



National Park Service Rock Creek Park Curriculum Based Program

A Mill or A Grocery Store

Young students will discover how much of the food they eat are dependent upon milling, just as it was in 1820 when Peirce Mill was operating.

Curriculum Based Topics:

Life, Food, Business, Producing vs. Consuming, Natural Resources.

Background Information:

Many things have changed since 1820. Cars replaced wagons, streets were paved and the outskirts of Washington, D.C. changed from rural agriculture to an inner-city business district. Sometimes it is hard to picture a time period without computers, television, radio, electricity, or telephones.

Just like today, people in the 1820-40's depended on corn and wheat products to supply much of their dietary needs. Mills, such as Peirce Mill, used the power of water to commercially clean, grind, sift and package flour, grits, corn meal, cereal, and bran. As technology progressed, these mills were replaced, and Peirce Mill is now outdated. Today's mills are larger factories utilizing metal rollers and better cleaning methods. However, at least one thing is still true- mills are more than just a place to grind up corn and wheat. It is a place that turns the crops grown by the farmer into food that feeds the community.

The milling process is fairly simple. First, the grain is cleaned in the smutter, where all the dirt, mold and bugs are removed. Next, the grain is ground into meal by two large grindstones. Within the meal, there are smaller particles called flour, medium size particles called cereal, and larger flakes called bran. After being cooled in the hopper boy, the meal is sent through a bolter or sifter. The bolter separates the flour, the cereal and the bran. Each is then packaged in either barrels or cloth bags.

Wheat and corn can be found in a variety of foods. Breads, pasta, cakes, cookies and pizza dough come from wheat. Corn muffins, tortillas, corn bread, and grits are derived from corn. In addition, many cereals have corn bran or wheat bran as ingredients. Corn and wheat meal are often used to feed farm animals including chickens, pigs and cows. Therefore, other food including steaks, eggs, pork and milk are also indirectly related to milling.

Audience: Grades Pre-K - 2.

Length: 1 Hour.

Location: Peirce Barn (2401 Tilden Street, NW) or Peirce Mill

Students per group: maximum of 30

Chaperones per group: 3-5



Curriculum Based, Standards of Learning (Virginia Standards):

History

- 1.1 The student will compare everyday life in different places and times and recognize that people, places, and things change over time through such comparisons as * current school and community with past school and community; and * contemporary American life with American life in previous time periods.
- 1.7 The student will describe how climate, location, and physical surroundings affect the way people live, including their food, clothing, shelter, transportation, and recreation.
- 2.2 The student will compare rural, urban, and suburban communities and describe how the local community has changed physically and demographically over time.

Economics

- 1.9 The student will describe the differences between human resources (people at work), natural resources (water, soil, wood, coal, etc.), and capital resources (machines, tools, etc.) used to produce different goods or services.
- 1.10 The student will explain the difference between goods and services and will describe how people are both buyers (consumers) and sellers (producers) of goods and services.
- 2.6 The student will explain the interdependence of producers and consumers in a market economy by describing factors that have influenced consumer demand and describing how producers have used natural resources, human resources, and capital resources to produce goods and services in the past and the present.

Force, Motion, and Energy

- 1.2 The student will investigate and understand that moving objects exhibit different kinds of motion. Key concepts include * objects may have straight, circular, and back and forth motions; * objects vibrate; * pushes or pulls can change the movement of an object; and * the motion of objects may be observed in toys and in playground activities.

Objectives:

1. Be able to identify how 5 different foods relate to milling.
2. List the 4 processes of the mill.
3. Describe the relationships between the farmer, the miller and the baker in olden days.

Safety and Resource Management Message:

1. Please do not harm, harass or remove any native plants, animals, or historic artifacts from the park.

Books for the Classroom:

PreK-2nd:

- 1) Little House. Burton, Virginia Lee. Houghton. 1978.
Urban Development
- 2) C is For City. Grimes, Nikki. BOYDS MILL. 2002.
Rhyming verses describe different aspects of life in a city, featuring each letter of the alphabet.
- 3) Ox-Cart Man. Hall, Donald. Viking Press, 1979.
This book illustrates to students the household tasks that went along with the seasons in the early years of America.
- 4) Round Trip. Jonas, Ann. Mulberry. 1990.
Black and white illustrations and text record the sights on a day trip to the city and back home again to the country.

