TOPIC: Pre-Famine History
SUBJECT/GRADE LEVEL:
TITLE: Impact of the Potato on human history
AIM QUESTION: How did the potato change human history?

NEW YORK STATE SOCIAL STUDIES STANDARDS:
World History: Students will use a variety of intellectual skills to demonstrate their understanding of major ideas, eras, themes, developments and turning points in world history and examine the broad sweep of history from a variety of perspectives.
Geography: Students will use a variety of intellectual skills to demonstrate their understanding of the geography of the interdependent world in which we live -- local, national and global -- including the distribution of people, places and environments over the Earth's surface.
Economics: Students will use a variety of intellectual skills to demonstrate their understanding of how the United States and other societies develop economic systems and associated institutions to allocate scarce resources, how major decision-making units function in the U.S. and other national economies, and how an economy solves the scarcity problem through market and non-market mechanisms.

TEACHER BACKGROUND:

The potato comes from the Andes, where traditional farmers cultivate several thousand distinct varieties. A single field may be planted with as many as forty of them. The potato was introduced to Europe in about 1565, and there are reports that Sir Walter Raleigh planted them on his properties in County Waterford in southeastern Ireland as early as the 1580s. At first, the Irish used the potato more as a backup for grains, but toward the end of the seventeenth century, it become an important winter food. By the mid-eighteenth century it was a general field crop and provided the staple diet of small farmers during most of the year.

The potato was better adapted than other staple crops to the cool, wet conditions in Ireland, making it more productive and more reliable. Grains suffered too often from lodging (lying flat, which hinders growth), failure to ripen, low yields, preharvest sprouting, and high moisture content, which can lead to molding in storage. The grain crop especially suffered in quantity and quality in wet seasons. In contrast, potato plants yielded abundantly in wet years. One acre of poor ground could yield six tons of potatoes. The "lazy bed" mode of cultivation, in which rows of seed potatoes

were placed on the ground and covered with manure, seaweed, and soil dug from trenches along the rows, protected the tubers from excess moisture.

Europeans were no strangers to diseases of the potato. The "curl" reduced potato yields in the 1760s, and the far more destructive "taint," or "dry rot," caused hardship in Ireland and Scotland from 1832 to 1836 and on the Continent until 1841. At that time, hardly anyone understood what caused diseases in plants or animals. Today we know that curl was caused by a virus and taint by a fungus.

The potato blight almost certainly came from the central highlands of Mexico, where the fungus afflicts a number of related Mexican plants. The Mexican fungus and the Andean tuber that was so totally unprepared to resist it came together for the first time in the northeastern United States. It was first observed in potato crops near Philadelphia about 1843. By 1845, late blight spread to almost all of northeastern North America, and that summer it made its appearance in western Europe.

AIM: How did the potato change human history?
ASSESSMENT:
- Students will demonstrate an understanding of the impact of global interaction on world history through individual and group writing assignments and during group and class discussions.
- Students will demonstrate the importance of examining and respecting multiple perspectives on explaining historical events.

DO NOW ACTIVITY: Read ACTIVITY SHEET A- Potato Facts and Legends 1-3.
MOTIVATIONAL ACTIVITY: In a famous poem, Christopher Marlowe asked about Helen of Troy, “Was this the face that launch’d a thousand ships, And burnt the topless towers of Ilium?” Hold up a potato. I can understand how the fabled beauty of Helen brought about such world shaking events, but how could something that is so small and weird (wrinkly, battered, ugly, strange) looking change the course of world history?
TRANSITIONAL ACTIVITY: According to Activity Sheet A- Potato Facts and Legends, where does the potato originate? How did the Inca use the potato? In your opinion, why did the Inca have a special prayer about potatoes? Can you think of similar prayers in other cultures? Explain.

ACTIVITY: Examine Activity Sheet A- Potato Facts and Legends, passages 4-10.
Key Questions about Potato Facts and Legends:

1- How did the potato arrive in Europe?
2- How did the potato arrive in Ireland?
3- Why was there sharp debate over the food value of potatoes in Europe?
4- In your opinion, why did European peasants develop legends about the potato?
5- How did the potato arrive in the United States?
6- Why were potato diseases a major concern?
7- In your opinion, which was the more important event in world history, the discovery of gold in the Americas or the spread of the potato? Why?

