

# Underground Vegetables

## Alaska Agriculture in the Classroom for Pre-K (Ages 3-5)

### Lesson Goal

The goal of this lesson is to teach Pre-K students how to recognize plants, to care for them, and to understand that plants are useful for personal health and agricultural goals.

### Student Objective

The student will be able to recognize vegetables that grow underground, understand why plants are raised and how to care for them, participate in a physical activity, participate in a group activity, participate in



making food products, and to make healthy food choices.

### Activities

- **Story Time:** Agriculture in Alaska and Children’s Books
- **Exploring:** Plant Parts, Plant Parts Song, Fruit or Vegetable, Potato Bonsai, Carrot Seed Tape, and Test Your Senses
- **Creating:** Fruit & Veggie-Prints and Potato Heads
- **On the Go:** Hot Potato
- **MyPlate:** Making Healthy Food Choices, Mashed Potatoes, and Carrot Cookies

### Vocabulary

Vegetables, seeds, roots, stems, leaves, tuber, flowers, and fruits.

## Rubric

Alaska Early Learning Guideline Domains	Student Target	Facilitating Activities
1 – Physical Well-Being, Health, and Motor Development	The student participates in a physical activity, involving coordination and movement.  The student recognizes and participates in making and eating nutritious foods.	<ul style="list-style-type: none"> <li>• Hot Potato</li> <li>• Mashed Potatoes and Carrot Cookies</li> </ul>
2 – Social and Emotional Development	The student participates in a group activity, displays cooperative teamwork to accomplish a group goal, and recognizes individual contributions.	<ul style="list-style-type: none"> <li>• Hot Potato</li> </ul>
3 – Approaches to Learning	The student sustains attention on a multi-task project with specified requirements.	<ul style="list-style-type: none"> <li>• Fruit &amp; Veggie-Prints and Potato Heads</li> </ul>
4 – Cognition and General Knowledge	The student communicates comprehension by recognizing plants and is able to show understanding of how to care for them.  The student is able to choose healthy foods.	<ul style="list-style-type: none"> <li>• Plant Parts, Fruit or Vegetable, Plant Parts Song, Potato Bonsai, Carrot Seed Tape, and Test Your Senses</li> <li>• Making Healthy Food Choices, Mashed Potatoes, and Carrot Cookies</li> </ul>
5 – Communication, Language, and Literacy	The student listens with attentiveness and curiosity.  The student mimics sounds and/or actions.	<ul style="list-style-type: none"> <li>• Agriculture in Alaska and Children’s Books</li> </ul>

# Story Time!

## Agriculture in Alaska

### Alaskan Potatoes

Do you like to eat potatoes? They can be boiled, baked, mashed, fried, French fried and many other ways. But before you can eat them, a farmer must plant, weed, water, harvest, and sell them. That is what we do at the Jenny M Farm.

One potato, two potato, 3 potato, four. Five potato, six potato, seven potato and more! That is a lot of potatoes. But we plant more than seven potatoes on our vegetable farm -the Jenny M Farm. We plant hundreds of potatoes! We plant different colors of potatoes- white, red, golden, and blue. They are different shapes too- some are round, some are oval, and some are called fingerlings because they look like big fingers. Each kind has a special name: butterballs, reds, California whites, Yukon gold, russets, Swedish, magic molly, all red and all blue.

They are planted in a big field

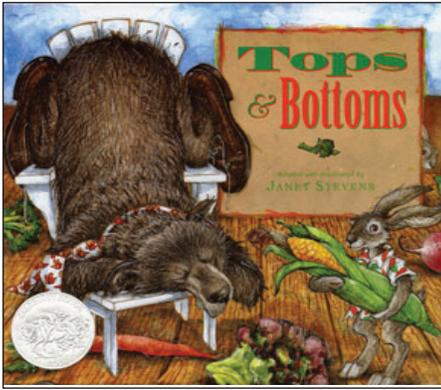


of soil that is plowed with a tractor to get rid of the weeds and other plants because all we want to grow in that field is potatoes. Another machine spreads fertilizer that will help the potatoes grow. We divide our field into very long rows and then a hole is dug every 16 inches. A potato is put in each hole and covered with soil- We can't plant the potato too deep, or it will take too long to grow. The rows of potatoes are watered, and the sun shines bright to warm the soil and help the potatoes grow. Above ground, a big green plant grows that has pink, white, or purple flowers later in the summer. But the potato you eat is underground where you put it and as the green plant above gets bigger, the potato below makes little sprouts and each of the little sprouts has a new potato on it.

