

# Potato Lesson

## Goals

Students will...

- Increase their familiarity with potatoes.
- Eat potatoes when offered them.
- Increase their awareness of the environmental benefits of composting.
- Increase their understanding of nutrition.



## Objectives

Students will be able to...

- a. Explain what part of a plant potato is
- b. Explain the origin of the potato and find it on a world map
- c. Identify the season for optimal growth
- d. Identify where potatoes are grown in Maine
- e. Write directions for planting potatoes
- f. Write a story for the first grade about Mr. Potato. Include at least 3 potato facts.
- g. Participate in composting activities.

## Lesson Activities

- Review points about safety, sanitation, and cooperation
- Introduce potatoes
- Background information on potatoes
- Lessons from the Farm
- Cook potato planks  
(Form groups of 4 to 6 students)
- Do compost activity while food is cooking  
(See compost activity for mini lesson)
- Eat
- Wrap-up
- Distribute copies of recipes and challenge sheets to students
- Clean-up

## Other Potato Activities

Nutrition science lesson: Types of Potatoes, Forms of Potatoes, and Discoloration of Raw Potatoes

Global and regional mapping

Potato fact sheet

Word search

Additional recipes

Writing ideas

Crossword puzzle

Parts of Potato Plant handout

## Background Information on Potatoes



### Did you know that...?

**The potato industry in Maine is more than 240 years old and potatoes are the biggest agricultural product in the state.**

The Scotch-Irish people brought the potato to Maine around 1750. Rich soil conditions, along with long warm days and cool nights, make Maine a natural home for potatoes. Between 1928 and 1958, Aroostook County produced more potatoes than any state in the nation. Today, Aroostook County produces the most potatoes of any county in the United States. The County's crop brings in about \$275 million in revenue to Maine annually. As a result, Maine remains one of the top potato producing states, serving the fresh, processing and seed markets with many different varieties of high quality potatoes.

In fact, potato farmers in Maine employ over 22,000 people. The potatoes are grown and shipped for direct consumption (tablestock), and to food service and seed consumers in the eastern United States, as well as to major french fry and potato chip companies such as McCain and Frito-Lay.

**Garden potatoes will grow in almost all soil types, but potatoes grown on a commercial scale require suitable soil to ensure a high yield.**

Farmers generally do not plant potatoes on the same patch in successive years, and gardeners should rotate their potato patches every three to four years. Rotating potatoes is important in order to avoid accumulation of diseases and pests in the soil, especially eelworm. Potato patches should be dug in the fall so they can weather over the winter. Compost should be mixed in when the patches are dug. To allow maximal surface exposure to frost, the surface should be left as rough as possible.

**Potato planting does not begin until May in Maine**

The potato plant loves sunlight, and the longer the potato is growing while the days are getting longer, the greater its potential yield. The potatoes should be planted on the surface and covered with soil drawn into a ridge from each side because the top layer of soil is the warmest. Potatoes respond very well to artificial fertilizers, especially those high in phosphate and potash. Once the potato plants are 31-inches tall, more soil should be drawn onto the ridge created at planting. This process is done to encourage the growth of more underground stems, which increase the potential plant yield. The additional soil also provides more soil for the potatoes to grow in so they do not burst through the ridge and turn green. When a potato skin turns green, it contains a substance called solanine, which can cause a potato to taste bitter and in large doses can be toxic to humans.

**In the 1780s the potato gained popularity in Ireland because of its high nutritional value and because a large number of potatoes can be grown per acre of land.**

The potato became a staple in the diet of the people of Ireland. (A staple is a food that is a basic and necessary part of the diet.) By the 1800s people all over Europe were eating potatoes. People became so dependent on the potato that when a fungus called *phytophthora infestans* caused the disastrous potato blight, thousands of people starved to death. Ireland's population decreased by half because of the potato blight.

