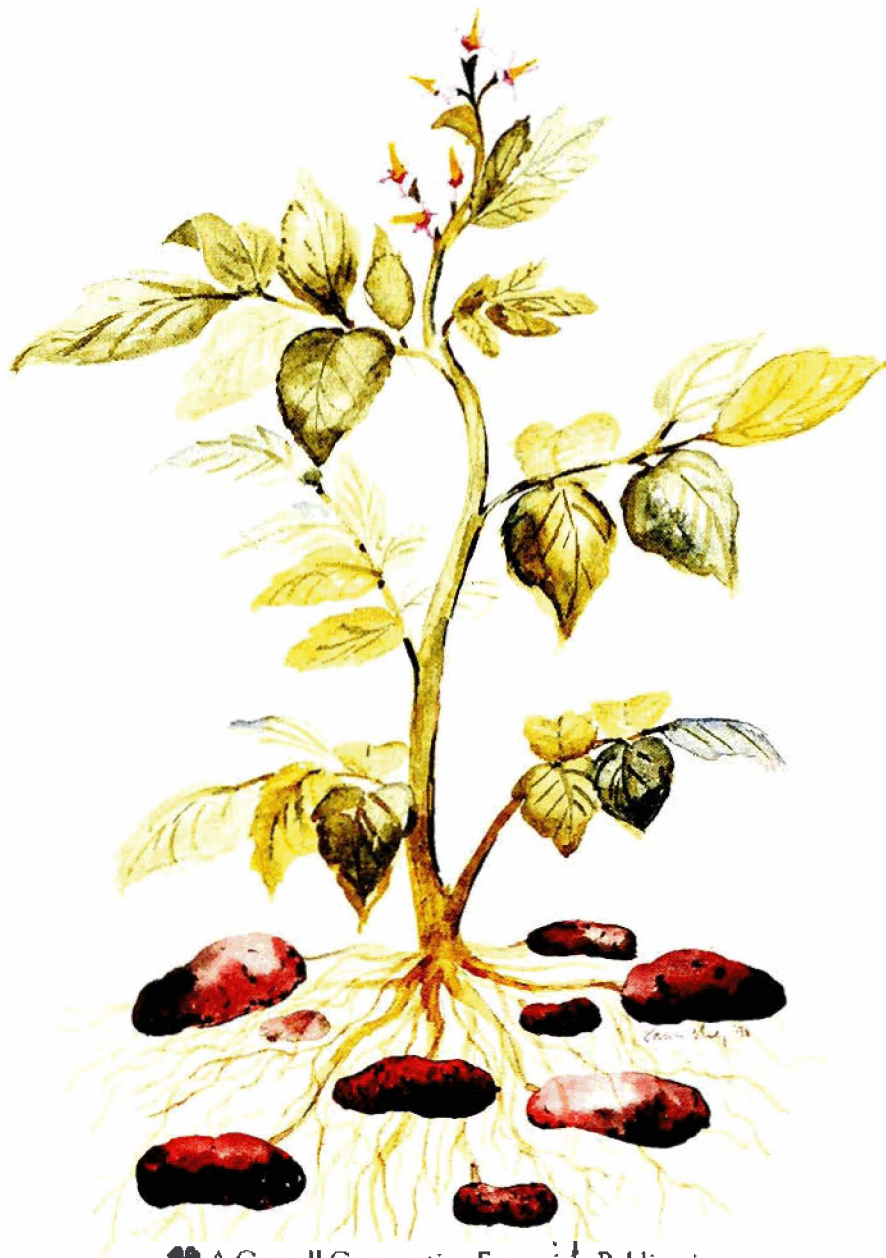


The Humble Potato

Underground Gold

Marcia Eames-Sheavly
and Tracy Farrell

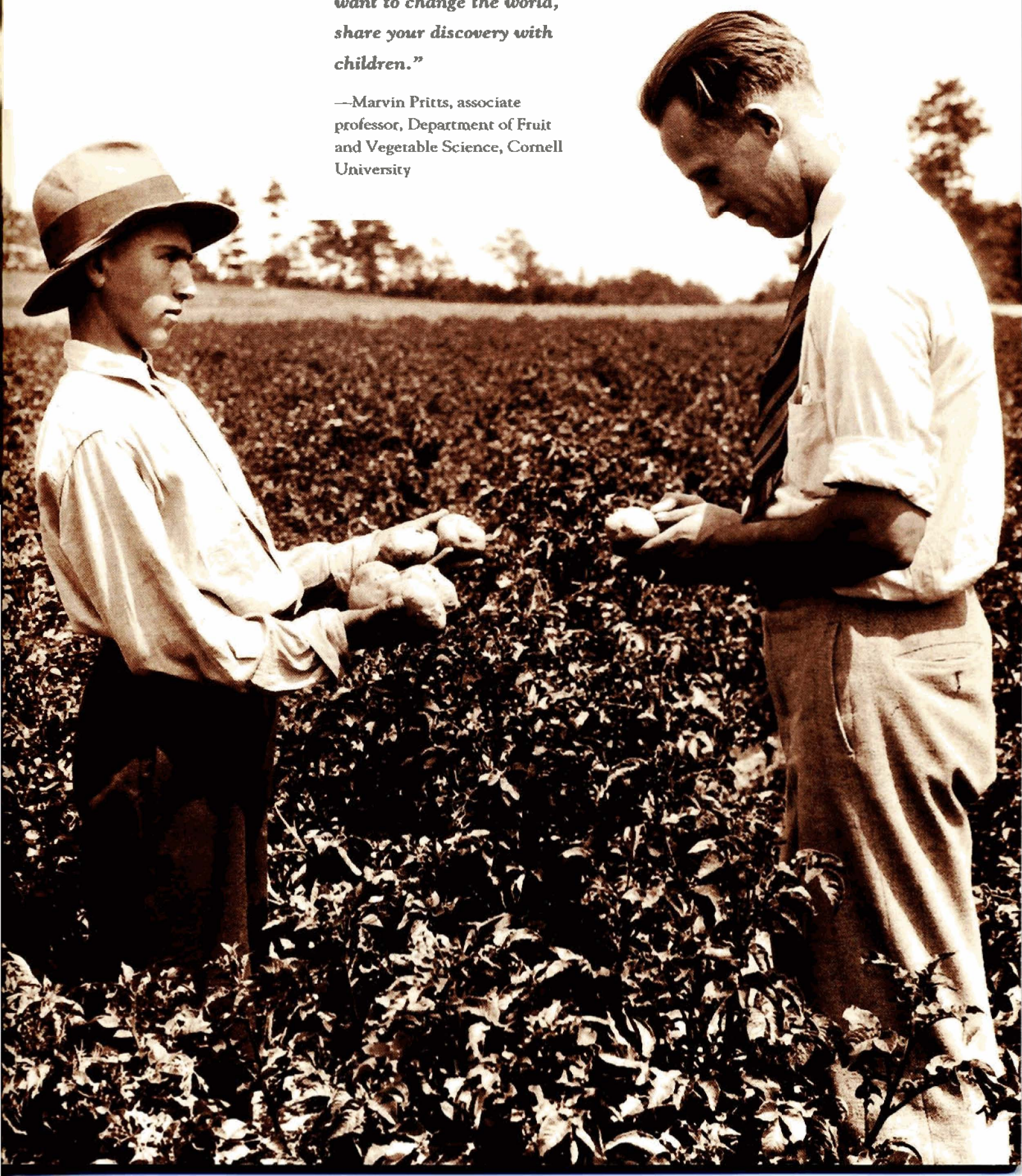


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“If you want to make a contribution to the world, discover something. If you want to change the world, share your discovery with children.”

—Marvin Pritts, associate professor, Department of Fruit and Vegetable Science, Cornell University



Introducing *The Humble Potato— Underground Gold*

The aim of *The Humble Potato—Underground Gold* is to help children explore a food crop from the perspectives of science and socioculture. Specific goals of the project are for children to

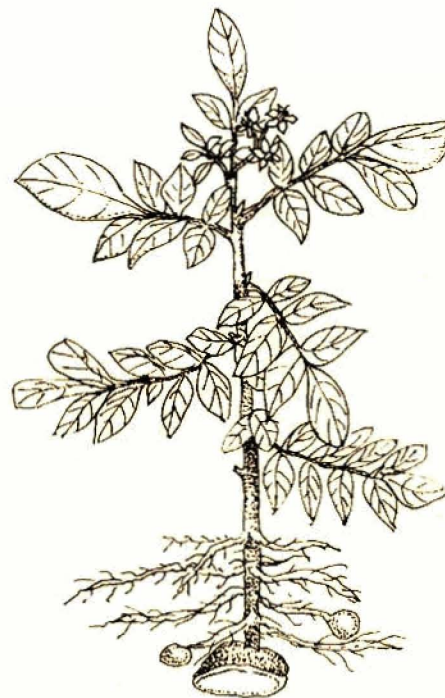
- develop an interest in and enthusiasm for horticultural and nutritional science
- appreciate the social influences of a food crop
- enjoy the project experiences

Potatoes! Throughout history they have been alternately rejected as poisonous and praised as a food fit for kings.

They're covered with soil and humble as can be, yet this often misunderstood vegetable has powered Incan civilizations, triggered mass population shifts, and is now one of the world's most important food crops. Potatoes grow in a wide range of conditions and climates and produce more food energy per acre than wheat, rice, or corn.

We can thank native Americans in the Andean highlands of South America for first cultivating the potato. As this plant has traveled around the world, people of many different cultures have adopted the potato to bake, mash, boil, stuff, fry, and broil, all with delicious results. Learning more about this humble tuber can lead to explorations in science, nutrition, world cultures, and history.

The Humble Potato—Underground Gold is a fun way for children ages



nine to twelve to learn about potatoes in informal groups such as 4-H clubs or in school classes. The project explores potatoes through the eyes of three imaginary children who lived in different places and at different times. By reading their stories and doing the suggested activities, children will learn about the history of potatoes, how to grow them, and how they stack up nutritionally. This project can be easily modified for older or younger children.