Later, the flowers disappear, and the green plant may be frosted. That means its time to dig for the potatoes. The plants are pulled out of the ground and then its like a treasure hunt as we search in the dirt to see how many potatoes are under each plant.

One, two, three potatoes, four-five, six, seven potatoes or more! The potatoes are washed and taken to a Farmers Market, or store, or restaurant to be sold. Some of the potatoes are kept all winter long in a root cellar- which is a place where it stays cool enough to make the potatoes last all year, but not too cold to freeze them. Then in the springtime, the potatoes come out to be planted all over again.

## Children's Books



### Materials

- Children's book Tops & Bottoms by Janet Stevens
1. Read Tops & Bottoms to the students, a story about a rabbit and a bear who decided to grow some plants to eat.
  2. After reading, discuss the lessons we can learn from the Bear? He doesn't know much about plant parts, so he doesn't get as much healthy and tasty food as the Hare. How do the decisions that the Hare and Bear make impact their lives?
  3. Ask student to describe the parts of the plant that we eat; roots, stems, leaves, flowers, and fruits. What do plants need? They need soil, water, and sunlight to produce their delicious and healthy food items.
  4. Who grows our food? Farmers grow and harvest vegetables and fruits for us to eat. Why do we eat vegetables and fruits? They provide us with a healthy diet.
  5. What parts of the plants do we eat? We eat the tops, middles, and bottoms. Which vegetables are tops?—The stems, leaves, and flowers. Which vegetables are bottoms?—The roots.

# Exploring

## Plant Parts

### Materials

- Plant Diagram page
- Crayons
- Live plant with roots, leaves, and flowers
- Examples of fruits and seeds

1. Discuss that plants are an important part of our life. They provide oxygen for us to breathe, food to eat, fiber for clothes to wear, and materials for homes and vehicles. In some way, we use every part of the plant.

2. Teach the students, the "Plant Parts Song" Have the students color in the parts on their Plant Diagram as they learn the song.

3. Plants are amazing—they make their own food! Just like people and animals, plants also need food, water, and air. Most (vascular) plants have 6 parts: roots, stems, leaves, flowers, fruit, and seeds.

4. Plants start their lives as **seeds**. Seeds are covered with a protective coating. Seeds contain an embryo, with everything it needs to make another plant. The plant emerges through the soil as it reaches for the sunlight and continues to grow upward, getting larger and larger. because they have lot of nutrients. Can you name some seeds that you like to eat?

5. The **roots** absorb and water and nutrients found in the soil. They also hold, or anchor, the plants in the soil. Can you

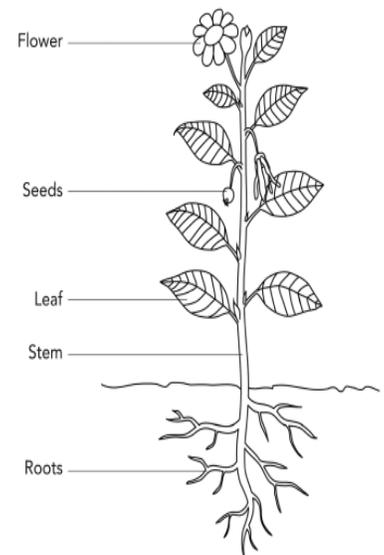
name some roots that you like to eat?

6. **Leaves** grow bigger and spread open to expose a lot of surface area to the sun. Can you name some leaves that you like to eat?

7. The **stems** on a plant help to hold it up and carries food and water through the plant. Can you name some stems that you like to eat?

8. A **flower** is the part of a that forms into fruits, after pollination, and hold the seeds of a plant. Flowers have pretty petals and fragrances (odors) to help attract pollinators such as birds, bees, and other insects. Birds, insects, and the wind help to pollinate and produce seeds within the flowers by moving the pollen from flower to flower. Can you name some flowers that you like to eat?

9. **Fruits** are the fleshy things that surround seeds. Fruits protect the seeds and attract animals to eat them, so they will help spread the seeds through their scat. Can you name some fruits that you like to eat?



# Plant Parts Song

## Materials

- Room to move around

1. Teach the students to sing this song by singing one line at a time and asking them to repeat the line, then sing the whole song together. Tune is Mary Had a Little Lamb.

2. Sing the song again and add movements to it. For example, when singing “the roots hold the plant in place,” ask the students to touch their toes.