Examine Activity Sheet B- Potatoes and World History. Key Questions about Potato and World History:

1- Which of these crops do you believe was the most important new world contribution to agriculture?
2- Based this list of agricultural products and what you know about history, how would you compare the level of civilization in the new world with the old world?

3- How did the potato get its name?

SUMMARY QUESTION: In your opinion, how did the potato change human history?
HOMEWORK: Make a list of the foods you generally eat during the course of a week. How many of these foods originated in the Americas.
APPLICATION: See Activity Sheet B. Potato Riddle Solution: Each person ate one potato per day for 100 days, totally 400 potatoes. They planted the remaining 100 potatoes. Each potato produced 4 potato plants and each plant produced five potatoes. The 100 potatoes yielded a crop of approximately 2,000 potatoes.
PROJECT:
- Pretend you discovered an unknown plant that produces an edible tuber. Research shows that it is a very healthy food source. Develop an advertising campaign to convince people to try this new food.
- Read Activity Sheet C- The Potato, the Potato Blight, and "An Gorta Mór (The Great Famine)", adapted from "The Leaf That Launched a Thousand Ships," by Douglas C. Daly, Natural History, January, 1998. Based on this article, write a 500 word newspaper story using the headline, "Potato Blight Strikes Ireland, Experts Fear Famine."

REFLECTIONS: Teachers also successfully used an alternative MOTIVATION. They asked students to imagine a small event or things that brought about great change in the past or present. Students shared and explained different ideas. After brief discussion teachers introduced the potato. How could something that is so small and weird (wrinkly, battered, ugly, strange) looking change the course of world history?

ACTIVITY SHEET A- Potato Facts and Legends

Sources: Milton Meltzer, *The Amazing Potato*, HarperCollins, 1992; Douglas Daly, "The Leaf That Launched a Thousand Ships," *Natural History*, January, 1996.

1- About 3,000 years ago, native peoples in the Andes Mountains, in what is now known as Peru, found a plant with a short, fleshy underground root that was good to eat. They called this vegetable *papa*. These native peoples learned how to grow different types of potatoes in different climates and soils.

2- The Inca, who developed an empire in this region, preserved potatoes for future use by letting them freeze on the ground overnight. The next day, men, women and children stamped on the potatoes in their bare feet to drive out the moisture. This was repeated for four or five days until they were left with a dry white flour they called *chuno*.

3- An Inca Prayer: "O Creator! Lord of the ends of the earth! Oh, most merciful! Thou who givest life to all things, and has made men that they might live, and eat and multiply. Multiply also the fruits of the earth, the papas [potatoes] and other food that thou has made that men may not suffer from hunger and misery."

Questions to consider: Where does the potato originate? How did the Inca use the potato? In your opinion, why did the Inca have a special prayer about potatoes? Can you think of similar prayers in other cultures? Explain.

4- In the 1530s, Spanish soldiers encountered potatoes high in the Andes Mountains when they invaded Peru. The potato was introduced in Europe about 1565. By 1570, they were being sold in the marketplace in Seville, Spain. In 1586, a boat commanded by Sir Francis Drake stopped in Cartegena, Columbia to pick up food and other supplies. The crew brought potatoes back with them to England.

5- There is more than one story about how potatoes reached Ireland. Sir Walter Raleigh may have grown potatoes on his lands in Ireland in the 1580s. Another possibility is that the potato arrived in Ireland in 1588 when an invading Spanish fleet was damaged by storms off the coast. The crews were killed or captured by the Irish, who took what they found on board, which probably included potatoes. After potato cultivation spread in Ireland, many English refused to eat them because they were seen as food fit only for Irish peasants.

