and in school lunches.

ACTIVITY #1 (15 MINUTES) ALL GRADES

COMPARING CABBAGES OBSERVATION & LEAF RUBBINGS

MATERIALS

- At least two different types of cabbages (here are six types of cabbages to choose from: red cabbage, green cabbage, savoy cabbage, Napa cabbage, bok choi, brussel sprouts
- Paper (2-3 sheets per student)
- Colored pencils and/or crayons

If you'd like to start the observation with a brief discussion of color and nutrition, you will also need pictures of each color of cabbage you bring samples of, and a cut out or print out to pass out/project of a human body (optional - you can also tape the pictures to a volunteer).

PREPARATION

Gather materials.

PROCEDURE

To get students thinking about why cabbage is healthy, start the observation by asking them to tell you the colors of the different types of cabbages. Review or introduce information about Eating the Rainbow (available in Intro to Nutrition lesson), and ask students to remember or read which parts of the body the different colors of cabbage help. For Kindergarten and 1st graders who aren't yet independent readers, tell them what each color does for the body: purple helps the brain and memory; white helps heart health, and green helps bones and teeth and gives you energy. Call up students to place a picture of

(activity #1 continued)

each color of cabbage on the part of the human body it helps, using a human body cut out or projection (or, students can tape the pictures to a volunteer student or the teacher if he/she is willing).

Next, ask what part of the plant we are eating when we eat cabbage (leaves). Review what leaves do for the plant (make food!).

Give students about five minutes to observe and draw the different cabbages. Remind students that the word cabbage comes from the french word for head, cabboche, and that we also refer to a head of cabbage. Ask them why people might connect cabbages to human heads.

Next, pass out a cabbage leaf to each student, and demonstrate how to make a leaf rubbing. Give students five more minutes to make one or more leaf rubbings (they can switch with one another to try different leaves).

Ask students about the texture of the cabbage leaves (how they felt). Explain that cabbage's rubbery, waxy texture comes from a protective layer on the leaves, the epidermis, that is like our skin (our skin is also called an epidermis). Cabbage leaves have an extra thick epidermis that helps them survive cold temperatures. Cabbages can survive a frost and can be stored at about 40 degrees Fahrenheit all winter long!

Finish the observation by asking students to share out what they noticed about the different types of cabbages. What was similar about all the different kinds? What was different?

ACTIVITY #2 (15 MINUTES) GRADES 3-4

CREATING A CABBAGE TIMELINE

MATERIALS & PREPARATION

Print out and cut apart the Cabbage History Facts in the appendix. Also keep a copy of the facts for yourself as a key. Mix them up and place in a bag, hat or basket. You may want to glue each fact to an index card to make them easier to shuffle and more durable. Or, you could laminate them.

PROCEDURE

Give one fact about the history of cabbages to groups of 2 or 3 students. Have students read the fact to/with their group members. Then, have them share out their fact to the whole group. Ask the class to figure out which order the facts go in, and have them stand with their fact & team in a human timeline to show the order they believe is correct. Let students lead the discussion as much as possible, but be prepared to facilitate - this may be a difficult task for some classes, both in terms of the academic skills and the social skills (working as a team).

See appendix for cabbage history facts.

ACTIVITY #3 (30 MINUTES) GRADE 4+

CABBAGE CHEMISTRY

MATERIALS

- One red cabbage
- Either a blender or a large cooking pot
- Strainer -or- a coffee filter and funnel/coffee maker basket
- Paper cups for every liquid you want to test for each team of students (so, if you are testing 5 liquids and have 5 groups of students, you need 25 paper cups)
- At least one example each of acidic, basic and neutral liquids (see chart below for ideas)
- Measuring spoons for each team
- One copy of the Cabbage Chemistry student worksheet for each child (see appendix)

ACIDS	BASES	NEUTRALS
Lemon juice (or other citrus juice - orange, grapefruit, lime)	Hydrogen peroxide	Distilled Water
Vinegar	Baking soda	Gatorade (choose clear)
Soda (choose clear or light colored)	Laundry detergent (again, try to choose clear)	Sugar
Coffee	Dish soap (clear)	Salt
Tomato juice	Lime (the rock/fertilizer component, not the food)	
	Tums (or any antacid)	

PREPARATION

This activity takes a bit more time to prepare than the others, but it is worth it! Gather materials. Either blend six large cabbage leaves with 12 cups of water, or chop up half the cabbage and cook in boiling water for 5-10 minutes. If you cooked the cabbage, let everything cool. Then strain the solution using a strainer or a coffee filter in a funnel/coffee maker basket. Store the cabbage solution in a closed container for up to a week. If you'd like, you can make the cabbage solution with students, but it streamlines the experiment to make it ahead, and is especially recommended for younger students.