## Parts of Plants Song

Sung to the tune of Mary Had a Little Lamb

Do you know the parts of plants, parts of plants, parts of plants?

Do you know the parts of plants—parts of plants!

The roots hold the plant in place, plant in place, plant in place.

The roots hold the plant in place—plant in place!

The roots store food and water, food and water, food and water.

The roots store food and water—food and water!

The stem moves water up the plant, up the plant, up the plant.

The stem moves water up the plant—up the plant!

The stem brings water to the leaves, to the leaves, to the leaves.

The stem brings water to the leaves—to the leaves!

The leaves soak up the sun, up the sun, up the sun.

The leaves soak up the sun—up the sun!

The sun helps the plant to grow, plant to grow, plant to grow.

The sun helps the plant to grow—plant to grow!

The flower grows into a fruit, into a fruit, into a fruit.

The flower grows into a fruit—into a fruit!

Inside the fruit are tiny seeds, tiny seeds, tiny seeds.

Inside the fruit are tiny seeds—tiny seeds!

Do you know the parts of plants, parts of plants, parts of plants?

Do you know the parts of plants—parts of plants!

# Fruit or Vegetable?

## Materials

- Variety of fruits and vegetables

- Platters

- Knife

1. We call plants that we eat, fruits and vegetables. We eat the roots, leaves, stems, and fruits of plants. Leafy foods, like lettuce, are vegetables. Root and tuber foods, like carrots, potatoes, or beets, are not vegetables. Fruits are not vegetables, but some foods that we call vegetables are actually fruits, such as tomatoes and peppers.

2. So, what's the difference? We need to understand the definitions for fruits, vegetables, leaves, and roots to be able to tell them apart.

3. Ask students to examine each fruit or vegetable that has been brought to class. Discuss what the difference is between fruits, vegetables, and roots. All fruits will have seeds in them.

4. Let students take turns choosing a fruit or vegetable. Cut it in half and look for seeds. If there are seeds, then it is a fruit. Place it on a platter labeled 'Fruit.'

5. If there are no seeds, discuss what part of the plant the food came from. If it came from underground, then it's a root or tuber. Place it on the platter labeled "Roots and Tubers."

# Potato Bonsai



## Materials

- Potatoes grown in Alaska, Russet potatoes work well for this project
- Plastic bowls
- Scissors
- Colored pencils
- Soil
- Water
- Spray bottle
- Light source
- Rulers
- Potato Bonsai Graphing Sheet

1. The students will be growing a potato bonsai. Explain what a bonsai tree is, showing images of examples.

2. Pass out potatoes grown in Alaska. Many potatoes are grown near Palmer, Nenana, and Fairbanks.

3. Demonstrate how to place the potato into a plastic bowl and fill in soil around the potato, leaving the top part of the potato exposed above the soil.

4. Demonstrate how to spray water over the soil and the potato. Ask students to place their bowls under a light source, such as growing lights, or in a window that gets direct, daily

sunlight. The students will water when necessary, keeping the soil moist, but not soaked.

**Display it!** Display all of the bonsai potatoes and their graphs (if complete).



# Carrot Seed Tape

## Materials

- Carrot seeds
- Flour
- Squeeze bottles
- Food coloring
- Paper towels, cut in 2 inch strips
- Rulers
- Large planting bins
- Soil, bowls
- Masking tape
- Markers
- Spray bottles

1. Ask the students what kind of vegetable a carrot is. (root) Ask why carrots are good for you. (healthy, good for eyes) Talk about the traditional method of planting carrots with many seeds in a row, then thinning—pulling some out to make room for others to grow bigger.

2. Explain that seed tape is great for planting tiny seeds, like carrots, that are difficult to handle. The “tape” is made of biodegradable paper which is planted directly into your garden. The seeds are embedded into the paper tape

one at a time, are perfectly spaced, and ready to go into the garden.

3. To make the seed glue for the seeds, dissolve 2-3 Tbsp of flour in 1/2 cup of hot water in a bowl. Keep adding flour until it thickens. It should look opaque and cling slightly to a fork before dripping off. Let it cool, then transfer into a squeeze bottle, add 1 drop of food coloring, and shake to mix.

4. Hand out a paper towel strip, a ruler, and a Sharpie to each student. Students can share a bowl of carrot seeds and squeeze bottles with the seed glue.

5. Demonstrate how to fold the paper towel strip in half the long way. Using the ruler and Sharpie—make 1-inch marks down the entire length.