6- During the 17th century, many European herbalists thought potatoes could cure medical problems like tuberculosis, diarrhea, impotence in men, and barrenness in women. Other writers were afraid that potatoes would cause diseases like leprosy. Some people feared eating potatoes because they were not mentioned in

the Jewish or Christian Bibles. In 1653, Bernabé Cobo of Spain, an historian, wrote about how to plant a potato crop, make potato flour, and cook potatoes.

7- European peasant folk beliefs included: Wear a dry potato around your neck to protect youself from rheumatism; Keep a peeled potato in your pocket to cure a tooth ache; If a pregnant woman eats a potato, she will have a child with a small head.

8- In 1719, Irish Protestants settlers in the British colony of New Hampshire brought the potato to North America. In the 1740s, Emperor Frederick II of Prussia ordered German peasants to grow potatoes. In the 1750s, a pharmacist named Antoine Parmentier popularized eating potatoes in France. When Thomas Jefferson returned to the United States from France in 1789, he brought home a love for potatoes. When he became President, he served potatoes in the White House.

9- In 1776, a strange new fungus ruined the potato crop in the Netherlands. In 1842, it struck American potatoes. From 1845 through 1849, the Potato Blight destroyed the Irish potato crop.

10- Today, the value of the potato crop worldwide is about $100 billion a year. This is about three times greater than all the gold and silver Spain took from the Americas during colonial times.

Activity Sheet B- Potatoes and World History

Agricultural Consequences of the Colombian Exchange

According to Russian botanist Nikolai Ivanovich Vavilov, approximately 100 of the 600 most important plants cultivated by humans came from the new world. Food crops include maize (corn), many varieties of beans, peanuts, potatoes, sweet potatoes, manioc (cassava and tapioca), varieties of squash (including the pumpkin), papaya, guava, avocado, pineapple, tomato, chile peppers, and coca. Non-food crops include tobacco, rubber, and certain varieties of cotton.

A Spanish botanist, who was at a loss for the proper Latin word to describe this new food, called it *taratufli*, or little truffle. This became *tarufoli* in Italian and *kartoffel* in German. British and Spanish soldiers in the Americas confused the potato with the sweet potato, whose Peruvian name was *papas* or *bappa*. They called the tuber "little bappa," or bappatas, which became *patatas* in Spanish and *potato* in English.

Source: Alfred Crosby, *The Columbian Exchange. Biological and Cultural Consequences of 1492* (Greenwood, 1972),

A Potato Riddle

Four people were stranded on an island for a year when rescuers found them alive and healthy. The people reported that they arrived on the island with only their clothing, two shovels, and 500 potatoes. Each of the people had eaten one potato per day all year. How did they get enough potatoes to survive?

Source: Sharryl Davis Hawke and James E. Davis. Seeds of Change, The Story of Cultural Exchange after 1492 (Menlo Park, CA: Addison-Wesley, 1992), p. 48.

ACTIVITY SHEET C-

The Potato, the Potato Blight, and "An Gorta Mór" (The Great Hunger)

(adapted from "The Leaf That Launched a Thousand Ships," by Douglas C. Daly, Natural History, January, 1998)

Bernard O'Regan died in June, 1997 at the age of ninety-eight. O'Regan knew some of those who had survived the Irish potato famine of the 1840s. He could recall watching Tom Guerin struggling up the road on misshapen legs to visit the O'Regan house near Skibbereen, County Cork. Young Bernard hid behind the ash tree at the head of the lane because children were not supposed to see such unpleasant things. Sixty years before, when Tom Guerin was a small boy, the hunger in his family reached the point where his mother mistook him for dead. She broke his fragile legs trying to fit him into the only box she had in which to bury him. The box was placed in a mass grave, where Tom's moans saved him.

For Bernard O'Regan, Tom Guerin was just one ghostly reminder of what the Irish call "An Gorta Mór," the Great Hunger of 1845-52. By the time it was over, a million people had died and a million and a half had emigrated in wave after wave of small ships. The famine was brought on by "late blight," a disease of potatoes that swept across Ireland like a scythe. It combined with desperate social and economic conditions to produce a terrible convulsion of suffering.

