

Harvest Lessons are a great way for K-4 classrooms to explore, taste and learn about eating more fruits and vegetables every day. This lesson is about beets and rutabagas.

BEET & RUTABAGA ACTIVITIES

ACTIVITY	GRADE LEVEL	CURRICULUM CONNECTION	TIME
#1: Beet & Rutabaga Observation	all	Health: nutrition Science: classification Math: measurement	10 min.
#2: Reading Time	K-2	Literacy: listening comprehension	15 min.
#3: Origins & Facts	3-4	Social studies: mapping, economics Math: measuring Literacy: reading comprehension	15 min.
#4: Root or Not?	K-2	Science: classification, structure of organisms	10 min.
#5: Easy Taste Test	all	Health: nutrition Math: graphing/tallying	10 min.
#6: Make & Taste Raw Beet Salad or Mashed Rutabagas	all	Math: measurement, graphing/tallying responses	15 min.
#7: Sprout a Beet	all	Science: structure of organisms	15 min.

FOCUSING QUESTIONS

What does a root do for a plant? What kinds of roots do we eat? How do beet roots differ from other plants? How are they the same and how are they different?



OVERVIEW

Grades K-2: Students will observe, explore and taste roots and learn how they are good for their bodies. Students will watch a 5 minute video interview with a local farmer who grows beets and rutabagas. Options for activities include: examining, sketching, measuring and comparing beets & rutabagas, sorting different vegetables to determine if they are roots or not, assembling a grated raw beet salad; growing a root in a jar (showing how the stored energy can make a plant); dyeing paper with beet juice.

Grades 3-4: Students may do the same activities as K-2, but in addition they may learn about the origin and history of beets, and about sugar beets. In closing, students will know what roots do for a plant and what kinds of roots we eat.

INTRODUCTION

ALL GRADES

Play local farmer video to introduce beets and rutabagas.

ACTIVITY #1 (10 MINUTES)

ALL GRADES

BEET & RUTABAGA OBSERVATION

MATERIALS

Yarn for measuring. Pencils, crayons and paper for sketching, variety of beets and rutabagas (try to get a chiogga beet for excellent sketching potential).

PREPARATION

Gather the materials.

PROCEDURE

Observe & sketch the vegetables. (Beets are red and good for your heart, lungs and blood. Rutabagas are tan and good for your heart.)

- **Grades K-1:** What color is this? How is it good for you? (Put the food on the body). What part of this plant are we eating? Review that plant part's job.
- **Grade 2:** What color is this? How is it good for you? (Put the food on the body). What part of this plant are we eating? Review that plant part's job. Where does this food grow?
- **Grades 3-4:** Origins: Where does this food grown? Where did it originate? (Beets are from the Mediterranean and rutabagas are from Sweden.) Putting the food on the map. How is this food good for you? (Put the food on the body.)

**(activity #1 continued)**

- **Grades K-4 (everyone):** Measure the beets and rutabagas with yarn around the middle of the plant. Grades 3-4 can add discussion of diameter, circumference and radius to this exercise.

ACTIVITY #2 (15 MINUTES)

GRADES K-2

READING TIME

Read through one of these two recommended books:

***Tops and Bottoms* by Janet Stevens**

This beautifully illustrated book tells the story of a hard working rabbit family, and a lazy bear. While the bear sleeps all summer, the rabbits work hard to grow a garden, and the rabbits let the bear decide whether or not he gets the tops or bottoms of plants. This is a great story, and a great way to introduce the difference between tops and bottoms as well as the parts of the plant.

***Eat Rutabagas* by Jerry Apps**

Jerry's father believes that nobody can resist the taste of rutabagas, so he grows a field full of them, only to discover that people don't know how much they may like this root vegetable. Though this book doesn't present the most enticing sell for rutabagas, it has a good depiction of the the whole process of planting to harvesting.

ACTIVITY #3 (15 MINUTES)

GRADES 3-4

ORIGINS & FUN FACTS

Refer to the map on page 11 to locate countries and regions of plant origins.

ALL ABOUT BEETS!

- Beets are an edible taproot, and though they are most commonly known for their red or pink color, they can be orange and yellow as well.
- Red beets get their color from the red pigment betalain.
- Beets were first eaten developed in the Mediterranean, when ancients only ate the leaves of the beet plant, not the roots.

ALL ABOUT RUTABAGAS!

- Sometimes considered a cross between a turnip and a cabbage. The leaves can also be eaten.
- Rutabagas are originally from Sweden. Locate Sweden on a map.
- In the United States they are used in stews and casseroles, sometimes mashed with carrots.

**(activity #3 continued)**

- In Ithaca, New York, a “Rutabaga Curling Championship” is held at the end of the farmers’ market season. Who knows what curling is?
- Children in Scotland and Ireland carve them into lanterns like we do with pumpkins!