The Humble Potato—Underground Gold was reviewed by many individuals throughout New York State and field-tested in several different educational settings. Adults who piloted the materials were enthusiastic about the multidisciplinary nature of the activities. Children especially enjoyed reading about the fictional children, testing foods for nutrients, mapping the travels of the potato, and growing potato plants.

Review and Select Activities

The project includes ten suggested activities. Review them to decide which would be most appropriate for your group. Supplies needed for each activity are listed. Most supplies are inexpensive and readily available.

If you plan to grow potatoes, see Appendix A for information about how to obtain potato seed pieces. Consider whether you will be growing potatoes indoors or outside. It is possible to grow potato plants in bushel-size containers. If you grow potatoes indoors, potato plants need to be placed in a sunny window or under grow lights. It takes about six or seven weeks for potato plants to form small potato tubers.

You may want to arrange to visit a local farmer who grows potatoes, or invite a Cooperative Extension specialist to visit with your group.

Monitor Success

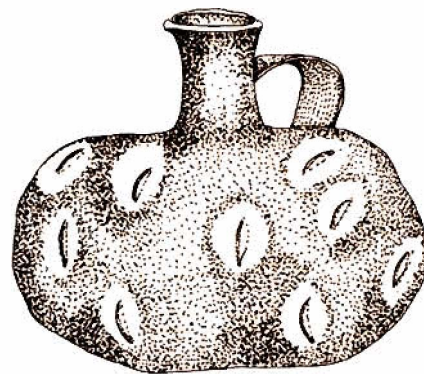
One way to evaluate children's learning during this project is to compile portfolios that illustrate children's work. The purpose of a portfolio is to collect examples of work that indicate progress, improvement, accomplishment, or special challenges. Portfolios may be compiled individually or as a group.

A project portfolio might contain completed activity data sheets; photographs of children working together or individually on activities; creative writing exercises; drawings showing children's observations; tape recordings or videos of a potato feast; recipes featuring potatoes; notes describing favorite activities; and **personal** observations on learning.

Part A: Inca Empire, Andean Highlands of South America, 1300

The story of cultivated potatoes began thousands of years ago with native Americans in the highlands of the Andes Mountains in South America. It is believed that these early people may have been forced by fierce tribes to flee from the jungles of the Amazon basin into the mountains. Looking for a peaceful existence, they instead found a harsh, barren climate—two miles high! Few edible plants grew there other than small wild, bitter potatoes.

Over thousands of years, the Andean people developed special growing methods to cultivate potatoes of many sizes, shapes, and colors. People dug canals for irrigation and built elaborate terraces to use even the smallest plots of land. The terraces, held in place by stone walls, could be as large as 240 acres! Some of those beautifully engineered terraces for growing potatoes are still used today.



South American pottery, at least 1,000 years old. From Salaman, R. *The History and Social Influence of the Potato*, rev. ed. (London: Cambridge University, 1985)

Besides developing special methods to grow potatoes, the Andean people also had to figure out special ways to store them. How could freshly dug potatoes be saved throughout cold Andean winters? One very interesting preservation method resulted in a food called chuño (CHOON-yo).



Harvesting potatoes in the Andes today
Adapted from a photograph in *Potatoes in the Developing World (A Collaborative Experience)*, International Potato Center (CIP), Lima, Peru, 1984.

To make chuño, luki potatoes, which are naturally small and bitter, were left outside overnight to freeze. During the day, they were allowed to warm in the sun; then they were walked upon to press out the moisture. Day after day this process was repeated—freezing, thawing, and treading.

After many days, the luki potatoes withered and dried. The shriveled potatoes, called chuño, did not rot during freezing winter weather. People used the dried chuño in foods such as stew. You can think of chuño as one of the first freeze-dried foods.

What do you think would happen if you tried to make chuño with potatoes that are available in our country? Try freezing a small potato in the freezer, thawing it, and pressing out the water. Repeat this several times. What does the potato look like? Does it dry out? Would you want to eat it?



Stomping chuño

Planting Day for Chikacha

Chikacha is an eight-year-old girl who lived 700 years ago. Although this is only a story, the events could have happened to a young girl at that time. Chikacha's people grew many vegetables and grains, including potatoes, peanuts, quinoa (KEEN-wah), and corn. They also raised crops with names like ullucu, tarwi, and oka. (Some Andean people still raise those same crops today.)

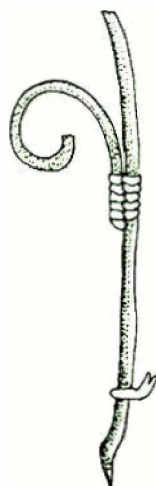
Chikacha faces an exciting day and an uncertain future. As you read her story, think how you would feel in her shoes.

Bear in mind that the word "Inca" has different meanings. We tend to use the word to refer to all the native American tribes who had been subjects of the Inca Empire. Many different native peoples—including the Nazca, Ica, Paracas, and Mochica cultures, for example—were under Inca rule, so we call them Incas. Strictly speaking though, the word "Inca" applied to the clan of the ruling dynasty and to the thirteen rulers of the Inca Empire. It was used more as a title than the way we use the term today.

Planting Day for Chikacha

Chikacha awoke with a start. It was the day she had been waiting for! Her stomach growled after three days of fasting. But the preparation for this day had been worth it. The time had come for planting day! Her people celebrated several festivals, and all were exciting, but the planting festival was her favorite. She especially loved the smell of freshly turned earth and the wonderful sense of community spirit.

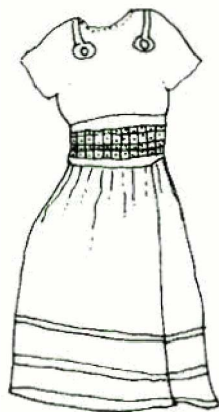
Chikacha thought about the day ahead. Planting the fields was a community event of great importance. Today the Holy Sapa Inca himself, the earthly representative of the Sun God, would make the first planting in Cuzco. He would dig into the soil with a great, golden stick. This act would then be repeated by all the noblemen and common people alike, although they would use common digging implements designed for hard work. The fields for the Sun God and for the Inca would be prepared first, then the fields for the poor and for the widows. The family plots would be last.



Pre-Columbian
Andes digging
stick

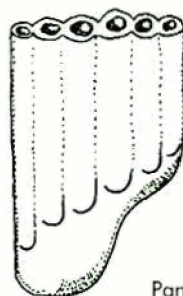
Singing and Dancing

Chikacha hummed as she remembered the music and colors of past planting days. She loved the singing! All the villagers would sing planting festival songs while they worked across the fields in great lines. And the colors! Men, women, and children all would wear their very best clothes. Flowers would spring from their hair, and the air would be filled with sweet smells!



Planting festival dress,
often worn with a shawl

Chikacha got up and stretched, brushing the sleep from her eyes. She had helped the women prepare chicha, a corn beer. People would drink lots of chicha as they drummed and danced through the night. Chikacha loved to dance. Everyone also would eat wild deer and llamas and guinea pigs until they were stuffed full. How



Panpipes

Chikacha enjoyed the food, especially the potatoes and corn. Of course, people would set aside portions of everything for the great Sun God and for the Inca.

A Maiden of the Sun

But perhaps this year she would be involved in the most thrilling event of the day. She was bursting with excitement. Rumors had been flying around the village, and Chikacha had heard whispers each time she had walked through the streets. It was said that she might be chosen as a Maiden of the Sun, and at the age of just eight years. A Maiden of the Sun! Most of the maidens were of noble birth, but once in a great while gentle commoners of exceptional beauty and grace were chosen. Her father, a commoner, was an engineer who built terraces.

If Chikacha were chosen, it would be a great honor for her family.

She would be dedicated to the service of the Sun God and, of course, the Inca. She would dress in white and live in seclusion for the rest of her life, spending time on activities such as creating beautiful fabrics. Mixed feelings suddenly swept over her. The maidens were not permitted to see anyone outside the convent where they lived. In fact, no one else, not even family members, could enter the convent. Once inside, the maidens were never permitted to step outside again. It was said that if a maiden were to break this order and visit a man, she would be buried alive.

As a Maiden of the Sun, there would be no more planting festivals for her! Chikacha shuddered and sighed but held her head high. If asked, she would proudly accept the position to honor her family, to honor the Sun God, and to revere the Inca. But for now, she would enjoy the festival.

Points to Ponder

- Chikacha's people enjoyed various grains, vegetables, and animal meats as well as a number of tuber and root crops. They also grew many different varieties of potato. Ask your friends and family if they have heard about quinoa. Can you find it in the grains section of your grocery store? What does it taste like? This grain is becoming more popular in this country.
- Some Andean people may have had up to 1,000 words for what we call "potato." Even today, people in the Andes grow different potatoes, including varieties that are round, long, knobby, finger-like, red, blue, black, and purple. (Later in *The Humble Potato—Underground Gold*, you will learn about a culture that depended almost entirely on just a few similar varieties of potato.)
- How does planting day in Chikacha's village differ from the way you approach this same activity? If you have a garden, how do you act on the first day of planting?
- The Inca empire was similar to the Roman empire in size and strength, and it had a sophisticated system of government. Try to find out more about the Inca empire. What was life like under Inca rule?
- Farmers in the Andes had to change the land in several interesting ways so they could grow crops there. These adaptations included terraced hillsides, canals, and irrigation systems. Why do you think native peoples built terraces on the mountainsides? You might make a model to show the value of terraces.

Activity 1: Examine Potatoes: Look and Taste

The part of the potato plant that we eat grows underground but is called a tuber, not a root. Tubers are enlarged parts of underground stems. Because they are stem parts, potatoes have dormant buds called "eyes" and undeveloped leaves that look like eyebrows lining the eyes. The eyes are located on the tuber in a spiral from one end to the other. This spiraling ensures that each leaf will receive as much sunlight as possible. New potato plants can grow from the eyes of the tubers.

In this activity you will examine and taste several different potato varieties.