Other Teacher Resources:

- 1) Life on a Southern Plantation. Isaacs, Sally Senzell. Heinemann. 2001.
Looks at the lives of the first Americans to set up plantations in the United States. Discusses homes, shelter, food, clothes, schools, communications, and everyday activities.

2) Cooking a Meal. Matthews, Rupert. Fr Watts. 2000.

Describes the foods eaten and methods of preparation used from the times of prehistoric peoples, through classical Greek and Roman times and the Middle Ages, to the developments in the 18th, 19th, and 20th centuries.

3) If You Lived 100 Years Ago. McGovern, Ann. Scholastic. 1999.

4) Bread, Bread, Bread. Morris, Ann. Lothrop, Lee, and Shepard Books, 1989.



Pre-visit Activities:

A) Milling Minds (from MCPS Social Studies field trip to Peirce Mill):

1. Conduct a brainstorming session in which the class generates words or phrases they would associate with mills. Ask them to group the words according to commonalities and explain their reasons for such classification.
2. Ask students to determine the sequence of events needed to produce flour in the nineteenth century. The events below are in correct order. Present them on paper in scrambled order and have students (working in pairs or teams) cut them in strips and arrange them in the order they think is correct. Discuss the order with the entire class:

1. A farmer grows fields of wheat and corn.
 2. The farmer harvests the wheat and corn.
 3. The farmer transports the wheat and corn to the mill.
 4. The miller buys the wheat and corn from the farmer.
 5. The miller cleans the wheat and corn.
 6. Then the miller grinds the wheat and corn.
 7. As the wheat and corn is ground, it becomes flour.
 8. The miller sells the flour to a local general store.
 9. The local general store sells it to consumers.
3. Review with students the meaning of these economic terms:
 - " production - putting resources together to make goods or provide a service.
 - " natural resources - those things found in or on the earth.
 - " human resources - people doing mental or physical work.
 - " capital resources - resources made by people and used to produce other goods and services.(Money is not considered a capital resource.)

Using the sequence of events in flour production, have the class give examples of some of the human resources (farmer, miller, wagon driver, grocer), the natural resources (land, water, seeds, etc.), and the capital resources (wagon, mill and milling machinery, harvesting equipment, bins for flour in store, etc.).

Record on a class chart titled "Resources Needed in Flour Production."

- If information is available, compare the nineteenth century milling approach with the modern process for producing flour. Compare the two, noting technological changes.

- Review with students to familiarize them with the specific vocabulary associated with a mill and the operation and design of the nineteenth century machinery.

- Have students predict the time of year a nineteenth century mill would have been the busiest. Have them explain their predictions.

B) Mapping the Mill (from MCPS Social Studies field trip to Peirce Mill):

Using a map of Rock Creek Park or D.C. locate Peirce Mill. Brainstorm with class why a mill would be built near a river or creek. Have the students locate Peirce Mill on a street map of Washington, D. C. Then, have them determine two routes the bus might take to get them there. Have the students estimate the distance to the mill and the length of time it will take to get there for each route.

C) A-Maize-ing Grain

Materials: Grocery bag full of food items that contain some form of corn (cornflakes, popcorn, cornmeal, canned corn, and corn by-products: corn starch - baked goods made with baking powder, mayonnaise, canned soup, pudding, candy; corn syrup -- chewing gum, candy, canned vegetables, peanut butter and jelly, etc.), wooden bowls, large rocks (cleaned) that fit inside the wooden bowls, heavy canvas cut in circles big enough to cover the inside surface of the bowl, whole kernel corn.

Ingredients and cookware for Indian Corn Pancakes: dried corn, honey, water, and griddle.

Directions:

Corn A-Day

1. Native Americans taught the European settlers how to use maize, or corn, in many ways. They used corn every day of the year. Do we still eat corn today? Did you eat corn today? How often in a week do we eat corn?
2. Pass around the bag of food items. Ask the students to take one item from the bag. Have the students quickly sort themselves into two groups based on whether or not their food item contains corn. Now ask them to look more carefully and read the label on their food item. Discuss the various corn by-products that are used everyday.