ACTIVITY #4 (10 MINUTES)

GRADES K-2

ROOT OR NOT? VEGGIE SORTING GAME**MATERIALS**

Assorted beets, rutabagas, and other vegetables for the sorting exercise, perhaps a tomato, broccoli and mushroom (try to avoid potatoes and other tubers to prevent confusion). Photographs of vegetables can also be used. *See photos on page 12*

PREPARATION

Gather materials.

PROCEDURE

Conduct a sorting game with vegetables, using either real vegetables or photos. What are roots and what are not roots? Follow up with a discussion of roots and their purposes: to transport food, the store food and to support plants. Examine an assortment of roots and discuss the differences and similarities.

ACTIVITY #5 (10 MINUTES)

ALL GRADES

EASY TASTE TEST

Sample raw sliced beets, roasted or boiled beets, beets with dressing in a salad and/or baked beet chips.

ACTIVITY #6 (15 MINUTES)

ALL GRADES

MAKING & TASTING GRATED BEET SALAD**MATERIALS**

Beets, oranges, lemons, olive oil, chives, mint, parsley, salt, romaine. Also vegetable peeler, box grater, bowl, measure spoons, wooden spoon and a plate.

PREPARATION

Volunteers can prepare ingredients ahead of time and combine the salad with the class or depending on timing, prepare the recipe ahead of time. With younger grades it might be best to do the grating part ahead of time.



(activity #6 continued)

PROCEDURE

Have children wash their hands. Measure and combine ingredients with the class. Afterward, create a chart with the categories liked it, loved it, and no thank you to record responses.

GRATED RAW BEET SALAD

INGREDIENTS

1/2 pound beets
3 tablespoons freshly squeezed orange juice
1 tablespoon freshly squeezed lemon juice
1 tablespoon extra virgin olive oil
2 tablespoon minced chives, mint or parsley (or a combination)
Salt to taste
Leaves of 1 romaine heart

DIRECTIONS

Peel the beets with a vegetable peeler ahead of time, and grate in a food processor fitted with the shredding blade (or use a box grater). Combine the orange juice, lemon juice and olive oil. Toss with the beets and herbs. Season to taste with salt. Line a salad bowl or platter with romaine lettuce leaves, top with the grated beets and serve.

Recipe by Martha Rose Shulman for the NY Times

MAKING & TASTING MASHED RUTABAGAS

MATERIALS

Rutabagas, salted water, butter, nutmeg and salt. Also, a stovetop, vegetable peeler, large pan and potato masher or fork.

PREPARATION

Gather the ingredients.

PROCEDURE

Have children wash their hands. Follow the directions below. Afterward, create a chart, with the categories liked it, loved it, and no thank you to record responses.



(activity #6 continued)

MASHED RUTABAGAS

INGREDIENTS

2 pounds peeled rutabagas, cut in large chunks
Cold salted water
3 to 4 tablespoons butter
Pinch nutmeg
salt to taste

DIRECTIONS

Peel rutabagas, and cut them in large chunks. Put them in a pan of cold salted water, cover, and bring to a boil. Simmer until very tender, 30 to 40 minutes. Drain the rutabagas, return them to the pan, and heat gently for 2 or 3 minutes to dry them. Mash the chunks with a potato masher or fork, the puree will always be slightly fibrous. Work in butter with a generous grate of nutmeg, taste, and adjust the seasoning.

Recipe by Ann Willan for the Food Network

ACTIVITY #7 (15 MINUTES)

ALL GRADES

SPROUT A BEET (GROWING ROOTS)

MATERIALS

Beets, bowls or saucers, soil or sand, water.

PREPARATION

Gather the materials.

PROCEDURE

Cut about 1/2 inch of the red part and the same amount of green stems off the top off a beet. Press the beet piece into damp sand or soil in a saucer or bowl. Just put a little water into the dish if sand/soil are not available. Soon pretty leaves could appear and hey presto you have a nice plant to keep at a window in bright light. The root will not regenerate itself. But if there is enough of the root left, it is possible to plant it and get some foliage from it. For grades 3-4 add discussion of biennials and their seed cycle. Annuals are plants which go to seed every year, and biennials are plants that make a flower and go to seed every other year. NOTE: This can be an activity that you spend a short amount of time on, but leave the beet in the classroom near a window for students to observe as it grows.



EXTENSIONS

OPTION #1: DYEING PAPER WITH BEET JUICE

Wash the beets thoroughly. Cut the leaves off the beets and dispose of them. Chop the beets and stems into small chunks and put them into the blender. Add 1 cup of water, tightly push the lid on the blender jar and liquefy the beets so they become a nice smooth pulp. Pour the beet pulp into the cooking pot and add 1/4 cup vinegar. The vinegar will help seal the dye into the paper fibers and make the color last longer. Place the pot on the stove and bring the mixture to a boil on high heat while you stir it with a large spoon.

