



# The Colorado Potato Administrative Committee K-12 Agriculture Education Program





# The Colorado Potato Administrative Committee Agriculture Education Program



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## The Colorado Potato Administrative Committee Agriculture Education Program



### Mission and Vision

The Colorado Potato Administrative Committee, along with its participating group of producers share a passion for agriculture and the prosperity that it has provided this country. Now more than ever, as we move forward into a new age filled with technology, our society moves further from the land that once connected us all.

Creation of the Agriculture Education Program (AEP) came about through the collaboration and vision of a group of agriculturists, educators, and field science professionals who are empowered by the independent spirit of agriculture and youth. Using the research from the North American Association of Environmental Educators (NAAEE), the curriculum was based on the premise that students who connect with the real world environment develop a sense of place, commitment and the ability to problem solve. AEP helps teacher mentor these skills in their students.

AEP's mission is to reconnect youth to agriculture through education and help them to see and understand that agriculture is sustainable, conservation minded and builds important interrelationships with the ecosystem and our culture.

The vision of AEP is to promote agriculture through problem solving, critical thinking and hands-on experiences to the learner.





May 15, 2018

Dear Teachers,

I recently saw a video clip about the “Greatest Story Never Told”. It is the story of American agriculture and the farmers who produce the breakfast, lunch, and dinner we enjoy daily. It is a story about incredible productivity, advanced science and technology, and most importantly the balancing act of feeding the world’s population while sustaining the environment through responsible conservation.

The Colorado Potato Administrative Committee (CPAC) consists of twenty eight potato growers and shippers that are elected by the one hundred seventy five potato growers of the San Luis valley in Southern Colorado. These potato growers typically produce nearly 2.2 billion lbs. of potatoes annually on sixty thousand acres of irrigated farmland. For perspective, that is sixty thousand football fields of potatoes. These fields provide an annual supply of potatoes to over 18.3 million people.

It isn’t easy work. Potato farmers must be part agronomist, conservationist, meteorologist, economist, and most of all optimist. Mother Nature often has the final say in how profitable a potato grower will be despite his very best efforts. The CPAC committee believes that their story and the story of the American farmer needs to be shared. CPAC has carefully partnered with conservation education specialist Judy Lopez to develop this educational curriculum so teachers will be able to tell the story of the American farmer and the San Luis valley potato growers.

Potatoes are the fourth largest crop in the world and have served as a staple for centuries. Potatoes are unique in the plant world in that they produce more calories per unit of land than any other food crop. They are fat and cholesterol free, have more potassium than a banana, and forty-five percent of the RDA of Vitamin C. The proud potato growers of the San Luis valley hope you will be able to use this curriculum as a tool to connect your precious students with our story and their food. Please contact us with any questions and let us know how we can improve this tool for your use.

Sincerely,  
Jim Ehrlich  
Executive Director  
Colorado Potato Administrative Committee





# The Colorado Potato Administrative Committee Agriculture Education Program



## Acknowledgements

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### Resources

American Forest Foundation. Project Learning Tree. PLT. 2007

Www.plt.org

Colorado Potato Administrative Committee. 1305 Park Ave.

Monte Vista, CO 81144

Discover a Watershed. The Rio Grande The Water Course. MSU. Bozeman, MT. 2002

NACD. Lines on the Land. Nacd Pub. League City Tx. 2001

Louv, Richard, Last Child in the Wood. Workman Press. New York. 2005.

Project Food, Land and People San Francisco, CA. FLP. 2000. info@foodlandandpeople.org

Rio Grande Watershed. 101 S Craft Alamosa Co 81101

USDA- NRCS. 101 S. Craft Drive Alamosa, Colorado 81101





## The Colorado Potato Administrative Committee Agriculture Education Program



### Program Structure

#### **Discovery Centers**

The Colorado Potato Administrative Committee lessons offer six, 10-20 minute self-guided activities which introduce students to major themes of the program as well as developing science processing needed for success.

#### **Tips for Developing Discovery Centers**

Simple, straightforward directions.

Each center should take 10-20 minutes to complete (younger grades should have shorter activities).

The more activity for students, the better. Examples: puzzles, pictures, classify objects, partner games, mazes, etc.

#### **Field Trips—On the Farm Wonders**

The field trips run 3-5 hours and can be done at a site in the San Luis Valley, or another farm community. The trip begins with an introduction to the day's concepts as a large group of 20-60 students. Then students can be divided into three groups and rotate through three, 30-40 minute lessons pertaining to the objectives of the specific grades. The students then reconvene and do a short wrap-up activity.

#### **Tips for Developing & Implementing Field Trips**

Try to create activities that are based in the outdoors, and try to avoid activities that can be done in the classroom. (For example: data collection, observation, field sketching, scavenger hunts.)

The Introduction/Wrap-up should introduce students to the goals of the field day and review material learned in pre-trip discovery centers.

Field Stations should be hands-on/minds-on and relate to the learner outcomes and program goals.

#### **Post-Field Trip Farm Inquiry (back in classroom)**

One activity that can be teacher-led and allows students to synthesize and apply what they have learned in the program.

#### **Tips for Developing Post-Field Trip Activities**

Interactive, group-work component, self-guided, or minimal direction from teachers, with some sort of problem-solving or decision-making component. Example: students decide what variety of potato they can plant and develop a timeline to plant, maintain, and harvest a crop or build a nutritional pyramid that incorporates potatoes.



The Colorado Potato Administrative Committee  
Agriculture Education Program

# A Spuds Eye View

## Grades K-2: Overview

### Learner Outcomes

- Know the importance of farming and agriculture to American society.
- Describe a potato.
- Know the importance of the potato.
- Understand the history of the potato.

### Connections to Colorado State Standards

Reading, Writing and Communications: 1,2,4

Science: 2,3

History: 1,2

### The Program

This program is divided into three parts that, together, make a complete integrated unit for your class.

*Discovery Centers*—As a pre-trip lesson, six student discovery centers are provided for your classroom to introduce students to the agriculture community, and the concepts they will be learning.

*Field Study*—This is a 3-4 hour field trip to a farming community where students will explore agriculture production through the use of their five senses. (This field trip can be set up in the San Luis Valley or in an agricultural setting close to your school or town.)

*Post-Field Study Problem-Solving*—Back in the classroom through a simple teacher-led activity, students will explore both the in-classroom activities and field experiences.





## The Colorado Potato Administrative Committee Agriculture Education Program

### Teacher Instructions:

Set up each discovery center around your classroom (see set-up instructions for each center). Each center will take 15-20 minutes to complete. Students may work cooperatively or individually on each center. You may need to help each group read and interpret the instructions.

For lower-level readers, work through each station as a class. You can choose one center each day and work through it together.

1. "Jamie O'Rourke and the Big Potato"—Students follow along with an audio story to learn what potatoes are (two sets of this discovery center are set out because it takes twice as long as the other three). After students listen to the story, they do the activity and write about what they learned.
2. *History of Potatoes—Following a Legend thru Time*—Students use clues to help a young potato find its ancestors across the ocean.
3. *Food Anatomy—Where do Potatoes Come From?*—Students observe a potato plant from root to flower to better understand how a potato grows.
4. *Living Through A Famine*—Students learn how the potato became an important food staple to the Irish.
5. *Potato Possibilities*—Students imagine what it would be like to be a potato.
6. *The Big Picture*—Students learn the importance of farms to our society.

- |   |  |                              |
|---|--|------------------------------|
| 1. One brown paper bag per child                          | 12. Story  | 21. Potato for each student. |
| 2. Scissors   | 13. Diagram of the Potato Plant (included)             |                              |
| 3. Paper scraps   | 14. White paper  |                              |
| 4. Glue   | 15. Scissors   |                              |
| 5. Glitter/decorating materials                           | 16. Glue   |                              |
| 6. White construction paper                               | 17. A bucket about 50 cm (20 inches) in diameter       |                              |
| 7. Writing paper  | 18. Three small potatoes about 7 cm (2.75 inches) high |                              |
| 8. "Jamie O'Rourke and the Big Potato" by Tommie De Paola | 19. Compost or soil                                    |                              |
| 9. Copies of World map                                    | 20. CD Player  |                              |
| 10. Copies of potato cut-out                              |  |                              |
| 11. Crayons   |  |                              |



The Colorado Potato Administrative Committee  
Agriculture Education Program



## "Jamie O'Rourke and the Big Potato"

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to identify the importance of the potato and write a story about it.

Materials:

1. One brown paper bag per child
2. Scissors
3. Paper scraps
4. Glue
5. Glitter/decorating materials
6. White construction paper
7. Writing paper
8. "Jamie O'Rourke and the Big Potato"

### Preparation:

Discuss the following with students:

Small communities all around the world have depended on growing their own food in order to feed themselves. Eighteenth-century Ireland was no exception. One of the main crops then and today is the potato. Potatoes are the focal point in the diet because they are easily stored and rich in many nutrients that the body needs to survive. Here is the story of one village that depended on the potato.

### Do:

1. Read the story "Jamie O'Rourke and the Big Potato," by Tommie De Paola.
2. Have each child, using scissors, cut out the shape of a potato. Then have them crinkle the paper, and carefully tear the edge of the potato so it looks rough around the edges. Have them smooth out the potato, and glue it down on the white paper.
3. Using scraps and other decorating materials, have your children decorate his or her potato making it into a person. (Encourage them to be creative, and make people such as pirates, doctors, football players, etc...) Once the potato person is complete, add a writing activity with it. "This is no ordinary potato. It is a...."



The Colorado Potato Administrative Committee  
Agriculture Education Program



*“History of Potatoes—  
Following a Legend thru Time”*

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to correctly follow the path the potato has traveled throughout history
2. Students will identify various locations throughout the world

Materials:

1. Copies of World map
2. Copies of potato cut-out
3. Crayons
4. Story

### Preparation:

Discuss the following with students:

The potato (see the attached teacher information sheet) has been around for a long time. Its history as a food staple is well known, and it is vital to the world’s food supply.

Introduce the students to Randy Russet and his little brother and sister Rodney and Rita, all from the Rio Grande basin in Colorado. They are on a journey to find their ancestry. Using the enclosed maps, help them track their way back across the globe in search of their ancient cousins.

Do:

1. Have students move into groups and give each student a copy of the map. Guide them through the history of the potato by telling the story from Randy and his siblings’ viewpoint.
2. As each group reaches the destination on the map, have students glue a potato token on the map. Write the name of the country that you travel through on the board.
3. To wrap up, have students write the name of the country on the bottom of their map and color it.



## The Colorado Potato Administrative Committee Agriculture Education Program



### *“History of Potatoes— Following a Legend thru Time” Continued...*

#### Randy Russet’s Family Tree

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to correctly follow the path the potato has traveled throughout history.
2. Students will Identify various locations throughout the world.

Materials:

1. Copies of World map
2. Copies of potato cut-out
3. Crayons
4. Story

Even though Randy was an average potato, he, his brother Rodney, and sister Rita, were a very close family and spent every holiday with their family. At these gatherings, Grandpa Russet would always talk about the rich history of the potato family. This got Randy to thinking one day that he might like to trace his potato family tree, and follow his family’s brave voyage around the world to their settlement here in the San Luis Valley.

One afternoon, Randy, his brother, and sister sat down at Randy’s computer to trace their family tree. This is what they found:

The potato was first grown in South America between three and seven thousand years ago, though scientists believe they may have grown wild in the region as long as 13,000 years ago. Probably originating in southern Peru and northeastern Bolivia, the potato’s first ancestor was likely Inca in origin. The word *potato* comes from the Indian word *batata*.

In 1532, the Spanish conquistadors arrived in Peru and failed to see that the potato was far more important than the silver and gold they took with them back to Spain. Though the potato was consumed by the ship’s crew on the way back to Spain, it did not catch on right away once they got home. By 1570, farmers were planting the crop on their farms, but mostly to feed their animals.

Use of the potato spread from Spain to Italy and other European countries by the late 1500’s. By 1600, the potato had entered Belgium, Holland, France, Switzerland, England, Germany, Portugal, and Ireland. Most people refused to eat the potato, because it was too UGLY! “Too ugly?” thought Randy? “No way!” Even Rodney and Rita thought that must be wrong! Everyone knows potatoes are beautiful! It wasn’t until the upper classes started eating them that they became popular. Then everyone began growing & eating them.

As Rodney pressed on, he found that, in 1795, his ancestors had invaded England to become a major part of the food source there. That made all three siblings feel very proud. By 1850 potatoes were also a part of Russia’s diet. All over Europe, England, and Ireland the potato had become a big part of everyone’s diet. There was only one place left to conquer – North America!

When early pilgrims came to America, the potato came with them, and, since then, the potato has become a major part of the American diet. The potato is the fourth largest food crop in the world, with 4300 different varieties grown internationally.



The Colorado Potato Administrative Committee  
Agriculture Education Program



*“History of Potatoes—  
Following a Legend thru Time”  
Continued...*

Time: 20 minutes

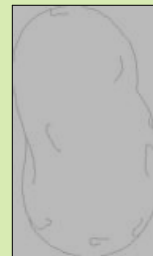
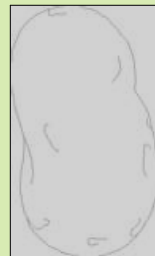
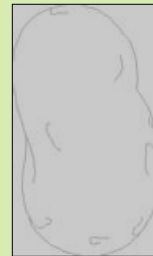
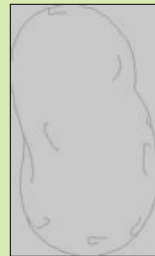
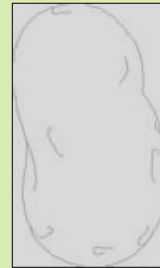
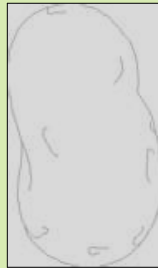
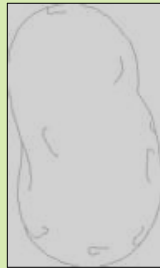
Location: Indoors

Learner Outcomes:

1. Students will be able to correctly follow the path the potato has traveled throughout history.

Materials:

1. Copies of World map
2. Copies of potato cut-out
3. Crayons
4. Story





The Colorado Potato Administrative Committee  
Agriculture Education Program



*“History of Potatoes—  
Following a Legend thru Time”  
Continued...*

Time: 20 minutes

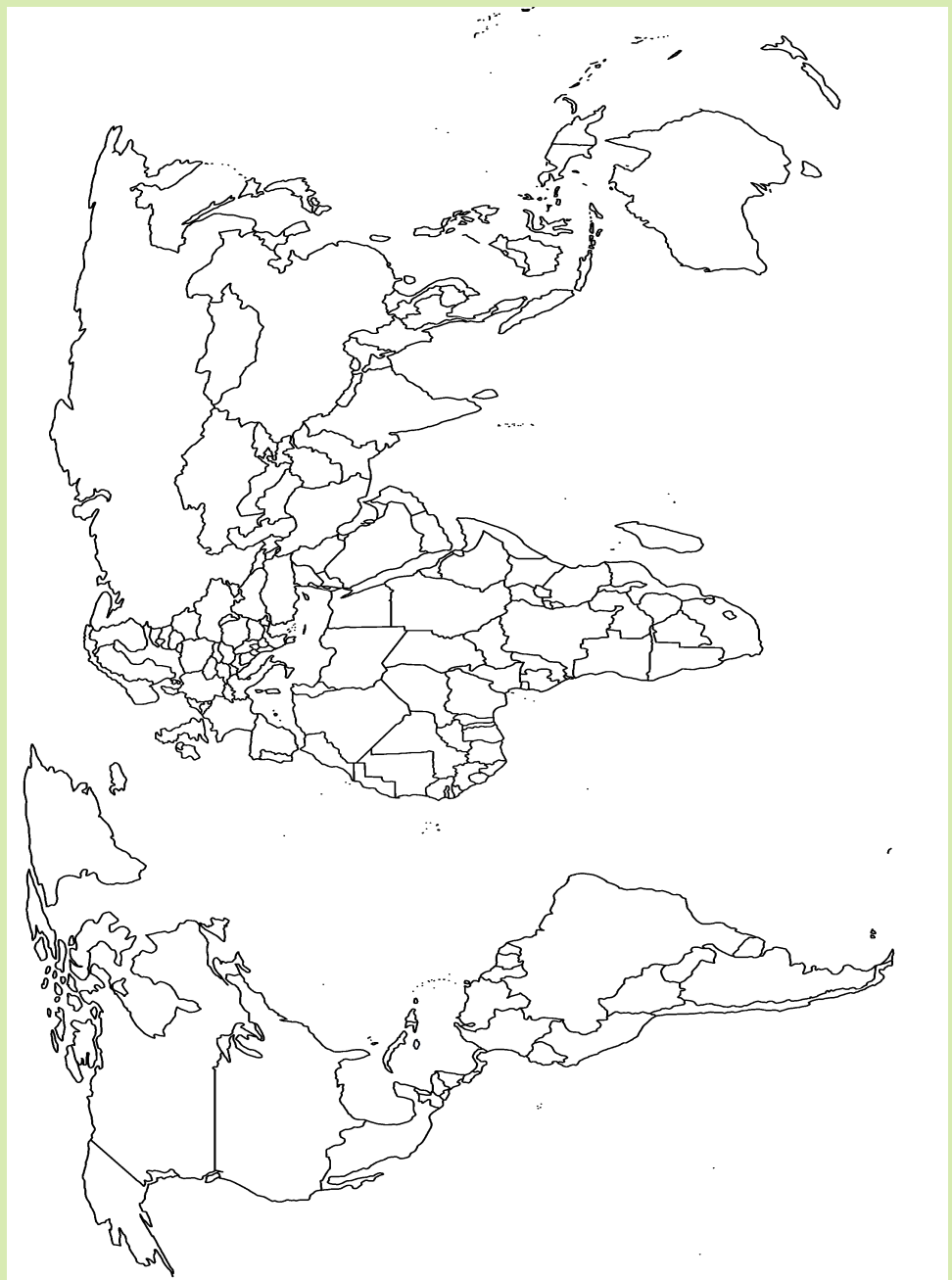
Location: Indoors

Learner Outcomes:

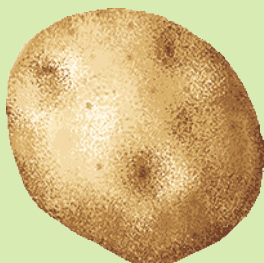
1. Students will be able to correctly follow the path the potato has traveled throughout history.

