THE POWER OF 3:
Get Healthy with Whole Grain Foods

Lessons

✓ Lesson 1
✓ Lesson 2
✓ Lesson 3
✓ Lesson 4
✓ Lesson 5
Lesson 1: The Whole Is Greater Than Its Parts

Introduction

Performance Objectives

By the end of this lesson, students will be able to:

• Identify common grains used to make food products.
• Describe the three parts of a grain kernel.
• Identify the location of grains on the MyPyramid graphic.
• Compare characteristics of whole and refined grain foods.

Theoretical Framework

Behavioral capability – instrumental knowledge regarding characteristics of whole versus refined grain foods.
Expectancies – change the perceived value placed on whole grain foods.

Lesson Overview

Introduction – 3-5 minutes

Identifying common grains, their components and use in food products – 15 minutes

• Brainstorm the most common grains used to make food products.
• Review the MyPyramid graphic. Have students locate grains on the graphic and state the recommended number of servings per day.
• Describe the three main parts of a grain kernel (using a poster).
• Have students label the three parts of a grain kernel on Worksheet #1.
• Review the milling process and briefly discuss the consequences of milling.

Comparing characteristics of whole and refined grain foods – 20 minutes

• Show students grain samples in small jars/baggies or test tubes. Have students complete Worksheet #2 on grain identification.
• Demonstrate grinding of grain kernels. Discuss characteristics of whole and refined grain flours.
• Taste and evaluate different types of breads. Have students complete the tasting Worksheet #3 for bread sampling.
• Show video clip to illustrate the milling process, common grains and their food products.

Evaluation and closure – 5-10 minutes

• Summarize key points and answer questions.
• Collect worksheets and examine for accuracy. Distribute Quiz Bowl cards for Lesson 1 and use to review. Introduce the Quiz Bowl event, distribute take-home flyer for parents publicizing the event, encourage students to invite parent to attend with their family.
• Distribute parent newsletters and ask students to return completed homework activities found in the newsletter.
• Distribute whole grain “snack packs” for students to take home.
In-class activities:
MyPyramid graphic
Worksheet #1 Labeling the 3 parts of a grain kernel
Worksheet #2 Grain identification activity
Worksheet #3 Bread tasting

Homework (activities included in the parent newsletter):
• Matching common grains and their food products.
• Word scramble: characteristics of whole and refined grain products.
• Quiz Bowl cards

Materials:
• Posters
  Kernel of Wheat poster 1993 – An 8½ x 11-inch colored diagram of a wheat kernel; includes nutritional information and a diagram of how flour is milled. Order from http://www.wheatfoods.org/NewOrder/index.asp#pos
• Video
  Amazing Wheat – Video/teacher’s guide (Grades 4-6) – This video provides your students with an educational (and entertaining) look at wheat and the teacher’s guide is a companion to the video. Chock-full of classroom activities and additional background information on wheat. Order from http://www.wheatfoods.org/NewOrder/index.asp#pos
• TV/VCR, overhead projector, transparencies
• Grinder and wheat berries (Inexpensive ($30-$80). Wheat grinders can be purchased at: http://www.wisementrading.com/grainmills.htm; wheat berries are available at health food /coop stores)
• Whole and refined grain flour samples, stalk of wheat (available at some coop stores, or possibly a craft store)
• Grain samples in small plastic containers/baggies or capped test tubes (e.g., barley, brown rice, wheat berries, millet, rolled oats, kamut, couscous, buckwheat, quinoa). Test tubes can usually be purchased through University laboratory supply departments. Glue containers shut to avoid spills. Label samples with letters. Prepare 8 ½ x 11-inch cards on cardstock with the name of grain on one side and the corresponding letter on the other.
• Blackboard or flipchart, markers
• Bread samples in baggies, napkins (suggest purchasing whole grain, partial whole grain and refined bread for sampling)
• Whole grain “snack packs” for students to take home

Getting Ready
1. Review the lesson plan and troubleshoot potential problems.
2. Obtain and prepare materials.
Introduction

Tell students that the purpose of the lesson is to become familiar with common grains and their food products and to understand the difference between whole and refined grain foods.