6. Demonstrate how to lay out the paper towel strip and place glue dots across one side of the fold with the squeeze bottle on the Sharpie marks.

7. Demonstrate how to place one seed on top of each the dots and then fold the other half of the paper towel on top of the glue dots and let it dry completely.

8. Ask the students to write their name on the seed tape and place them in a plastic bag until ready to plant. Plant them in the school garden or inside in a large seedling flat with a light source.





## Test Your Senses

### Extension Project:

#### Materials

- Variety of underground foods, cut into bite-size pieces
- Small paper plates and cups
- Copies of the Underground Food Picture Sheet

1. Place the bite-size food pieces into separate and labeled bowls, with an uncut version in front of the bowl.
2. Pass out a small paper cup to each student for spitting foods into, if they don't like it.
3. Demonstrate the way foods are tested, one at a time, for each food, and category: Look, Smell, Feel, Taste and Sound.
4. Discuss how the food looks, smells, feels, tastes, and the sound it makes when eating it. Demonstrate how to record their observations as they test each food, by putting a sticker next to the foods they like on the picture sheet.

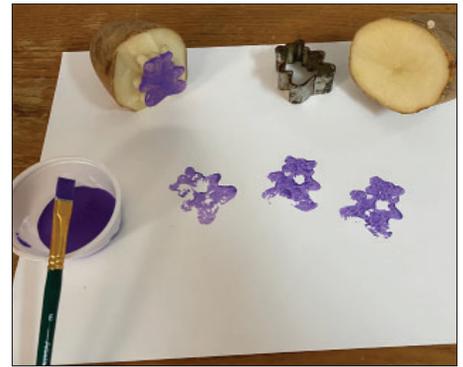
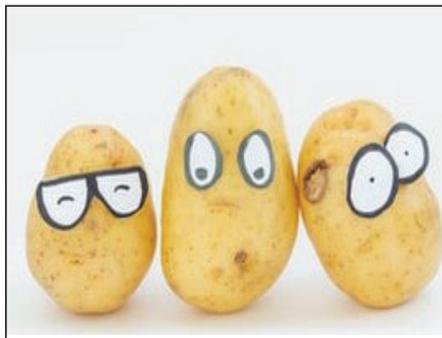
# Creating

## Potato Heads

#### Materials

- Potatoes
- Microwave
- Various craft items
- Construction paper
- Glue

1. Wash the potatoes and let them dry. Microwave each potato for 3-5 minutes to soften them. Let them cool.
2. Hand each child a potato and demonstrate how to push various craft items into the potatoes to make faces and to dress them up. Or, demonstrate how to cut up colored construction paper to cut up as decorations or facial parts.



## Fruit & Veggie Prints

#### Materials

- Variety of fruits and vegetables, cut crosswise or in large slices to expose the shapes
- Small Cookie Cutters
- Plastic Knives
- Painting paper
- Non-permanent markers or water-based paints
- Paint Brushes

1. Place a small amount of the cut fruits and vegetables into many bowls and set out on tables for students to share. Remind students that we are not eating these, we are going to use them to make prints. Explain that the insides of the vegetables have amazing designs.
2. Demonstrate how to dip the crosscut ends of them into the ink or paint and then pressing its design onto the paper.
3. For potatoes, you can use small cookie cutters to make stamps.
4. Repeat the printing with as many as they like, filling up the paper to make abstract designs or using the shapes to suggest objects, places, or people.

# On the Go!

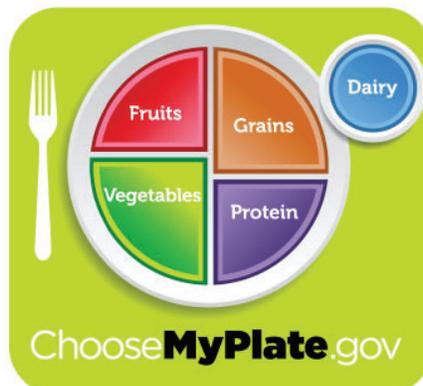
## Hot Potato

### Materials

- A soft ball, for a “hot potato”
- Rope or cones, to delineate a large circle
- Room to form a large circle or to run around the circle
- Spinning Wheel, with farm animals on it

1. Set up your cones or rope to create a circle. Ask the students to stand around the outside edge of the circle.
2. Explain how to play the game, by passing the ball around the circle. Review the rules, including tossing gently, sharing, and having fun.
3. Start the first round by handing the ball from child to child, then rolling, and transition into tossing. If someone drops it, they should pick it up and pass it on.
4. Play or sing a short song while the object is being passed. Continue passing the ball until the song ends. When the song ends, the student with the ball, the “hot potato,” spins the wheel and makes the sound of the animal it lands on, with all of the students joining in. Make sure everyone gets a turn!