Supplies Needed

- Several different varieties of fresh potatoes from a local store
- A ruler
- A knife
- To cook potatoes: a kettle, water, a stove burner, a baking sheet, and an oven or a microwave oven
- Copies of data sheets

Look at Potatoes

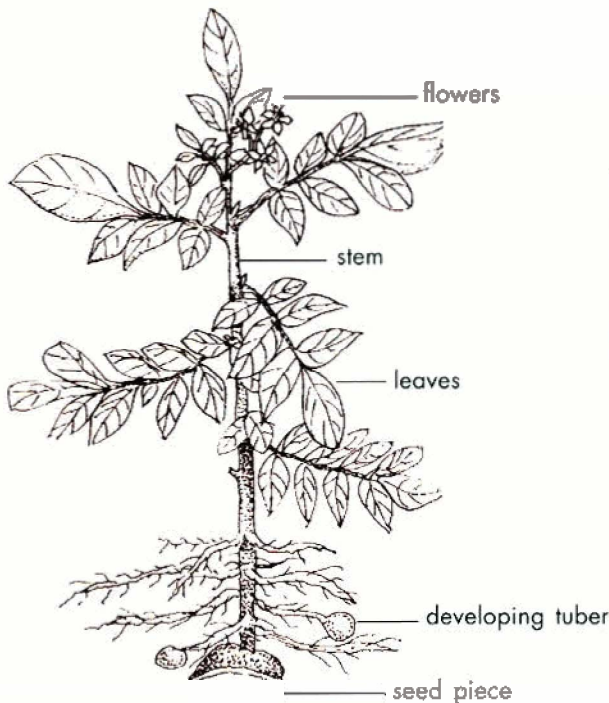
Visit a grocery store and buy several different varieties of potato to examine. Keep the varieties in separate bags and note how each variety is labeled in the store. Potatoes are often labeled by the state in which they were grown, or as "boiling" or "baking" potatoes.

Work with a partner to select at least two different potato varieties, one boiling and one baking. Examine each potato closely. Then complete the data sheet. Save your potatoes to cook.

Taste Potatoes

Potato varieties are often described according to whether people think they taste better boiled or baked. Try cooking at least two different varieties, and judge for yourself.

- Slice each potato in half. Leave the skin on to help identify the potatoes after cooking.
- Boil one half of each potato for 15 minutes. Bake the other halves in an oven at 400 degrees for 30 minutes. Or bake the halves in a microwave oven on "high" for about 6 minutes for each pound of potato. Remove the potatoes from the microwave oven, wrap them in a terry-cloth towel, and let them sit 5 to 10 minutes to finish cooking.
- Compare the textures and tastes of the different potatoes after boiling and baking.



Question: Where did the word "spud" come from? (See the answer below.)

Answer: A spud is a long, narrow spade used to dig potatoes.

Questions

1. What differences did you notice in taste and texture?
2. Which potatoes tasted best to you?
3. Based on your findings, what do you think is the best way to label potatoes?

Activity 1 Data Sheet: A Closer Look at Potato Varieties

Label in Store	Where Grown	Size	Skin Color	Number of Eyes	Pulp Color

Questions

1. Compare your chart with those of the others in your group. Where were most potatoes grown?
2. Are the same varieties of potato grown in different states?

Activity 2: All in the (Plant) Family

Potatoes belong to the plant family Solanaceae (sole-un-AY-say-ee). This important plant family also includes tomatoes, peppers, and eggplants as well as a weed called the deadly nightshade. Another common family of plants is Poaceae (poe-AY-say-ee). Members of this

family include corn, rice, wheat, oats, barley, and the grasses that make up lawns and meadows. In this activity, you will compare plants from both families.

Supplies Needed

- Two different plants from the Solanaceae plant family and two from the Poaceae family
- A knife
- A magnifying lens (optional)
- Copies of data sheets

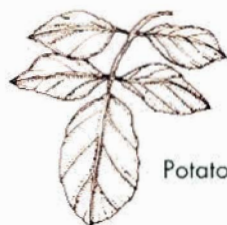
Examine Plants

Examine samples of at least two plants from the Solanaceae family and at least two plants from the Poaceae family. Examine the leaves, flowers, fruits, and roots. Compare the shapes of the flowers, the colors and number of flower petals, the shapes and arrangements of leaves, and the number and size of the seeds in the fruits. Record your observations on the data sheet. Draw what you observe whenever possible.

Solanaceae family



Potato flower



Potato leaf



Tomato flower

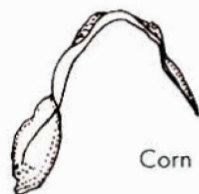


Tomato leaf

Poaceae family



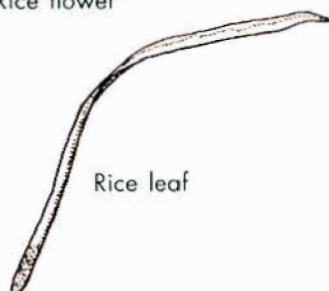
Corn flower



Corn leaf



Rice flower



Rice leaf

Questions

1. Based on your observations, what characteristics are most similar among members of the same plant family?
2. How do you think plant scientists classify plants into families?
3. How are family members alike, and how are they different?

Activity 2 Data Sheet: Plant Family Characteristics

Plant Name	Flower	Leaf	Fruit	Root
Solanaceae family				
1. _____				
2. _____				
Poaceae family				
1. _____				
2. _____				

Drawings of observations:

Activity 3: Digging through Seed Catalogs

People in this country grow many different varieties of one species of potato. Different varieties grow best in certain areas. In this activity you will look in several seed catalogs to collect information about at least four different potatoes.

Supplies Needed

- Several seed catalogs with sections on potatoes (You might be able to borrow catalogs from your Cooperative Extension agent or local garden center.)

Copies of data sheets

Compare Potatoes

Look in the seed catalogs and record on the data sheet information about at least four different potatoes.



Colorful Chips Ahead?

Will red and purple potato chips join blue corn chips as a snack food? Professor Robert Plaisted, a potato breeder at Cornell University, intends to find out. He is experimenting with naturally red and blue potatoes. If he succeeds, watch for colorful potato chips on your grocery shelf!

Questions

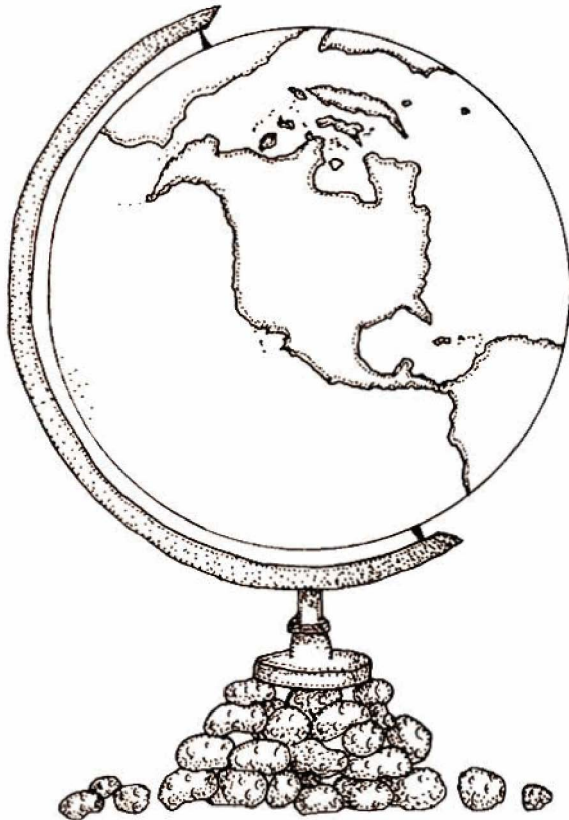
1. Compare your chart with those of the others in your group. What potato varieties are most common?
2. Are any potatoes especially recommended for growing in your area?
3. Can you find potatoes with red, blue, or purple flesh in the catalogs? Are fingerlings mentioned?
4. Why might potatoes with unusual shapes and colors be uncommon in this country?

Activity 4: Potatoes around the World

Although the story of the potato started in South America, it didn't stop there. Today, potatoes are grown in most areas of the world. So how did they get around? In this activity you will use maps to follow their journey.

Supplies Needed

- Black-and-white copies of maps of the world and of the United States with the names of countries and states
- Colored pencils or crayons



Locate Potatoes around the World

Read about the potato's journey from South America, and record it on your maps as instructed.

1. Peru. Spanish conquistadors found potatoes in Peru in 1524 and took them back to Spain. The Spaniards were the first to call this vegetable "potato" because it resembled the "batata" (our sweet potato), which was grown and named by native Americans. Latin Americans continue to use the native American word "papa" for potato even though they speak Spanish. **Color Peru yellow.**

2. Spain. Early on, most Spanish people were suspicious of this dirty, lumpy, brown tuber. Potato plants looked a lot like a weed called deadly nightshade. (Their suspicion was well founded. Both the leaves and the fruit of potatoes contain a chemical called solanine, the same poison contained in deadly nightshade. The fruits of potato plants, which look like little green tomatoes, are poisonous!) Anyone who grew potatoes usually fed them to farm animals. **Color Spain red.**

3. Ireland. Irish people most likely first planted potatoes that drifted ashore when Spanish ships were damaged off the coast of Ireland sometime during the late 1500s. Potatoes became popular because they were easy to grow in the cool climate and war-torn countryside. (Enemies couldn't harm potatoes because they formed and grew underground.) **Color Ireland brown.**

4. England. People in eighteenth century England avoided eating potatoes because they were believed to cause sexual urges. **Color England green.**

5. Scotland. In the early part of the eighteenth century, devout Scottish citizens believed that anything growing so far underground must be sinful. Scottish people also distrusted potatoes because they were not mentioned in the Bible. Worse, they were considered to make one "windy." **Color Scotland purple.**

6. France. Parmentier, a well-known French pharmacist in the late 1700s, threw a huge party and designed a menu of foods all made from potatoes. He invited many famous people to his party, and some guests even wore potato flowers in their

hair. Potatoes became very popular. Color France pink.

7. Prussia. In 1774 the leader Frederick the Great declared that potatoes were a good food. He ordered people to grow and eat potatoes or have their ears cut off. What parts of which countries now represent Prussia? Color them blue.

8. United States. In 1719 Scotch-Irish immigrants brought potatoes with them when they settled in Londonderry (now Derry), New Hampshire. Place an X on the map near Derry, New Hampshire.