**Potato production in the U.S. increased from about 13 million in 1961 to approximately 21 million in 1995.**

Despite this increase in production, the area harvested for potatoes decreased from about 600,000 acres in 1961 to 500,000 acres in 1995.

**The majority of the U.S. potato harvest is in the fall.**

This means the potatoes are planted in the spring.

**Which potatoes are used for what?**

The top five Maine potato varieties are: Russet Burbank, Shepody, Ontario, Frito-Lay, and Superior. Round whites and red varieties represent 72% of the acres of potatoes planted in Maine. The russet variety represents the remaining 28%. The Russet Burbank and Shepody are made into french fries and other fresh-cut and frozen products like frozen meals, stuffed potatoes, and potato wedges. Special potato varieties are grown for Frito-Lay potato chips. The Ontario and Superior varieties are grown mainly for the fresh market. Over half of the tablestock potatoes harvested in 1998 were shipped to Massachusetts, New York, and Pennsylvania. Over half of the seed potatoes harvested in 1998 were shipped to Florida, New York and North Carolina.

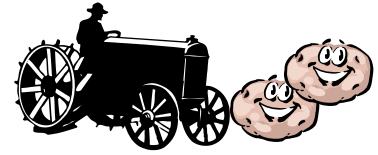
**The potato is the world's 4<sup>th</sup> most important food crop and by far the most important vegetable.**

Potatoes are grown in 130 countries around the world and their adaptability allows them to grow in more than a dozen distinct climates. The plant is also significant because large numbers of potatoes can be grown in fewer acres of land than other staple crops. In addition, potatoes are noteworthy because they are so nutritious.

**Water makes up 70 to 80% of a potato's weight.**

Potatoes are a good source of complex carbohydrates (starch), vitamin C, phosphorous, and potassium.

## Lessons from the Farm - Potatoes



In Maine, there are 16 million pounds of potatoes grown annually!! That means the total pounds of potatoes grown in Maine each year would be equal to the TOTAL weight of 200,000 4<sup>th</sup> grade students. That's a lot of potatoes.

The potato is one of the most widely grown crops in the WORLD! It has a lot of different uses. It can be baked in the oven, boiled in water, turned into a french fry, potato puff, or used to make potato chips. Potatoes come in a variety of different shapes and sizes. There are blue potatoes, red potatoes, yellow potatoes, and white potatoes. If you have internet access and want to learn more about the different varieties of potatoes or more general information on potatoes please visit the Maine Potato Board website: [www.mainepotatoes.com](http://www.mainepotatoes.com).

In Maine, potatoes are planted in the ground around the first part of May. Whole potatoes (just like the ones you can buy in the produce section of a grocery store) are planted in the ground. Potato farmers refer to the potato that is planted as a seed piece. After the potatoes are planted in the ground, you need to make a row so the potatoes have enough soil covering them. If you didn't make a row of soil over the potatoes they would get burned by the sun (just like we would) and turn green. Farmers use a tractor and a piece of machinery called a cultivator to make a row.

After the potatoes have been planted in the soil, they will begin to send out sprouts through the soil. The sprouts will eventually develop into green leaves. Like any plant, these leaves provide the plant energy, nutrition, and water to allow the plant to grow.

The next major event is when the potato plant blossoms. At this time, it is preparing to grow anywhere between 8 to 10 baby potatoes. The potato plant blossoms about 2 months after planting. In Maine, the potatoes usually blossom in July.

After the plant has blossomed it concentrates on making these little potatoes big potatoes. It normally takes these 8 to 10 baby potatoes about another 2 months before they are ready to be harvested.

Harvest time starts in the middle of September and lasts about one month. Farmers use a tractor and a potato harvester to dig the potatoes from the soil. In summary, the farmer plants one potato in the spring and that one potato multiplies into about 8 - 10 potatoes that are harvested in the fall.