**Variations:** Use a bean bag or frisbee for passing. Use physical activities such as jumping up and down, turning in a circle, or hopping on one foot for the “hot potato” activity.



# MyPlate

## Making Healthy Food Choices

### Materials

- MyPlate Place Mat
- Variety of fresh fruits and vegetables, cut into bite-size pieces or short strips
- Small paper cups

1. Show the students the laminated “MyPlate” poster and discuss what it represents. Explain that it shows the five food groups a person should eat from each day to grow up healthy.
2. Point out the different colors and types of foods that belong to each group.
3. Hand out the “MyPlate” place mats and a small paper cup. Give the same kind of sample of a fruit or vegetable slice to all of the students.
4. Discuss which food groups each fruit and vegetable belongs to on the place mat. Discuss why they fit where they do, reviewing the definitions of fruits and vegetables. Discuss how making food choices that fill in each food group area for meals will help them grow healthy.
5. Repeat with each food sample, allowing the students to eat them after the discussion.

# Carrot Cookies

## Materials

- 2 cookie sheets
- 1 small and 1 large mixing bowl
- Wooden spoon
- Small spoons
- Parchment paper
- Spatula
- Oven

## Ingredients

- 1 cup butter
- 1 cup sugar
- 1 egg
- 1 cup of grated carrots
- 2.5 cups all-purpose flour
- 2 tsp baking powder
- 1 pinch of salt
- 1/2 tsp ground cinnamon

**1.** Preheat the oven to 375°F. Place parchment paper on 2 cookie sheets.

**2.** Melt the butter until soft using a microwave on HIGH for 30 seconds. In a small mixing bowl, mix the butter and sugar until very light and fluffy. Add the egg and blend together.

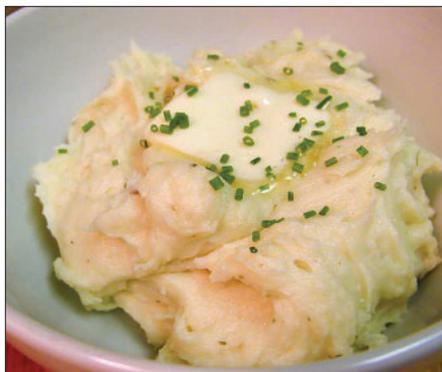
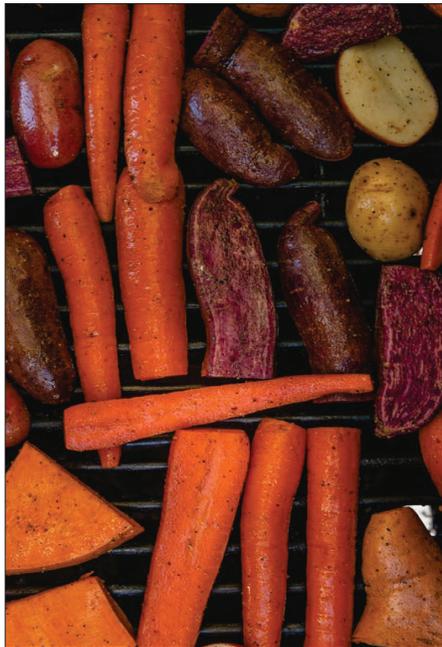
**3.** In a large mixing bowl, mix the flour, salt, baking powder, and cinnamon together. Add the butter mixture and the grated carrots to the large mixing bowl and mix it until it forms a soft, consistent dough.

**4.** Using small spoons, scoop the dough out and place it in balls onto the cookie sheets, leaving 1 inch of space between them for spreading.

**5.** Bake for 10-12 minutes or until cookies are lightly



browned around the edges. Loosen cookies with a spatula and place onto a wire rack, or parchment paper on a counter, to cool.



# Mashed Potatoes

## Materials

- Electric cooking pad or oven
- Large sauce pan
- Slotted spoon
- Potato masher
- Small paper cups
- Spoons

## Ingredients

- 2 lbs of baking potatoes, peeled and quartered
- 2 Tbsp Butter
- 1 cup whole milk
- Salt and pepper

**1.** Place the potatoes into the sauce pan. Add enough water to cover the potatoes. Heat the pot until the water boils and continue to boil until the potatoes are tender, but still firm for 15-20 minutes.