Materials:

1. Copies of World map
2. Copies of potato cut-out
3. Crayons
4. Story



The Colorado Potato Administrative Committee  
Agriculture Education Program



## *Food Anatomy- Where do Potatoes Come From?*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to correctly identify the parts of a potato and diagram them.

Materials:

1. Diagram of the Potato Plant (included)
2. White paper
3. Scissors
4. Glue

### Preparation:

Discuss the following with students:

Where do potatoes come from? Most kids think it's from their local grocery store! To help kids better understand this concept, today's lesson will introduce them, first, to some potato vocabulary and, next, to the entire potato plant that they can make and color themselves and then display in their own potato field!

Do:

1. Give students the cut-outs of the potato plants and have them cut them out and color them.
2. Have students reassemble the plant in the correct order and label the various parts of the plant.
3. Hang the plants in the room so that you have your own crop of potatoes!



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*Food Anatomy-  
Where do Potatoes  
Come From?  
Continued...*

Time: 30 minutes

Location: Indoors

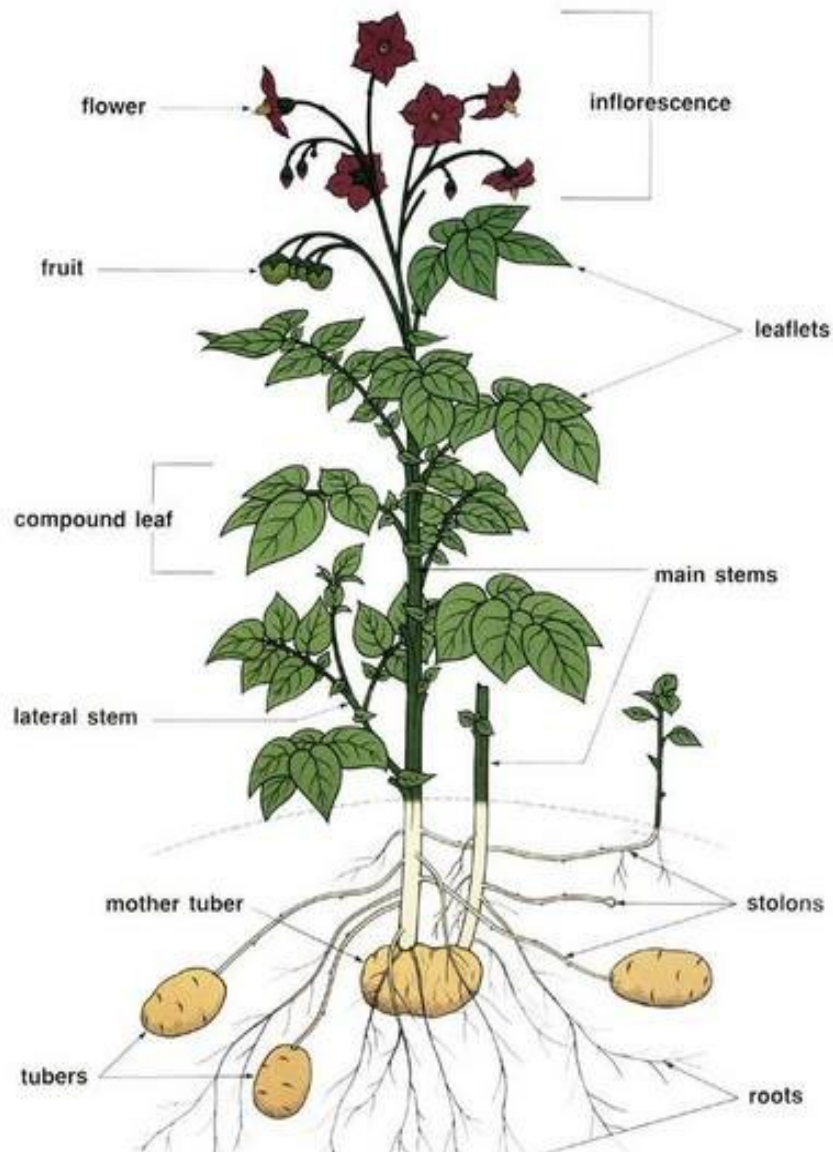
Learner Outcomes:

1. Students will be able to correctly identify the parts of a potato and diagram them.

Materials:

1. Diagram of the Potato Plant (included)
2. White paper
3. Scissors
4. Glue

## The Potato Plant



The Colorado Potato Administrative Committee  
Agriculture Education Program



*Food for Thought -  
Living through a Famine*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to understand the importance of a food crop.
2. Students will identify where food comes from.
3. Students will know that crop cultivation takes time.

Materials:

1. Story and potato page
2. Pencil

**Preparation:**

Discuss the following with students:

Small communities all around the world have depended on growing their own food in order to feed themselves. Eighteenth-century Ireland was no exception. One of the main crops then and now is the potato. Potatoes are the focal point in the diet because they are easily stored and rich in many nutrients that the body needs to survive. Here is the story of one village that depended on the potato.

1. Read students the story about the Irish Potato Famine.
2. Have students write a story about what it might be like to consume nothing but potatoes and milk day after day.



The Colorado Potato Administrative Committee  
Agriculture Education Program



*Food for Thought -  
Living through a Famine  
Continued...*

Time: 30 minutes

Location: Indoors

A large, hand-drawn outline of a potato occupies the right side of the page. Inside the outline, there are ten horizontal lines spaced evenly, providing a template for writing. The outline is simple, showing the irregular shape of a potato with a few small indentations and protrusions.





The Colorado Potato Administrative Committee  
Agriculture Education Program



*Food for Thought -  
Living through a Famine  
Continued...*

The Irish Potato Famine

Time: 30 minutes

Location: Indoors

The 'Great Hunger' was one of many famines in Ireland during the first half of the nineteenth century, but the size of this disaster was very large compared to those before that came before the famine. The Irish population had increased in the first half of the nineteenth century, reaching about 8.5 million by 1845. The peasants were almost totally dependent on the potato as a food source, because this crop produced more food per acre than wheat and could also be sold as a source of income.

Because only one type of potato was grown, a disease called *blight* destroyed the potato crop of 1845. By the early autumn of that year it was clear that the famine was going to happen in Ireland. The government was slow to act, and said that the Irish people had a habit of making up stories to get their attention. The government's lack of attention set a terrible turn of events into action.

During the winter of 1845-1846, the government spent £100,000 (about \$160 dollars today) on American corn, which was sold to the poor. However, without money, the Irish peasants could not afford to buy it. As food storages decreased, the citizens of Ireland lived many years on a diet of milk and potatoes.

The 1841 census recorded an Irish population of 8.2 million. By 1851 this figure had been reduced to 6.5 million. These numbers give some idea of the size of the disaster, but since many of those affected by the famine lived in remote and in out of the way places, it is more than possible that far more people died than was originally thought. It has been estimated that at least one million people died from starvation and its attendant diseases, with the balance seeking emigration to Britain and North America.

The blight was eventually brought under control in Ireland, and the Irish also began to grow a wider variety of potatoes. Today the potato is still a staple of the Irish diet!



The Colorado Potato Administrative Committee  
Agriculture Education Program



## *Potato Possibilities*

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to visualize and imagine using their creativity as it applies to real world objects.

Materials:

1. CD Player
2. Potato for each student

### Preparation:

Discuss the following with students: When we use our imaginations, it is fun to pretend that we are things that don't exist, but today we are going to be something that is real, something that we eat, something we touch and something that we grow. Today we are going to be a POTATO.

### Do:

1. Give each student a fresh potato. Have them smell it, touch it, and feel it.
2. Give them an opportunity to discuss with a partner what it tastes like and how they like to eat it.
3. Ask them what it might feel like to be a potato growing in the ground. They will share their answers.
4. Spread the students out and have them act out what it would be like to be a potato, from the time they sprout out of the ground to the time they are eaten.
5. Choose your best and have them share with the class!



The Colorado Potato Administrative Committee  
Agriculture Education Program



## *The Big Picture*

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to describe the importance of farms, and write a story about that importance.

Materials:

1. Copies of farm pictures
2. Crayons or colored pencils

### Preparation:

Discuss the following with students:

Farming was once the chief way of life in nearly every country. People cannot live without food, and nearly all their food came from crops and animals raised on farms. Many other materials such as cotton and wool also came from plants and animals raised on farms. Not as many people farm for a living any more, but farming remains the most important occupation in the world.

### Do:

1. Talk about farms with students, then have them color and write about them.



The Colorado Potato Administrative Committee  
Agriculture Education Program



# Potato Possibilities

*Continued...*

Time: 20 minutes

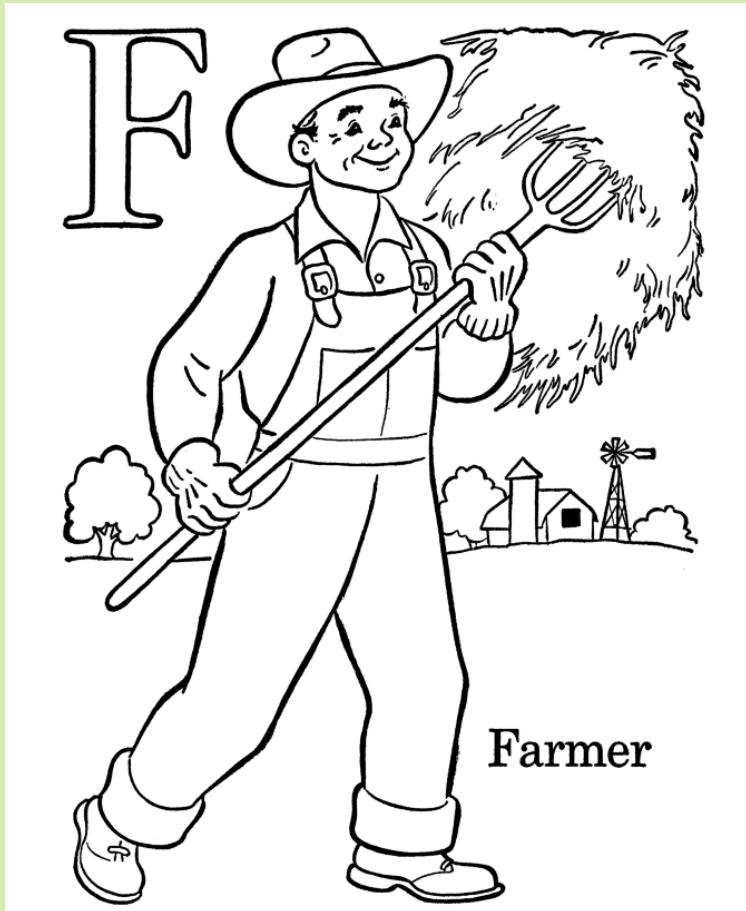
Location: Indoors

Learner Outcomes:

1. Students will be able to describe the importance of farms, and write a story about that importance.

Materials:

1. Copies of farm pictures
2. Crayons or colored pencils



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The Colorado Potato Administrative Committee  
Agriculture Education Program



# A Tubers Trail

## *Grades 3-5*







## The Colorado Potato Administrative Committee Agriculture Education Program



### Program Structure

#### **Discovery Centers**

The Colorado Potato Administrative Committee lessons offer seven, 10-20 minute, self-guided activities which introduce students to major themes of the program as well as develop the skills (science process) needed for success.

#### **Tips for Developing Discovery Centers**

Simple, straightforward directions

Each center should take 10-20 minutes to complete (younger grades should have shorter activities).

The more physical the activity the better. Examples: puzzles, picture books, classify objects, partner games, mazes, etc.

#### **Field Trips—On the Farm Wonders**

The field trips run 3-5 hours and can be done at a site in the San Luis Valley or other farm community. The trip begins with an introduction to the day's concepts as a large group of 20-60 students. Students are then divided into three groups and rotate through three, 30-40 minute lessons pertaining to the objectives of the specific grades. Then students reconvene and do a short wrap-up activity.

#### **Tips for Developing & Implementing Field Trips**

Try to create activities that are outdoor-based, and try to avoid activities that can be done in the classroom. (For example: data collection, observation, field sketching, scavenger hunts.)

The Introduction/Wrap-up should review material learned in pre-trip discovery centers and introduce students to the goals of the field day.

Field Stations should be hands-on/minds-on and relate to the learner outcomes and program goals.

#### **Post-Field Trip Wetland Inquiry (back in classroom)**

One activity that can be teacher-led and allows students to synthesize and apply what they have learned in the program.

#### **Tips for Developing Post-Field Trip Activities**

Interactive, group-work component, self-guided, or minimal direction from teachers, with some sort of problem-solving component or decision-making. Example: students decide what variety of potato they can plant and develop a timeline to plant, maintain and harvest a crop, or build a nutritional pyramid that incorporates potatoes.



The Colorado Potato Administrative Committee  
Agriculture Education Program

# A Tubers Trail

## *Grades 3-5: Overview*

### Learner Outcomes

- Describe how a potato plant grows and know the importance potatoes play.
- Know the importance of the potato as a food source throughout history.
- Understand potato nutrition.
- Know the importance of farming and agriculture to American society.

### Connections to Colorado State Standards

Reading, Writing, Communications: 1, 2, 4

Science: 2, 3

History: 1,2, 3, 4,

### The Program

This program is divided into three parts that, together, make a complete, integrated unit for your class.

*Discovery Centers*—As a pre-trip lesson, seven student discovery centers are provided for your classroom to introduce students to the agriculture community and the concepts they will be learning.

*Field Study*—This is a 3-4 hour field trip to a farming community where students will explore agriculture production through the use of their five senses. (This field trip can be set up in the San Luis Valley or in an agricultural setting close to your school or town.)

*Post-Field Study Problem Solving*—Back in the classroom through a simple teacher-led activity, students will explore both the in-classroom activities and field experiences.



## The Colorado Potato Administrative Committee Agriculture Education Program

### Teacher Instructions:

Set up each discovery center around your classroom (see set-up instructions for each center). Each center will take 10-15 minutes to complete. Students may work cooperatively or individually on each center. You may need to help each group read and interpret the instructions.

For lower-level readers, work through each station as a class. You can choose one center each day and work through it together.

- "From the Bottom Up" — Understanding how soils form.
- "Following A Legend Through Time" — The history of the potato as seen through Randy Russets' family tree.
- "Food Anatomy" — Where do potatoes come from?
- "Eating and Planting—A Group Project of Growing a Harvest" — Learning how to plant and grow a potato.
- "Food for Thought" — Learning how potato plants grow.
- "Potato Possibilities" — The nutrition of potatoes.
- "Farm Futures" — Understanding how important farms are to all of our futures and why.

- |                                       |  |   |
|---------------------------------------|--|---|
| 1. Plastic Jar (1 Liter)              | 13. Story  | 25. Template copies                           |
| 2. Silty, sandy, clayey soils         | 14. Diagram of the Potato Plant (included)             | 26. Several potato varieties (color and size) |
| 3. Sand                               | 15. White paper  | 27. Food pyramid chart                        |
| 4. Pebbles                            | 16. Scissors   | 28. Microwave-safe dish                       |
| 5. Twigs, grass clippings, dry leaves | 17. Glue   | 29. Paring knife                              |
| 6. Biodegradable liquid dish soap     | 18. Graph paper  | 30. Canola oil                                |
| 7. Spoon                              | 19. A bucket about 50 cm (20 inches) in diameter       | 31. Seasonings                                |
| 8. Bucket                             | 20. Three small potatoes about 7 cm (2.75 inches) high | 32. Plastic wrap                              |
| 9. Jar and soil handouts              | 21. Compost or soil                                    | 33. Copies of pie chart                       |
| 10. Copies of world map               | 22. Colored pencils                                    |   |
| 11. Copies of potato cut-out          | 23. Crayons  |   |
| 12. Colored pencils                   | 24. Pencil   |   |



The Colorado Potato Administrative Committee  
Agriculture Education Program



## From the Bottom Up-

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to correctly identify the parts of a potato and write a story about them.

Materials:

1. Plastic jar (1 Liter)
2. Silty, sandy, clayey soils
3. Sand
4. Pebbles
5. Twigs, grass clippings, dry leaves
6. Biodegradable liquid dish soap
7. Spoon
8. Bucket
9. Jar and soil handouts

### Preparation:

Discuss the following with students:

The basis for all agriculture is healthy soil. This lesson will take students to a world that is seldom seen, because it usually takes digging. Soils have different layers that are based on texture, color, and structure, as well as the amount of organic matter and gravel that are present.

The uppermost portion of the soil column is usually the most productive—it is characteristically darker and looser than the lower layers. This is due to the fallen twigs, grasses, leaves, and dead and decaying organisms that live in it. The middle layer is often lighter, denser, grittier, and lower in organic matter. The next part is a transition layer made up of densely packed rock particles, while the deepest layer is the parent material from which the soil originally formed.