The potato comes from the Andes, where traditional farmers cultivate several thousand distinct varieties. A single field may be planted with as many as forty of them. The potato was introduced to Europe in about 1565, and there are reports that Sir Walter Raleigh planted them on his properties in western Ireland as early as the 1580s. At first, the Irish used the potato more as a backup for grains, but toward the end of the seventeenth century, it become an important winter food. By the mid-eighteenth century it was a general field crop and provided the staple diet of small farmers during most of the year.

The potato was better adapted than other staple crops to the cool, wet conditions in Ireland, making it more productive and more reliable. Grains suffered too often from lodging (lying flat, which hinders growth), failure to ripen, low yields, preharvest sprouting, and high moisture content, which can lead to molding in storage. The grain crop especially suffered in quantity and quality in wet seasons. In contrast, potato plants yielded abundantly in wet years. One acre of poor ground could yield six tons of potatoes. The "lazy bed" mode of cultivation, in which rows of seed potatoes were placed on the ground and covered with manure, seaweed, and soil dug from trenches along the rows, protected the tubers from excess moisture.

Unfortunately, the success of potato horticulture in Ireland, contributed to disaster for the Irish. Austin Bourke, an authority on the history of late blight and the famine described a "sinister trend toward monoculture" on the island. Potatoes made up 60 percent of the food supply for a population of about 8.1 million people, with some 3.3 million Irish men, women, and children relying on it almost exclusively. In agricultural areas, the average per capita consumption of potatoes was a ton a year, or more than five pounds a day, and as much as fourteen pounds a day for adult males. Many laborers were paid in potatoes or in the use of land to grow them.

Ireland's overdependence on the potato was not the result of some exaggerated cultural preference. For most landless, debt-ridden Irish peasants, it was the only way they could feed their family. Most peasants in the regions hardest hit by the famine grew a single potato variety, the lumper. It was universally detested as a "watery" tuber. Reportedly ,even livestock avoided this variety of the potato when there was an alternative. But in the wet, rocky soils of western Ireland, it was the most productive variety available and did the best job of filling a lot of hungry stomachs.

The potato blight, the disease that devastated the Irish potato, is caused by a fungus, Phytophthora infestans, whose spores germinate on the leaves and stems of the potato plant, as well as in the soil. The damage done by the disease usually becomes obvious relatively late in the growing season, so it is also called the late blight. Dark spots signal the initial infection. Eventually, leaves and stems decay, and the plant dies. Often the outside of the potato tubers become discolored and the inside is affected by a dark, corky rot.

The potato blight almost certainly came from the central highlands of Mexico where the fungus afflicts a number of related Mexican plants. The Mexican fungus and the Andean tuber that was so totally unprepared to resist it came together for the first time in the northeastern United States. It was first observed in potato crops near Philadelphia about 1843. By 1845, late blight spread to almost all of northeastern North America, and that summer it made its appearance in western Europe.

Europeans were no strangers to diseases of the potato. The "curl" reduced potato yields in the 1760s, and the far more destructive "taint," or "dry rot," caused hardship in Ireland and Scotland from 1832 to 1836 and on the Continent until 1841. At that time, hardly anyone understood what caused diseases in plants or animals. Today we know that curl was caused by a virus and taint by a fungus.

In this period, European countries were engaged in the regular exchange and importation of new potato varieties to replace failing crops. This interchange was stepped up in response to the need for varieties resistant to dry rot. Although well intentioned, in this case the practice led to disaster.

At one point, someone imported potatoes infected with late blight. They could have been one of a number of official or extraofficial shipments to several ports of entry, but one story is compelling. In a move to make the potato crop healthier, the provincial government of West Flanders funded importation of fresh potato varieties from North and South America, and these were the subject of field trials in 1843-5; late blight was first reported there, in the Courtrai area of Belgium, in the last week of June 1845.

Late blight could destroy a potato field in a few days. Each fungal lesion on each leaf could generate 300,000 offspring every five days, and each of those, 300,000 more. By mid-July, late blight was all over Flanders and neighboring parts of the Netherlands and France. By mid-August it was around Paris, the lower Rhineland, northwestern France, the Channel Islands, and southern England.