## Materials and Preparation

### Food needed for potato planks recipe (for 4 groups)

12 medium potatoes  
1 bottle vegetable oil  
4 teaspoons salt  
8 teaspoons sugar  
8 teaspoons paprika  
1 teaspoon dry mustard  
1/2 teaspoon garlic powder  
1 bottle ketchup



### Materials needed (for 4 groups)

4 vegetable brushes (to scrub potatoes)  
4 jelly roll pans  
4 knives  
4 cutting boards  
4 set measuring spoons  
4 pastry brushes  
4 pancake turners  
8 small bowls  
4 small spoons  
8 potholders  
Cleaning towels, napkins  
Paper plates  
Plastic cups  
Wax paper  
Water for students  
Copy of recipes for each student  
Copy of challenge sheet for each student  
Copy of potato word search for each student  
Copy of potato crossword puzzle for each student  
Copy of parts of the potato plant for each student

## Materials and Preparation continued

Each station should have the following:

### Food

3 medium potatoes  
Vegetable oil  
1 teaspoon salt  
2 teaspoons sugar  
2 teaspoons paprika  
1/4 teaspoon dry mustard  
1/8 teaspoon garlic powder

### Materials

1 vegetable brush  
1 jellyroll pan  
1 knife  
1 cutting board  
1 set measuring spoons  
1 pastry brush  
1 pancake turner  
2 small bowls  
1 small spoon  
2 potholders  
1 cutting board  
Cleaning towel  
Paper plates  
Plastic cups  
Wax paper  
Drinks for students  
1 potato cut into 4 slices  
1 bowl of water  
1 tablespoon lemon juice  
Copy of recipes

**Use Maine ingredients when available.**

## Classroom Recipe for Potato Planks

### Ingredients:

3 medium potatoes, each cut lengthwise into eighths  
Vegetable oil  
1 teaspoon salt  
2 teaspoons sugar  
2 teaspoons paprika  
1/4 teaspoon dry mustard  
1/8 teaspoon garlic powder

**Use Maine ingredients when available.**

### Student Cooking Activities

**Note:** This recipe requires the use of knives and ovens.

Set oven control to broil and/or 550°F.

Place potatoes, cut sides down, on ungreased jelly roll pan, 15x10x1 inch; brush with oil.

Mix remaining ingredients; sprinkle potatoes with half of the mixture.

Broil potatoes with tops about 3 inches from heat source for 10 minutes.

Turn, brush with oil, and sprinkle with remaining salt mixture.

Broil until golden brown, about 10 minutes.

Yield: 6 servings (4 wedges); 60 calories each.





## **Nutrition Science Lesson - Potatoes**



### **Types of Potatoes**

There are many different varieties of potatoes. Buy several different varieties of potatoes and compare them. Cut the potatoes in half, so that students can see differences in flesh color.

The different varieties include:

#### **White varieties**

Russet Burbank (long russet group)

Russet rural or round Russet

#### **Red Varieties**

Shepody

Ontario

Superior

#### **Blue Varieties**

All-Blue

Baby Maine

These have blue skin and blue flesh

### **Forms of Potatoes**

Potatoes are processed into many forms after they are harvested. Some reasons for the changed form are to increase the shelf life of potatoes, and for convenience, variety and flavor.

Have students make a list of different forms of potatoes. Some ideas for the list are:

Potato Flour

Potato Chips

Potato Buds

Potato Flakes

French Fries

Baked Potatoes

Hash browned

Boiled Potatoes

Shoestring Potatoes

## Nutrition Science Lesson continued



### Potato Discoloration

#### Enzymatic Browning of Potatoes

To investigate browning reactions in potatoes you will need per group:

- 1 potato
- 1 small plate
- 1 knife
- 1 bowl of water
- 1 tablespoon of lemon juice

Cut four slices out of a potato.  
Leave one slice out on a plate.  
Put one slice in a bowl of water.  
Cover one with lemon juice.

Let the potatoes set for half an hour and observe the changes in color.

Discuss.