Do:

1. Fill a large plastic jar one-quarter full of soil, pebbles, twigs, and plant matter. Fill jar three-quarter full with water and add a few drops of dish soap.
2. Have students create charts about their predictions and to record their observations about this activity.
3. Make sure the jar lid is secure. Ask students to predict what will happen.





## From the Bottom Up- Continued...

3. (Con't) Shake the jar vigorously and let stand.
4. Ask the students what they observe. Have them make a series of sketches on the sheets they made beforehand.
5. Pour off the excess water without disturbing the layers. Use a spoon to sample each layer to show the students. Have them describe the contents, and show them that the soil components separated based on size. (The densest layer should be at the bottom of the jar, silt in the middle, clay, dead leaves, sticks and other organic matter on the top.)
6. Make "before" and "after" sketches of the jar on the board and have students help you label them.
7. Distribute the handout and have students draw their own illustration and label it. You may wish to add vocabulary words for younger students.
8. Use the bucket to empty and dispose of used contents.

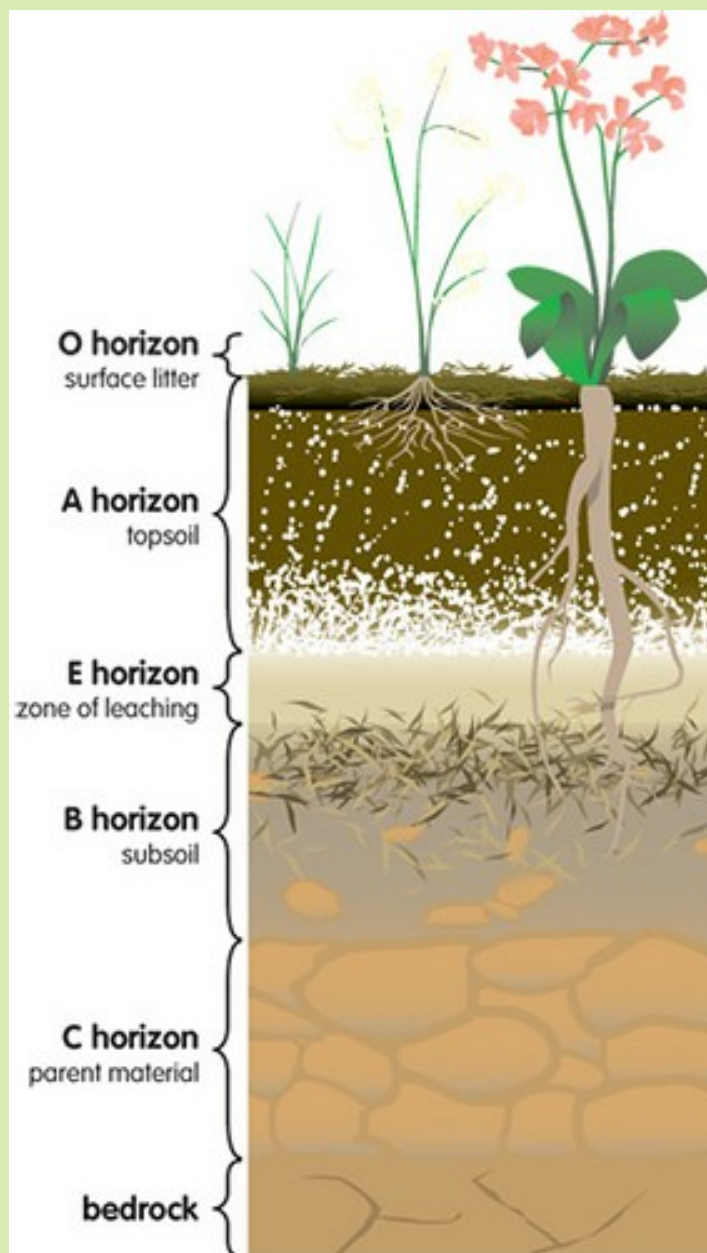




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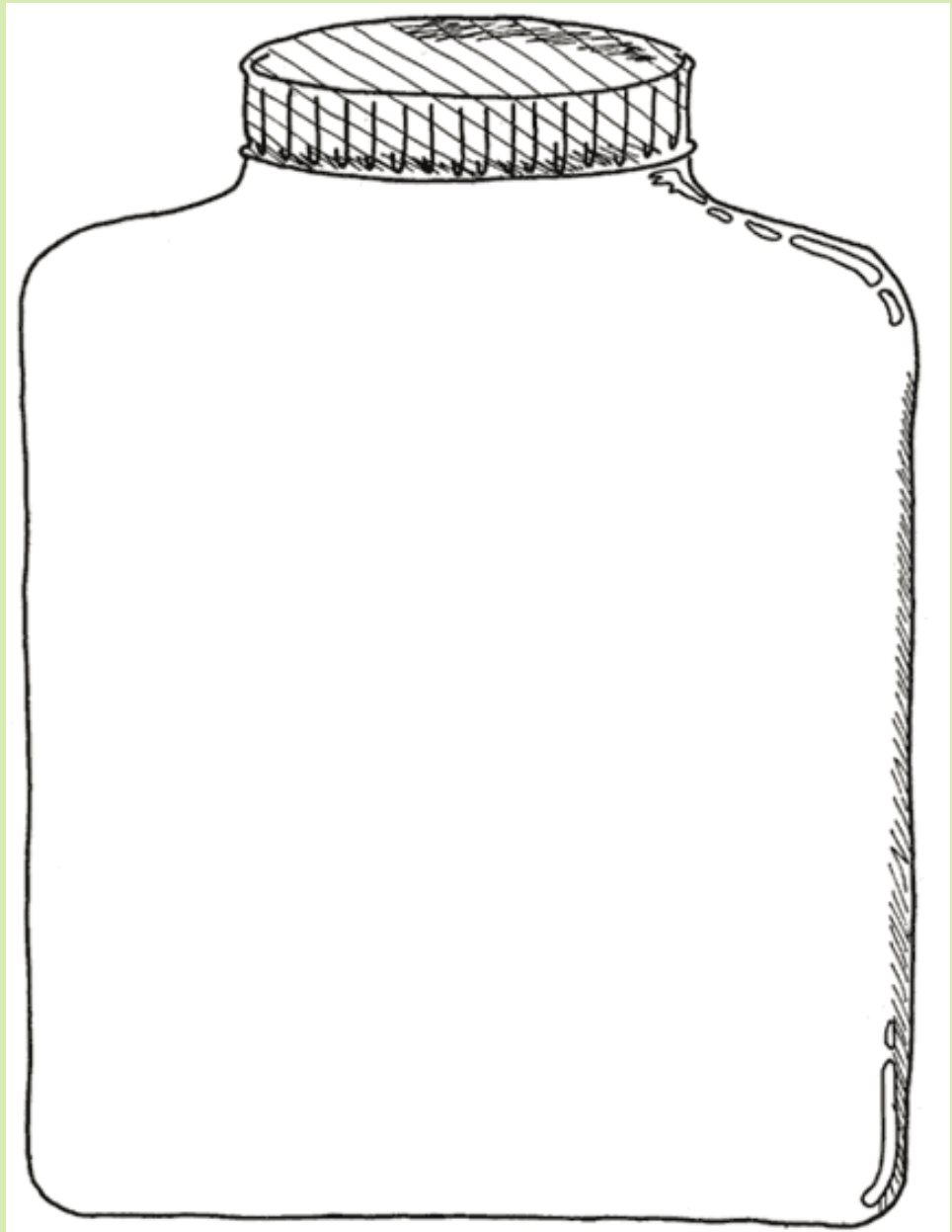
## From the Bottom Up- Continued...



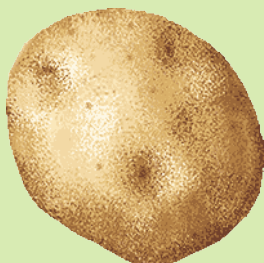
The Colorado Potato Administrative Committee  
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From the Bottom Up-  
Continued...



## The Colorado Potato Administrative Committee Agriculture Education Program



### *“History of Potatoes— Following a Legend thru Time”*

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to correctly follow the path the potato has traveled throughout history.
2. Students will identify various locations throughout the world.

Materials:

1. Copies of world map
2. Copies of potato cut-out
3. Colored pencils
4. Story

#### The Potatoes' Family Tree

The potato was first cultivated in South America between three and seven thousand years ago, though scientists believe they may have grown wild in the region as long as 13,000 years ago. The word *potato* comes from the Indian word *batata*. Probably originating in the south of Peru and the northeast of Bolivia, this meant their first ancestor was Inca in origin.

In 1532, the Spanish conquistadors arrived in Peru and failed to see that the potato was far more important than the silver and gold that they took back to Spain with them. Though the potato was consumed by the ship's crew on the way back to Spain, it did not catch on right away once they got home. By 1570, farmers were planting the crop on their farms, but mostly to feed their animals.

From Spain the popularity of the potato spread to Italy and other European countries by the late 1500's. By 1600, the potato entered Belgium, Holland, France, Switzerland, England, Germany, Portugal, and Ireland. Most everyone refused to eat the potato, because it was too UGLY! Everyone knows potatoes are beautiful! It wasn't until the upper classes started eating them that they became popular. Then everyone began growing them.

In 1795, the potato invaded England full force and became a part of the food source there. By 1850 potatoes were a part of Russia's diet as well. All over Europe, England, and Ireland the potato had become a big part of everyone's diet. There was only one place left to conquer – North America! When early pilgrims came to America, the potato came too. The potato has become a major part of the American diet. It is the fourth largest food crop in the world, with 4300 different varieties grown internationally.

Materials



The Colorado Potato Administrative Committee  
Agriculture Education Program



*“History of Potatoes—  
Following a Legend thru Time”  
Continued...*

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to correctly follow the path the potato has traveled throughout history.

Materials:



The Colorado Potato Administrative Committee  
Agriculture Education Program



*“History of Potatoes—  
Following a Legend thru Time”  
Continued...*

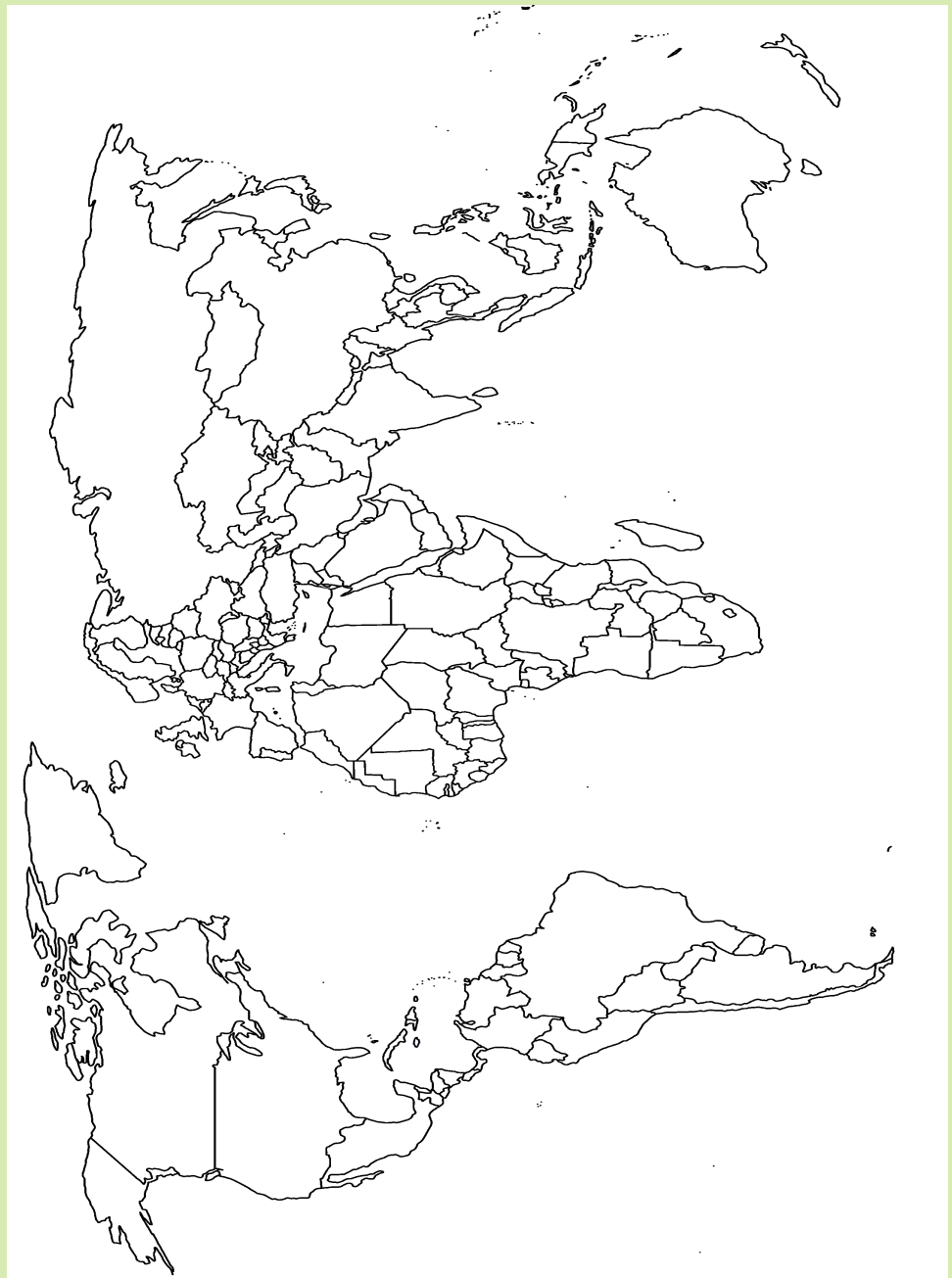
Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to correctly follow the path the potato has traveled throughout history.

Materials:





The Colorado Potato Administrative Committee  
Agriculture Education Program



## Food Anatomy- Where do Potatoes Come From?

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to correctly identify the parts of a potato and diagram them.

Materials:

1. Diagram of the Potato Plant (included)
2. White paper
3. Graph paper
4. Scissors
5. Glue

### Preparation:

Discuss the following with students:

Where do potatoes come from? Most kids think it's from their local grocer! To help kids better understand this concept, today's lesson will introduce them to some potato vocabulary and the entire potato plant. The potato (*Solanum tuberosum*) is an herbaceous annual that grows up to 100 cm (40 inches) tall and produces a tuber - also called potato - so rich in nutrients it ranks as the world's fourth most important food crop, after corn, wheat and rice. The potato belongs to the Solanaceae - or "nightshade"- family of flowering plants, and shares the genus *Solanum* with at least 1,000 other species, including tomato and eggplant. The potato is adapted to short day conditions and is now cultivated around the world. It is believed to be descended from a small introduction to Europe of *andigena* potatoes that later adapted to longer day lengths. To better understand the potato, use the diagram on the next page.

Do:

1. Give students the hand-outs of the potato plants and have them work with a partner to develop a crossword or word search using the terms.
2. To help students with terms, have them make a vocabulary terms list.



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*Food Anatomy-*  
*Where do Potatoes*  
*Come From?*  
Continued...

Time: 30 minutes

Location: Indoors

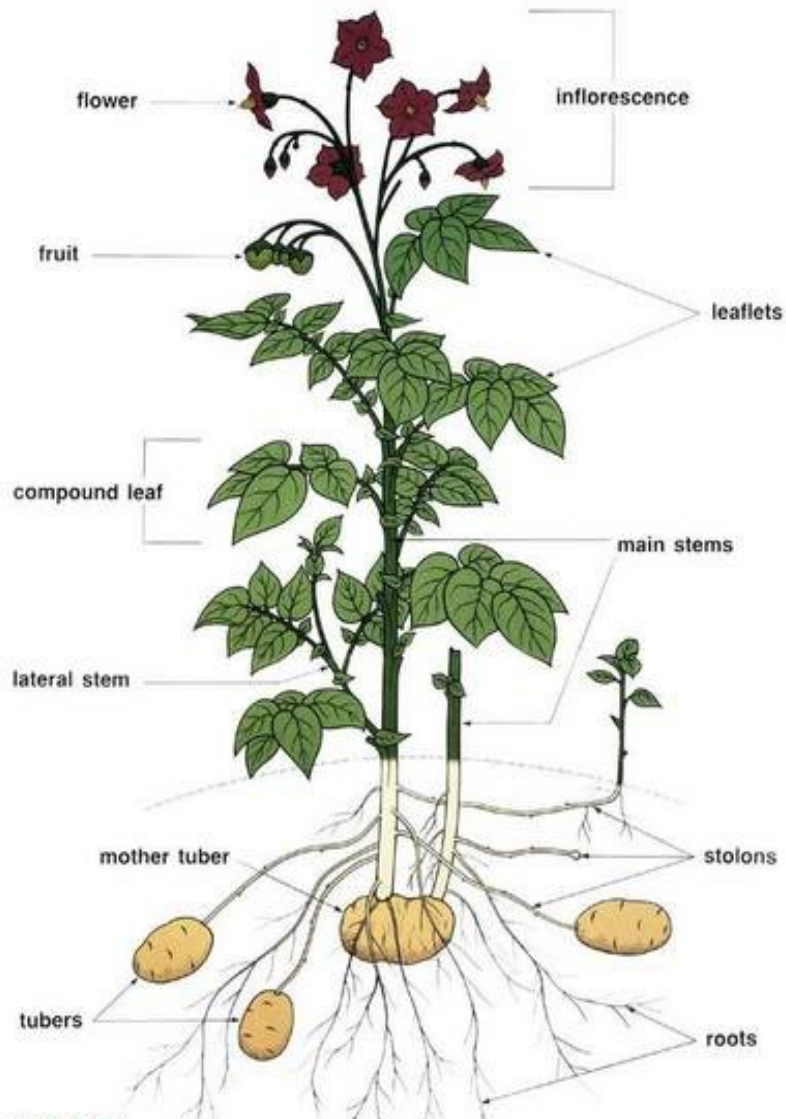
Learner Outcomes:

1. Students will be able to correctly identify the parts of a potato and diagram them.

Materials:

1. Diagram of the Potato Plant (included)
2. White paper
3. Scissors
4. Glue

## The Potato Plant





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*Eating and Planting —  
A Groups Project of  
Planting and Harvest*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to understand the importance of a food crop.
2. Students will identify where food comes from.
3. Students will know that crop cultivation takes time.