9. United States. Sometime between 1801 and 1809, Thomas Jefferson, the third president of the United States, first served french fries to guests at the White House. Place a J on Washington, D.C.

10. United States. In 1853 George Crum, a chef in Saratoga Springs, New York, made the first potato chips. Place a circle on the map near Saratoga Springs, New York.

11. United States. In 1900 the two top potato-growing states in the United States were Maine and New York. Mark the states with a * (star).

12. Peru. The International Potato Institute was founded by Richard Sawyer in 1971. The institute stores genetic material from thousands of potato varieties and conducts research related to growing potatoes. Add the word "Institute" to Peru on the map.

13. United States. In 1990 the three top potato-growing states in the United States were Idaho, Washington, and North Dakota. Mark the states with a \$ (dollar sign).

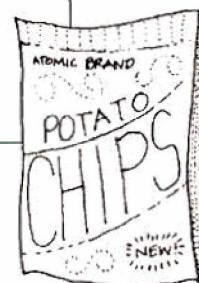
14. Soviet Union. In 1990 the country that produced the most pounds of potatoes was the Soviet Union. Mark the area represented by the former Soviet Union with a # (pound sign).

15. China. Today, this country harvests more than twice as many potatoes as all the countries from Panama north through Canada. Mark China with a small drawing of a spud.

16. Africa. As of 1990, one of the few places where potatoes were not grown was the lowlands of tropical Africa. Can you name other areas where it is too hot and wet to grow potatoes? Mark these areas with a 0 (zero).

If you had lived in the eighteenth century and were suspicious of the "lumpy, brown thing" yourself, would you rather have lived in Prussia or France?

The first potato chips were actually a mistake. Chef George Crum prided himself on his thick french fries. Insulted by a customer's request for thinner fried potatoes, Crum sliced the potatoes so thin they were transparent! To his surprise, his customer loved them—and so do we!



Part B: County Galway, Ireland, 1846

All plants can be injured by certain insects and diseases. Such pests cause potato plants their share of problems. Can you think of what problems might occur if people planted only closely related varieties of a crop such as the potato? One example in history, the Irish Potato Famine, clearly showed the danger of planting one basic crop. In 1846 a fungus disease of potato plants known as late blight brought tragedy to Ireland.

During the 1800s when Ireland was ruled by the British, many Irish people were desperately poor. Most of the country was divided into

huge estates that belonged to landlords. Families rented small huts and a little land from these landlords. On their small plots of land, families were able to grow enough potatoes for most of the year's food. For many families, potatoes were their main, and sometimes only, food. An average adult ate about 10 pounds of them every day! With potatoes, a little milk, and some oatmeal, people survived. Everything changed, however, during the Irish Potato Famine.

Living through a Nightmare

Patrick is a boy who lived through the famine. His tale is imaginary, but it could have happened.

Patrick, his younger brother, Daniel, and their parents joined the line boarding a ship for New York City. Everyone was crying. One woman clutched a handful of wild flowers. A man knelt down and kissed the ground. Like those around him, Patrick could hardly imagine leaving Ireland behind. He was frightened of the voyage ahead. But there was no other choice. If they stayed, they would starve.



As they moved toward the ship, Patrick thought back to that terrible day last August when their troubles began....

When It All Began

Patrick rolled over on his straw mat and opened his eyes. He lay quietly, listening to the even breathing of his parents and his brother Daniel still asleep on their mats. Patrick heard the pig snuffle in the next room. Patrick's stomach growled as he jumped up and headed outside to the clamp to gather a day's supply of potatoes. For breakfast, his mother would boil a kettle of potatoes over the fire and mix them with a little milk from their neighbor's cow. When there was no milk, they would eat plain potatoes, or a bowl of oatmeal when the potatoes ran out. His father sold most of the oats that they grew to pay the rent on their land and cottage. They only kept a small amount of oats to eat themselves. Patrick carefully lifted turf and straw from around the clamp and



A clamp was an outside storage area for potatoes, where fresh potatoes were piled up and covered with turf and straw.

reached toward the dwindling pile of potatoes. Those that were left were starting to shrivel and sprout. Luckily, they didn't have to last much longer. Next month he and his brother Daniel would help their father dig up the new crop, which would feed the family for another year. Patrick struggled to fill his sack with enough for the whole day, because he hated to make separate trips for each meal. He added some for the pig as well. When the family finished eating, they would dump the leftovers into a trough for the pig. Each year they raised a pig and sold it for money to buy next year's seeds. Finally, with his sack almost too heavy to lift, Patrick hoisted it and headed back toward the cottage.

It was cold and rainy, just as it had been all week. Patrick shivered as he walked by their garden. Suddenly, he shivered harder, and prickles ran down his spine. At the far end of the garden, the leaves of several potato plants looked black, and their stalks slumped toward the ground. Patrick dropped his sack and ran toward the blackened plants. As he got closer, he covered his nose to keep out the putrid odor. Terrified,

Patrick stumbled toward the cottage, calling for his father to come quickly.

Nothing Helped

Over the next weeks, Patrick and his family worked frantically to save their potatoes. They ripped up and burned the decayed leaves and stalks. They dug the new tubers early. They called on the priest to sprinkle the plants with holy water. Nothing helped. The plants died and the new tubers rotted. Everyone in the village watched in despair as potato plants for miles around turned black and tubers turned into a slimy mass. No one could eat them, not even the pig.

For many nights, Patrick fell asleep listening as his parents talked about their troubles. What would they do? Without potatoes, they wouldn't have food for themselves or their pig. Without a pig, they wouldn't have money for seeds to grow oats to pay their rent. Without rent, their family would be evicted from the farm where they had lived all their lives. The situation was desperate. Only a few old potatoes remained in the clamp, and a winter chill was in the air.

Planning to Leave

Their only hope was to leave Ireland and their farm to escape certain hunger and death. Patrick's father sold the pig, the tools, and their few pieces of furniture. Then the family waited anxiously for a ship to take them to America. When it finally came, they bundled together their few clothes and little remaining food and began to walk toward the harbor.

The sights along the road were frightening. A woman in ragged clothes with crying children poked in a field for anything they could eat. A scrawny man sobbed beside his tiny cabin. He told them that he had just buried two of his children, and his wife was sick with famine fever. Further along, fresh graves stood near deserted shacks. The stink of decay was everywhere. Patrick and his family were relieved finally to enter the harbor area and join the other travelers who were headed to America.

.... Standing in line, Patrick breathed in the fresh ocean air and took a long last look at his homeland. Then he sighed and followed his mother into the ship.

Points to Ponder

- Life in the United States was difficult for Irish people who fled the potato famine. Many of them lacked education and job skills. Widespread prejudice against the Irish was common. For example, some job advertisements ended with the statement "No Irish need apply." In what ways might the Irish immigrants have seemed "different" to the people who already lived here? What other groups of newcomers have been discriminated against in similar ways?

- There have been other famines in the world's history. Research one of them, and find out what caused a shortage of food.

- When Irish people arrived in this country and Canada, many of them were sick with typhus and malnutrition. A large number of people died aboard the ships because of illness, poor sanitation, and too little food and water. Write an ending to Patrick's story. Describe how he felt finally to get off the ship.

- The United States has been called a "nation of immigrants." Interview one of your family members or a friend to find out how he or she arrived in this country.

We challenge you to eat only boiled potatoes and milk for a day! Try it for a school fundraiser in memory of the Irish potato famine!

Questions

1. In Ireland people grew several similar potato varieties. All the varieties belonged to the same species, and none of the species was resistant to late blight. Do you think that the blight would have been as devastating to potatoes grown by Chikacha's family and neighbors? Explain your ideas.

2. Late blight is only one disease that can harm potatoes. What are some others?

Late Blight, Then and Now

The Irish potato famine showed the danger of depending on one food. When late blight struck, potato plants died, and one million people died from starvation or sickness. Another million people left Ireland for England, the United States, Canada, or Australia. Several years later, scientists learned that the fungus *Phytophthora infestans* caused the blight. Even today this disease continues to challenge growers and researchers around the world.

How does late blight kill potatoes?

The fungus is classified as a water mold. Its spores are spread by wind and water to the leaves of plants. There, the fungus grows in the plant's tissues, breaking down cells and using up nutrients. This process causes small yellow lesions to form on the plant. Spores from the fungus also can be washed into the soil to infect the tubers. This results in a purple-red corky rot that can spread in storage.

A new problem

Recently, late blight has become a bigger threat for American gardeners and growers. A fungus has arrived from Europe that makes it easier for the late blight fungus to survive cold weather. Also, farmers are becoming increasingly concerned that many home gardens are sources of late blight infection.

What can you do to prevent late blight?

- Always use certified potato seed pieces. Certification programs ensure that the seed pieces meet certain standards for disease levels. Certification, however, is not a guarantee that late blight will not be present.
- Purchase disease-resistant varieties. The potato variety Elba is quite resistant to the late blight fungus, and the varieties Rosa, Kennebec, Sebago, and Allegany are moderately resistant.

- Examine your seed pieces carefully before you plant them, and plant only those that are solid and blemish-free.

- Water the plants early in the day so that the foliage dries off quickly.

- If late blight strikes, pull up and discard the affected potato plants immediately. The disease can spread rapidly from your garden to that of your neighbor, or even to a commercial farm.

- Plant tomatoes and potatoes in different parts of the garden each year.

Activity 5: Potatoes in the Pyramid

Although Patrick and his family survived by eating mainly potatoes, they might have been healthier if they had been able to get other foods.

There is a tool called the "Food Guide Pyramid" that can help people check how well they are eating. It recommends that we eat a certain number of servings from five groups of foods each day. Different foods have varying amounts of nutrients that we need to be healthy. Eating different foods increases our

chances of getting all the nutrients we need. The Food Guide Pyramid also recommends limiting foods that are high in fat, salt, and sugar. Too much fat, salt, and sugar are not good for health.