On August 23, 1845, a week after the first sighting of the fungus in England, the eminent botanist John Lindley began an editor's note in the widely *read Gardeners' Chronicle and Agricultural Gazette* with the ominous report that "A fatal malady has broken out amongst the potato crop. On all sides we hear of the destruction." Lindley was appointed to a three-man commission to study and report on the disease in Ireland. After visiting Ireland and spending a month sifting through all the available information and a number of hypotheses about the origin of the problem, the commission concluded that the potato murrain had been caused by unusual weather. They also warned of massive food shortages in Ireland.

As it turned out, the disease proved less devastating to Ireland in 1845 than predicted. In Belgium, Holland, and northeastern France, the potato plants' foliage had been destroyed in most cases while the tubers were no bigger than marbles; but the disease arrived later in Ireland, which in 1845 salvaged about 60 percent of what was going to be a bumper crop. In addition, the tubers that were already stored away that fall were not affected as much as Lindley had expected.

People were optimistic when the summer of 1846 got off to a good start. This time the blight in Ireland started in the west in August and spread east and northeast with tremendous speed -- fifty miles a week according to some estimates. In 1847, still known in Ireland as Black ’47, and 1848, the blight of 1846 reappeared.

In Kenmare, County Kerry, a market town at the head of a tidal river in the west of Ireland, the parish priest, Father John O'Sullivan, wrote on July 16, 1848:

> "We were all in the greatest spirits at the approach of plenty, but blight has made its appearance. On the morning of the 13th, to the astonishment of everyone, the potato fields that had, on the previous evening, presented an appearance that was calculated to gladden the hearts of the most indifferent, appeared blasted, withered, blackened and, as it were, sprinkled with vitriol, and the whole country has in consequence been thrown into dismay and confusion."

The scale of the suffering, especially in such a small country, is difficult to imagine. Tens of thousands died as they tried to emigrate, some on the "coffin ships" that carried them or in quarantine thereafter, but the great majority of the victims of the Great Hunger are buried in unmarked graves all over the island.

Terrible smells pervaded the countryside. Lindley remarked that the decaying plants emitted a "peculiar and rather offensive odour." Father Mathew, a well-known observer of the famine, passed "one wide waste of putrefying vegetation" between Dublin and Cork on August 7, 1846. There were also the smells of death, of unburied bodies, of the sick and starving crammed into the workhouses, uncared for and unable to care for themselves. Most who died were weakened by hunger and then killed by what was collectively known as famine fever -- actually louse-borne relapsing fever and louse-borne typhus, whose victims give off a characteristic, awful smell in the last stages before they die.

Within weeks of the outbreak in 1845, a flood of newspaper articles, privately published pamphlets, reports, and scientific papers offered explanations for the plant disease and proposed solutions to it. Some were crackpot even by the standards of the day; some were reasonable, and some were even correct, but the science of plant pathology did not yet exist, and the germ theory of Pasteur was still a quarter-century away. The causes suggested for the disease included a poisonous miasma borne on the air, industrial pollution, volcanic exhalations, gases from the recently introduced sulfur matches, electricity in the atmosphere, the use of guano as a fertilizer, an aerial taint originating from outer space, or, to use a phrase adopted by Austin Bourke as the title of his superb book on the famine, "the visitation of God."

A simpler explanation, and one proposed almost immediately by a number of scientists and amateur mycologists in Belgium, was that the disease was caused by the fungus that everyone had observed in association with the ailing potato plants. Once the blight had reached England, they were joined in this conclusion by the Reverend

Miles J. Berkeley, who went on to become the father of plant pathology. Soon, however, all but a stubborn few were obliged to recant or remain silent as a more numerous and more influential group espoused a different theory. This group held that the disease was due to the inability of potato plants to eliminate excess water in their normal fashion under extreme conditions, so the plants developed a kind of dropsy and died from wet putrefaction. In other words, it was the weather, and the fungus was only an opportunist on the enfeebled plants. It was not until 1861 that Anton de Bary of Freiburg published experiments that showed the growth patterns of Phytophthora infestans, the potato blight, and established its guilt.