Review the agenda. Explain that students will work on activities to 1) recognize common grains and their uses, 2) identify the main parts of a grain kernel, 3) identify the location of grains on the MyPyramid graphic, and 4) distinguish whole from refined grain products.

Activity 1: Identifying common grains, their components and use in food products.

Identifying common grains, their components and use in food products.

1. Ask students to brainstorm the most common grains used to make food products. Show wheat stalk and explain where wheat grains grow.

2. Review the MyPyramid graphic. Locate the grain group. State the recommended number of servings per day from the grain group based on a 2000 calorie diet.

3. Have students look at Worksheet #1 for a diagram of the main parts of a grain kernel.

4. Use the Grain Kernel poster to illustrate the 3 parts of a grain kernel (bran, germ and endosperm).

5. Have students complete Worksheet #1.

Activity 2: Comparing characteristics of whole and refined grain foods.

Comparing characteristics of whole and refined grain foods.

1. Divide the large group into two or more smaller groups. In small groups, show students the containers prepared with various types of grain samples and marked with a corresponding letter. Ask students to match the name of the grain with the letter on the sample using Worksheet #2 (grain identification activity).

2. In other small groups, grind the wheat berries to flour in a grinder (i.e., milling simulation). Show students samples of whole and refined grain flours.

3. Come back together in a large group and review the activities completed by the small groups. Hold up the 8½ x 11-inch cards to quiz students on the name of the grain and corresponding letter on their worksheet.

4. Have the students taste a variety of bread samples and discuss the characteristics of whole and refined grain products. Have students complete Worksheet #3 as they taste the samples.

5. OPTIONAL ACTIVITY: Play the video to show milling process, common grains and their food products (time permitting).
### Evaluation/Closure

1. Distribute Quiz Bowl cards for Lesson 1 and use to review. Explain the purpose of the cards. Tell students about the Quiz Bowl event and encourage all students to attend with their family.

2. Collect completed worksheets and examine for accuracy. Take notes regarding what sections in this lesson need to be reviewed in the next lesson.

3. Summarize the activities. What was the overall “message” of today’s lesson? Close by encouraging students to tell their families what they have learned about whole grains in this lesson. Explain that in the next lesson, students will learn more about identifying whole grain food products in a variety of environments.

4. Distribute parent newsletter and give instructions for completing the activities in the newsletter. Ask students to complete the homework activities with their parents and return the homework for the next lesson.

5. Distribute whole grain “snack packs” at dismissal.

### Background Information

#### References/Resources
- The Flour and Grain Education Program describes the importance of grain and flour in history, geography, science, nutrition, food technology, business and marketing at: www.flourandgrain.com
- “Get on the Grain Train” USDA pamphlet describes whole grain nutrition at: http://www.usda.gov/cnpp/Pubs/Brochures/GrainTrainPamphlet.pdf

### Notes

**Explain how flour is made from wheat:**
Wheat grains grow at the top of the plant. They are packed together in clusters called ears. Each ear of wheat is made up of 40-60 grains. The grains have to be separated from the ears and stalks before they can be turned into flour. Wheat berries are intact grains of wheat.

**Each whole grain kernel is made up of 3 distinct parts:**
- Bran: “outer shell” that protects the seed
- Endosperm: “largest portion”; starchy; provides energy
- Germ: food for the seed
Each part contains important nutrients for your body.

**Remember:**
*Whole grains* use the “whole” seed to make your grain foods.
*Refined grains* use only the endosperm (“starchy part”)
Lesson 1

Worksheets
Lesson 1: The Whole Is Greater Than Its Parts

Worksheet #1

Directions:
Working in pairs, think about the different types of grains that are grown around the world. Write your ideas in the space provided below. How many different grains did you think of?

Introduction:
Fill in the blanks with the correct words as they are discussed in class.