There are chemicals in potatoes called phenolic compounds. When potatoes are cut these chemicals react with oxygen and enzymes and change color. You can keep these reactions from happening by keeping oxygen from touching the potatoes by soaking them in water. You can also stop the potatoes from browning by using lemon juice. Lemon juice keeps the enzymes from reacting with the phenolic compounds, so the potatoes don't change color.

Other fruits also turn brown when they are cut open and left sitting. These include:

- Apples
- Bananas
- Peaches

## Global and Regional Mapping

### Potatoes



#### World Map

Discuss with students the origin of potatoes. Have them find the spot on the map.

Potatoes were originally grown in the Andes Mountains of South America (70 - 75°west, 15-30°south).

#### Local Harvest Calendar

Discuss the 6 primary states potatoes are grown in: Idaho (345,000 acres), North Dakota (139,000 acres), Washington (126,000 acres), Maine (97,000 acres), Minnesota (75,500 acres), and Wisconsin (63,500 acres).

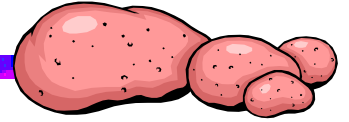
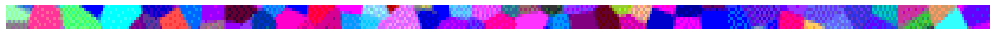
Potatoes are also grown in Colorado, California, Oregon, and Michigan; parts of Canada, (especially Prince Edward Island); and **all over the world**.

Have students determine when potatoes are available in our area from the harvest calendar (they are harvested every month in the U.S., but mainly in the fall).

Discuss methods of storing potatoes through the winter months (dark, cool place where air circulation is sufficient to maintain temperature and very low humidity).

Date: \_\_\_\_\_ Name: \_\_\_\_\_

## Potato Fact Sheet



1. What part of a plant is the potato?
2. Where did potatoes come from?
3. What is another name for the potato?
4. Where is the potato grown in Maine?
5. In what season do potatoes grow best in Maine?
6. What is another name for a root vegetable?

## Writing Ideas - Potato



1. What did you like or dislike about this lesson?
2. Write a story for the first grade about Mr. Potato Head and an adventure he has.
3. Write step-by-step directions for planting potatoes.
4. Prepare the potato recipe for your family or friends. What did they think? Did they like it? Were they surprised?
6. Come up with your own ideas...

# Potato Challenge Sheet



I agree to try potatoes the next time they are served to me in the cafeteria or at home.

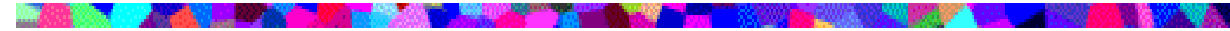
I agree to eat potatoes	I did it! I ate potatoes!

## Potato Word Search

Find the words in the list-they are hidden among the letters!

N Q S T A R C H E G Y U F I J C M F  
H B K J G Y E A T E K R X P L A O R  
R U S S E T B U R B A N K F P O Z I  
E V P T P N A F I B C S U R E P S T  
G P L O I U S H E P O D Y F L A I O  
H R A Q M J D E R S T H K O V E N L  
S C N E G U C O R M A J Y O X P E A  
P O T A T O C A K E S U W D L O M Y  
D N L U H A G L B E Y M S A R T J G  
F T N S U P E R I O R M T L E A C F  
E A C P I X M R S T I B U L Y T T H  
N R B H E U F L M O D A F W U O L E  
S I O F J H O U A R T K F E T C B N  
B O I K C T G O R L S E E D P H O H  
R P L N J F M A S H E D D G P I F S  
T D E D C O F S T W R N Y E X P I D  
E R D U V E H W G O O R F S I S L A  
F R O O T V E G E T A B L E C T N B