Supplies Needed

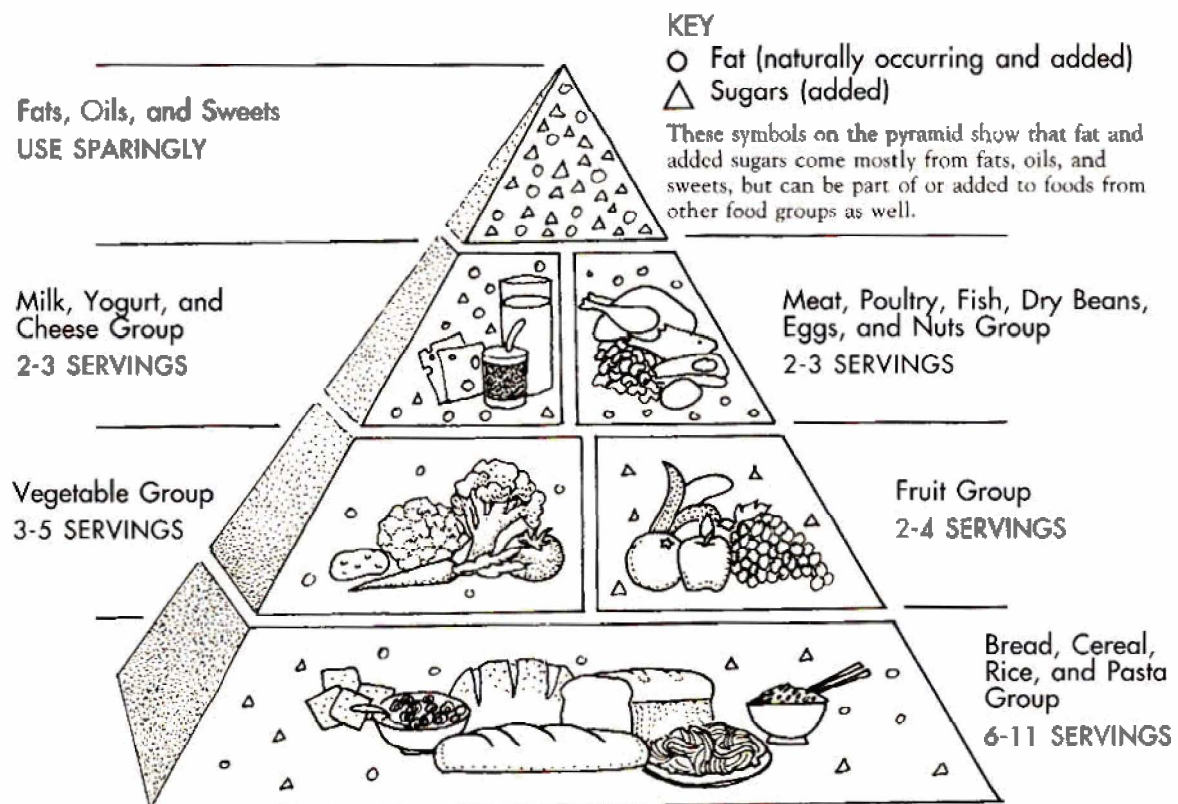
- Copies of this page

Check the Food Guide Pyramid

Look at the picture of the Food Guide Pyramid and try to answer the questions.

Questions

1. Where do potatoes fit in the pyramid?
2. After reading the stories about Chikacha and Patrick, which youth do you think was more likely to get enough of the nutrients needed for health? Explain your ideas.
3. Think about other foods Patrick might eat if he were living today. Look at the pyramid. Then make up a day's menu for Patrick that follows the pyramid's guidelines.



Activity 6: Testing for Nutrients

Patrick and his family ate mainly potatoes and very few other foods. What nutrients do people get from potatoes? How do the nutrients people get by eating potatoes compare with the nutrients they get from other foods?

In this activity you will run four simple tests to get a general idea about the nutrients in different foods. Scientists use more complicated tests to get more precise information. At each test site, or station, record your predictions and observations on data sheets.

Supplies Needed

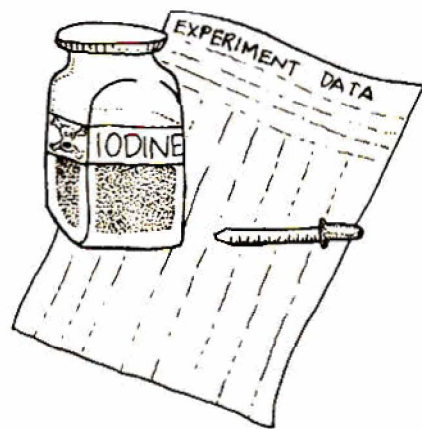
At Station 1: Starch

- Foods to test—for example, potato, apple, banana, bread, rice, cracker, hard-cooked egg white, and tofu (White-colored foods will work best in this test.)

- Copies of data sheets
- Newspaper, to protect surfaces
- An eyedropper

Iodine solution—1 teaspoon iodine mixed with 8 to 10 teaspoons water (Caution: Be careful when handling iodine. It stains skin and clothing and is poisonous if swallowed.)

- Small squares of scrap paper



At Station 2: Protein

- Foods to test—for example, potato, apple, banana, bread, rice, cracker, hard-cooked egg white, and tofu (White-colored foods will work best in this test.)
- Copies of data sheets
- Newspaper to protect surfaces
- White cheese
- A small cup for each food being tested

A knife and a fork

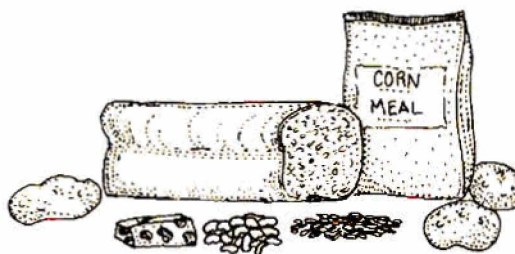
- A container of water
- 2 eyedroppers
- Copper sulfate solution—1 tablespoon of 3% copper sulfate (available from chemical supply stores) dissolved in 2 cups of water (Be careful when handling copper sulfate. It is poisonous.)
- Lime water—1 tablespoon of powdered lime (available from garden supply stores) dissolved in 1 cup of water.

At Station 3: Fat

- Foods to test—for example, potato, apple, banana, bread, rice, cracker, hard-cooked egg white, and tofu
- Copies of data sheets
- Newspaper to protect surfaces
- Small squares of brown paper towels or bags
- Butter or margarine
- Water

At Station 4: Water

- Foods to test—for example, potato, apple, banana, bread, rice, cracker, hard-cooked egg white, and tofu
- Copies of data sheets
- Newspaper to protect surfaces
- Sugar
- Small squares of scrap paper



Station 1: Starch

Starch reacts with iodine to produce a dark blue color. Iodine is an "indicator" for starch because a chemical reaction occurs that produces a color change.

Prediction

1. Predict (make a best guess) which foods contain starch.

Procedure

1. Place each food sample on a separate scrap of paper.
2. Use the eyedropper to place a few drops of iodine solution on each sample. (**Caution: Iodine is poisonous. Do not eat any foods that you test.**)

Observations

1. Which foods changed color with the indicator? Which did not change?
2. Were there any differences in the color changes?
3. Were any foods difficult to test? Explain.
4. Which foods do you think contain starch?
5. You might want to investigate why starch is an important nutrient.

Station 2: Protein

Protein in food reacts with a solution of copper sulfate and lime water to produce a dark violet color. A solution of copper sulfate and lime water is an "indicator" for protein because a chemical reaction occurs that produces a color change. Cheese is high in protein. You can compare the color change of cheese with the color changes in other foods.

Prediction

1. Predict (make a best guess) which foods contain protein.

Procedure

1. Put each food sample in a separate cup. Chop and mash each sample with a knife and a fork and mix in a small amount of water.
2. Using one of the eyedroppers, add a few drops of copper sulfate solution to each food sample. (**Caution: Copper sulfate is poisonous. Do not eat any foods that you test.**)
3. With the other eyedropper, add a few drops of lime solution to each sample.
4. Watch for a color change.

Observations

1. Which foods changed color with the indicator? Which did not change?
2. Were there any differences in the color changes?
3. Were any foods difficult to test? Explain.
4. Which foods do you think contain protein?
5. You might want to investigate why protein is an important nutrient.

Station 3: Fat

When foods with fat are rubbed on paper, the fat leaves a greasy spot on the paper that light can pass through. Butter and margarine are high in fat. You can compare paper rubbed with butter or margarine to paper rubbed with other foods.

Prediction

1. Predict (make a best guess) which foods contain fat.

Procedure

1. On each square of paper, write the name of the food sample you are testing.
2. Rub each food sample on the square of paper with its name.
3. Drip water on another square.
4. Rub butter or margarine on another square.
5. Allow all the squares to dry.
6. Shake off any excess food samples.
7. Hold the squares up to the light.

Observations

1. Can you see light through any of the spots?
2. Which foods made greasy spots?
3. What happened to the water spot?
4. Were any foods difficult to test? Explain.
5. Which foods do you think contain fat?
6. You might want to investigate why fat is an important nutrient.

Station 4: Water

Many foods contain water in their cells. When you put sugar on the surface of the food, water leaves the cells.

Prediction

1. Predict (make a best guess) which foods contain water.

Procedure

1. Put each food sample on a separate piece of paper.
2. Sprinkle each sample with a little sugar.
3. Watch for any changes.

Observations

1. Which foods released water when sugar was added?
2. Were there any differences in the amounts of water released?
3. Were any foods difficult to test? Explain.
4. Which foods do you think contain water?
5. You might want to investigate why water is an important nutrient.

Questions

1. Based on your observations, what can you conclude about nutrients in potatoes?
2. What other food(s) did you test that appear to have nutrients similar to those in potatoes?
3. What would you say if someone claimed that potatoes were "fattening" (high in fat)?
4. Why might someone think potatoes are fattening?

Activity 7: Storing Fresh Potatoes

Irish people in the 1800s stored fresh potatoes in a clamp, where a pile of potatoes was covered with turf and straw. This storage method was appropriate for their level of technology and for their climate. How would you store fresh potatoes if you wanted to keep them for several months? How does the storage of potatoes compare with the storage of other staple foods? Staple foods are inexpensive, traditional foods that many people eat every day. In this activity you will consider the best way to store fresh potatoes.