Wheat berries grow at the top of the wheat plant. The grains are tightly packed together in clusters called ___________________. To make ________________, the grains are separated from the stalks and ears. A grain kernel is made up of _________ parts: the bran, germ and endosperm. Each part gives our bodies important nutrients and health benefits.

Directions:
Label the three parts of a whole grain kernel.

(Source: www.flourandgrain.com)
Lesson 1: The Whole Is Greater Than Its Parts

**Worksheet #2**

**Directions:**
Use the words at the bottom of the page to help you figure out which type of grain is in each sample. Use each word only once.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Identification</th>
<th>Name a food product containing this grain</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
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<tr>
<td>D</td>
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<td>E</td>
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<td>F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Words you can use**

- Barley
- Bulgur
- Rolled Oats
- Whole oats
- Brown rice
- Millet
- Kamut
- Whole wheat couscous
- Wheat berries
- Buckwheat
- Spelt
- Quinoa
- Grano
Worksheet #3

Directions:
For each bread sample, use the words found at the bottom of the page to help you describe the taste, texture, appearance and your overall rating of the different breads. Have fun!

<table>
<thead>
<tr>
<th>Bread Type of bread</th>
<th>Taste (What does the bread taste like?)</th>
<th>Texture (How does the bread feel in your mouth?)</th>
<th>Appearance (What does the bread look like?)</th>
<th>Overall Rating (How much do you like this bread?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample A:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample B:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample C:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample D:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Words you can use

Yummy      Soft      Rough    Moist    Nutty    Crusty

Delicious  Hard     Smooth   Dry      Yucky    Great

I like a lot     I don’t like     I’m not sure
Lesson 1

Quiz Bowl Cards
Lesson 1: The Whole Is Greater Than Its Parts

Quiz Bowl

Directions:
Use these cards to continue learning about whole grain foods. Share the information with your family. Practice for the Whole Grain Quiz Bowl at the end of the program. Have fun!

Whole Grain Quiz Bowl Question #1
What is the key message about grains from MyPyramid?

Whole Grain Quiz Bowl Question #2
What are the 3 parts of a grain kernel?

Whole Grain Quiz Bowl Question #3
True or False?
During the milling process, conditioning is a blending process that mixes different types of wheat together to make flour.

Whole Grain Quiz Bowl Question #4
Egyptians buried mummies with necklaces of this grain around their necks.
Was it corn, barley or wheat?

Whole Grain Quiz Bowl Question #5
I form the outer layer of the grain kernel and am a rich source of fiber, B vitamins and phytochemicals. Who am I?

Whole Grain Quiz Bowl Question #6
Wheat grains grow at the top of the plant and are packed together in clusters. What are these clusters called?
Hint:
Think about a part of your body that helps you hear.

Whole Grain Quiz Bowl Question #7
I am the largest part of whole grain kernel. My friends call me “Starchy”. Who am I?
Whole Grain Quiz Bowl Answer #1

Make half your grains whole.

Name ____________________

Whole Grain Quiz Bowl Answer #2

Bran
Germ
Endosperm

Whole Grain Quiz Bowl Answer #3

False

Whole Grain Quiz Bowl Answer #4

Barley

Whole Grain Quiz Bowl Answer #5

Bran

Whole Grain Quiz Bowl Answer #6

Ears

Whole Grain Quiz Bowl Answer #7

Endosperm
Lesson 1

Newsletter
Welcome Issue

Let’s learn more about whole grains & healthy eating

“The Power of 3” is a unique set of 5 nutrition lessons about whole grain foods. Today your child participated in the first lesson at school.

Studies show that eating whole grain foods is linked to important health benefits such as lower risk for chronic disease and better weight control. However, we are currently only eating about one-third of the recommended number of daily servings.

Some people don’t eat whole grain foods because they are not familiar with these foods or can’t identify them, and these foods may not be available in homes and at school.

Kids Win with Healthy School Meals

The 5 lessons in “The Power of 3” will help children gain knowledge and skills to identify whole grain foods, set healthy goals, and plan a daily menu to include whole grain foods – all of which will help children eat more whole grain foods.