PROCEDURE

Ask students to tell you what they know about acids and bases. Explain that all liquids, and solids, are either acidic, basic, or neutral. We can measure how acidic or basic something is using the pH scale, which goes from 0 to 14. Zero means something is really acidic. Fourteen means it is really basic and a reading of seven means it is neutral.

(activity #3 continued)

To measure the pH of something, you need special materials. But, if you don't have those materials, you can use red cabbage! Red cabbage juice is a pH indicator -- it indicates, or tells you, whether something is acidic, basic or neutral. This happens because red cabbage has lots of anthocyanins in it. Anthocyanins are chemicals found in plants. They are healthy to eat -- they are the reason that cabbage helps protect you from getting cancer. The anthocyanins are purple in neutral liquids. They turn bright pink in acids. They turn green in bases! We are going to use cabbage juice to find out whether different liquids are acidic, basic or neutral.

Go over the directions on the student worksheet with the class. Remind students to follow the directions carefully and to be safe with their bodies so they avoid spilling liquids.

Then, distribute cabbage solution, cups and test liquids to teams of 2-4 students. Also pass out a copy of the student worksheet to each child.

Help students carry out the experiment. Teams that finish early can try mixing the acids and bases they have found to see what happens, and record the results on blank paper or in their science notebook.

Once all students have finished the experiment, discuss the results as a class. Ask students why it might be helpful or important to know whether a liquid is acidic or basic. Explain that one reason they are important is that certain plants only grow in soils of a certain pH. For example, blueberries and pine trees only grow in acidic soils. Other plants like maple trees can't grow in acidic soils. Also, pH is very important to animals and plants that live in the water. Different fish prefer different pHs, and can't survive if the pH changes in the water they are living in. You can also discuss whether they noticed any patterns - one thing they might realize is that a lot of sour foods are acidic, and a lot of cleaning products are basic.

Sources:

- Steve Spangler Cabbage Chemistry: www.stevespanglerscience.com/lab/experiments/red-cabbage-chemistry
- How Stuff Works: http://science.howstuffworks.com/innovation/everyday-innovations/experiment1.htm

ACTIVITY #4 (30 MINUTES) ALL GRADES

CABBAGE VS. CABBAGE WORMS GAME

MATERIALS

- Pinneys for half the students
- Two green pieces of paper each for half of the students
- Three or four spray bottles filled with water

PREPARATION

Gather materials.

PROCEDURE

Discuss cabbage predators and adaptations: Ask students if they know what a predator is. (A predator is an animal that eats another animal or plant. Students might not have thought about plants having predators -- if they haven't, mention that plants have predators too, which gardeners call *pests*). Explain that cabbage has a few different predators. The worst cabbage predator is the cabbage worm. Cabbage worms turn into small white cabbage moths that are very common -- show students a picture of a cabbage moth and they probably will recognize it. Ask students if they know what an adaptation is (an adaptation is something that an animal has or does to survive). Explain that cabbages have a neat adaptation to survive attacks by cabbage worms and other predators. When an animal starts eating a cabbage leaf, that cabbage releases a gas. Other cabbages near the cabbage that is being attacked sense the gas, and start producing chemicals in their leaves that will make the cabbage worms sick.