## Potato Word Search

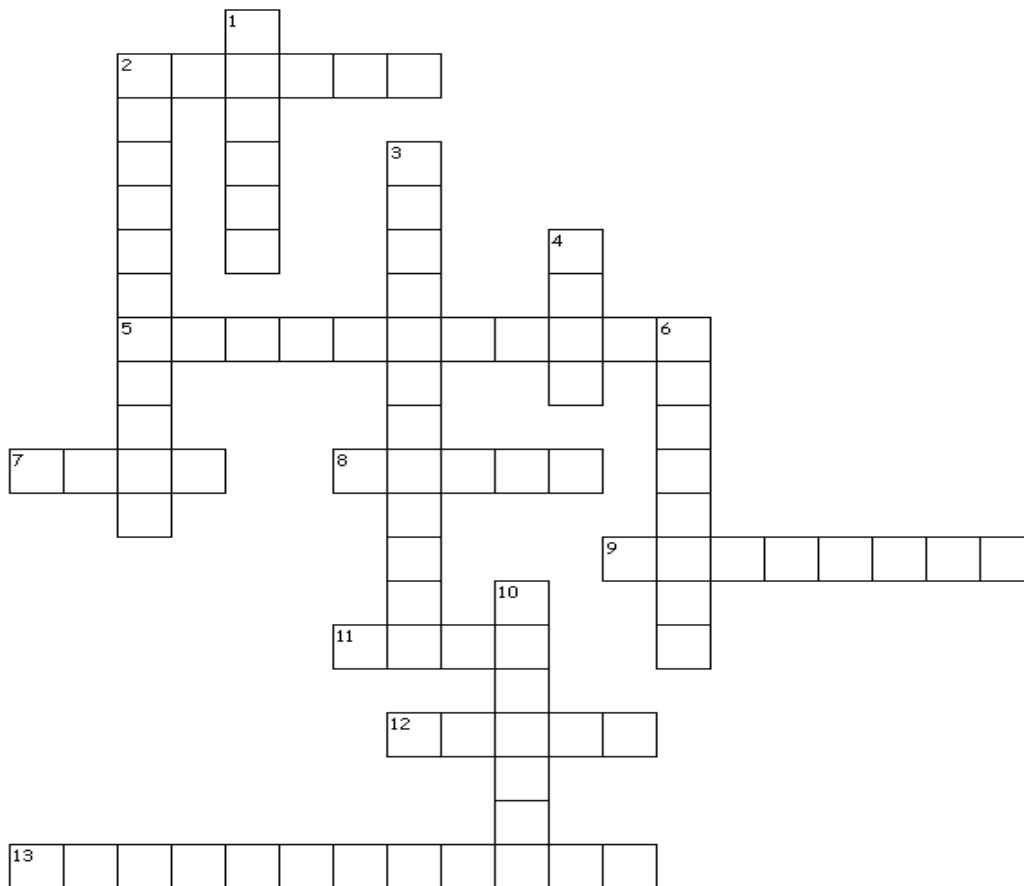


Baked  
Boiled  
Carbohydrate  
Eat  
Food  
French Fries  
Frito-Lay  
Mashed  
Ontario  
Plant  
Potato Cakes  
Potato Chips  
Root Vegetable  
Russet Burbank  
Shepody  
Spud  
Starch  
Stuffed  
Superior  
Wedges

**(Answer Key on page 236)**



# Potato Crossword Puzzle



## Potato Crossword

### Across

2. The vegetable we are learning about today
5. A favorite potato food
7. Another name for a potato
8. Potatoes best for baking, mashing & frying
9. Vitamin most abundant in potatoes
11. Season when most potatoes are harvested
12. The part of the plant the potato is
13. Popular toy made by Hasbro

### Down

1. The main form of carbohydrate in potatoes
2. Ground form of potato used in baking
3. Where the potato originated.
4. Part of potato where most vitamins are
6. Green toxic substance formed on potatoes
10. A blue potato grown in Maine

**(Answer Key on page 237)**