Materials:

1. A bucket about 50 cm (20 inches) in diameter
2. Three small potatoes about 7 cm (2.75 inches) high
3. Compost or soil

### Preparation:

Discuss the following with students:

Small communities all around the world have depended on growing their own food in order to feed themselves. Eighteenth-century Ireland was no exception. One of the main crops then and today is the potato. Potatoes are a focal point in the diet, because they are easily stored and rich in many nutrients that the body needs to survive.

### Do:

1. Ten days before you plant, place the potatoes in a warm spot with lots of light so that their shoots start growing.
2. Once the potatoes have strong, hard shoots, make a drainage hole in the bottom of the bucket, then fill it two-thirds full with compost or soil.
3. Press the seed potatoes into the soil, with the shoots facing up. Then fill the bucket nearly to the top with compost or soil.
4. Place the bucket on bricks for drainage, in a spot that has reasonable light. The ideal temperature is 10-15° C (or 50-60° F).



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Agriculture Education Program



*Eating and Planting —  
A Groups Project of  
Planting and Harvest  
Continued...*

Time: 30 minutes

Location: Indoors

5. Have students use the potato record pages to track the progress of their crop, including drawings of plant growth.
6. Using a classroom digital camera can add great detail to this project.
7. Enjoy an in-class harvest fest when the potatoes are harvested.





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*Eating and Planting —  
A Group's Project of  
Planting and Harvest  
Continued...*

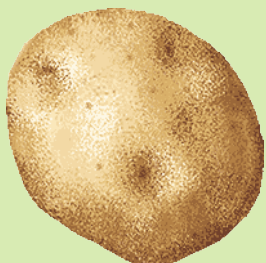
Time: 30 minutes

Location: Indoors

A large, hand-drawn outline of a potato tuber, intended for students to draw and write about. Inside the outline, there are ten horizontal lines for writing.



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Agriculture Education Program



*Food for Thought -  
How do plants grow?*

Time: 30 minutes

Location: Indoors

Materials:

1. Colored pencils
2. Crayons
3. Pencil
4. Template copies

Preparation:

1. Ask students the following set of questions after writing them on the board:

How do plants grow?

What job does each plant have?

Why are plants important?

Why is it important to find out about the food that we eat?

2. Next, go over these plant facts with students:

- The roots—Anchor plants and take in nutrients.
- The stem—Carries nutrients and water to the different parts of the plant.
- The leaves—Use light from the sun to make food for the plant.

(cont.)



The Colorado Potato Administrative Committee  
Agriculture Education Program



*Food for Thought -  
How do plants grow?*

Continued...

Time: 30 minutes

Location: Indoors

- The flowers—Are brightly colored so that they attract insects like bees and butterflies for pollination.

Plants need all of these to grow healthy. So, how does a seed grow into a plant? A seed germinates and then sends out shoots. When light, water, warmth, and nutrients reach the shoot, it grows. After a period of time these shoots grow into healthy vegetables.

DO:

1. Break the students up into groups and have each of them develop potato "Plantation" using the template provided.
2. After they have created their "Plantation" have them share them with the whole group.



The Colorado Potato Administrative Committee  
Agriculture Education Program



*Food for Thought -  
How do plants grow?*

Continued...

Time: 30 minutes

Location: Indoors

Label the potato plant  
and tell why it is  
important to know  
where our food comes  
from.

"Plantation"



Stem Roots Leaves Flowers

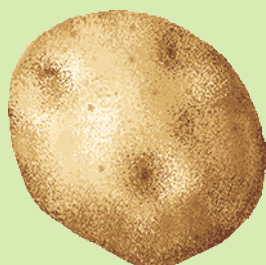
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## *Potato Possibilities*

### *Why variety is the spice of life!*

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to understand how potatoes fit into a healthy diet.

Materials:

1. Several potato varieties (color and size)
2. Food pyramid chart
3. Microwave-safe dish
4. Paring knife
5. Canola oil
6. Seasonings
7. Plastic wrap

### Preparation:

Understanding nutrition is important for a variety of reasons. Health is certainly one of those reasons, but also to build food habits that stay with us for a lifetime.

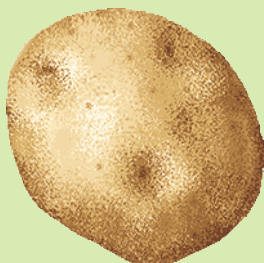
Discuss this information with students: The potato contains vitamins and minerals that have been identified as vital to human nutrition. A medium-sized 150 g (5.3 oz) potato with the skin provides 27 mg of vitamin C (45% of the Daily Value (DV)), 620 mg of potassium (18% of DV), 0.2 mg vitamin B<sub>6</sub> (10% of DV) and trace amounts of thiamin, riboflavin, folate, niacin, magnesium, phosphorus, iron, and zinc. The fiber content of a potato with skin is equivalent to that of many whole grain breads, pastas, and cereals.

Nutritionally, the potato is best known for its carbohydrate content (approximately 26 grams in a medium potato). The predominant form of this carbohydrate is starch. A small but significant portion of this starch is resistant to digestion by enzymes in the stomach and small intestine, and so reaches the large intestine essentially intact. This resistant starch is considered to have similar physiological effects and health benefits as fiber.





The Colorado Potato Administrative Committee  
Agriculture Education Program



## *Potato Possibilities*

*Why variety is the spice of life!*  
Continued...

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to understand how potatoes fit into a healthy diet.

Materials:

1. Several potato varieties (color and size)
2. Microwave-safe dish
3. Paring knife
4. Canola oil
5. Seasonings
6. Plastic wrap
7. My Plate chart

Do:

1. Give each student group a bucket of fresh potatoes. Have them smell, touch, and feel them.
2. Provide each group an opportunity to look at the different types of potatoes and share with their group members how these different potatoes might be cooked. Have them write down their choices on their share sheet.
3. Have the students use the my plate to decide where on the plate the potato fits and how many of each serving of that group they need.
4. Optional activity:

Using a microwave, cook and eat the following potato dish with students.

### **Microwave Roasted Potatoes**

Wash 4 (5-6 oz) potatoes. Cut into 1-inch cubes and place into microwave-safe dish. Drizzle 2 tablespoons of olive oil over potatoes and sprinkle with seasonings of choice. Toss evenly to disperse oil and seasonings. Cover with lid or plastic wrap. (If covering dish with plastic wrap, poke small hole in plastic.) Microwave on high for 10 minutes\*. Use oven mitts to carefully remove from microwave.

\*Depending On the Microwave



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Agriculture Education Program



*Potato Possibilities*  
*Why variety is the spice of life!*  
Continued...

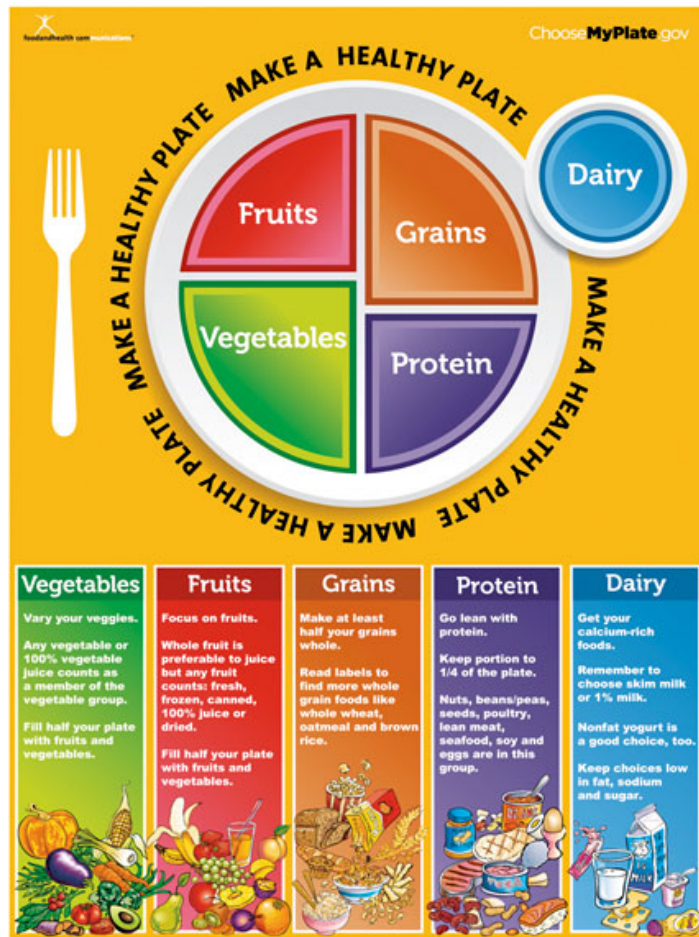
Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to understand how potatoes fit into a healthy diet.

Preparation:



**Vegetables**  
Vary your veggies.  
Any vegetable or 100% vegetable juice counts as a member of the vegetable group.  
Fill half your plate with fruits and vegetables.

**Fruits**  
Focus on fruits.  
Whole fruit is preferable to juice but any fruit counts: fresh, frozen, canned, 100% juice or dried.  
Fill half your plate with fruits and vegetables.

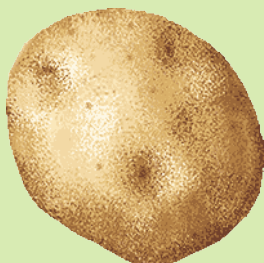
**Grains**  
Make at least half your grains whole.  
Read labels to find more whole grain foods like whole wheat, oatmeal and brown rice.

**Protein**  
Go lean with protein.  
Keep portion to 1/4 of the plate.  
Nuts, beans/peas, seeds, poultry, lean meat, seafood, soy and eggs are in this group.

**Dairy**  
Get your calcium-rich foods.  
Remember to choose skim milk or 1% milk.  
Nonfat yogurt is a good choice, too.  
Keep choices low in fat, sodium and sugar.



The Colorado Potato Administrative Committee  
Agriculture Education Program



## *Farm Futures*

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to describe the importance of the farm in our country's independence and wealth.

Materials:

1. Copies of pie graph

### Preparation:

Discuss the following with students:

The cost of food all over the world differs greatly. For Americans, food is one of the best buys available. This is because of the abilities of the American farmer. According to the United States Department of Agriculture, a bag of groceries that contains a gallon of milk, a dozen eggs, a pound of cheddar cheese, ten pounds of potatoes and one pound of ground beef cost \$29.19. The same bag costs \$21.83 in Spain and \$41.20 in Tokyo.

There are several reasons why food in the United States costs are low: the U.S. has 25% of the world's class one land, there is more open space for farms in the U.S., the climate is favorable for growing a variety of crops, the U.S. has an infrastructure that supports growing and distribution of food, and, finally, we have laws that keep our food safe.

What all of this means for consumers is that only about 7% of our gross income is spent on food.

### Do:

1. Break students into groups and have them list what they spend their money on — types of food, clothing, housing, recreation, transportation etc.



The Colorado Potato Administrative Committee  
Agriculture Education Program



## *Farm Futures*

Continued...

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to describe the importance of the farm in our country's independence and wealth.

2. Have each group prioritize the list based on the amount of money spent in each category.
3. Have groups share their lists with the class. Which are necessities? Why? If your family lost income where would your spending change?
4. Have each student group create a pie chart of their expenses. Be sure to have them label each category.
5. Bringing all of the charts together, what do you notice about the food category? Discuss.
6. Write a paragraph about food in America and the importance of the American farmer.



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# *Farm Futures*

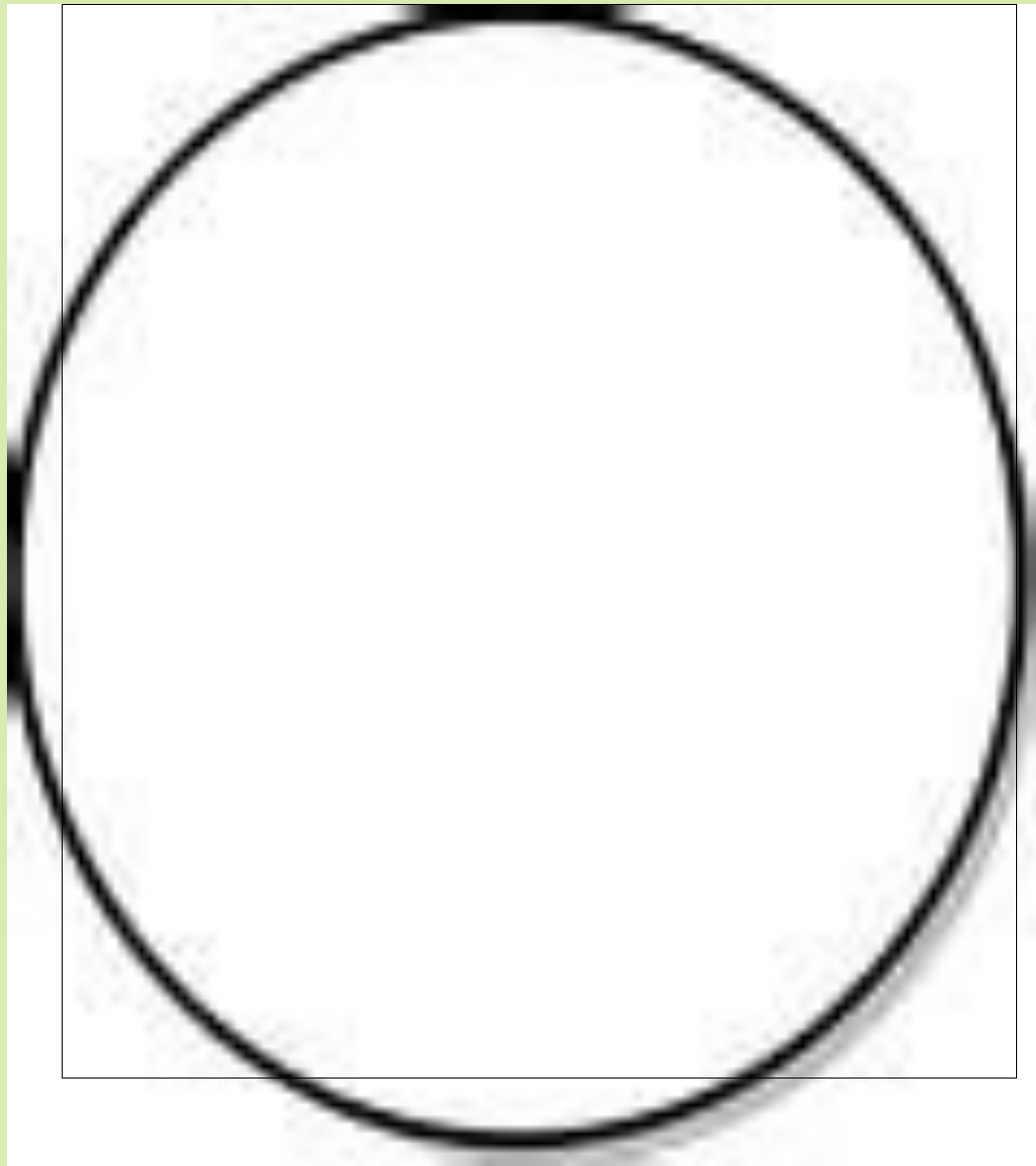
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Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to describe the importance of the farm in our country's independence and wealth.



Pie Chart for Expenses







The Colorado Potato Administrative Committee  
Agriculture Education Program



# Hidden Treasures

## *Grades 6-8*





## The Colorado Potato Administrative Committee Agriculture Education Program



### Program Structure

#### **Discovery Centers**

The Colorado Potato Administrative Committee lessons offer seven, 10-20 minute self-guided activities which introduce students to major themes of the program, as well as develop the skills (science process) needed for success.

#### **Tips for Developing Discovery Centers**

Simple, straightforward directions

Each center should take 10-20 minutes to complete (younger grades should have shorter activities).

The more physical the activity the better. Examples: puzzles, picture books, classify objects, partner games, mazes, etc.

#### **Field Trips—On the Farm Wonders**

The field trips run 3-5 hours and can be done at a site in the San Luis Valley, or other farm community. The trip begins with an introduction to the day's concepts as a large group of 20-60 students. Then students are divided into three groups and rotate through three, 30-40 minute lessons pertaining to the objectives of the specific grades. The students then reconvene and do a short wrap-up activity.

#### **Tips for Developing & Implementing Field Trips**

Try to create activities that are outdoor-based, and try to avoid activities that can be done in the classroom. (For example: data collection, observation, field sketching, scavenger hunts.

The Introduction/Wrap-up should review material learned in pre-trip discovery centers and introduce students to the goals of the field day. Field Stations should be hands-on/minds-on and relate to the learner outcomes and program goals.

#### **Post-Field Trip Wetland Inquiry (back in classroom)**

One activity that can be teacher-led and allows students to synthesize and apply what they have learned in the program.