**2.** Remove the potatoes from the sauce pan with the slotted spoon, allowing the water to drain from the spoon. Transfer all of the potatoes to a mixing bowl and let cool.

**3.** Add 2 Tbsp of butter (cut into small cubes) and 1 cup of milk to the bowl of potatoes. Demonstrate how to use the potato masher to slowly mix the butter and milk into the mashed potatoes. Mash and mix until smooth and creamy. Season with salt and pepper, chives, or dill, if desired.

**4.** Serve the warm, but not hot, mashed potatoes in small paper cups.

# References

The activities in this lesson have been, in part, adapted from the following references:

## Rubric

- Alaska Early Learning Guidelines—<https://www.alaskaelg.org/goals-by-domain>
- **Agriculture in Alaska**
  - Story by Joni Scharfenberg of Jenny M Farms in Fairbanks.

## Children’s Books

- Tops & Bottoms by Janet Stevens
- Plant Tops & Bottoms, National Agriculture in the Classroom— <https://www.agclassroom.org/matrix/lesson/78/>

## Plant Parts

- Do You Know the Parts of Plants?, Alaska Agriculture in the Classroom—<http://www.fairbankssoilwater.org/akaginthelesson.htm>

## Plant Parts Song

- Do You Know the Parts of Plants?, Alaska Agriculture in the Classroom—<http://www.fairbankssoilwater.org/akaginthelesson.htm>

## Fruit or Vegetable

- Plant Parts We Eat, Alaska Agriculture in the Classroom—<http://www.fairbankssoilwater.org/akaginthelesson.htm>

## Potato Bonsai

- Potato Bonsai, Alaska Agriculture in the Classroom—<http://www.fairbankssoilwater.org/akaginthelesson.htm>

## Carrot Seed Tape

- Carrot Seed Tape, Alaska Agriculture in the Classroom

## Test Your Senses

- Written by Diane R. Hunt

## Potato Heads

- Potato Lesson, Alaska Agriculture in the Classroom <http://www.fairbankssoilwater.org/akaginthelesson.htm>

## Fruit & Veggie-Prints

- Potato Lesson, Alaska Agriculture in the Classroom

## Hot Potato

- Playworks—<https://www.playworks.org/game-library/hot-potato/>

## Making Healthy Food Choices

- Grow It, Try It, Like It, U.S. Department of Agriculture—<https://www.fns.usda.gov/tn/grow-it>

## Your Resources:

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MyPlate Place Mat, U.S. Department of Agriculture—<https://www.myplate.gov/resources/graphics/myplate-graphics>