Supplies Needed

- Fresh potatoes
- Other staple foods, such as dry beans, rice, cornmeal
- Assorted containers for storage
- Storage areas with different temperatures and different amounts of light

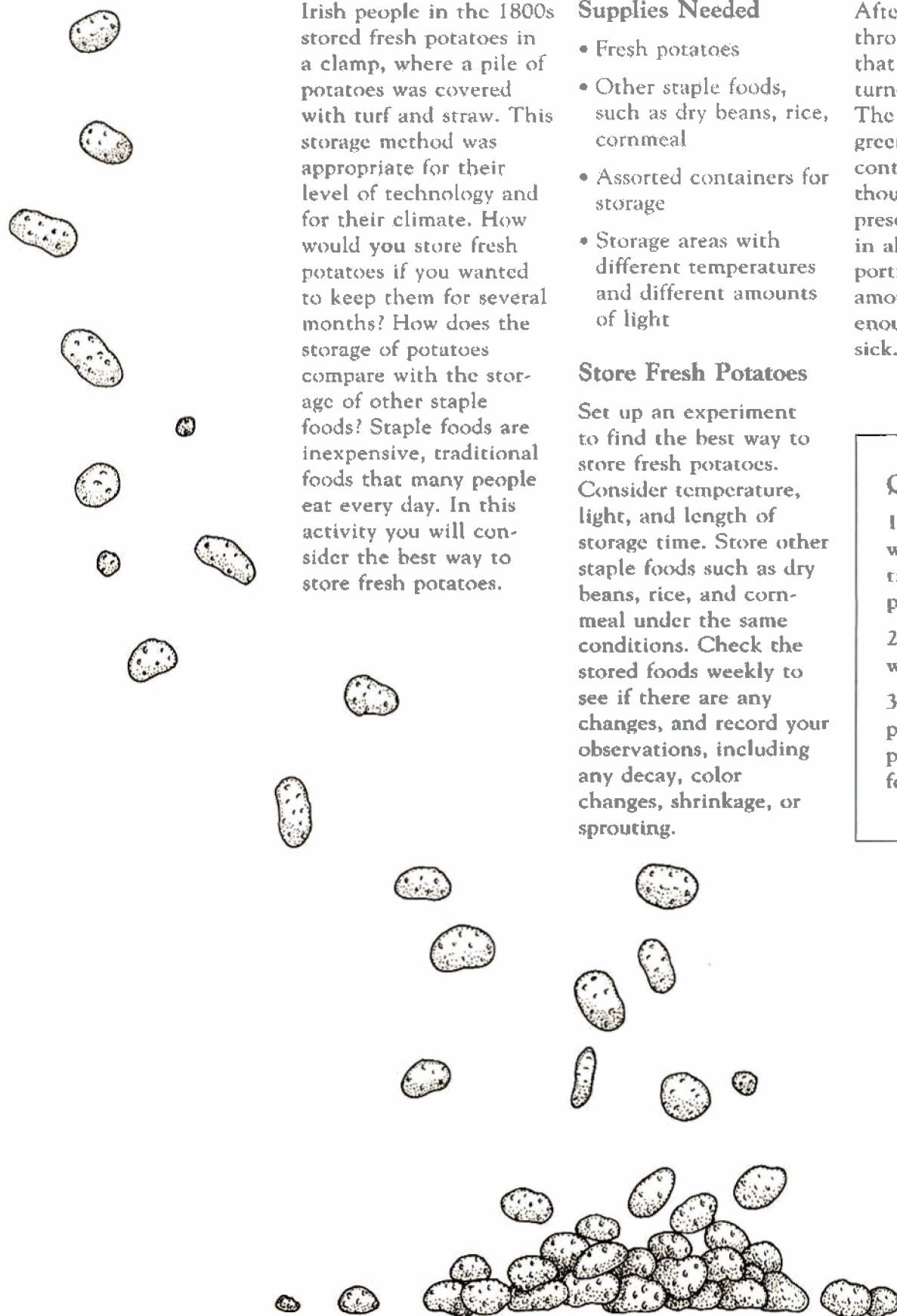
Store Fresh Potatoes

Set up an experiment to find the best way to store fresh potatoes. Consider temperature, light, and length of storage time. Store other staple foods such as dry beans, rice, and cornmeal under the same conditions. Check the stored foods weekly to see if there are any changes, and record your observations, including any decay, color changes, shrinkage, or sprouting.

After your experiment, throw out any potatoes that have sprouted or turned a green color. The sprouts and any green-colored areas contain solanine. Although this substance is present in low amounts in all potatoes, the green portions contain amounts that are large enough to make you sick.

Questions

1. After several weeks, which conditions were best for potatoes?
2. Which conditions were worst?
3. How well did the potatoes keep compared with the other foods?



Part C: Long Island, New York, 1996

Today potatoes are grown commercially in all 50 American states. The most important growing regions are in the states of Idaho, Washington, and Oregon in the Northwest; in the states of North Dakota, Minnesota, Wisconsin, and Michigan in the Midwest; and in the states of Maine and New York in the Northeast.

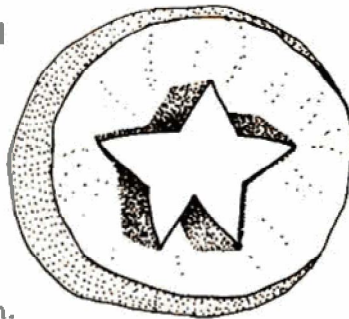
Down on the Farm

This is a story about Amy, an imaginary teenager who lives on a potato farm on Long Island in New York State.

Potato Prints

Potatoes can be cut in half and carved to use for printing your own stationery. You'll need a potato, a knife, paper towels, a pencil, poster paint or an ink pad, paper, and paper plates.

1. Cut a potato in half and wipe each half on a paper towel to blot up the moisture. Think of a simple design. Draw your idea on the cut side of a potato half using the pencil; press down hard so that you can see the design.



2. Cut away the potato around the design so that the design is raised. Always be careful when handling the knife!

3. Pour a small amount of paint onto a paper plate. Gently press the potato into the paint. Lift it and then press it onto a blank sheet of paper.

Experiment with varying amounts of paint and with different designs and colors. You can even print cloth, make gift tags, or personalize wrapping paper.

Amy was having a bad day. And when Amy had a bad day, everyone around her did too. She pouted, sulked, and complained to everyone within earshot. On this particular perfect 70-degree Long Island day, Amy's friends were where all normal teenagers would be: at the park. However, Amy's parents, Tom and Jeanne, owners of a large and successful potato farm, had different plans for her.

Tom and Jeanne were mostly okay, as parents went anyway, except during two seasons of the year: planting and harvest. This April was no exception. As usual, they expected Amy and her brother, Jacob, to help prepare the fields for planting. So, no park, no rock concert that night.

Plowing the Fields

The fields stretched ahead, as far as Amy could see. She picked the tractor without the cab; at least she could enjoy the sunshine. Up one side, down the other; up one side, down the other. Earth was plowed and weeds went under. Amy sighed. Her chewing gum was stale, and the batteries in her tape player had died. It was a bad day.

Yet as the morning wore on, Amy fell into the rhythm of the tractor's hum. She loved watching the gulls swoop down in her wake, gobbling up worms that surfaced in the new furrows. The fat yellow sun made shimmering patterns on Long Island Sound. As she breathed in smells of fresh earth and spring, Amy thought ahead to the coming fall, when she would be a freshman at Cornell University in Ithaca, New York. She planned to study horticulture and, get this, learn everything she could about potatoes.

Making a Difference

Amy glanced over at the next field where her father planned to grow another experimental potato developed by scientists at Cornell. He always enjoyed trying

new varieties, but this potato sounded really special. It was supposed to resist attacks by the dreaded Colorado potato beetle. Hard to believe, but genes in the new plant were from an old South American potato type whose hairy leaves served to trap insects. The genetic material for this naturally resistant potato had come from one of the thousands of different potato varieties stored in the International Potato Institute in Peru.

Amy's father had visited the institute two years ago and often talked about his trip. He had described to Amy the breathtaking views of the mountains, the incredible centuries-old terraced fields, and of course, the colorful, wonderful potatoes. He loved to talk about how the old, traditional plants held the key to solving modern-day problems. So far, he seemed to have a point, especially if this new potato did all it was supposed to do.

Daydreaming

As Amy worked, she daydreamed about all she had to do before the next weekend. Her French club, in the spirit of Parmentier, was organizing a potato feast to raise money for their trip to Quebec. All the foods on the menu, even dessert, were to be made from locally grown potatoes. Amy planned to decorate flyers for the dinner with homemade potato prints. And there would be a contest with a prize for the best-tasting, low-fat, low-salt recipe. For entertainment, her friend Lilly planned to dress up as a potato and lead everyone in potato games!

Questions

1. Who was Parmentier?
2. Find out if there are any commercial potato farms in your county. If so, what potato varieties are grown?
3. Besides as food for people, how are potatoes used in this country?
4. Can you invent your own potato game?

Activity 8: Potato Products Today

Patrick's family stored fresh potatoes in a clamp, and Chikacha's family froze and dried potatoes over the winter to save them as chuño. These are two ways to keep potatoes good for eating. Today in our country, people have other ways to keep potatoes edible. In this activity you will visit a supermarket to look for different foods made from potatoes.

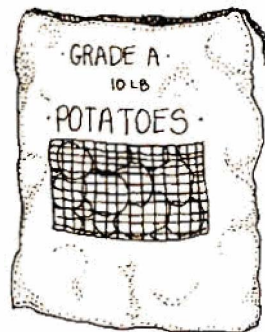
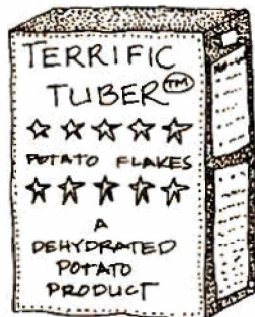
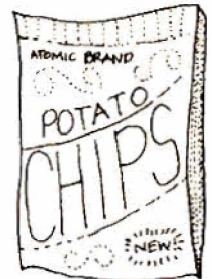
Supplies Needed

- A grocery store that carries a variety of potato products
- Copies of data sheets



Shop for Potato Products

Before you go to the grocery store, you might want to separate into groups. Each group can look through a different section of the store for potato products. Include sections that offer fresh fruits and vegetables, frozen foods, canned and dried foods, and snack foods. List what you find.