Demonstrating Corn Grinders

1. Early settlers and Native Americans had a special way of changing corn into a new product. They ground the corn with simple tools. Today, corn is still ground to make it into different products, but now there are very large machines that grind large amounts of corn at one time.
2. Show the students a wooden bowl and a rock. Explain that these are similar to the tools the early settlers used to grind corn. They placed the corn in three foot stumps that had been hollowed out slightly. Wooden clubs or billets suspended from thin saplings over the stump were used to grind the corn into meal. Let each student take a handful of corn kernels and place them in the bowl.
3. Grind the corn with the rock until the kernels are completely crushed and it resembles coarse cornmeal.
4. Make Indian Corn Pancakes with the ground corn and talk about other products that can be made with ground corn, and other ground products (wheat, buckwheat, rice).

Indian Corn Pancakes: Grind a handful of dried corn until all the kernels have been finely crushed. If the grain is fine, the pancake will have a better consistency and taste. Add enough water to cover the ground cornmeal and stir. This allows the tougher husks to rise and float on the water. Pour them off with the excess water. Mix the wet cornmeal with honey (approximately 1 tablespoon) until it holds together. Form a patty. Cook it on a hot griddle, turning once. The final product tastes a bit like crackerjacks or caramel corn as the honey caramelizes and holds the pancake together.

D) Blowin' in the Wind

Get plenty of wheat stalks (from a florist shop or a farm if it is fall) and let the students thresh and winnow it. Spread an old sheet or piece of plastic tarp on the ground outside and let the students stomp on the wheat stalks to remove the berries from the seed head. Next, have them winnow it to separate the wheat berries from the chaff. Ask the students to work in pairs and give them each a dish towel. Have them add a handful to the threshed wheat to the towel. Direct them to pull the towel tight between them so that the wind blows across the towel. The wheat chaff will blow away and the berries should collect in the bottom of the towel.

E) Match Game

Show the students bags of eight common grains (wheat, oats, corn, rye, rice, barley, millet, buckwheat). They should be able to tell that the corn meal is made from the corn kernels and the whole wheat flour is made from the wheat berries. Explain that the wheat berries and/or corn

kernels are ground at the mill and turned into "flour" or "meal." Have them match the bags to food made from these grains.

F) From Farm to You

Materials: Selections of farm animal products, large paper grocery bags.

1. Ask the class to brainstorm the different animals that are raised on farms for food and fiber. Say a few adjectives and phrases that describe a particular farm animal. Challenge the students to add another word or phrase that describes the same animal. What animal are you describing? Play this game with several different farm animals. Compile a list of farm animals and their descriptive words and phrases.

2. Beforehand, ask students to bring in a farm animal product from home in a brown paper grocery bag, keeping its identity a secret. Bring in a few of the more unusual ones to ensure diversity. For perishable products ask them to bring the empty container or a representation.

(Cows - dairy products; Beef Cattle - leather products, steak dog toy wrapped on a Styrofoam meat tray; Sheep - wool sweater, hat, mittens, or lamb or mutton products similar to Beef example; Pigs - bristle brush, football, empty ham, bacon or sausage containers, pork products like Beef example; Goats - kid leather gloves, goat cheese package; Chickens - Empty egg cartons, empty chicken noodle soup cans, other like Beef example; Horses - glue, dog food; Turkey - Large aluminum roasting pan, covered with foil and labeled as Thanksgiving dinner; Ducks/Geese - Feather pillow, down jacket, sleeping bag or comforter; Rabbits - Angora sweater, fur-lined mittens, rabbit meat package like Beef example)

3. Divide the class into small groups. Give each group a farm product in a paper grocery bag. Have them look at their product, but keep its identity a secret from other groups. Ask them to write down then adjectives or short phrases describing the product.

4. Have each group read their list of descriptive words or phrases to the class and have the rest of the class guess the identity of the product. Ask them to arrange their words or phrases in an order that makes the guessing the most challenging.

5. When the product is identified, reveal the farm animal item and read any remaining adjectives. Can the class think of still others? Where does this product come from? How many students eat or commonly use this product? Record this information. Repeat the process with the remaining ingredients.