Explain the game: Explain the rules for a fun game about cabbage predators and adaptations - Cabbages vs. Cabbage Worms! Half of the students will be cabbages, and half will be cabbage worms. Give one team pinneys. Cabbages each get two leaves (green pieces of paper). In this game, cabbages can move, unlike in real life. But, they can't talk! The cabbage worms chase the cabbages and try to get their leaves. Cabbages can run away (within game boundaries), and can move their leaves to evade the cabbage worms, but once a cabbage worm grabs a leaf, the cabbage must let go. Taking the leaf represents eating it. Once a cabbage has lost one leaf, the cabbage can run to a central location/corner and get a spray bottle. The one-leafed cabbage can then spray other cabbage's leaves with water. Wet leaves become inedible to the worms (simulating the injured cabbage emitting the gas to alert neighboring cabbages who then make the toxic chemicals). Remind students that if they use spray bottles for any purpose besides spraying cabbage leaves (paper), they will be removed from the game and/or the class will lose the privilege of playing the game. If a cabbage loses both of its leaves to the worms, that child must sit down. Play for a set amount of time - say, 10 minutes - and the team with the most leaves at the end of that time wins!

(activity #4 continued)

Play the game: Play as many times as you have time for, switching up which students are cabbages and which are worms. You could also add challenges, like making some students into chickens that can eat (tag) the cabbage worms and get them out of the game, or by limiting the number of spray bottles for the cabbages to use, or by limiting how each team can move (for example, maybe the cabbages have to roll, and the worms have to crawl on their bellies).

Closing: Review the terms predator and adaptation, ask students to describe how cabbages are adapted to survive attacks by predators.

Sources for the information on cabbage predation and adaptations:

- www.garden.harvard.edu/?p=1789
- www.motherearthnews.com/organic-gardening/organic-cabbage-worm-control-zw0z1303zkin.aspx#axzz374XWR5tk

ACTIVITY #5 (20 MINUTES) GRADES 3–4

MAPPING THE HISTORY OF CABBAGE

MATERIALS

- A copy of Harvest Lessons map for each student (see appendix)
- One copy of the Cabbage Timeline & Mapping Directions to project, or one copy per student
- An atlas for each student or pair of students
- Colored pencils

PREPARATION

Gather materials. This activity pairs well with Activity #2: Creating a Cabbage Timeline, so you could do that activity before or after this one.

PROCEDURE

Pass out copies of the Harvest Lessons map to each student. Project or pass out the Cabbage Timeline & Mapping Directions. Instruct students to follow the directions to map the history of cabbage!

See appendix for cabbage timeline and mapping directions.

ACTIVITY #6 (10 MINUTES) GRADES 3-4

BRASSICA FAMILY MATCHING

MATERIALS

- Brassica matching game cards (see appendix)

PREPARATION

Print and cut apart the cards. You may want to laminate them so you can reuse.

PROCEDURE

This activity is also listed in the Broccoli lesson. You can do it more than once -- that way, students are more likely to become familiar with the different veggies in the Brassica family. This is a fun activity to do at Morning Meeting. After students have done it once or twice, you can start timing it and make it a fun race.

Ask students to define "family" and "related." Explain that there are lots of vegetables that are related to cabbages, and that this family of vegetables are called the brassica family. All the plants in the brassica family because they have things in common. The different members of the brassica family give us similar nutrients and have similar adaptations (ways they survive).

Introduce the brassica family using the pictures on the cards, or actual examples. Then, hand each student or pair of students a card from the matching game, and have them find their match.

See appendix for cabbage matching game cards (two pages)

ACTIVITY #7 (20 MINUTES) ALL GRADES

CABBAGE LITERATURE

Here are some books with cabbage connections:

The Giant Cabbage: An Alaska Folktale by Cherie B. Stihler: This charming folktale tells the story of a cabbage so large the Moose who grew it cannot budge it alone to get it to the fair. Consider following the story with a taste test of the cabbage soup recipe at the end of the book.

There's a Cow in the Cabbage Patch by Clare Beaton: This rhyming book is appropriate for Kindergarteners. It only mentions cabbage once but has very engaging illustrations of cabbage and describes farming and farm life in a way that young children will understand and enjoy.

Rapunzel (many versions): In some versions of the Rapunzel story, Rapunzel's mother is craving cabbage, and ends up giving away her child in exchange for a cabbage from a witch's garden. There is a type of cabbage called Rapunzel. There are also other greens referred to as rapunzel, including lettuce and mâche. After reading a version of this story that features cabbage, students could write their own retelling, featuring cabbage or another healthy, local food.