#### **Tips for Developing Post-Field Trip Activities**

Interactive, group-work component, self-guided, or minimal direction from teachers, with some sort of problem-solving component or decision-making. Example: students decide what variety of potato they can plant, and develop a timeline to plant, maintain, and harvest a crop or build a nutritional pyramid that incorporates potatoes.



The Colorado Potato Administrative Committee  
Agriculture Education Program

# Hidden Treasures

## *Grades 6-8: Overview*

### **Learner Outcomes**

- Describe how a potato plant grows and know the importance it plays in the modern diet
- Know the importance of a healthy diet
- Understanding potato biology and pollination
- Know the importance of farming and agriculture to American society

### **Connections to Colorado State Standards**

Reading, Writing, Communications: 1, 2, 4

Science: 2, 3

History: 1,2, 3, 4,

### **The Program**

This program is divided into three parts that, together, make a complete integrated unit for your class.

*Discovery Centers*—As a pre-trip lesson, five student discovery centers are provided for your classroom to introduce students to the agriculture community and the concepts they will be learning.

*Field Study*—This is a 3-4 hour field trip to a farming community where students will explore agriculture production through the use of their five senses. (This field trip can be set up in the San Luis Valley or in an agricultural setting close to your school or town.)

*Post-Field Study Problem Solving*—Back in the classroom through a simple teacher-led activity, students will explore both the in-classroom activities and field experiences.



## The Colorado Potato Administrative Committee Agriculture Education Program

### Teacher Instructions:

Set up each discovery center around your classroom (see set-up instructions for each center). Each center will take 10-15 minutes to complete. Students may work cooperatively or individually on each center. You may need to help each group read and interpret the instructions.

For lower-level readers you will need to go through each station as a class. You can choose one center each day and work through it together.

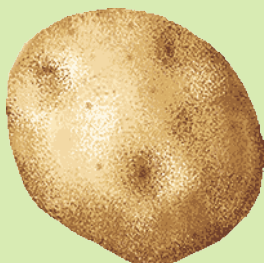
1. A lesson in "Doin' Without" — Students learn the important role that farms have played in the development of societies.
2. Watching as a Potato Plant grows — Students learn the steps of tuber growth and development.
3. Food for Thought — What does "diet" really mean? — Students understand what nutrition and diet really are and why they are important to health.
4. Production Pallet — Links in the Food Chain — Students demonstrate how food is processed from field to market.
5. Monocots and Dicots — Students will understand the important difference between the two different seed types.
6. Pollen's Power — Students learn the importance of pollination.
7. The Big Picture — Students share their ideas on need for farms and agriculture.

### Materials List

1. One copy of story for each student
2. Poster board
3. Copies of potato development pictures
4. Assembly supplies
5. Markers, colored pencils
6. Poster Board Diagram of the Potato Plant (included)
7. White paper
8. Butcher paper
9. 3X5 cards
10. "Links in the Food Chain" Info Sheets for each group
11. Pictures or samples of monocot and dicot plants
12. Science journal
13. Pollen activity
14. Plant picture
15. Copy of student survey for each student.



The Colorado Potato Administrative Committee  
Agriculture Education Program



## *A Lesson in "Doin' Without"*

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the importance of farming to our current lifestyle.
2. Students can look at related experiences and relate them to their own lives.

Materials:

1. One copy of story for each student
2. Poster board

### Preparation:

Ask students the following question: What makes America great? Write some of their responses on the board.

Then read the following story (a student or group of students may choose to read it).

I remember telling my little brother, "Shut-up, you ain't never done without – not like Old Grandma. You just whine!" He was whining and I knew it. I used to do the same thing, until that day, that day I'll never forget...

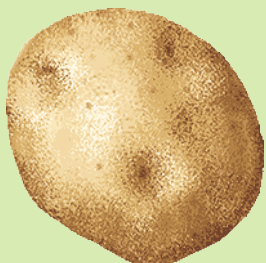
I woke up that morning knowing that I was going out to be with my best friends, Anna Lee and Shari. We always spent our Saturdays together doin' stuff. I had just gotten used to it, but things were a little different now, my Dad got sick and died last winter, so Mom had to work, a lot, just so we could get by and that's why Old Grandma came to live with us. She needed help and, like Mom said, we needed help. Together things seemed to come out okay.

We all had our chores to do, but that Saturday I had plans, lots of them, and let's say chores weren't part of them. I started to slip out the door real quiet, so no one would hear, figuring by the time they caught on I'd be long gone. But that darn door just had it in for me and sure enough it squealed my name as if it could talk. Old Grandma came to life and I was dead in my tracks. She started talkin' at me as if I had just committed capital murder. I WAS DONE!





The Colorado Potato Administrative Committee  
Agriculture Education Program



*“A Lesson in ‘Doin’ Without”*  
*Continued...*

The rest of my day was spent cleaning, washing, ironing, dusting, feeding, mowing, and helping with dinner. “That was just the start” she told me. “You will be with me, at home, the next two weeks until you learn to respect your family”. That was it: she had truly gone too far. “Grandma, you do not know what it is like to do without, I have needs!” Her eyes went gray, the tears immediately came and she looked through me as if I wasn’t there. I never felt so cold. “Old Grandma, are you alright?” “What is wrong?”

“Do without, child? We ate beans and flour cakes for six months, once a day. My belly never growled so loud. I watched as my Daddy and Granddaddy carried our belongings out of that city and sold the last of our things to buy a small piece of share cropped land, do you know why?” “No” I nodded. “So that we could grow something so that we would always eat! After that day on that land, we were never hungry. We all learned to work together to farm OUR land to build OUR futures. My Daddy knew what every farmer knows: if you can feed yourself then you are strong, but feed others and you are great! Abbey, that is why we are a great nation – we work to feed ourselves and others. That is why I want you to learn to work with your family here, so you understand that sacrifice is worth a lot in the end.”



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*“A Lesson in ‘Doin’ Without”*  
*Continued...*

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the importance of farming to our current lifestyle.
2. Students can look at related experiences and relate them to their own lives.

**Do:**

Have students break into groups and answer the following questions:

1. Have students write down the lesson that Abbey learned from “Old Grandma”.
2. What is the lesson Abbey is trying to teach her little brother and why?
3. How would Abbey’s childhood lesson affect her decisions as an adult?
4. Write a “Big Picture” idea that Abbey learned from her grandmother. Explain why you chose it.



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## *“Watching as a Potato Plant Grows”*

Time: 40 minutes

Location: Indoors

Learner Outcomes:

1. Students will be able to correctly describe the growth and development of the potato.

Materials:

1. Copies of potato development pictures

Assembly supplies:

1. Markers, colored pencils
2. Poster board

### Preparation:

It's hard for students in the classroom to have the time to be able to watch the growth and development of a plant. The process from planting to harvest is an integral part of our society and an important part of the biological system.

1. Students will create motion books that move through the process from seed to tuber. Each group will create and cut out a set of pictures (8-9) and place them into an envelope. Then trade with other groups.
2. Once each group gets its envelopes, they need to sequence them, then assemble their books, and then describe the process on their poster board.
3. As a follow-up activity, students can research the growth and development of different food crops and make different motion books to share with other students.



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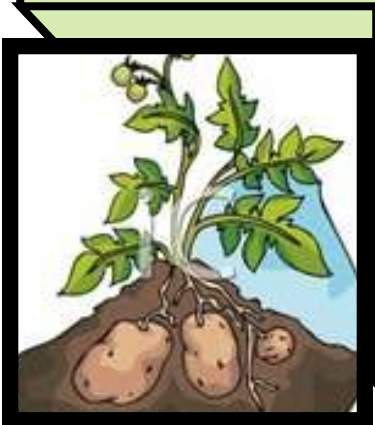
*Watching as a Potato Plant  
Grows”  
Continued...*

Time: 40 minutes

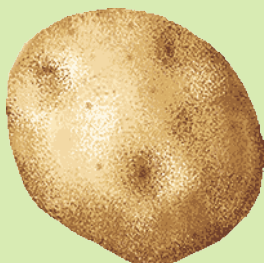
Location: Indoors

Learner Outcomes:  
1. Students will be able to correctly describe the growth and development of the potato.

	15-20 cm	No flower ends	Establishment (0) 15-20 days
	20-30 cm	With small buds present at top of plants	Vegetative (1) (1a) 15-20 days (1b) 15-20 days
	30-40 cm	tubers at 80% of final weight	Yield Formation (3) 45-55 days
	full grown	Vines and lower foliage changing colour, no flower visible	Ripening (4) 10-15 days



The Colorado Potato Administrative Committee  
Agriculture Education Program



## Food for Thought — What does diet really mean?

Time: 40 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand what they are eating.
2. Students will understand the amount of food they should be eating.
3. Students will compare what they currently eat to the my plate.
4. Students will be able to identify nutrients in foods.

Materials:

1. Markers, colored pencils
2. Various food labels
3. My Plate
4. Consumption Information

### Preparation:

Today, we hear the word *diet* much more than we hear the word *nutrition*. There are so many diets on the market that it's easy to get lost in the fad and forget that good nutrition is really what's important! There are all kinds of diets and diet foods. Our society has become fixated on the 'diet', instead of on the quality of the nutrition in the diet. Unfortunately, this fixation isn't working. America is amongst the fattest nations in the world, with high rates of diabetes, heart disease, and other life threatening illnesses. While diets are becoming more popular, nutrition is suffering.

#### What is a Diet?

While many people think a diet is a set of rules you follow to try to lose weight, your diet is actually the food that you eat to supply your body with the nutrients it needs to function properly. While the average American diet consists of large quantities of processed sugar, white flour, meat and fast foods, a healthy diet is one that supplies the body with vitamins, minerals, fiber, antioxidants, and enzymes. These nutritional building blocks affect your energy levels, your quality of life, and have a direct effect on your mood, memory, eyesight, body functions, and lifespan. Without a healthy diet that supplies the body with much needed nutrients, you are more susceptible to colds, infections, and illnesses. Good nutrition is what sustains your life.

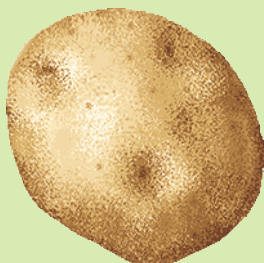
#### Nutritional Labels

There is much confusion surrounding nutritional labels. Most people look strictly at the top of the label for calories, fat grams and serving size information. The truth is that nutritional labels offer a look at the nutrients in one's food, such as vitamins A, C, D and E, as well as calcium, iron, magnesium, zinc, and folic acid. This information, although lower down on the nutritional label, is very important if you are seeking to supply your body with nutrients, as opposed to empty calories.





The Colorado Potato Administrative Committee  
Agriculture Education Program



*Food for Thought —  
What does diet really mean?  
Continued.....*

Time: 40 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand what they are eating.
2. Students will understand the amount of food they should be eating.
3. Students will compare what they currently eat to the my plate.
4. Students will be able to identify nutrients in foods.

The U. S. Department of Agriculture, along with the U.S. Department of Health & Human Services, developed the food pyramid in 1992. Implemented in 2011 was a new "USDA Food Guide", The "my plate" campaign is the updated nutritional guide. The purpose of the my food plate template is to guide us in making nutritional decisions. The information in the guide is updated as new information is compiled.

The my plate guide is made up of five essential nutritional groups and the serving amounts from each grouping. It serves as a daily guideline to help Americans make sound nutritional choices. The number of calories that a person requires each day depends on age, gender, size, and activity level. For example, the higher level of activity that you maintain, the more calories you are likely to require. Fats, oils, and sweets are included in the my plate but should be used sparingly and are not considered a food group.

Carbohydrate group

Carbohydrates are an ideal source of energy for the body. This is because they can be transformed more quickly into glucose (the form of sugar that's transported and used by the body) than can proteins or fats. Even so, a diet too high in carbohydrates can upset the delicate balance of a body's blood sugar level, resulting in fluctuations in energy and mood that can leave one feeling irritated and tired.

Vegetable group

A vegetable is a part of a plant consumed by humans that is generally savory (not sweet) and not considered a grain, fruit, nut, spice, or herb. For example, the stem, root, flower, etc., may be eaten as vegetables. Vegetables contain many vitamins and minerals, however, different vegetables contain different spreads, so it is important to eat a wide variety of types. For example, green vegetables typically contain vitamin A, dark orange and dark green



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*Food for Thought -  
What does diet really mean?  
Continued.....*

Time: 40 minutes

Location: Indoors

Learner Outcomes:

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4. Students will be able to identify nutrients in foods.

vegetables contain vitamin C, and vegetables like broccoli and related plants contain iron and calcium. Vegetables are very low in fats and calories, but cooking can often add these. A person should have between 3-5 servings of vegetables in a day. They may be fresh, frozen, canned, or juiced.

#### Protein group

Meat is the tissue - usually muscle - of an animal that is consumed by humans. Since most parts of many animals are edible, there is a vast variety of meats. Meat is a major source of protein, as well as iron, zinc, and vitamin B12. Meat, poultry, and fish include beef, chicken, pork, salmon, tuna, and shrimp; eggs, spices, and herbs are also in this group. However, since many of the same nutrients found in meat can also be found in foods like eggs, dry beans, and nuts, such foods are typically placed in the same category as meats, as meat alternatives.

These include tofu, products that resemble meat or fish but are made with soy, eggs, and cheeses. The meat group is one of the major compacted food groups in the food guide pyramid. Although meat provides energy and nutrients, it is often high in fat and cholesterol, and can be high in sodium. Simply trimming off fatty tissue can go a long way towards reducing this negative effect. However, this tactic may prove to be ineffective, so large portions of meats are not recommended; 2 -3 ounces per day of meat or alternatives are recommended. This is 3-5 servings. For those who don't consume meat or animal products (*see Vegetarianism and Taboo food and drink*), meat analogs, tofu, beans, lentils, chick peas, nuts, and high-protein vegetables make up this group.



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*Food for Thought -  
What does diet really mean?  
Continued.....*

Time: 40 minutes

Location: Indoors

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Oil group

It is least needed in the body and it is not really needed to stay healthy. One must have these in small amounts and not much per day.

Fruit group

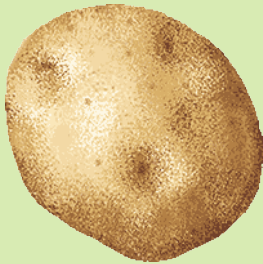
In terms of food (rather than botany), fruits are the sweet-tasting, seed-bearing parts of plants, or occasionally sweet parts of plants which do not bear seeds. These include apples, oranges, plums, bananas, etc. Fruits are low in calories and fat and are a source of natural sugars, fiber and vitamins. Processing fruits when canning or making into juices unfortunately may add sugars and remove nutrients. The fruit food group is sometimes combined with the vegetable food group. Note that many foods considered fruits in botany because they bear seeds are **not** considered fruits in cuisine, because they lack the characteristic sweet taste, e.g., tomatoes or avocados. It is best to consume 2 servings of fruit in a day. They may be fresh, frozen, canned, dried, pureed or juiced.

Dairy group

The dairy group is represented by a blue circle on the right hand corner above the plate. Dairy products are produced from the milk of mammals, most usually but not exclusively, cattle. They include milk, yogurt, and cheese. Milk and its derivative products are a rich source of the mineral calcium, but also provide protein, phosphorus, vitamin A, and vitamin D. However, many dairy products are high in saturated fat and cholesterol compared to vegetables, fruits, and whole grains, which is why skim products are available as an alternative. For adults, 3 cups of dairy products are recommended per day.



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Agriculture Education Program



*Food for Thought —  
What does diet really mean?  
Continued.....*

Time: 40 minutes

Location: Indoors

Learner Outcomes:

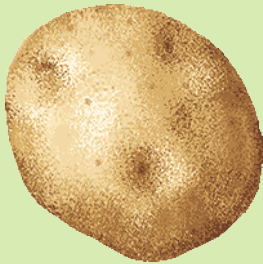
1. Students will understand what they are eating.
2. Students will understand the amount of food they should be eating.
3. Students will compare what they currently eat to the my plate.
4. Students will be able to identify nutrients in foods.

Since no one food group can provide all the necessary nutrients, including the following steps is important:

1. Eat a variety of foods.
2. Balance what you eat with physical activity.
3. Choose a diet with plenty of grains, fruits and vegetables.
4. Eat a diet low in fat, saturated fats, and cholesterol.
5. Choose a diet moderate in sugar, salt and sodium.
6. Drink alcoholic beverages in moderation.



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Agriculture Education Program



*Food for Thought —  
What does diet really mean?  
Continued.....*

Time: 40 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand what they are eating.
2. Students will understand the amount of food they should be eating.
3. Students will compare what they currently eat to the my plate.
4. Students will be able to identify nutrients in foods.

**Do:**

1. Since everybody knows that it is important to eat every day, ask -

- Do you think about what you eat before you eat it?
- How do you decide what to eat (taste or health)?

Write a variety of answers on board.

2. Do you think about how much you eat? Where do we get the information about how much to eat? (answers include labels, nutritional magazines)

3. Divide the class into groups and have them list the foods that they have eaten over the past 24 hours, and estimate the serving size. Next have them divide the list into the various food groups.

4. Have them swap their list with another group to make sure they have placed everything correctly.

5. Using the blank my plate, have them add up the number of servings in each group and sketch the food choices of the other group.

6. Hand back the charts and compare the two plates. Discuss the differences that you see and how improvements could be made.