Place a lid on the pot and turn down the heat once it starts bubbling. Let the liquid simmer for about one hour. After simmering, turn off the heat, stir the mixture and let the dye cool. Pour the dye mixture through a mesh sieve into the plastic tray. A clean litter tray is ideal for most paper sizes, but any large, shallow container will work. If the dye is too thick, add 1/4 cup water.

Slide a piece of white paper into the tray. Try to use heavy papers or card stock for dyeing, as the moisture may cause more delicate papers, like tissue or rice paper, to fall apart. Make sure the dye covers the paper completely. Wait 5 to 10 minutes for a light tone to your paper. Wait overnight for a richer shade.

Read more on eHow at <http://bit.ly/1bx1Qwv>

OPTION #2: MAKE BEET PRINTS

Slice beets and rutabagas in half and use them as stamps on paper. Another option is to paint on paper with beet juice.

OPTION #3: POSY POETRY

Posy Poetry from Shelburne Farms' Project Seasons. For taste tests, have children take 3 pieces of paper and write adjectives or nouns to describe the color, texture, and taste of different foods at different tasting stations. Break into groups to create poetry using the words.



CLOSINGS

ACKNOWLEDGEMENTS

- Shelburne Farms' Project Seasons
- Green Mountain Farm to School's Harvest of the Month program

BACKGROUND INFORMATION

Information on nutrition and the history of beets:

<http://en.wikipedia.org/wiki/Beetroot>

Background information about rutabagas:

<http://en.wikipedia.org/wiki/Rutabaga>

Great information about beets can be found at this website:

www.panen.org/snap/beets

Nutritional Information about beets and rutabagas:

<http://skipthepie.org/vegetables-and-vegetable-products/beets-raw/compared-to/rutabagas-raw/>

Grades 3-4: History and information on sugar beets:

https://en.wikipedia.org/wiki/Sugar_beet

Suggested Books

- *Tops and Bottoms* by Janet Stevens
- *Eat Rutabagas* by Jerry Apps
- *Rootabaga Stories* by Carl Sandburg (doesn't actually have to do with rootabagas, but really good folktales)
- *The Turnip* by Morgan Pierr

APPENDIX

See worksheets that follow.

SUGAR BEETS



BACKGROUND

Sugar beets (*Beta vulgaris*) are used primarily for production of sucrose, a high energy, pure food. Our demand for sweet foods is universal, and honey was the main sweetener for primitive humans. Trade in sugar from sugarcane can be traced to primitive times too. The sugar beet was recognized as a plant with valuable sweetening properties in the early 1700s. It was developed in Europe in the 18th century from white fodder beets.

The process involved in extracting sugar from sugar beets involves slicing and boiling beets to make a sugary beet water. This is then boiled down until it is a thick syrup. The syrup is then cooled and the sugar is crystallized. The pulp that results from processing the sugar beets can be used as feed supplements for livestock. The beet tops can also be used as silage to feed livestock.

Sugar beets are a biennial plant, meaning that if the plant is allowed to overwinter, it will produce a flowering stem and seeds for the next crop. It takes two years to get a seed from sugar beet plant.

Sugar beets grow primarily in a temperate zone, latitudes of 30 to 60 degrees north. Sugar beet plants do not survive a hard frost. After planting, they take 70 to 90 days to reach maturity.

Sugar beets have been grown for sugar in the United States since 1870. Sugar beets are grown in 26 states, with Minnesota and North Dakota producing the most. They are also grown in Canada. Russia leads worldwide production of sugar beets followed by France, the US, Germany and Ukraine.

According to the UN Food and Agriculture Organization, these countries had the highest production in 2011:

COUNTRY	TONS OF SUGAR BEETS
Russia	47.6 million tons
France	38.1
United States	26.2
Germany	25
Ukraine	18.7
Turkey	16.1
Poland	11.6
China	10.7
United Kingdom	8.5
Egypt	7.4

QUESTIONS

1. What continent first developed beets for use as a sweetener? Color the continent red. Color the country that has the highest sugar beet production blue. Color the country that has the second highest production green.
2. What is done with the other parts of the plant left over after extracting sugar from the sugar beets?
3. What does the word biennial mean?
4. What does temperate mean? Can you mark on a map the “temperate” zone in which beets grow, between 30 and 60 degrees N latitude.
5. Make a bar graph to illustrate the countries with the highest sugar beet production.