Questions

1. How many different potato products did you find?
2. In which section of the store did you find the greatest number of potato products?
3. Which products would you choose if you wanted to keep potatoes for a long time?

Activity 9: Growing Potatoes

Usually, people grow potatoes by planting a "seed piece" that contains at least one "eye." This way, each of the new potato plants will be a genetic clone of the original. Although potatoes can also be grown from seed, seed-grown potatoes can vary in size, shape, color, sensitivity to disease, and taste. Both farmers and cooks in this country like the uniformity of potatoes grown from seed pieces. In this activity you will plant potato seed pieces and watch them grow.

Supplies Needed

- Potato seed pieces (See ordering information in Appendix A.)
- A trowel
- Water
- For outdoors: a garden area or bushel-size containers with soil
- For inside: large bushel-size containers with soil and a sunny window or grow light

Plant Potatoes

Potatoes are easy to grow, especially with certain conditions. You might ask a farmer or Cooperative Extension specialist for tips on growing potatoes in your area. Here are some general guidelines for growing potatoes:

- Potatoes grow best in full sun and in well-drained, slightly acid soil. (A pH between 5 and 5.4 is best. Although potatoes will grow in less acid soils, they are more likely to get a disease that causes scabby lesions. Varieties of potatoes that are resistant to scab include Norchip, Norland, Chieftain, Sebago, and Superior.)

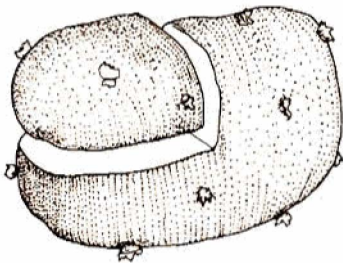


Planting seed pieces

MARVIN PRITTS

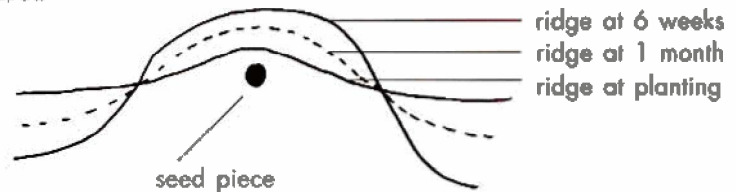
- The best time of year for planting potatoes outside is just before the last expected frost, when the soil temperature is at least 50 degrees.

Cut large potatoes into 1-inch block-shaped pieces. Each piece must have at least one eye. You might experiment to find out if smaller pieces with eyes will grow.



Removing a seed piece

- As the plants grow, cover the developing tubers to protect them from light. Either build up ridges of soil, 2 to 4 inches at a time, around the base of the plants, or cover the area with straw or hay.



The strategy is to plant somewhat deeply, and to cover shallowly through the season.

- Before planting, place the cut pieces in a paper bag. Close the bag, and store the pieces for at least a day to allow the cut surfaces to dry.

- In a garden, plant the pieces 2 to 3 inches deep, 9 to 12 inches apart, in rows about 3 feet apart. You might experiment with other spacing to find out whether the number and size of tubers varies.

Tips for Growing Potatoes in a Container

If you don't have a garden, you can still grow potatoes! Plant several seed pieces in a bushel basket. Keep an extra container of soil or some hay on hand to cover the tubers as they grow. Place the basket outside on a sunny patio or rooftop or indoors in a sunny window or under grow lights. Water the soil when it feels dry. If you provide enough light and water and keep the growing tubers covered, your potatoes are likely to thrive. In fact, they may do even better than potatoes grown in a garden. Colorado potato beetles may not find them indoors or on a city rooftop.

Activity 10: Plan a Potato Feast

Amy's French club organized a potato feast to raise money for their trip. Every food on their menu was made from potatoes. In this activity you will plan your own potato feast.

Supplies Needed

Ingredients and equipment to prepare various potato dishes

Plan the Feast

First, decide where and when to hold your feast and whom to invite. Then decide how to prepare the food. Your group could work together to cook several dishes. Or each person could bring in a dish from home to share. Dishes might be traditional family recipes or new recipes that you develop.

Here are some foods that Amy and her friends enjoyed. Recipes for them are included in Appendix B.

- Potato soup
- Potato salad
- Baked potato super
- Mashed potatoes
- Parmesan potato slices
- Chocolate potato cake



A potato convention

Appendix A: Ordering Potato Seed Pieces

Potato Seed Pieces

Potato seed pieces are available from many seed companies. The following companies also carry colorful heirloom varieties. Check the potato pages in the catalog of your favorite seed company to see what they carry as well.

Garden City Seeds

778 Highway 93 North
Hamilton, Montana 59840

Ronniger's Seed Potatoes

Star Route
Moyie Springs, Idaho 83845

Seeds Blum

Idaho City Stage
Boise, Idaho 83706

Shepherd's Garden Seeds

30 Irene Street
Torrington, Connecticut 06790

For more information about an active organization dedicated to preserving genetic diversity, send a self-addressed, stamped envelope to

Seed Saver's Exchange

3076 North Winn Road
Decorah, Iowa 52101

True Potato Seeds

True potato seed is difficult to find. You may see it advertised occasionally in a seed catalog, but the most convenient source is your own garden. To save seed, cut open any potato fruit you find and dry the seeds contained within. (But remember, the fruits are poisonous.) Store the seeds in a cool, dry place. You will need to keep the seeds for a full year before planting to fulfill the dormancy requirement. Seeds planted right away probably will not germinate.

In addition to the inconvenience of fulfilling a long dormancy requirement, occasionally you'll plant a variety that will not set fruit. Some varieties develop very few seeds, or seeds that do not germinate well.

Appendix B: Potato Recipes

Potato Soup

Potatoes make a hearty soup. Add other vegetables or cheese to vary the flavor and add nutrition.

- 1 small onion (1/3 cup chopped)
- 2 large potatoes (2 cups cubed)
- 1 teaspoon margarine
- 1 teaspoon salt
- 1 cup water
- 1 cup skim milk
- 1/4 teaspoon pepper

1. Chop the onion.
2. Peel the potatoes. Cut the potatoes into small cubes or chop them finely.
3. Heat the margarine in a large pan. Add the onion and sauté until soft.
4. Add the potatoes, salt, and water to the sautéed onions.
5. Bring to a boil. Reduce heat, cover, and simmer until the potatoes are tender—about 15 minutes.
6. Stir in the milk and pepper.
7. Simmer until hot but not boiling.

Yield: 4 cups

Preparation time: 40 minutes

Variation: Add 1/2 cup grated sharp cheddar cheese with the milk. Stir until the cheese is melted.



Note: For creamier soup, use a potato masher to mash some of the potatoes in the pan before adding milk. Or puree 1 cup of potatoes with liquid in a blender or a food processor; return the puree to the pan and add milk.

Healthful Hints

- Use skim or low-fat milk when a recipe calls for milk or cream. Or see if you like the somewhat creamy taste of canned evaporated skim milk, another low-fat substitute for milk and cream.
- Omit egg yolks from creamed soups and chowders.
- Reduce by half the fat used to make the roux (a mixture of fat and flour) for creamed soups. In this slimmed-down version of potato soup, we used only enough fat to saute the onion.
- Add vegetables like corn and carrots to increase fiber, vitamins, and minerals.

Potato Salad

Bits of carrots, broccoli, or other vegetables add crunch and nutrition to potato salad. Keep it healthful by using a low-fat dressing. For a spicier flavor, add onion and more mustard. Try making a patriotic salad using red, white, and blue potatoes!

- 4 medium-size boiling potatoes
- 1/2 carrot (1/4 cup chopped)
- 1 stalk celery (1/4 cup chopped)
- 1/4 cup creamy yogurt dressing

1. Fill a 2-quart saucepan half full with water and bring it to a boil.
2. Peel and cut each potato into 4 or 6 large chunks; add them to the boiling water and cook until tender (15 to 20 minutes).
3. Chop the carrot and celery.
4. When the potatoes are done, drain and cut them into bite-size chunks.
5. Stir together the potatoes, carrots, and celery.
6. Add the dressing. Cover and refrigerate

Yield: 4 cups

Preparation time: 30 minutes

Variation: Add 1/2 cup broccoli florets, chopped into small pieces.

Creamy Yogurt Dressing

- 1/2 cup nonfat yogurt
- 1 tablespoon mayonnaise
- 1 teaspoon prepared mustard
- 1 teaspoon lemon juice or vinegar
- 1/2 teaspoon sugar
- Dash of pepper

1. Combine all the ingredients in a small bowl and mix well.

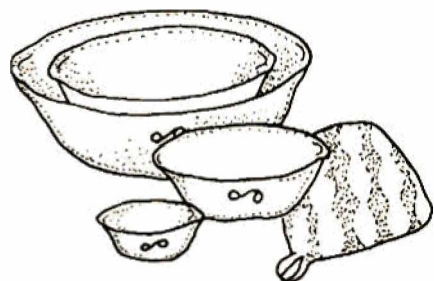
2. Cover and refrigerate.

Yield: 1/2 cup

Preparation time: 5 minutes

Healthful Hints

- Potato salad is often loaded with fat from the mayonnaise dressing. Switch to low-fat dressings without giving up the taste by substituting plain low-fat yogurt for part or all of the mayonnaise. And try using less dressing: one-third or one-half the directed amount may add plenty of moistness and flavor.
- Experiment with different vegetables in potato salad to add crunch, color, flavor, and nutrition.
- Skip the hard-boiled egg, or add half as much as directed. Or add more whites and fewer yolks. The yolks contain fat and cholesterol.



Baked Potato Super

Try any of the suggested toppings for baked potatoes. Or make up your own.