6. Have each group use their descriptive words or phrases to write short riddles about their products. Create an exhibit with the riddles, and post it in the hallway, encouraging other students to guess the identity of the farm product.

Alternative:

Do the same activity using only dairy products, or things made of wheat, corn, or other farm animal products or crops.



Post-visit Activities:

A) Track Your Food

Ask the students to read the labels on the various foods they eat and drink for an entire day (or their lunch for the day). Did anything contain some form of corn? Make a class list of all the foods that are made with corn products. Have students keep a tally of how many days in a week they ate corn.

B) Make a Seed Viewer

- Take a glass jar or plastic cup and line the inside with construction paper.
- Place two of your corn kernels between the glass and construction paper.
- Fill the empty center of the jar with paper towels and wet thoroughly until the construction paper has been moistened.
- Place in a warm spot and add water daily
- Watch your seeds and see how they grow. Have the class keep a journal with pictures documenting each day of its growth.

C) Magic Bread

Materials: Wheat berries, wheat stalks, grain mill (optional), bleached and unbleached white flour, whole wheat flour, hand lenses, sifters, plastic measuring spoons and cups, great pencils, towels, extra yeast and sugar, small plastic cups, margarine tubs or other container that plastic cups can fit inside.

- There is an important seed most people eat every day. What is it? Have students cup their hands, close their eyes and you will give them a clue. Place some wheat berries in each student's hands. Have them feel and smell them. Suggest they taste them by grinding and crushing them with their back teeth, releasing the flavor. Hold up some wheat stalks and have them open their eyes for another clue. Can they guess the identity now? Explain that wheat is an important grain. Pass a stalk to every two or three students and ask them to find the wheat berries inside.
- Explain that most people don't recognize wheat berries or seeds because we usually eat them after they have been ground and baked into a variety of foods. What are the ground wheat seeds called? (flour) Ask the students to list things made from flour (bread, cereal, muffins, pizza, cookies, pasta, cake, etc) have the students share what they've had for breakfast. How many students have already eaten this seed today or will eat it for lunch?
- Show the students the grain and explain how it works. Inside the mill are two flat stones, one on top of the other. The seeds fall between the two and are crushed. Let students take turns adding wheat berries to the mill and grinding them into flour. Set up bowls of different types of wheat flour for students to investigate while they are waiting their turn. Provide hand lenses and encourage them to use all of their senses. How did the flour they made compare to these? Have them sift their flour again and compare. (If you are unable to obtain a grain mill, grind small amounts of grain using a mortar and pestle, a rock in a wooden bowl, or a food processor.) Stress the difference between whole wheat and white flour. Whole wheat flour is made from the entire seed - the endosperm, germ, and bran - and it contains natural B vitamins and protein. Unbleached white flour has the germ and bran removed.
- Divide the class into groups of 5 to 10 students. Provide each group with a recipe, mixing bowls, measuring cups, and spoons. Lead the group through the recipes, having students take turns adding ingredients. Highlight what each ingredient does for the recipe.
- Take turns kneading the dough then set it aside. Ask students to make predictions as to how high it will rise. Have them mark the outside of the bowl with a grease pencil and initial their predictions. Then cover the bowls with a towel and set aside in a warm place to rise for 30 to 60 minutes.

6. While the dough is rising, have small groups of students try the following experiment to see the yeast in action. Fill a plastic cup $\frac{3}{4}$ full of warm water. St the cup inside an empty margarine tub. Add 1 teaspoon of yeast and 1 teaspoon of sugar. As the yeast begins to 'eat' the sugar, it releases bubbles of carbon dioxide gas which form a head similar to a root beer float. This head will grow until it spills over the top of the glass. (Students can also try making a similar solution of warm water, yeast and sugar in a small soda bottle and cover the top with a balloon. As the yeast starts to feast, the carbon dioxide gas will expand the balloon.)

7. After the bread has risen, ask each group to punch down their dough and divide it evenly among themselves. Each individual can then form the dough into an imaginative shape. Have the students place their 'loaves' on a baking sheet, let them rise for a second time, then back according to the recipe. Together they can enjoy fresh hot bread.