## Carrot Cookies

- All Recipes—<https://www.allrecipes.com/recipe/10148/carrot-cookies-ii/>

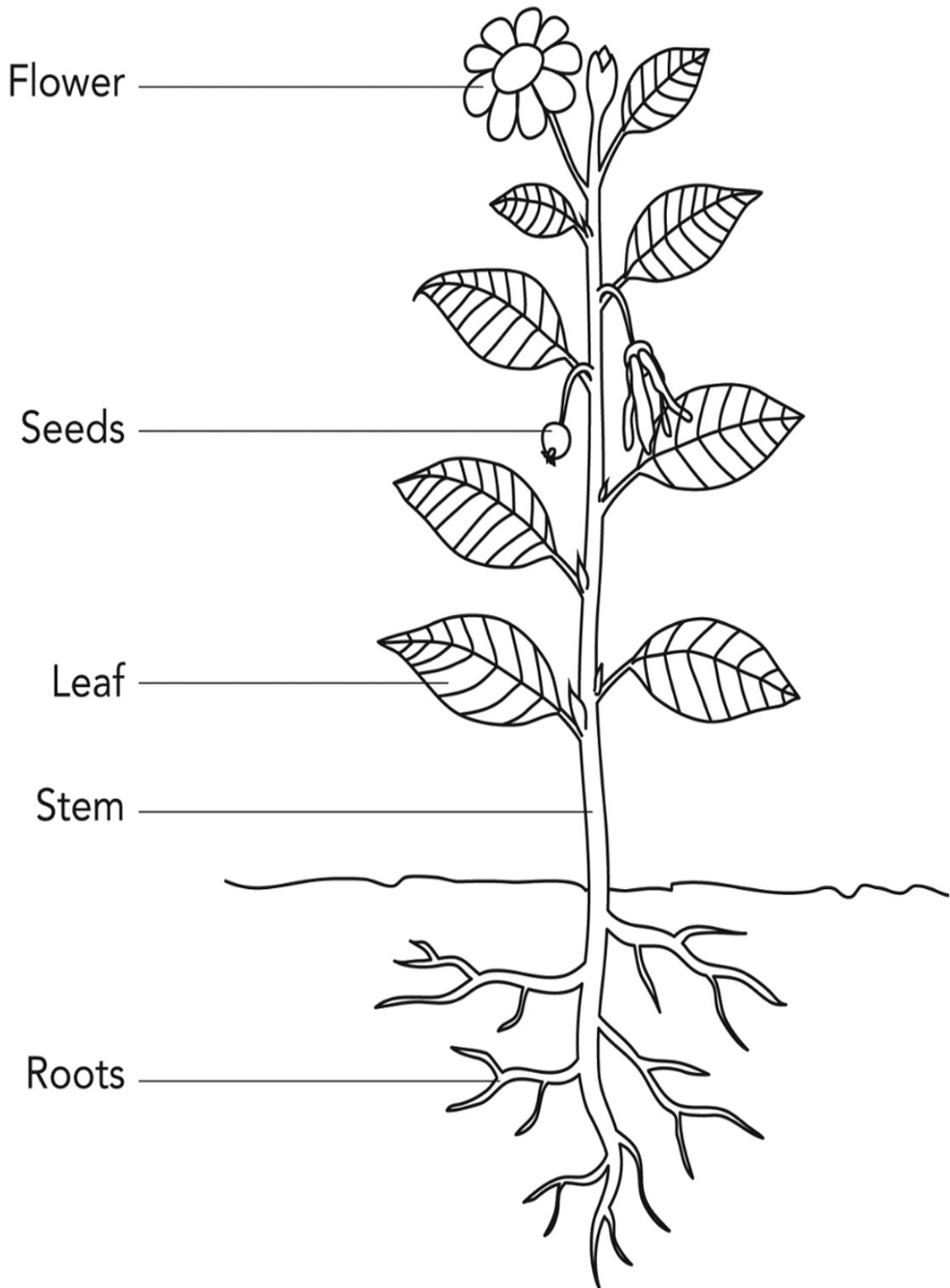
## Mashed Potatoes

All Recipes—<https://www.allrecipes.com/recipe/24771/basic-mashed-potatoes/>

# Resources

- Alaska Early Learning Guidelines—<https://www.alaskaelg.org/>
- MyPlate Poster and Place mat—<https://www.myplate.gov/resources/print-materials>
- MyPlate Tools, Graphics, Print Materials, and Videos—<https://www.myplate.gov/resources>
- Alaska Agriculture in the Classroom Lessons—<http://www.fairbankssoilwater.org/akaginthelesson.htm>
- National Agriculture in the Classroom Lessons—<https://www.agclassroom.org/matrix>