7. Survey the class on what is the most popular vegetable, fruit, protein, and dairy.





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*Food for Thought -  
What does diet really mean?  
Continued.....*

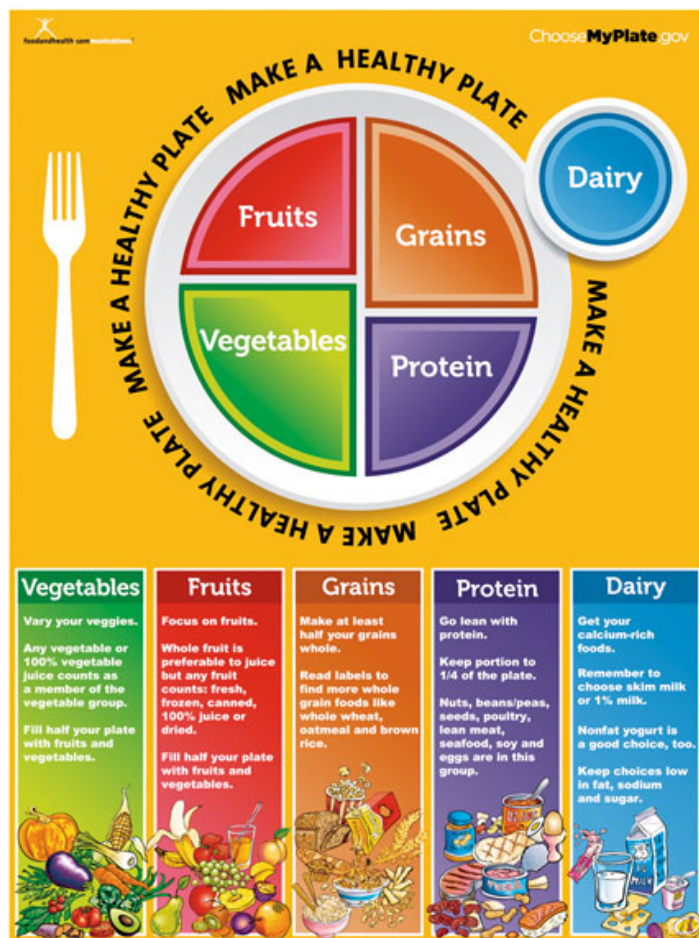
Time: 40 minutes

Location: Indoors

Learner Outcomes:

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2. Students will understand the amount of food they should be eating.
3. Students will compare what they currently eat to the my plate.
4. Students will be able to identify nutrients in foods.

Preparation:



The Colorado Potato Administrative Committee  
Agriculture Education Program



*Food for Thought -  
What does diet really mean?  
Continued.....*

Time: 40 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand what they are eating.
2. Students will understand the amount of food they should be eating.
3. Students will compare what they currently eat to the my plate.
4. Students will be able to identify nutrients in foods.

**Preparation:**



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Agriculture Education Program



## *Production Pallet — Links in the Food Chain*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Students teams design a flow chart that illustrates the food production sequence.
3. Students will learn the array of careers available in and along the path of food production.

Materials:

1. Butcher paper
2. 3X5 cards
3. "Links in the Food Chain" Info Sheets for each group

### Preparation:

Discuss the following with students:

In early America the farm represented a self-sufficient lifestyle. These early farmers raised their own livestock, made their own clothes, gathered their own wood to build and heat their homes, and grew their own food. Most of the food they grew was to feed their family or to trade for the essential supplies that they needed.

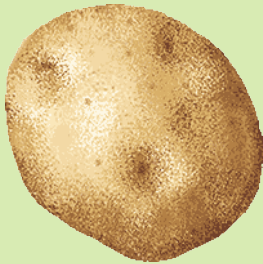
It wasn't until the onset of the industrial revolution in the mid-1800's that the potential of the American was truly tapped. Even as early as 1850, the American farmer produced enough food to feed five people; by 1940 that number had risen to 19 people. Today the American farmer is the most productive in the world, feeding 130 people.

The United States has six percent of the world's land area and its farmers produce 16 percent of the world's food supply. By 2000, one million acres of U.S. soil were committed to farming, as cropland, livestock grazing, timbering, and fish farming. Of the approximately two million farms in the United States, 150,000 are women-owned, while the average farm size is 478 acres.

With all of this in mind, a farm is defined as any establishment that sells \$1,000.00 dollars or more of agricultural products annually.



The Colorado Potato Administrative Committee  
Agriculture Education Program



## *Production Pallet — Links in the Food Chain*

*Continued....*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Student teams design a flow chart that illustrates the food production sequence.
3. Students will learn the array of careers available in and along the path of food production.

The approximate number of people in agriculture in the U.S. is 3.2 million people and is representative of less than 2% of the population. Today most Americans do not know what it means to raise their own food; the modern lifestyle does not require the majority of us to know or understand where or how our food is produced. But all of us are links in the food chain.

The producer is the "farmer" or "rancher" who produces commodities such as livestock, crops, timber goods, mining products, and so on. These are the raw goods that drive the agricultural industry. These producers are involved in the everyday operations of their farms and ranches even though they employ others to help plant, harvest, pack the crop and care for the livestock. Producers can sell their crops directly to the consumer, but most often they sell to the warehouse

The warehouse is also known as the middleman. The middleman consists of processors/packagers, distributors, and retailers. The processor/packager processes the raw goods and creates new products that are packaged and made ready for sale to retailers. Distributors store goods in the warehouse waiting for later delivery to the retailer. Processors and distributors are called wholesalers when they sell large quantities.

Retailers sell directly to the consumer, and are the last link to the consumer. Retailers may buy in large quantity and then divide into smaller quantities.





The Colorado Potato Administrative Committee  
Agriculture Education Program



## *Production Pallet — Links in the Food Chain*

*Continued.....*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Student teams design a flow chart that illustrates the food production sequence.
3. Students will learn the array of careers available in and along the path of food production.

Supermarkets and large retail food chains are the number one source of food retailers in the United States, accounting for about 92% of all food sales. Last but not least is the consumer. The consumer is you, your family, friends and anyone who purchases the final product.

This process represents how food is grown, harvested, processed, packaged and then delivered to retail stores.

Each step in this process requires numerous individuals involved in many careers. In fact, agriculture and its many related occupations provide jobs for 21 million people in the United States.

- 2.6 million are directly involved in farming.
- 4.7 million produce the machinery and equipment used in agriculture or in the production of the agriculture product.
- 15 million people are employed in wholesale and retail sales operations to the consumer.

Agriculture offers a variety of jobs from farm manager to crop consultant; plant and animal scientist to product development; warehouse managers, storage personnel, commodity brokers, truck drivers, photographers and many others.





The Colorado Potato Administrative Committee  
Agriculture Education Program



## *Production Pallet — Links in the Food Chain*

*Continued.....*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Students teams design a flow chart that illustrates the food production sequence.
3. Students will learn the array of careers available in along the path of food production.

1

### Do:

1. Holding up a 5-pound sack of potatoes, tell the students that this is an example of a consumer food product, something made by a small number of producers to be used by a large number of consumers.
2. Divide students into groups and explain the process from beginning to end. Give each group a set of 3x5 cards and label them Ag Producer, Processor, Distributor, Retailer, Consumer. Have them place them across the top of their butcher paper. Then ask them to discuss the steps that got the potatoes from the field, to the bag and into the home. Have each group write those steps under the label.
3. Once the groups agree on their specific steps have them share them. If there is disagreement, help them arbitrate a reasonable solution, until everyone agrees on the solution.
4. Display the final outcome of the entire class.



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## *Monocots and Dicots*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will work with monocot and dicot seeds and know the difference between the two.
2. Students will define monocot and dicot.
3. Students will label the parts of monocot and dicot seeds.

Materials:

1. Pictures or samples of monocot and dicot plants
2. Science journal

### Preparation:

This exercise will help students understand the difference between monocots and dicots.

### Do:

1. Observe the sprouts and look at the cotyledons. The "cot" in monocot and dicot is short for "cotyledon." The cotyledon is the "seed leaf" that the seed puts out when it sprouts. A monocot has a single seed leaf ("mono" means "one") and a dicot has two seed leaves ("di" means "two"). This observation can only be made when the seed is just sprouting.

2. Observe the roots. Monocots have short fibrous roots that stay close to the surface. Dicots have a long, central tap root that goes deep into the ground. Dicots may also have other roots, too, surrounding the tap root.

3. Observe the veins in the leaves. The veins in monocots run parallel to each other, as seen in grass leaves. Monocot leaves tend to be long and narrow. The veins in dicot leaves branch out like the veins in your hands.



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## *Monocots and Dicots*

*Continued.....*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will work with monocot and dicot seeds and know the difference between the two.
2. Students will define monocot and dicot.
3. Students will label the parts of monocot and dicot seeds.

4. Observe the petals of the flowers. Monocot petals come in multiples of three such as three, six or nine. Dicot petals and sepals come in multiples of four or five--four, eight and 12 or five, 10 and 15.

5. Observe a cross section of the stem under a microscope. Monocots have their vascular bundles scattered randomly throughout. Dicots have their vascular bundles arranged neatly in a circle, as if they were placed on imaginary spokes coming out of the center.

6. Monocots mainly belong to the grass family of plants. Examples of monocots are grass, wheat, oats, barley, corn, rice, bamboo, onion, asparagus, lilies, bananas and palm trees.

7. Dicots are mainly broad-leaf trees, ornamental flowers, fruits, and vegetables. Examples of dicots include maple and oak trees, fruit trees, grapes, strawberries, daisies, marigolds, roses and garden vegetables such as tomatoes, squash, beans, peas and potatoes.

8. Using plant samples or pictures have students identify the monocots and dicots.



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## Pollens Power

*Continued.....*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students understand the importance of pollen and pollinators.

Materials:

1. Pollen activity
2. Plant picture

### Preparation:

Discuss with students the structure of the plant's flower and its importance. Begin by making a list of all the parts that they know. Then show them a diagram and have them label it with the parts they knew and go over the ones they did not and fill them in. These parts should include pistil, stigma, ovary, ovule, stamen, anther, petal, and sepal.

### Do:

1. Once students are familiar with the flower's parts, break them into groups and have them look at the potato plant's flower. Have them look at the following information in their groups: How large is the flower? What is the shape of the flower? Does it have a specific color? What about an odor? What parts can you see without dissecting? Why is it important to the potato?
2. As a class go over the questions and come up with a correct group answer for each question. Once this is done, ask the groups to answer one final question — Why is pollination important?
3. Once you have come up with a collective answer to this question, have students dissect a potato plant flower in groups of two. Have them glue each part to a small poster board, and then label it.
4. To extend this project, repeat using other vegetable plants or flowers.



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# Pollen's Power

*Continued.....*

Time: 30 minutes

Location: Indoors

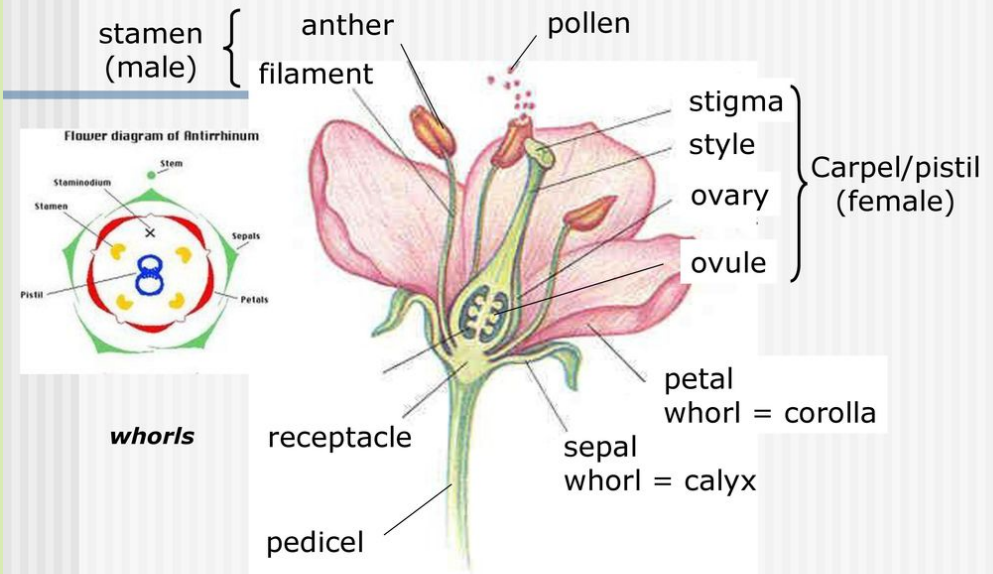
Learner Outcomes:

1. Students understand the importance of pollen and pollinators.

Materials

1. Pollen activity
2. Plant picture

## Anatomy of a flower





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# Pollens Power

Continued....

Time: 30 minutes

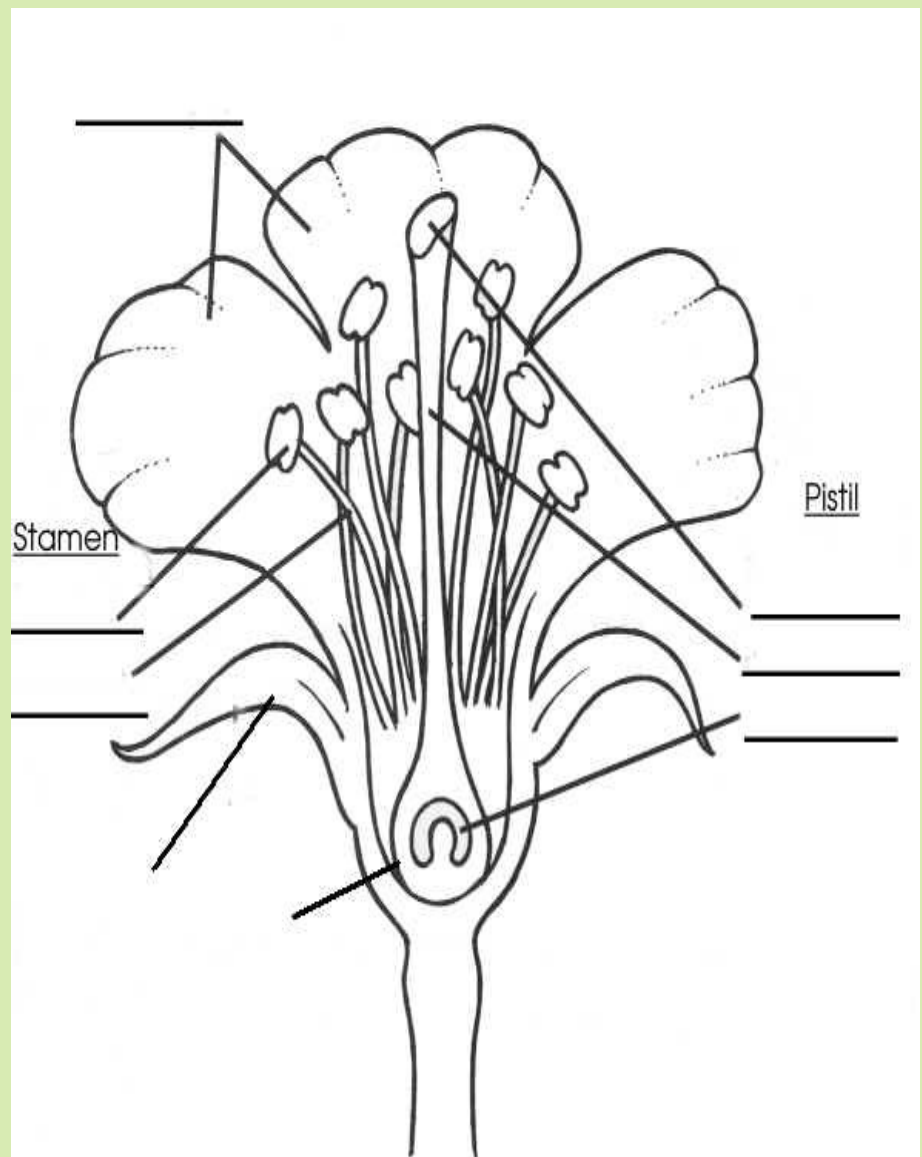
Location: Indoors

Learner Outcomes:

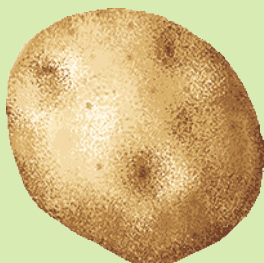
1. Students understand the importance of pollen and pollinators.

Materials

1. Pollen activity
2. Plant picture



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## *The Big Picture*

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will look at their opinion about natural resources and see how it compares to others.
2. Students will look at current views of natural resources.

Materials:

1. Copy of student survey for each student.

### Preparation:

Understanding how we feel about the world around us often means that we must not only understand how others feel, but how they came to feel that way. This is an exercise in listening and speaking about agriculture and natural resources.

### Do:

1. Give each student a copy of the student page and then rank how they feel about each statement.
2. Find an open space and have students stand in a line that represents a scale from 1 (strongly agree) to 10 (strongly disagree).
3. Read each statement out loud and have students reposition themselves dependent upon how they respond to a question.



The Colorado Potato Administrative Committee  
Agriculture Education Program



# The Big Picture

Continued....

Time: 20 minutes

Location: Indoors

Learner Outcomes:

1. Students will look at their opinion about natural resources and see how it compares to others.
2. Students will look at current views of natural resources.