4 large baking potatoes

Ingredients for the topping of your choice

1. Preheat the oven to 400 degrees.
2. Wash and scrub the potatoes with warm water. Pierce each potato with a fork.
3. Bake the potatoes for about 1 hour.
(To bake in a microwave oven, cook 4 potatoes on high for about 13 minutes. Remove the potatoes from the microwave, wrap them in a clean terrycloth towel, and let them stand for 5 to 10 minutes.)
4. Allow the potatoes to cool for about 10 minutes.
5. Slice each potato in half lengthwise. Squeeze the potatoes to loosen up the insides. Use a fork to lightly mash the insides, and make a well in the center of each half.
6. Fill each well with 1/4 cup of any topping.

Toppings

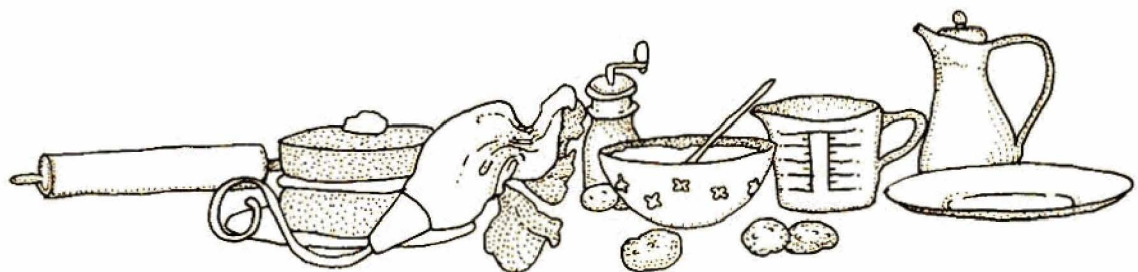
- Mixture of 1 cup thick tomato sauce and 1/4 cup shredded part-skim mozzarella cheese and a dash of oregano
- Mixture of 1 cup nonfat yogurt and 1 cup cooked, chopped broccoli
- Mixture of 1 cup baked beans and 1/4 cup shredded, part-skim mozzarella cheese
- Mixture of 1 cup low-fat cottage cheese and 1/4 teaspoon powdered garlic

Yield: 4 baked potatoes (8 halves)

Preparation time: 1 1/2 hours in a conventional oven; 50 minutes in a microwave oven

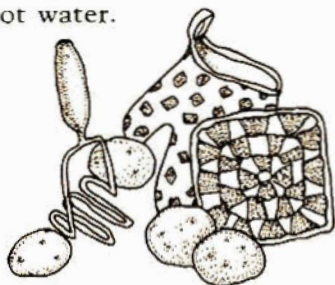
Healthful Hints

- Use low- or non-fat cheese when a recipe calls for cheese.
- Use low- or non-fat yogurt when a recipe calls for sour cream.



Mashed Potatoes

This traditional American favorite tastes best when served immediately. If necessary, you can hold mashed potatoes by placing the container in a larger pan of hot water.



6 medium-size potatoes (2 pounds)

4 cups water

2 tablespoons margarine or butter

1/3 cup milk

Salt and pepper

1. Add the water to a saucepan and bring it to a boil.
2. Peel the potatoes. Cut the potatoes into quarters.
3. Add the potatoes to the boiling water and cook until tender (15 to 20 minutes).
4. Drain the potatoes well.
5. Mash the potatoes with a fork or a potato masher.
6. Add the margarine and milk. Beat until creamy.
7. Add salt and pepper to taste.

Yield: 6 servings

Preparation time: 35 minutes

Variation: Sprinkle mashed potatoes with chopped parsley or chives.

Healthful Hint

- Use skim or low-fat milk when a recipe calls for milk or cream.

Parmesan Potato Slices

This tasty recipe bakes rather than fries potatoes to reduce the fat.

2 large baking potatoes

4 teaspoons cooking oil

2 tablespoons grated Parmesan cheese

Dash of salt

1. Preheat the oven to 425 degrees.
2. Cut the potatoes in half lengthwise. Place the potato halves flat side down, and cut each into 4 slices.
3. Place the slices on a baking sheet and sprinkle them with olive oil. Toss lightly with your hands to coat the slices.
4. Bake for 35 minutes, turning the slices once after 15 minutes with a spatula.
5. Sprinkle the slices with cheese and salt. Return them to the oven for 2 more minutes, or until they are light brown.

Yield: 4 servings

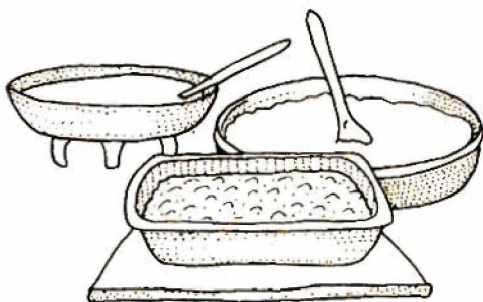
Preparation time: 45 minutes

Healthful Hint

- Baking instead of frying food helps reduce the amount of fat.

Chocolate Potato Cake

A fudgy, moist cake. No one will ever suspect its secret ingredient!



Vegetable cooking spray

1 cup plus 1 tablespoon sifted all-purpose flour, divided

1 medium-size baking potato, peeled and cut into 1-inch pieces

3/4 cup boiling water

1/2 cup firmly packed brown sugar

1/2 cup light corn syrup

1/4 cup margarine

1 egg

1/2 cup unsweetened cocoa

1 teaspoon baking powder

1/2 teaspoon baking soda

1 tablespoon powdered sugar

1. Preheat oven to 325 degrees.

2. Coat a 6-cup bundt pan with cooking spray, and dust it with 1 tablespoon of flour. Set aside.

3. Place the potato pieces in a small saucepan; cover with water and bring to a boil. Reduce heat and simmer uncovered until the potato pieces are very tender, about 10 to 15 minutes.

4. Drain the potato pieces and mash them. Measure 1/2 cup of mashed potato and place in a bowl.

5. Add boiling water to the mashed potato. Stir until smooth and set aside.

6. Combine the brown sugar, corn syrup, and margarine in a large bowl. Beat with an electric mixer at medium speed for about 5 minutes.

7. Add the egg to the brown sugar mixture, and beat well.

8. Sift together the remaining 1 cup flour, cocoa, baking powder, and baking soda.

9. With mixer at low speed, slowly add the sifted ingredients to the creamed mixture. While mixing, add the potato mixture as well. Continue mixing until thoroughly blended.

10. Pour the batter into the prepared pan. Bake at 325 degrees for 40 minutes, or until the cake springs back when touched lightly in the center.

11. Cool 10 minutes; remove the cake from the pan and let it cool completely on a wire rack.

12. Sprinkle with powdered sugar. Cut with a serrated knife.

Yield: 12 servings

Preparation time: 1 1/2 hours

Appendix C: References and Resources

References

* Indicates books written for children

*Bourgeois, P. *The Amazing Potato Book: Two Dozen Fun Projects for Home or School*. New York: Addison-Wesley, 1991.

A fun book sprinkled with activities, information, and many illustrations.

Burland, C. A. *Peru Under the Incas*. London: Evans Brothers Ltd. 1967.

A book covering Incan culture that includes a map of Inca territory, color plates, and centuries-old drawings.

*Branson, K. *The Potato Eaters*. New York: G. P. Putnam's Sons, 1979.

A powerful and sensitive novel that tells the story of the O'Connor family during the potato famine in Ireland. When forced by hunger and illness, the family makes an agonized decision to leave Ireland for America.

Foster, R. F. *Modern Ireland: 1600–1972*. New York: Penguin, 1989.

A description of the potato famine and its consequences is set within the sociopolitical and cultural conditions of Ireland.

Gheerbrant, A. *The Incas: The Royal Commentaries of the Inca, Garcilaso de la Vega, 1539–1616*. New York: Orion Press, 1961.

This thorough book on Inca culture covers each detail of life under the Incan regime.

*Hawke, S. D., and V. E. Davis. *Seeds of Change: The Story of Cultural Exchange after 1492*. New York: Addison-Wesley, 1992.

This wonderful book examines the "cultural encounters" between the Old and New Worlds after 1492. The authors look specifically at the exchanges of horses, potatoes, corn, sugar cane, and human diseases and their impacts on both worlds.

*Meltzer, M. *The Amazing Potato. A Story in Which the Incas, Conquistadors, Marie Antoinette, Thomas Jefferson, Wars, Famines, Immigrants, and French Fries All Play a Part*. New York: Harper Collins, 1992.

A concise and engaging history of the potato that traces its cultivation, its uses, and the paths taken by its supporters and detractors around the world and throughout history.

Miller, K. *Emigrants and Exiles, Ireland and the Irish Exodus to North America*. New York: Oxford University Press, 1985.

This book explores the patterns and causes of Irish emigration before, during, and after the potato famine.

National Gardening Association. *Growing Ideas: A Journal of Garden-Based Learning*. Volume 5, Number 3, January 1994.

This series of newsletters contains practical ideas for incorporating garden-based learning into diverse educational settings.

This particular issue focuses on potatoes. Call 800-538-7476 for a sample copy, or write NGA, 180 Flynn Avenue, Burlington, VT 05401.

Rhoades, R. "The incredible potato." *National Geographic* 161 (5): 668-694, May 1982.

An excellent, well-illustrated article that describes the history, culture, and nutritional contribution of "the amazing spud."

Rhoades, R. "The world's food supply at risk." *National Geographic* 179 (4): 74-105, April 1991.

This article explains the worldwide efforts of scientists to rescue wild species of plants, including potatoes, to maintain genetic diversity and how those efforts could help save our future food crops from large-scale failure.

Salaman, R. *The History and Social Influence of the Potato*, rev. ed. London: Cambridge University, 1985.

This comprehensive history of the potato and its significance throughout the world gives an especially good discussion of the complex social and economic consequences of the potato in Ireland.

Resources

Klass, C., and D. Karasevicz. *Pest Management around the Home, Part I Cultural Methods* (Miscellaneous Bulletin S74). Ithaca, N.Y.: Cornell Cooperative Extension, 1995.

This handbook is useful for people who grow their own vegetables or anyone who has ever wondered how to get rid of unwanted pests.

The National Potato Board, 1385 South Colorado Boulevard, Suite 512, Denver, CO 80222.

The National Potato Board has a wide range of materials related to potato nutrition, and educational packets for different age ranges.

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