See the Harvest Lesson Activities to Use Again and Again for information and ideas on how to engage students in reading about healthy foods.

ACTIVITY #9 (20 MINUTES) GRADES 3-4

MEASURING CABBAGE

MATERIALS

- Cabbages (preferably enough so that each team of 2-4 students can have their own)

To measure circumference, length and/or width:

- String
- Rulers/yardsticks/tape measures
- Paper and pencil

To measure volume and/or density:

- A large bowl, bucket or pitcher
- Crayons or eyeliner
- Measuring cups
- A source of water
- Heads of lettuce if you want to compare density

(activity #8 continued)

To measure weight:

- Scales

If interested in graphing results, you may need graph paper, colored pencils and rulers for each student.

PREPARATION

Gather materials. You might also want to set up stations for taking different measurements.

PROCEDURE

For cabbage, it would be especially interesting to measure volume and to compare volume and/or weight to lettuce. Many heads of lettuce are similar in width and length to heads of cabbage, but cabbage is much denser. Children might confuse cabbage and lettuce, so this is a chance to show them how they are different physically, and explain that they are also different in terms of their resistance to cold, shelf life (lettuce goes bad quickly while cabbage can be stored all winter long), and nutritional value.

ACTIVITY #9 (10–30 MINUTES) ALL GRADES

MAPPING CABBAGE DISHES ACROSS CULTURES

MATERIALS

- A copy of the Harvest Lessons map for each student (see appendix)
- A copy of the Cabbage Across Cultures worksheet/directions (see appendix) to project, or a copy for each student
- Colored pencils
- An atlas for each student or pair of students

PREPARATION

Gather materials. If you can, buy or prepare as many of the foods mentioned as you can, and/or the recipes to send home, so that students can experience cabbage's versatility!

PROCEDURE

Pass out copies of the Harvest Lessons map to each student. Project or pass out the Cabbage Across Cultures worksheet with the directions. Instruct students to follow the directions to map cabbage across cultures! If you are able to taste test some culturally important cabbage dishes, you can do so before mapping or after.

See appendix for map and worksheet.

After students have colored their map, ask why they think cabbage is eaten all over the world. Some reasons students might come up with or that you might suggest is that it can grow in cold temperatures and in the heat, it stores well for a long time, it has lots of nutrients, and one seed produces a lot of food (it is a high-yield crop).

CLOSINGS

ACKNOWLEDGEMENTS

The following people contributed to developing this lesson plan: Chloe Powell, Aurora Coon, Cat Buxton, Karen Ganey and Kaitlin Haskins.

APPENDIX SEE WORKSHEETS THAT FOLLOW

CREATING A CABBAGE TIMELINE *Activity #2*

Cabbages originated in Asia more than 4,000 years ago. These very first cabbages had looser leaves than the cabbages we eat nowadays.

The Celts (tribes speaking Celtic langauges and living in central Europe) brought cabbage from Asia to Europe 600 (600 B.C.).

In the Middle Ages, 400 - 1400 years after Christ, European farmers developed the heavy heads of cabbage with very tightly packed leaves that we eat most often nowadays.

In 1536, a French explorer named Jacques Cartier brought cabbage to North & South America.

Explorers traveling on ships in the 1600s and 1700s brought pickled cabbage (sauerkraut) with them to make sure the sailors had enough Vitamin C. Sailors who didn't get their Vitamin C from eating cabbage or other fruits or veggies would get scurvy, a painful disease that could kill them.

In 1865, a man named William Collingwood who lived in England grew a cabbage that weighed 123 lbs!

In 2012, a man named Scott Robb set the world record for the biggest cabbage ever with his cabbage that weighed 138.25 lbs! He lives in Alaska.

Today, your class learned about and tasted cabbage!