**It is important to preserve wilderness areas.**

1 2 3 4 5 6 7 8 9 10

**The World's natural resources are here for people to use.**

1 2 3 4 5 6 7 8 9 10

**People will eventually develop new technologies to cope with environmental problems.**

1 2 3 4 5 6 7 8 9 10

**Agriculture gives us not only food, but serves as an important source of jobs.**

1 2 3 4 5 6 7 8 9 10

**There should be laws that restrict development of farm land because they are important.**

1 2 3 4 5 6 7 8 9 10

**New energy production should be limited to only renewable resources.**

1 2 3 4 5 6 7 8 9 10

**People should be able to use their own land for whatever they want (farming, housing, logging, wildlife).**

1 2 3 4 5 6 7 8 9 10





The Colorado Potato Administrative Committee  
Agriculture Education Program



# Agriculture In Action Grades 9-12





## The Colorado Potato Administrative Committee Agriculture Education Program



### Program Structure

#### **Discovery Centers**

The Colorado Potato Administrative Committee lessons offer six, 20-60 minute self-guided activities which introduce students to major themes of the program, as well as develop the skills (science process) needed for success.

#### **Tips for Developing Discovery Centers**

Simple, straightforward directions

Each center should take 20-60 minutes to complete (younger grades should have shorter activities).

The more physical the activity the better. Examples: puzzles, picture books, classify objects, partner games, mazes, etc.

#### **Field Trips—On the Farm Wonders**

The field trips run 3-5 hours and can be done at a site in the San Luis Valley or other farm community. The trip begins with an introduction to the day's concepts as a large group of 20-60 students. Students are then divided into three groups and rotate through three, 30-40 minute lessons pertaining to the objectives of the specific grades. The students then reconvene and do a short wrap-up activity.

#### **Tips for Developing & Implementing Field Trips**

Try to create activities that are outdoor-based, and try to avoid activities that can be done in the classroom. (For example: data collection, observation, field sketching, scavenger hunts.

The Introduction/Wrap-up should review material learned in pre-trip discovery centers and introduce students to the goals of the field day. Field Stations should be hands-on/minds-on and relate to the learner outcomes and program goals.

#### **Post-Field Trip Wetland Inquiry (back in classroom)**

One activity that can be teacher-led and allows students to synthesize and apply what they have learned in the program.

#### **Tips for Developing Post-field Trip Activities**

Interactive, group-work component, self-guided, or minimal direction from teachers, with some sort of problem-solving component or decision-making. Example: students decide what variety of potato they can plant, and develop a timeline to plant, maintain, and harvest a crop, or build a nutritional pyramid that incorporates potatoes.





The Colorado Potato Administrative Committee  
Potato Education Program

# Agriculture in Action

*Grades 9-12:*

## *Overview*

### **Learner Outcomes**

- Describe how a potato plant grows and know the importance it plays in the modern diet.
- Know the importance of a healthy diet.
- Understanding potato biology and pollination.
- Know the importance of farming and agriculture to American society.

### **Connections to Colorado State Standards**

Reading, Writing, Communications: 1, 2, 4

Science: 2, 3

History: 1,2, 3, 4,

### **The Program**

This program is divided into three parts that, together, make a complete integrated unit for your class.

*Discovery Centers*—As a pre-trip lesson, six student discovery centers are provided for your classroom to introduce students to the agriculture community and the concepts they will be learning.

*Field Study*—This is a 3-4 hour field trip to a farming community where students will explore agriculture production through the use of their five senses. (This field trip can be set up in the San Luis Valley or in an agricultural setting close to your school or town.)

*Post-Field Study Problem Solving*—Back in the classroom, through a simple teacher-led activity, students will explore both the in-classroom activities and field experiences.



## The Colorado Potato Administrative Committee Potato Education Program

### Teacher Instructions:

Set up each discovery center around your classroom (see set-up instructions for each center). Each center will take 20-60 minutes to complete. Students may work cooperatively or individually on each center. You may need to help each group read and interpret the instructions.

For lower-level readers, work through each station as a class. You can choose one center each day and work through it together.

1. "Where Do We Stack Up" — A look at the US compared to the world food markets.
2. "Food for Thought" — A look at good nutrition and diet.
3. "Field to Table" — Following food on its journey from the field to our table.
4. "The Economy of Food" — The economics food gets to the consumers table.
5. "Yummy Plant Parts" — Understanding that most of what is grown is actually part of a plant.
6. "Spread it Around" — A look at the world of viruses.

### Materials Check List :

- |  |  |                     |
|--|--|---------------------|
| 1. Copies of food graphs for each student. | 10. Colored pencils  | 18. Internet access |
| 2. Markers, colored pencils                | 11. Various fresh market potatoes, carrots, radishes, celery, spring onions, parsley |                     |
| 3. Various food labels                     | 12. Magnifying glass   |                     |
| 4. Food pyramid                            | 13. Paring knives  |                     |
| 5. Consumption pyramid                     | 14. Pre-made beef soup stock   |                     |
| 6. Poster board                            | 15. Food trays, bowls, and spoons  |                     |
| 7. 3x5 cards                               | 16. Hot plate  |                     |
| 8. Copy of table for each group.           | 17. Napkins  |                     |
| 9. Pie chart                               |  |                     |



The Colorado Potato Administrative Committee  
Potato Education Program



## “Where Do We Stack Up?”

Time: 40 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand what they are eating.
2. Students will understand what food sources other countries are eating.
3. Students will understand where the US ranks in food production.

Materials:

1. Copies of food graphs for each student.

### Preparation:

Discuss the following with students:

This page presents production of the 15 most important food and agricultural commodities (ranked by value) in 5 countries and in a world ranking.

This page presents the United States, United Kingdom, South Africa, India, Australia and Philippines and compares 15 different products and agricultural commodity for the year indicated (2012).

When applicable, international commodity prices are used to calculate the total value of each commodity produced by each country, and are subsequently used in the ranking of commodities and countries. They are applied in order to avoid the use of exchange rates for obtaining continental and world aggregates, and also to improve and facilitate international comparative analysis of productivity at the national level.

**Do:**

1. Have students look at this chart and find commonalities, differences, and the most important food crops in each country.



# The Colorado Potato Administrative Committee Potato Education Program



## “Where Do We Stack Up?” *Continued.....*

Time: 40 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand what they are eating.
2. Students will understand what food sources other countries are eating.
3. Students will understand where the US ranks in food production.

Materials:

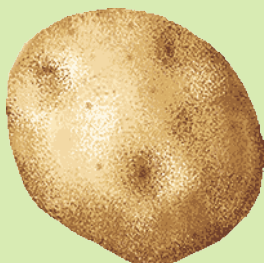
1. Copies of food graphs for each student.

### Top 15 Produce Commodities Comparison

	UNITED STATES	UNITED KINGDOM	SOUTH AFRICA	INDIA	AUSTRALIA	PHILIPPINES
1	sugar cane	wheat	sugar cane	sugar cane	wheat	sugar cane
2	soybeans	sugar beet	maize	rice, paddy	sugar cane	rice, paddy
3	wheat	barley	potatoes	wheat	barley	coconuts
4	sugar beet	potatoes	wheat	potatoes	rapeseed	bananas
5	sugar cane	rapeseed	grapes	bananas	sorghum	maize
6	potatoes	carrots and turnips	oranges	maize	cottonseed	pineapples
7	tomatoes	oats	apples	tomatoes	grapes	cassava
8	rice, paddy	onions, dry	soybeans	onions, dry	potatoes	mangoes, mangoes-teens, guavas
9	oranges	cabbages and other brassicas	onions, dry	mangoes, mangosteens, guavas	oats	sweet potatoes
10	grapes	apples	sunflower seed	soybeans	lupins	pumpkins, squash and gourds
11	sorghum	broad beans, horse beans, dry	tomatoes	eggplants (aubergines)	cotton lint	eggplants (aubergines)
12	cottonseed	cauliflowers and broccoli	maize, green	cottonseed	rice, paddy	tomatoes
13	barley	peas, green	bananas	millet	chick peas	papayas
14	apples	lettuce and chicory	pears	coconuts	lentils	rubber, natural
15	maize, green	strawberries	grapefruit (inc. pomelos)	cassava	maize	cashew nuts, with shell



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## *Food for Thought — What does diet really mean?*

### Preparation:

Today, we hear the word *diet* much more than we hear the word *nutrition*. There are so many diets on the market that it's easy to get lost in the fad and forget that good nutrition is really what's important! There are all kinds of diets and diet foods. Our society has become fixated on the 'diet', instead of on the quality of the nutrition in the diet. Unfortunately, this fixation isn't working. America is amongst the fattest nations in the world, with high rates of diabetes, heart disease and other life-threatening illnesses. While diets are becoming more popular, nutrition is suffering.

#### What is a Diet?

While many people think a diet is a set of rules you follow to try to lose weight, your diet is actually the food that you eat to supply your body with the nutrients it needs to function properly. While the average American diet consists of large quantities of processed sugar, white flour, meat, and convenience foods, a healthy diet is one that supplies the body with vitamins, minerals, fiber, antioxidants, and enzymes. These nutritional building blocks affect energy levels and quality of life, and have a direct effect on mood, memory, eyesight, body functions, and lifespan. Without a healthy diet that supplies the body with much needed nutrients, you are more susceptible to colds, infections, and illnesses. Good nutrition is what sustains your life.

#### Nutritional Labels

There is much confusion surrounding nutritional labels. Most people look strictly at the top of the label for calories, fat grams, and serving size information. The truth is that nutritional labels offer a look at the nutrients in one's food, such as vitamins A, C, D and E, as well as calcium, iron, magnesium, zinc, and folic acid. This information, although lower down on the nutritional label, is very important if you are seeking to supply your body with nutrients, as opposed to empty calories.

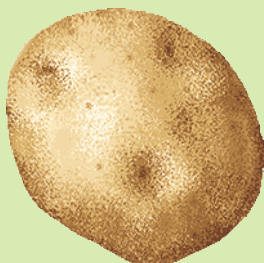
#### Materials:

1. Markers, colored pencils
2. Various food labels
3. My Plate
4. Consumption Information





The Colorado Potato Administrative Committee  
Potato Education Program



*Food for Thought —  
What does diet really mean?  
Continued.....*

Time: 40 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand what they are eating.
2. Students will understand the amount of food they should be eating.
3. Students will compare what they currently eat to the my plate.

Materials:

1. Markers, colored pencils
2. Various food labels
3. My Plate
4. Consumption Information

The U. S. Department of Agriculture, along with the U.S. Department of Health & Human Services, developed the food pyramid in 1992. Implemented in 2011 was a new "USDA Food Guide", The "my plate" campaign is the updated nutritional guide. The purpose of the my food plate template is to guide us in making nutritional decisions. The information in the guide is updated as new information is compiled.

The my plate guide is made up of five essential nutritional groups and the serving amounts from each grouping. It serves as a daily guideline to help Americans make sound nutritional choices. The number of calories that a person requires each day depends on age, gender, size, and activity level. For example, the higher level of activity that you maintain, the more calories you are likely to require. Fats, oils, and sweets are included in the pyramid but should be used sparingly and are not considered a food group.

Carbohydrate group

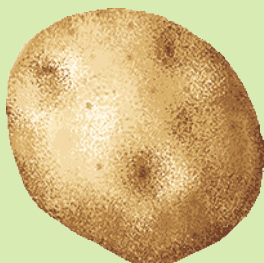
Carbohydrates are an ideal source of energy for the body. This is because they can be transformed more quickly into glucose (the form of sugar that's transported and used by the body) than can proteins or fats. Even so, a diet too high in carbohydrates can upset the delicate balance of a body's blood sugar level, resulting in fluctuations in energy and mood that can leave one feeling irritated and tired.

Vegetable group

A vegetable is a part of a plant consumed by humans that is generally savory (not sweet) and not considered a grain, fruit, nut, spice, or herb. For example, the stem, root, flower, etc., may be eaten as vegetables. Vegetables contain many vitamins and minerals; however, different vegetables contain different spreads, so it is important to eat a wide variety of types. For example, green vegetables typically contain vitamin A, dark orange and dark green vegetables contain vitamin C, and vegetables like broccoli and related plants contain iron and calcium. Vegetables are very low in fats and calories, but cooking can often add these.



The Colorado Potato Administrative Committee  
Potato Education Program



*“Food for Thought –  
What does diet really mean?  
Continued.....*

Time: 40 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand what they are eating.
2. Students will understand the amount of food they should be eating.
3. Students will compare what they currently eat to the my plate.

Protein group

Meat is the tissue - usually muscle - of an animal that is consumed by humans. Since most parts of many animals are edible, there is a vast variety of meats. Meat is a major source of protein, as well as iron, zinc, and vitamin B12. Meats, poultry, and fish include beef, chicken, pork, salmon, tuna, and shrimp. Eggs, spices, and herbs are also in this group. However, since many of the same nutrients found in meat can also be found in foods like eggs, dry beans, and nuts, such foods are typically placed in the same category as meats, as meat alternatives. These meat alternatives include tofu and other products that resemble meat or fish but are made with soy, eggs, and cheeses. The meat group is one of the major compacted food groups in the food guide pyramid. Although meats provide energy and nutrients, they are often high in fat and cholesterol, and can be high in sodium. Simply trimming off fatty tissue can go a long way toward reducing this negative effect. However, this tactic may prove to be ineffective, so large, daily portions of meats are not recommended; 2-3 ounces per day of meat or alternatives are recommended. This is 3-5 servings. For those who don't consume meat or animal products (*see Vegetarianism and Taboo food and drink*), meat analogs, tofu, beans, lentils, chick peas, nuts and high-protein vegetables make up this group.

Oil group

It is least needed in the body and it is not really needed to stay healthy. One must have these in small amounts and not much per day, if consumed.



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*Food for Thought —  
What does diet really mean?  
Continued.....*

Time: 40 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand what they are eating.
2. Students will understand the amount of food they should be eating.
3. Students will compare what they currently eat to the my plate.

Fruit group

In terms of food (rather than botany), fruits are the sweet-tasting seed-bearing parts of plants, or occasionally sweet parts of plants which do not bear seeds. These include apples, oranges, plums, bananas, etc. Fruits are low in calories and fat and are a source of natural sugars, fiber, and vitamins. Processing fruits when canning or making into juices unfortunately may add sugars and remove nutrients. The fruit food group is sometimes combined with the vegetable food group. Note that many foods considered fruits in botany, because they bear seeds, are **not** considered fruits in cuisine because they lack the characteristic sweet taste, e.g., tomatoes or avocados. It is best to consume 2 servings of fruit in a day. They may be fresh, frozen, canned, dried, pureed or juiced.

Dairy group

The dairy group is represented by a blue circle on the right side above the my plate. Dairy products are produced from the milk of mammals, most usually but not exclusively cattle. They include milk, yogurt, and cheese. Milk and its derivative products are a rich source of the mineral calcium, but also provide protein, phosphorus, vitamin A, and vitamin D. However, many dairy products are high in saturated fat and cholesterol compared to vegetables, fruits, and whole grains, which is why skim products are available as an alternative. For adults, three cups of dairy products are recommended per day.



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*Food for Thought —  
What does diet really mean?  
Continued.....*

Time: 40 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand what they are eating.
2. Students will understand the amount of food they should be eating.
3. Students will compare what they currently eat to the my plate.

Since no one food group can provide all the necessary nutrients, including the following steps is important:

1. Eat a variety of foods.
2. Balance what you eat with physical activity.
3. Choose a diet with plenty of grains, fruits and vegetables.
4. Eat a diet low in fat, saturated fats, and cholesterol.
5. Choose a diet moderate in sugar, salt and sodium.
6. Drink alcoholic beverages in moderation.



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*Food for Thought —  
What does diet really mean?  
Continued.....*

Time: 40 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand what they are eating.
2. Students will understand the amount of food they should be eating.
3. Students will compare what they currently eat to the my plate.

**Do:**

1. Since everybody knows that it is important to eat everyday, ask -
  - Do you think about what you eat before you eat it?
  - How do you decide what to eat—taste or health?Write a variety of answers on board.
2. Do you think about how much you eat? Where do we get the information about how much to eat? (answers include labels, nutritional magazines).
3. Divide the class into groups and have them list the foods that they have eaten over the past 24 hours, estimating the serving size. Next have them divide the list into the various food groups.
4. Have them swap their list with another group to make sure they have placed everything correctly.
5. Using the blank my plate, have them add up the number of servings in each group and sketch the food choices of the other group.
6. Hand back the charts and compare the two my plates. Discuss the differences that you see and how improvements could be made.
7. Survey the class on what is the most popular vegetable, fruit, protein, and dairy.





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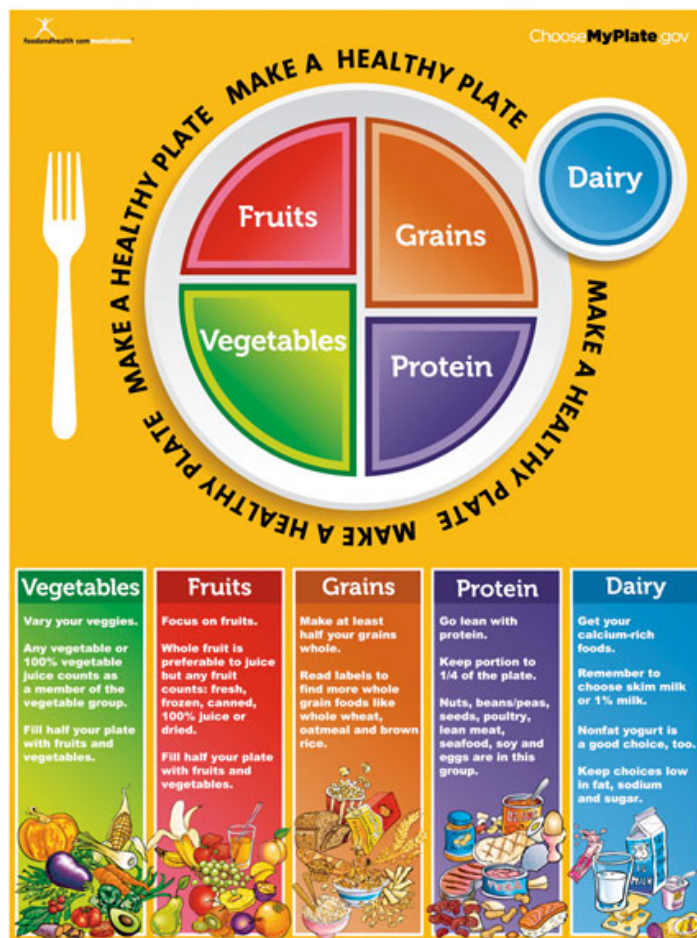
*Food for Thought —  
What does diet really mean?  
Continued.....*

Time: 40 minutes

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Learner Outcomes:

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The Colorado Potato Administrative Committee  
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*Food for Thought —  
What does diet really mean?  
Continued.....*

Time: 40 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand what they are eating.
2. Students will understand the amount of food they should be eating.
3. Students will compare what they currently eat to the my plate.