Magic Bread Ingredients:

2 pkgs. active dry yeast

1 $\frac{1}{4}$ cups warm water

4 to 4 $\frac{1}{2}$ cups flour (mix 1 part whole wheat and 3 parts unbleached white)

1 Tbs. Sugar, honey or maple syrup

1 tsp. Salt

$\frac{1}{4}$ cup olive or salad oil

Optional: 1 egg white beaten with 1 Tbs. Of water and sesame or poppy seeds

D) Be a Wheat-y

Have the students dramatize the bread baking process. Have them begin as wheat berries and lead them through the process from mill to mixing bowl, through kneading, rising, shaping and baking. Eat the bread after completing the process.

E) Grandma's Secret Recipes

Have the students create a family cookbook or recipe calendar. Assign them to dig through their families' old recipe files, call older relatives for their "secret" concoctions, and record these memories before they are lost. Then, have the class prepare some of the recipes for an "Ancestor Party." Later, have the students make collective cookbooks of the classes' favorite traditional family dishes.

F) Starting from Scratch

Materials: Four bins labeled "Store," "Factory," "Natural World," and "Farms," magazines for students to cut up, scissors, crayons, paper

1. Have students work in pairs to record their daily routines, noting specific activities, items used and food eaten. Have them cut out pictures from old magazines to illustrate these everyday items and foods or draw their own.

2. Have several pairs share their pictures and routines with the class. How many students had similar activities, items, or food? Who recorded different activities? Classify these into basic categories: food, clothing, health, shelter, transportation, education, and recreation. Which are necessary for life? Which make life more comfortable or enjoyable?

3. Collect all the pictures and remove duplicates. Have students sort the pictures based on their source and place them in the appropriate bins, Store, Factory, Natural World, and Farm.

4. Divide the students into two groups and form two lines. Set the bins opposite these lines. Place the collection of pictures a few feet in from of their lines. One student from each team selects a picture, runs and places it in the appropriate bin, then return to the end of his or her line. The next

person in each line will repeat the process. This will continue until everyone has had a turn or all the pictures are sorted.

5. Review the items in each bin. The students can show their approval or disapproval for each item with a show of thumbs up or thumbs down. Begin with the bin labeled "Store." Review one or two items, asking if they can be traced back even further. Does anything actually originate from the store? (No, this is where most of us purchase the things we need and use daily.) Encourage the students to offer suggestions on where items should be placed. Continue on to the "Factory" bin. Where do the raw materials come from to make these items? Can these items be traced back even further back to their source? (Yes, the natural world or the farm.) Peirce Mill used to act as a middle point from farm to home, like a store, and processed farm products, grains, for use at home.

6. Review the items in the bin labeled "Natural World." (It will include a wide array of items including wooden objects from trees, metal mined from minerals in the earth and plastics and synthetic materials made from petroleum products.) What categories do these objects fall into? (Clothing, health, shelter, transportation, education or recreation.) Point out that some of the objects are made with renewable resources and others with non-renewable resources. Which are renewable and which are non-renewable? Which are recyclable?

7. Review the items in the "Farm" bin. What categories do they fall into? (Mostly food, both fresh and processed, with some examples of natural fibers, such as wool, cotton, and silk.) Could we live without these things? (No, because food is essential to life and therefore so are farms!) Discuss the idea of farming as a renewable resource with food being produced year after year.

8. Complete the discussion by talking about the wise care or stewardship of our natural resources and farmlands. Stress that the stewardship of farmland goes hand-in-hand with that of the natural world to insure a high quality of life. Rock Creek Park is fed with water that runs off of farms. Care needs to be given to the soil, water, and air to insure adequate and continued food production. Discuss the farming practices that reflect this caring attitude towards the earth and environment. (Advances in agriculture like manure holding areas are reducing the nitrate and phosphate pollution of water. Special rotational grazing systems prevent overgrazing and soil erosion. Good soil management practices reduced the need for synthetic fertilizers and insure healthy, disease-resistant vegetation, thereby reducing the need for pesticides. Organic methods of pest control and integrated pest management can further reduce pesticide use.)

G) Taste Something New

Have students sample some of the food products made from the various animals. Introduce students to especially unusual or unfamiliar ones.

H) Now and Then

Have students compare specialized farms of today with diversified farms of the past. How were children's roles different in getting food to the table from yesterday and today?