# Plant Diagram page



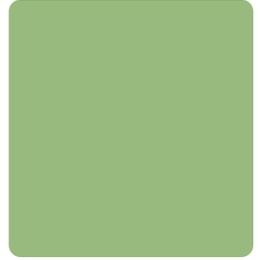
Underground Foods Picture page



**Beets**



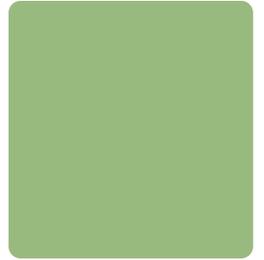
**Yellow  
Onion**



**Radish**



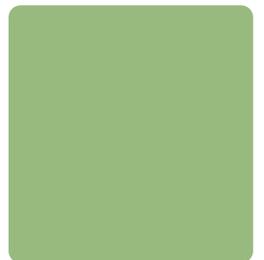
**Red  
Onion**



**Turnip**



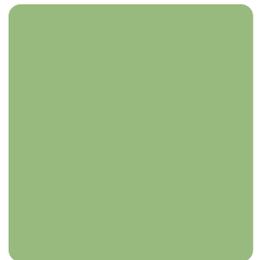
**Potato**



**Carrot**



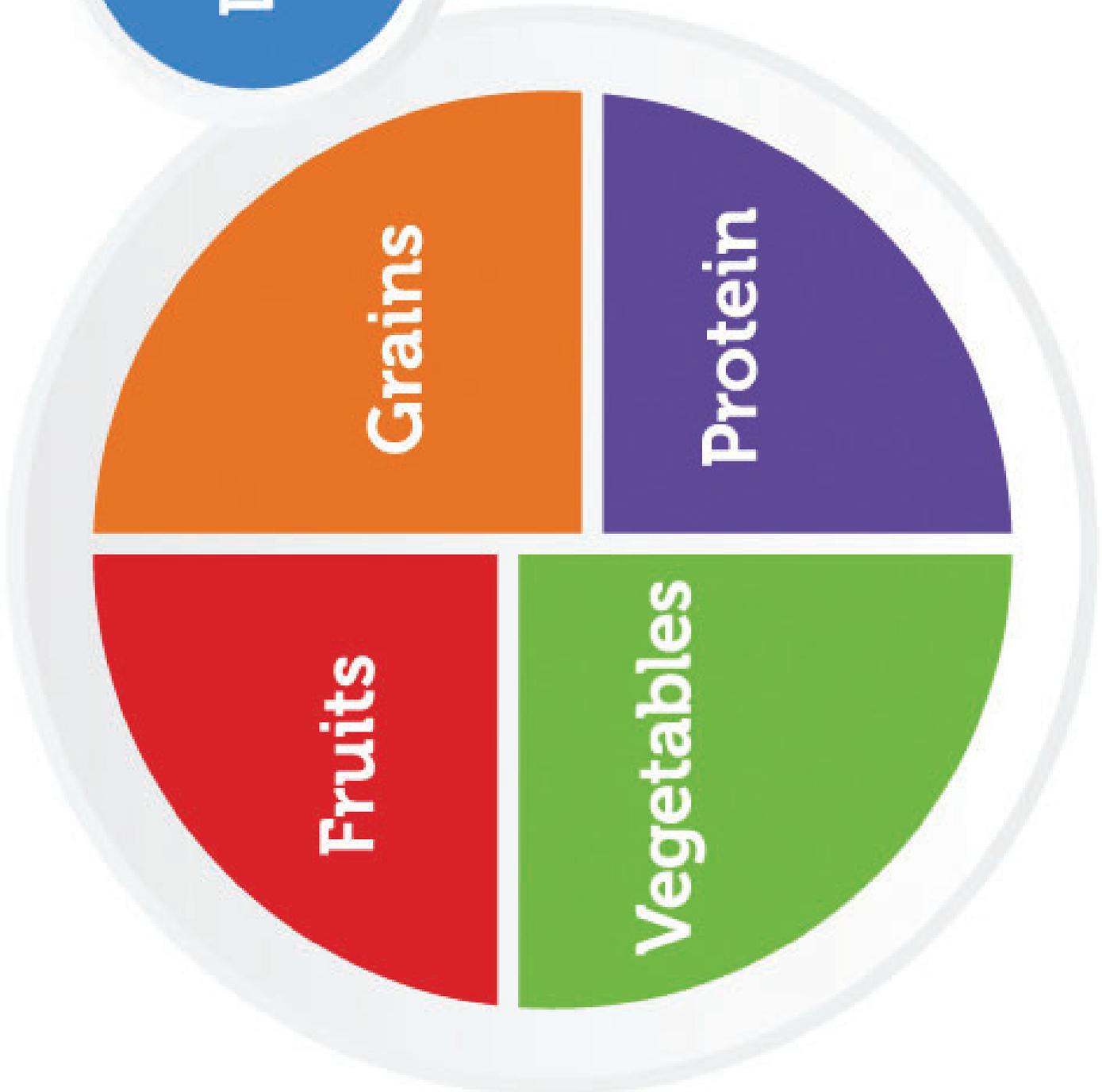
**Sweet  
Potato**



# MyPlate Place Mat



Dairy

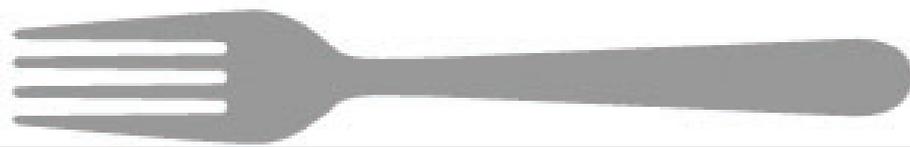


Grains

Protein

Fruits

Vegetables



# What's **MyPlate** All About?