Sources for these facts:

About.Com: Homecooking, "The Culinary History of Cabbage." http://homecooking.about.com/od/foodhistory/a/cabbagehistory.htm

Alaska Dispatch. "Giant Cabbage Sets World Record at Alaska State Fair." September 1, 2012. http://www.alaskadispatch.com/article/giant-cabbage-sets-world-record-alaska-state-fair

Melody Rose. "Cabbage: It's History, Uses and Culture." Dave's Garden. http://davesgarden.com/guides/articles/view/753/

Activity #5

CABBAGE TIMELINE & MAPPING DIRECTIONS

Cabbages originated in Asia more than 4,000 years ago. These very first cabbages had looser leaves than the cabbages we eat nowadays.
#1: Color Asia purple, and draw a black or gray star in the middle.

The Celts (tribes speaking Celtic languages and living in central Europe) brought cabbage from Asia to Europe 600 years before Christ (600 B.C.).
#2: Color Europe green. Draw an arrow from Asia to Europe to show how cabbage traveled from Asia to Europe with the Celts.

In 1536, a French explorer named Jacques Cartier brought cabbage to North & South America.
#3: Color North & South America yellow. Draw an arrow from Europe to the Americas to show how cabbage traveled from Europe to the Americas.

In 2012, a man named Scott Robb set the world record for the biggest cabbage ever with his cabbage that weighed 138.25 lbs! He lives in Alaska.
#4: Color Alaska red.

Today, your class learned about and tasted cabbage!
#5: Draw a black or gray star in the part of the United States where you live.

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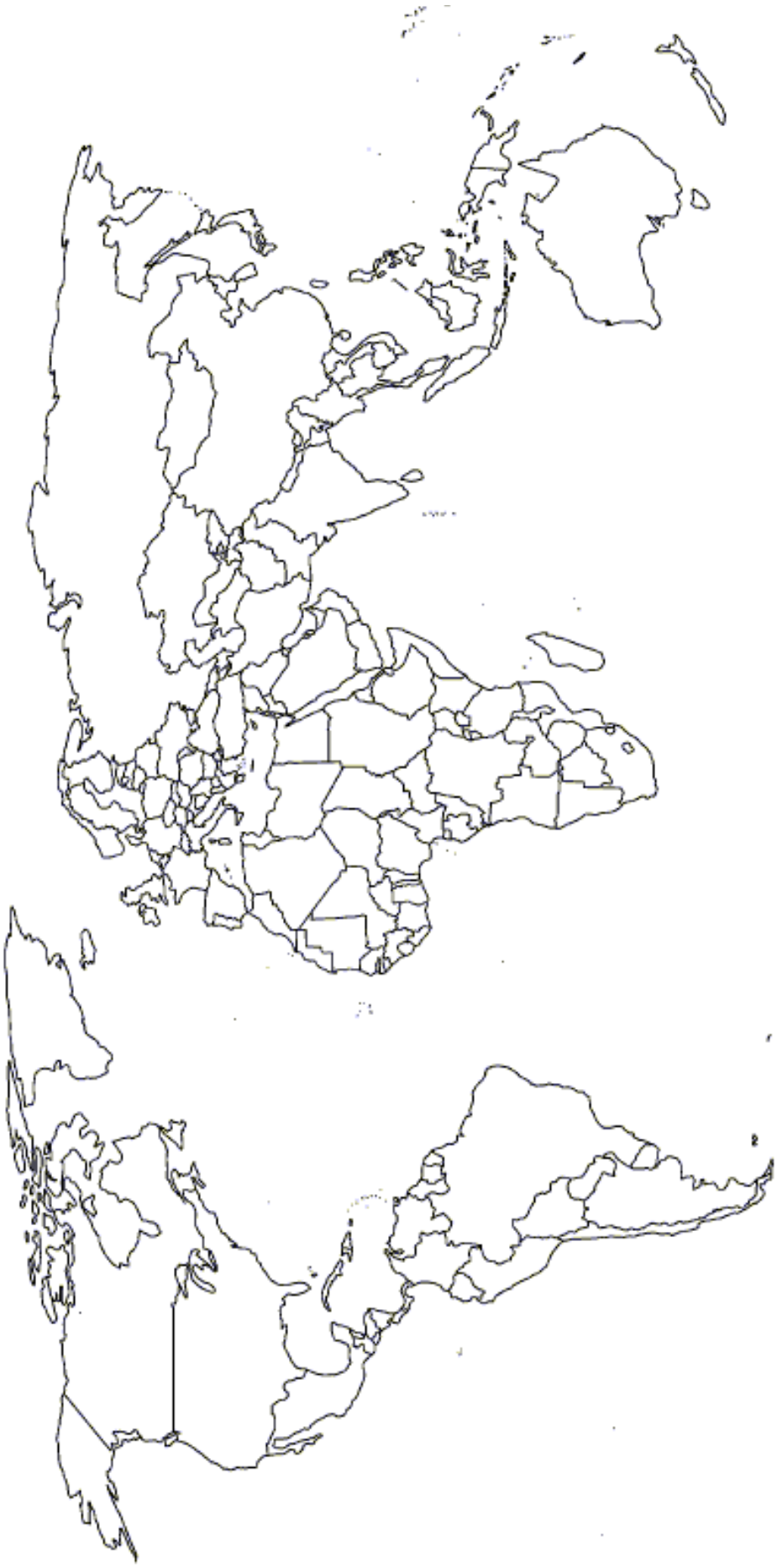
Activity #5 and #9

