

MATERIALS

- Metal trash can
- Clear plastic cups (1 for each student)
- 2-3 labeled flour samples in jars (i.e. cornmeal, buckwheat flour, white flour, whole wheat flour, rice flour)
- Hand flour grinder
- Small bowl

PREPARATION

- Gather and label flour samples
- Ensure trash can is free of debris
- Gather other materials

PROCEDURE

Part 1: Threshing wheat

- Return to the sheave of wheat that has cured for 7-10 days in the garden.
- Remove row cover, untie, and hand a small bunch of wheat stalks to each student.
- Have each student identify the anatomy of the plant. Find the wheat grains, straw, chaff, and kernels inside.
- Taking turns, have groups of students go up to the clean trashcan, and carefully hit their seed head on the side of the can, forcing the dried kernels to fall off. This resulting product will have a lot of chaff and some whole seed heads in it, break whole seed heads up with your hands, and pull out any bigger bits of straw.

Part 2: Winnowing wheat

- Break students into pairs, giving each pair a cup with some grain and an empty cup.
- Tell them to pour their grain from one cup to another while lightly blowing on the grain, blowing away the chaff from the grain to isolate the edible kernels. If this process is moving slowly, you can ask students to rub the grains carefully between their hands to help get the chaff loose before they blow on it.
- After 5-10 minutes of processing, ask students to pick through grains and take out the rest of the chaff by hand.

Part 3: Grinding wheat

- Pass around the labeled jars of flours. Explain a definition of *flour*, “a fine, powdery foodstuff obtained by grinding and sifting the meal of a grain.”
- Hold a short discussion about the manifold uses for flours – what do we eat that has ground grains in it? What are some of the common uses of wheat?
- Show students how a hand grinder works, using the newly winnowed wheat kernels from the class.
- Have students take turns grinding the wheat kernels in the hand grinder. Pass the grinder from student to student, allowing each five turns of the handle. Ask students to count the turns of each student as the grinder is carefully passed around the class.

Threshing, Winnowing, & Grinding Wheat

Patterns & Preparation

ENGAGE

Ask students to name some qualities of a hunter-gatherer (mobile, few possessions, communal food and supplies, etc.) and farmers (sedentary, etc.). List them on the board.

OBJECTIVES

- Students will understand that many foods are processed before they are consumed.
- Students will understand *threshing*, *winnow*, and *grinding*.
- Students will understand that being able to store crops for lengths of time affected the development of civilization

EXPLAIN

Storing crops, staying still: Agriculture and settlement

The movement from hunter-gatherer to agriculture changed the way humans *eat*, but it also changed the way humans *live*. Domesticated plants and animals altered our landscape, our bodies, and the social structure of our lives. While the hunter-gatherer lifestyle was predicated on mobility, on the delicate balance between overexploitation of natural resources and survival, the farmed world was based on stability and predictability. Crops were planted, crops were harvested, and crops were stored and eaten in the colder months. An important factor in the adoption of grains was their ability to be stored for long periods of time, and support whole civilizations year-round. No longer nomadic, humans were able to store surplus crops and build up stationary high-density populations.

People were now gathering into towns and villages, and since everyone didn't have to spend all their time acquiring food as farmer, new professions and trades emerged, governments arose, and writing came to be. This period is known as the first agricultural revolution, or the Neolithic Revolution, and took place over 3,000 years. This revolution completely transformed the way humans live on earth, and made our society today possible!

Curing wheat

After we harvested our wheat during the last class, we let it sit in *sheaves*, 12 inch circumference bundles, and *cure* for 7-10 days in an airy, outdoor location. In a larger scale agriculture operation, farmers would cure their wheat in their fields, stacking the sheaves into larger piles of *shocks*. Curing wheat allows it to dry out more completely before it is stored, extending its shelf life by lowering its moisture content.

ADDITIONAL CONTENT INTEGRATION (see previous page)

Try storing some of your newly harvested wheat in a container with a few drops of water, and some in a dry container. Have students report weekly on the status of the grains in the two containers. What happens to the grain in the slightly wet container? Have students come up with different ways to store grain on a farm to keep it dry and free of hungry pests. Then, allow them to research different ways we store grains and other foods to preserve them.

ADDITIONAL MATERIALS

- Two containers
- Science journals
- 1 cup newly harvested wheat

EVALUATE

Journal prompt: Diagram and describe the threshing, winnowing, and grinding process for wheat!