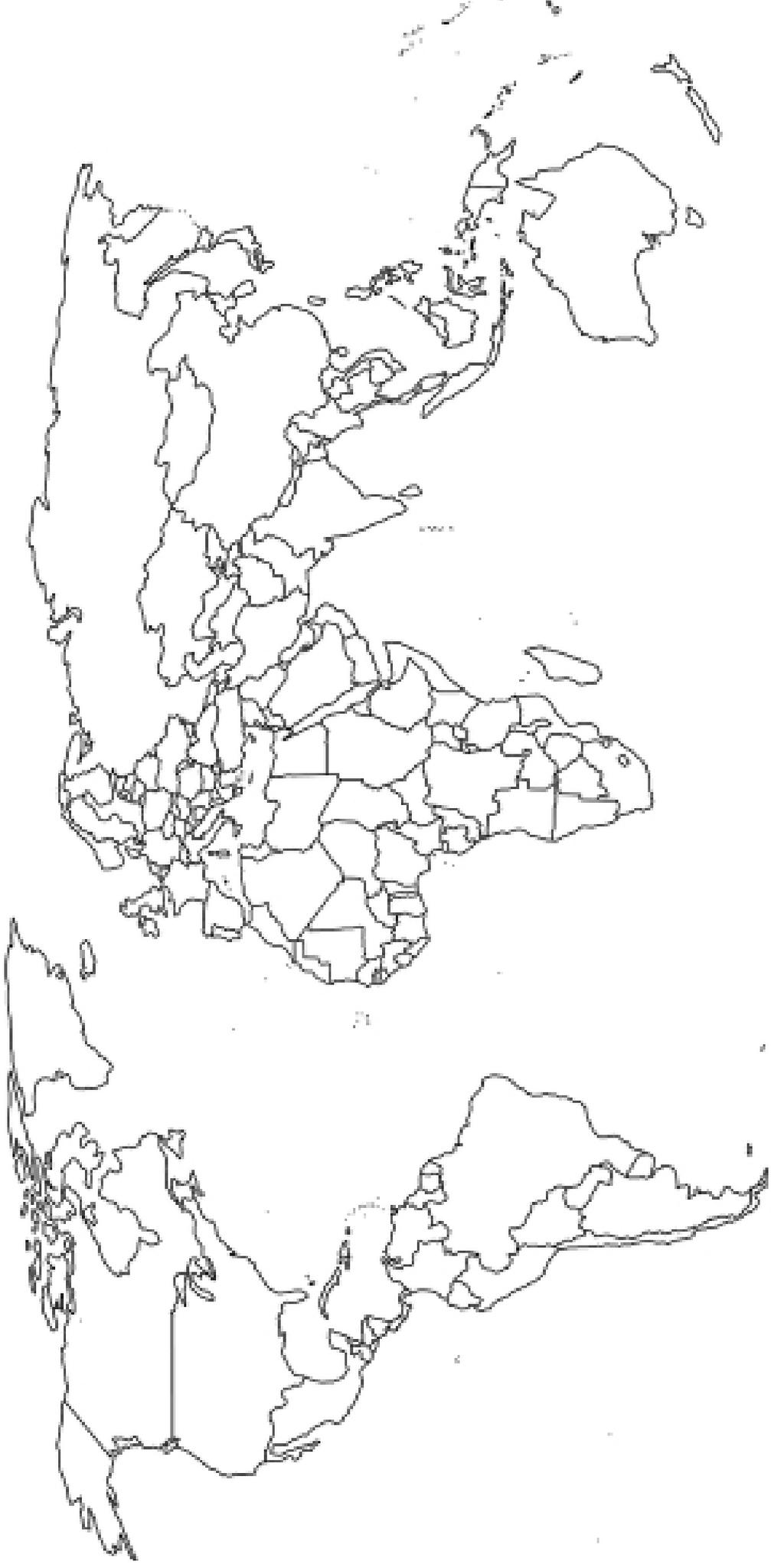
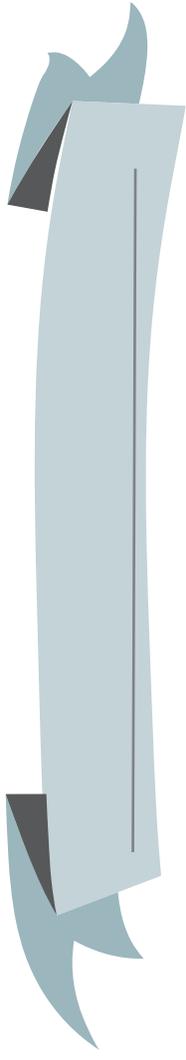
Information adapted from www.hort.purdue.edu/newcrop/afcm/sugarbeet.html

REFER TO ATTACHED WORLD MAP



UPPER VALLEY
FARM TO
SCHOOL
NETWORK
HARVEST
LESSONS

THIS MONTH'S FOOD:



ROOT OR NOT? SORTING GAME

Which vegetables are roots and which are not roots?



UPPER VALLEY
FARM TO
SCHOOL
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