THIS MONTH'S FOOD:



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BRASSICA MATCHING GAME *Activity #6*

Students will be given a description of a vegetable in the cabbage family to read, and must match it with pictures of the vegetable on the following page. Cut out each description and pass them out around the classroom.

KALE: I am a green leaf and grow on a stalk. My leaves can be curly, or flat with scales that look like a dinosaur. One serving of me has a lot of vitamin C and A.	ROMANESCO: I am a very strange looking vegetable, a light green bud grows in spirals in a repeating pattern called a fractal. Sometimes I am called Romanesco broccoli and sometimes roman cauliflower, and if you taste me, I taste somewhere in between the two.
RED CABBAGE: I'm often called red, but you might say I'm more of a purple. My leaves grow in a tight "head" in a round ball. My dark color tells you that I'm full of antioxidants, and good to keep you healthy.	NAPA CABBAGE: Also known as "celery cabbage" I am a kind of Chinese cabbage, and I am commonly used in Asian cuisine. My shape is longer, and my "head" is much more loosely formed than my siblings, red and green cabbage.
CAULIFLOWER: People usually think of me as white, though I come in fun colors such as purple and orange. I am a flower forming a dense head. I am chock full of vitamin C.	BROCCOLI: A green plant that looks like a tree. I am also full of vitamin C. My name is Italian, and comes from Latin meaning "little branch."
BRUSSELS SPROUTS: I grow on a tall stalk, covered with small buds that look like miniature cabbages.	KOHLRABI: My stem makes a big bulb, in green or purple, and inside my flesh is white. I may look a little funny, but try me, raw or cooked, and I'm quite crispy, juicy, and delicious.
MUSTARD GREENS: My spicy green leaves are full of vitamins and minerals, and can be eaten cooked or raw. My seeds are used to make oil, and as a spice.	

Activity #6

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CABBAGE ACROSS CULTURES *Activity #9*

Cabbage is eaten all over the world! It is a very important food for many different cultures. Cabbage is prepared in different ways in different places. Here are some descriptions of important cabbage dishes eaten in different countries. Read the description, and think about how the dish might taste. Are some of the cabbage dishes similar? Are some different? After reading about a food, follow the directions and color in the place that food is often eaten.

KIMCHI

Kimchi is a spicy, sour food from Korea. It is made of cabbage, hot peppers and other spices. Sometimes other vegetables, like cucumbers and radishes, are added with the cabbage or used instead. Kimchi is fermented, like yogurt or sourdough bread. Good bacteria change the ingredients into a very flavorful sauce or side dish. Kimchi is the national dish of Korea, and on average, people who live in Korea eat 40 pounds of kimchi each year! It is very popular there! It is also very healthy.

Color South Korea red because Kimchi is red (because of the hot peppers used in it, which are a bright red color)!

SAUERKRAUT

Sauerkraut means "sour cabbage" in German. Like kimchi, it is fermented. It doesn't have any spices though, just salt, so it has a different flavor from kimchi. Sauerkraut is eaten in Germany, Russia, Poland, the Netherlands and in the part of France that is next to Germany. It is usually eaten with pork, sausage, hot dogs, or bacon (all of which come from the meat of pigs). It tastes kind of like relish, but has a stronger flavor and you eat more of it (like a whole pile, not just a squirt).

