

# Eat Smart Be Smart

 **Grade Level:** Third      **Lesson Time:** 30 Minutes

 **Integrated Core Subjects:** Science and Health Enhancement

 **Montana Content Standard:** Science 1 & 3: Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate and communicate results and reasonable conclusions to scientific investigations; Students, through the inquiry process, demonstrate knowledge of characteristics, structures, and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.

 **Montana Content Standard:** Health Enhancement 1: Students have a basic knowledge and understanding of concepts that promote comprehensive health.

 **Objectives:** Students will learn about wheat and its properties; understand the importance of whole grains; through the inquiry process, recognize there are different amounts of protein (gluten) in different flours.

Whole  
Grain  
Goodness

## Lesson/Activity

1. Show students the wheat plant and ask them if they know what it is. Ask them to name foods that are made of wheat. Ask the students to identify the food group these types of foods are in (grain group) and what key nutrient is found in the grain group (carbohydrates). Point out that protein is also found in grains. Explain the process of planting, growing, harvesting, and milling grain to make flour and from there to become foods in a grocery store.
2. Point out the different parts of the wheat plant. Project the Wheat Plant Handout onto the board. Review the function and location of the six parts of the plant. Discuss the function of the plant parts to address plant structure, function and energy needs.
3. Describe the three parts of the kernel; bran (outer covering), endosperm (largest part of the kernel), germ (smallest part of the kernel). Use the Diagram of a Kernel. When all three are milled together it makes whole wheat flour. If just the endosperm is used it makes white flour.
4. Distribute the Identify the Parts worksheet and have students complete it. Review the answers with the class to assess their understanding. Ask the students to predict which flour they think is healthier. Whole wheat is the answer because it contains the fiber (from the bran) and larger amounts of naturally occurring vitamins and minerals. Whole grains are recommended for good health. Whole grains are those where the whole kernel was milled into flour and used to make the product. Whole wheat bread or pasta, whole grain cereal, wheat crackers (i.e., Triscuit®), brown or wild rice and oatmeal are examples of whole grains. Point out that white bread is often "enriched" which means manufacturer's add back the nutrients lost in the milling. Explain that we need to eat from the grain group for a good supply of carbohydrates, protein, and vitamins and minerals.

## Materials Needed

- 1 cup wheat flour for each group, 1 cup rye or barley flour and water (recommend 4-5 kids per group)
- 3 Bowls and a 1 cup measure for each group
- A copy of the Identify the Parts work sheet for each student.
- A copy of the Science Inquiry Work Sheet on Protein Levels in Flours
- A stalk of wheat or wheat plant if available.
- Teacher Reference: Diagram of a Wheat Kernel and The Wheat Plant and answer sheet for the Identify the Parts work sheet. The Story of Wheat children's booklet, available to download at <http://wbc.agr.mt.gov>, then go to Teachers and Students link.

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5. Both types of wheat flour are often used in baking because they contain a high quality protein called gluten in larger quantities than other flours. Montana wheat has a high protein/gluten content.
6. Distribute the Science Inquiry Work Sheet on Protein Levels in Flours. Brainstorm a way to determine how much protein or gluten is in different kinds of flours and complete questions 1-2 on their work sheets.
7. To conduct the experiment, divide the students into four groups and ask them to conduct the following process to determine how much gluten is in different kinds of flour.
  - Measure out 1 cup wheat flour and 1 cup rye or barley flour into two separate bowls.
  - Mix enough water with the wheat flour to make a smooth, clay-like dough. Keep track of how much water is added. Ask the students to write the amount of water, in ounces, on their work sheets.
  - Next, mix the same amount of water with the rye or barley flour and stir. What do they observe?
8. Ask them to draw their observations on their work sheets under question number 3. As a class, brainstorm explanations for their observations and have the students list their explanation under question 4. The mixture with the rye or barley flour stays sticky and wet because there isn't as much gluten in these grains to soak up the moisture as there is in wheat flour.
9. Ask the students to write their conclusions about this experiment under question 5. The answer should be along the lines that the results indicate that there is more protein or gluten in the wheat flour than rye or barley flours, which makes it healthier. Are there any other conclusions? Ask the students if they have ever tasted items made from rye or barley flours. Assure them that these are also healthy choices.
10. Close the lesson by reinforcing the importance of enjoying whole grains. As a class, brainstorm a list of whole grains food items that they can enjoy today at lunch, for an afternoon snack or at dinner. Write these on the board. If the school menu is available, point out the whole grains served on it. Ask students what kind of bread they will choose the next time they eat a sandwich. Ask the students to write down on their work sheets the name of three whole grain food items they like.

## Outcome Goals

-  Students will identify the parts of the wheat plant.
-  Students will identify foods that come from wheat.
-  Students will, through the inquiry process, determine which flours have a higher protein content.
-  Students will know the importance of eating whole grains and identify examples of them.

## Extending the Lesson

-  Link to Geography and Other Cultures: Make a copy of the work sheet, Bread Around the World for each student and have them complete the matching activity. The answer sheet is also attached. Make this activity come alive by having examples of the breads in the classroom and add some others to it. One addition may be to explore breads in Native American cultures. What is the origin of frybread or bannock bread and why is it a traditional food for American Indians? Add these words to the weekly vocabulary and have the students show you on the map where the bread is eaten.

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