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## *Field to Table*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Student teams design a flow chart that illustrates the food production sequence.
3. Students will learn the array of careers available in and along the path of food production.

Materials:

1. Poster board
2. 3x5 cards
3. Copy of table for each group.

### Preparation:

Discuss the following with students:

In early America the farm represented a self-sufficient lifestyle. These early farmers raised their own livestock, made their own clothes, gathered their own wood to build and heat their homes, and grew their own food. Most of the food they grew was to feed the family or to trade for the essential supplies they needed.

It wasn't until the onset of the industrial revolution in the mid-1800's that the potential of the American was truly tapped. Even as early as 1850, the American farmer produced enough food to feed five people. By 1940 that number rose to 19 people. Today the American farmer is the most productive in the world, feeding 130 people.

The United States has six percent of the world's land area and its farmers produce 16 percent of the world's food supply. By the year 2000, a million acres of U.S. soil were committed to farming as cropland, livestock grazing, timbering, and fish farming. Of the approximately two million farms in the United States, 288,265 are women-owned, and the average farm size is 180 acres.

With all of this in mind, a farm is defined as any establishment that sells \$1,000.00 or more of agriculture products per year.



The Colorado Potato Administrative Committee  
Potato Education Program



## *Field to Table*

*Continued.....*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Student teams design a flow chart that illustrates the food production sequence.
3. Students will learn the array of careers available in and along the path of food production.

The approximate population of 3.25 million people is representative of less than 2 percent of the population. Today Americans do not know how to raise their own food; the modern lifestyle does not require the majority of us to know or understand where or how our food is produced. But all of us are links in the food chain.

The producer is the "farmer" or "rancher" who produces commodities such as livestock, crops, timber goods, mining products, and so on. These are the raw goods that drive the agricultural industry. These producers are involved in the everyday operations of their farms and ranches even though they employ others to help plant, harvest, pack the crop, and care for the livestock. Producers can sell their crops directly to the consumer but most often they sell to the warehouse.

The warehouse is also known as the middleman. The middleman consists of processors/packagers, distributors, and retailers. The processor/packager processes the raw goods and creates new products that are packaged and made ready for sale to retailers. Distributors store goods in the warehouse waiting for later delivery to the retailer. Processors and distributors are called wholesalers when they sell large quantities.

Retailers sell directly to the consumer and are the last link to the consumer. Retailers may buy in large quantities and then divide into smaller quantities for sale.





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## *Field to Table*

*Continued.....*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Student teams design a flow chart that illustrates the food production sequence.
3. Students will learn the array of careers available in and along the path of food production.

Supermarkets and large retail food chains are the number one source of food retailers in the United States, accounting for about 92% of all food sales. Last—but not least—is the consumer.

The consumer is you, your family, friends, and anyone who purchases the final product. This process represents how food is grown, harvested, processed, packaged, and then delivered to retail stores.

Each step in this process requires numerous individuals involved in many careers. In fact, agriculture and its many related occupations provide jobs for 21 million people in the United States.

- 2.6 million are directly involved in farming.
- 4.7 million produce the machinery and equipment used in agriculture or in the production of the agricultural product.
- 15 million people are employed in wholesale and retail sales operations to the consumer.

Agriculture offers a variety of jobs, from farm manager to crop consultants; plant and animal scientist to product development; and warehouse managers, storage personnel, commodity brokers, truck drivers, photographers, and many others.





The Colorado Potato Administrative Committee  
Potato Education Program



## *Field to Table*

*Continued.....*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Student teams design a flow chart that illustrates the food production sequence.
3. Students will learn the array of careers available in and along the path of food production.

### **Do:**

1. Hold up a five-pound sack of potatoes. Tell the students that this is an example of a consumer food product, something made by a small number of producers to be used by a large number of consumers.
2. Divide the students into groups and explain the process from beginning to end. Give each group a set of 3x5 cards; label them Ag Producer, Processor, Distributor, Retailer, Consumer. Have them place the cards across the top of their poster board. Then ask them to discuss the steps that got the potatoes from the field, to the bag, and into the home. Have each group write those steps under the label (card).
3. Once the groups agree on their specific steps have them share them. If there is disagreement, help them arbitrate a reasonable solution, until everyone agrees on the solution. Display the final outcome of the entire class.
4. Next, have each group decide what the most important part of the food production process is. Ask them, within their group, to explain why.
5. Finally, have students fill out the following table as it relates to the five-pound sack of potatoes.



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# Field to Table

*Continued.....*

Time: 30 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Student teams design a flow chart that illustrates the food production sequence.
3. Students will learn the array of careers available in and along the path of food production.

Jobs					
Resources					
Steps					
		1st	2nd	3rd	4th
					5th



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## *The Economy of Food*

Time: 45 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Students will compare the expense of retailing food.
3. Students will create graphs and charts.

### Preparation:

#### The Economy of Food

Since most of us are not directly involved in food production, it is difficult to understand the arduous process that food goes through just to arrive at our table. Even though the American consumer is very familiar with the cost of food, what goes on behind the scenes is often very foreign to most of us.

Even though we in the United States are feeling the budget squeeze, thanks to the American agriculture industry we are only spending 10.7% of our disposable income on food. Compare that to other countries, where, according to the United Nations Report on Food and Hunger, between 30 and 80% of their income goes to food purchases! With this in mind, only 20 percent of the American population is involved in the food and fiber production system. Pretty efficient!

Since it takes millions of workers to make the food production system move, we need to look at the spokes of the production wheel. There are planting, feeding, growing, harvesting, warehousing, baking, freezing, canning, processing, butchering, bottling, packaging, packing, advertising, and shipping, to name only a few. Each one of the people involved in each of these steps pays rent or mortgage, buys food, clothing, cars, cosmetics—many of the same items that you do. They share in the economy of us!



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Potato Education Program



## *The Economy of Food*

*Continued.....*

Time: 45 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Students will compare the expense of retailing food.
3. Students will create graphs and charts.

There are five things that drive the food economy:

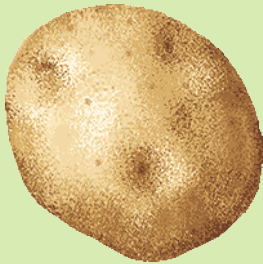
- How much to produce?
- What to produce?
- Who should produce what and who benefits from it?
- How should resources be used and conserved?
- Can we change as the technology and market demands change?

How much to produce is a decision faced by any business, but with food it's a bit trickier - too much and the supply can't be saved until next year, because it spoils; too little and everyone goes hungry. This decision is often made by watching market trends and planting based on resource needs, such as the economy strength, export capability and buyer demand.

How to produce goods and services is always based on cost, efficiency, and long term outcomes that bring about conservation and stewardship of the land and water resources. For any operation, it is the repeated use of the land that brings about profit. Practices that damage the land are not cost effective. People in agriculture have been land stewards for generations, caring for and living on the same piece of ground for many years. Remember—their livelihoods depend on it.



The Colorado Potato Administrative Committee  
Potato Education Program



## *The Economy of Food*

*Continued.....*

Time: 45 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Students will compare the expense of retailing food.
3. Create graphs and charts.

Since our economic system relies on different people doing different jobs, who decides who does what? Within our democracy, it is our free enterprise system that delegates who can do what—agricultural businesses form relationships based on specialization, quality of work, pricing, and experience. Our economy is competitive. Some countries truly have an advantage due to their resource base, climate, labor force, technology, and market access. Every business decides how to compete based on these parameters.

Each of these features determine wages that are earned in a given area, the product demand, whether or not there is a union to organize the labor, and how many benefits employee might receive. These things also determine employee tax rates, and they play greatly into what we now call our “global economy”.

How we conserve and use our resources are concepts that each of us is facing. As resources cost more and become limited, the wise use of them seems prudent. Agriculture has been in the forefront of resource management for decades. Most farmers and ranchers have firsthand knowledge of limited resources simply because they are only able to work so much ground—it is finite. The majority of farmers and ranchers work with private entities or government agencies in developing conservation usage plans for their operations, that are designed to protect their soil and water resources.





The Colorado Potato Administrative Committee  
Potato Education Program



## *The Economy of Food*

*Continued.....*

Time: 45 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Students will compare the expense of retailing food.
3. Create graphs and charts.

They continue to invest in technologies to help them do their jobs better. All of this is to help them as market demand shifts and technology changes. This is called establishing a competitive edge; though expensive, this is a trade-off for business owners weighing which changes need to be made at what time in order to remain ahead in their field.

Below are some additional factors that influence food production cost:

- Supply and Demand — When consumer demand for food is greater than the amount available, the cost increases; when consumer demand is less than the supply, cost decreases.
- Natural Disasters — When a natural disaster (flood, drought, freeze) strikes, it can affect the availability of that crop type, thereby changing its cost.
- Processing and Storage Costs — These processes increase the cost of foods.
- Shipping, Inspection, Labor, Packaging, Regulation, Taxes, Advertising, Insurance, Loan Interest, Depreciation, Shipping, and Energy — All of these affect the cost of your food.



The Colorado Potato Administrative Committee  
Potato Education Program



## *The Economy of Food*

*Continued.....*

Time: 45 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Students will compare the expense of retailing food.
3. Students will create graphs and charts.

Materials:

1. Pie chart
2. Colored pencils

### Do:

1. Begin by asking students "Where do you buy your food?" Write the store names on the board so that everyone can see the names.
2. Next, divide the class into groups and give each student a copy of "The Economy of Food". Have each group read and discuss the article.
3. Hand out the pie chart and explain that the chart represents one food dollar. Have them color the pie chart based on what they just learned. Remember—10% must go to the consumer! The other categories are Farm Costs, Labor, Packaging, Transportation, Advertising, Depreciation, Fuels/Electricity, Taxes, Rents, Interest, Repairs, Other costs.
4. Have each group decide how many pennies of every dollar might go to each category.
5. Here are the real numbers—share them with the class.

- .21 Farmers
- .38 Labor
- .09 Packaging
- .04 Transportation/shipping
- .04 Depreciation
- .04 Advertising
- .04 Fuels/Electricity
- .06 Taxes
- .04 Rent
- .015 Repairs
- .025 Regulation
- .02 Other

Materials



The Colorado Potato Administrative Committee  
Potato Education Program



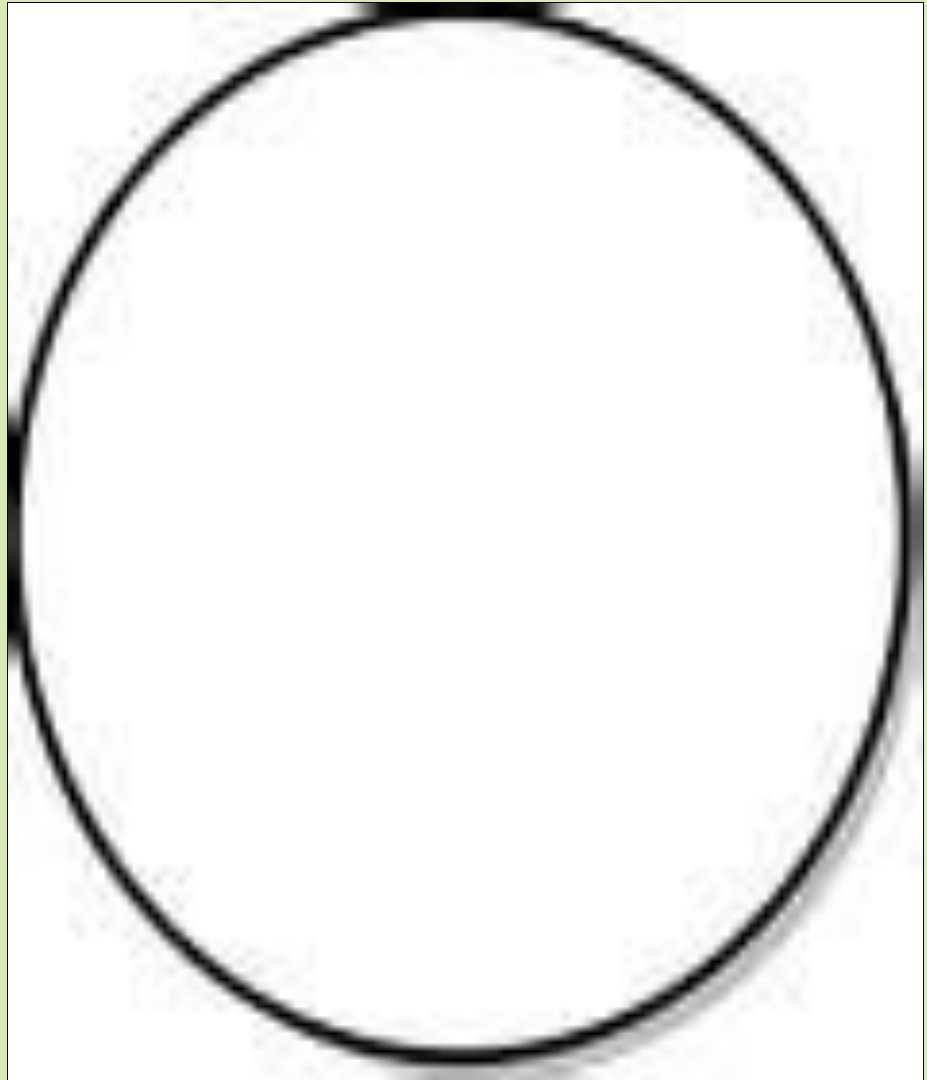
*The Economy of Food*  
*Continued.....*

Time: 45 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the sequence of food production.
2. Students will compare the expense of retailing food.
3. Students will create graphs and charts.



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## *Yummy Plant Parts*

Time: 45 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand the function and structure of roots, stems and leaves.
2. Students will identify the parts of a plant.
3. Understand the importance of plants as food crops.

Materials:

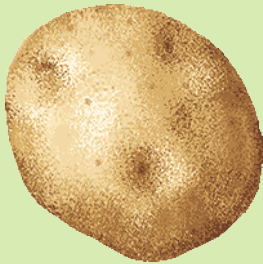
1. Various fresh market potatoes, carrots, radishes, celery, spring onions, parsley
2. Magnifying glass
3. Paring knives
4. Pre-made beef soup stock
5. Food trays, bowls, and spoons
6. Hot plate
7. Napkins

### Preparation:

1. Discuss with students the four organs that are found on the plant: roots, stems, leaves and flowers. Concentrating on roots, stems, and leaves — describe the structure and function of each organ. (Be sure to describe internal and external structure.)
2. Give each student group a set of plants and have them define a unique set of characteristics for each plant, including the root system and tendrils.
3. Have the groups dissect the organs, classify their structure, and compare them to each other. Note which plant part the vegetable represents.
4. Discuss with students which plant parts were easier to identify. Which vegetable contained more than one plant? What variation could be seen in the plant organs?
5. Finally, using a fresh set of vegetables, have the students wash and help cut up the appropriate vegetables to add to the pre-made soup stock. While that simmers, snack on the finger veggies.



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## *Spread it Around*

Time: 60 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand that a virus can infect plants as well as animals.
2. Students will understand that a virus contains genetic information wrapped in a protein coat.
3. Students will understand that viruses can be useful as well as harmful.

Materials:

1. Internet access.

### Preparation:

Review with your students what they know about viruses. Additional information can be found at the CDC website. Be sure they understand that viruses can infect plants as well as animals; that is the focus of today's lesson. Tell your students they are going to work on a project where they may suggest a purpose for a virus. First, though, they need to know how viruses work.

- A virus is an infectious organism that reproduces with cells of the infected host.
- A virus is not alive until it enters the cell of a living plant or animal.
- A virus contains genetic information wrapped in a protein coat.
- A virus mutates to ensure its own survival by making itself unrecognizable to immune systems and vaccines.

### Do:

1. Divide students into groups and tell them that they are scientists trying to stop a potato plant crop epidemic and must engineer a virus that will target the local pest problem. Discuss how developing such a virus is helpful, and discuss the potential challenges.





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## *Spread it Around*

*Continued.....*

Time: 60 minutes

Location: Indoors

Learner Outcomes:

1. Students will understand that a virus can infect plants as well as animals.
2. Students will understand that a virus contains genetic information wrapped in a protein coat.
3. Students will understand that viruses can be useful as well as harmful.

2. Give students time to go to the computer lab to research potato diseases and their effects on the crop. Have them identify the following:
  - Disease/virus names?
  - What do they look like?
  - Do they attack specific potato varieties?
  - Are they local specific or can they be transported?
  - How are they treated?
  - What is the cost to control?
3. Share findings with class.