Color Germany and Russia (just two of the many countries where sauerkraut is eaten) yellow because sauerkraut is a light yellow color.

SURKAL

Surkal is a kind of cabbage eaten in Norway and Sweden. It is similar to sauerkraut, but sweeter, with apples often added, and caraway, a sweet spice. Also, the cabbage is cooked in butter, while sauerkraut is fermented and not cooked.

Color Norway and Sweden purple.

COLESLAW

Coleslaw is a salad made mostly of shredded raw cabbage, with dressing added. Coleslaw originated in Europe, but has become a very common summer dish in the United States. In Europe, coleslaw is made with a vinegar and oil dressing, while in the United States, it is usually made with mayonnaise or buttermilk and almost always has carrots.

Draw an arrow from Europe to the United States. Color the United States blue.

GOLUMPKI

Golumpki comes from Poland. It is a cabbage roll made from cooked cabbage leaves wrapped around a mixture of meat, onions and rice that has been baked in a casserole pan.

Color Poland brown.

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CABBAGE ACROSS CULTURES *(Continued)*

CURTIDO

Curtido is made from fermented cabbage, onions and carrots. It is similar to kimchi, sauerkraut, and relish. It is usually eaten with pupusas, which are thick corn tortillas filled with meat or cheese. Curtido comes from El Salvador.

Color El Salvador orange. Curtido is also eaten in other countries in Latin America, like Mexico.

THORAN

Thoran is from southwestern India. It is made by cooking finely chopped vegetables with hot peppers, curry spices, onion and coconut. It is often made with cabbage but can also be made with other vegetables, like beets or spinach or green beans. Thoran is usually eaten on top of rice.

Color India green.

BUBBLE & SQUEAK

Bubble and squeak is made in England and the rest of the United Kingdom. It is a breakfast food made using leftovers from the night before. It has lots of cabbage and potatoes, and also some carrots, peas and sometimes chopped meat. The cooked, chopped vegetables & meat from dinner are made into a little cake and then fried in a pan until heated through and golden brown. The name bubble and squeak comes from the sounds the cake makes as it is frying in the pan.

Color England gray.

Last but not least, make a key for your map showing what foods each color represents.

Kimchi - Red
Sauerkraut - Yellow
Surkal - Purple
Coleslaw - Blue
Golumpki - Brown
Curtido - Orange
Thoran - Green
Bubble and squeak - Gray

Sources for Cabbage Across Cultures:

www.thekitchn.com/cabbage-in-traditional-dishes-149116

Name: _____
Date: _____

Cabbage Chemistry
Student Worksheet

Directions:

1. **Label cups:** Get one paper cup for each liquid you will test. Write the name of each liquid on a cup.

2. **Pour cabbage juice:** Fill each cup halfway full with cabbage juice. Pour carefully so you don't spill. Try to get the same amount of juice in each cup.

3. **Make predictions:** Make a prediction for each liquid you are testing and record your prediction in the chart below. YOU HAVE TO MAKE PREDICTIONS **BEFORE** YOU TEST!!

4. **Test the liquids:** Measure out 1 tsp (one teaspoon) of each of the test liquids, and dump it into the cup that is labeled with the name of that liquid.

5. **Record results:** Record what color the cabbage juice turns in the chart.

6. **Clean up:** After everyone in your team has recorded the results, carefully dump the contents of each cup down the drain. Recycle or throw out the empty cups. Wipe down the area you worked in.

7. **Come to conclusions:** Use the results you recorded in the chart to figure out which liquids were acids, which were bases, and which were neutral. Were your predictions correct, or were you surprised?

Predictions & Results:

Liquids Tested	**My Prediction**	**Results:** What color did the cabbage juice turn?
Example: Vinegar	Acid	Bright pink

Conclusions:

Write at least 4 sentences about what you found out. Be sure to answer these questions:

- Which liquids were acids?
- Which were bases?
- Which were neutral?
- Were your predictions correct or were you surprised?