Each week your child will bring home a newsletter that includes information regarding the weekly lesson along with fun activities to do together. Please send the completed activity sheets, found on the last pages of each newsletter, back to school with your child.

In the first lesson, your child will learn about the main parts of a grain kernel and the different characteristics of whole and refined grain foods.

Look for future “The Power of 3” newsletters. We hope you and your child will enjoy this program. Parents, you’ll also find helpful tips and ideas to make eating more whole grain foods fun and easy for your entire family.

This week meet Poppa Corn. Here are some interesting facts about Poppa:
- Born over 17,000 years ago in North and South America.
- Along with squash and beans, he kept the Native American people alive for centuries.
- Loves to hang out in cornbread, chips, tortillas, tamales, grits and taco shells.
- Best friends include salsa, cheese and beans!
- Loves to keep you healthy with more vitamin A than any other grain, good quantities of many B vitamins, and the minerals phosphorus, magnesium, iron and zinc as well as the essential linoleic acid.
Milling grains into flour

In earlier times, grains were crushed and milled between millstones in windmills or watermills to produce coarser flour. Today, milled flour is much smoother and finer through use of advanced technology.

A variety of grains such as wheat, rice, corn, oats, barley and rye can be milled into flour. The majority of bread in the marketplace today is made from wheat. Through a series of milling stages, wheat bran and germ are separated from the endosperm. Here are the six stages of the milling process:

- **Cleaning**: After the wheat from the field reaches the mill, it is cleaned to remove impurities such as metals, stones and dust.
- **Conditioning**: Water softens the bran which improves its separation from the starchy endosperm.
- **Gristing**: This blending process mixes different types of wheat together to produce the appropriate quality of flour.
- **Breaking**: Wheat is passed through sets of fluted rollers (“break rolls”) which break each grain up into its three components: the bran, endosperm and germ.
- **Sieving**: The three components are separated or sifted by sieves into different streams.
- **Reducing**: Endosperm particles are passed through a sequence of smooth reduction rollers to produce finer white flour.

Finally, the three separated components produce different types of flour – *whole grain flour* contains all parts of the grain; *brown flour* has some, but not all, of the bran and germ removed; and *white flour* has all of the bran and germ removed.

Three main parts of a grain kernel

![Diagram of grain kernel](Source: www.flourandgrain.com)

**The basic structure is similar for all grains:**

- **Endosperm**
  - The largest part of whole grain and the main source of starch.
- **Bran**
  - Outer layer of grain and a rich source of fiber, B-vitamins and phytochemicals.
- **Germ**
  - The embryo of the grain which is an extra nutrient source including protein, B vitamins, vitamin E, minerals and oil.
**Matching Common Grains and Their Food Products**

Working together with your child, match the common grains and their food products. An example is given below.

<table>
<thead>
<tr>
<th>1. Corn</th>
<th>A. Served with stir-fried foods in sauces. There are many varieties: white and brown; short, medium and long grain.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Rye</td>
<td>B. Used to make many foods such as pancakes, soba noodles, and kasha.</td>
</tr>
<tr>
<td>3. Rice</td>
<td>C. The most common grain used to make breads.</td>
</tr>
<tr>
<td>4. Oats</td>
<td>D. The only grain that can be eaten as a fresh vegetable.</td>
</tr>
<tr>
<td>5. Wheat</td>
<td>E. Has a strong flavor and can be made into breads and crackers.</td>
</tr>
<tr>
<td>6. Barley</td>
<td>F. Commonly made into hot breakfast cereals and cookies.</td>
</tr>
<tr>
<td>7. Buckwheat</td>
<td>G. Often added to soups and stews. Egyptians buried mummies with necklaces of this grain around their necks.</td>
</tr>
</tbody>
</table>

(Source: www.foodsubs.com)

**Homework Instructions for Parents:**

- Cut or tear off pages 3 and 4.
- Fill in the blanks below with names.
- Return pages to school with your child after you have completed the activities.

Child’s name_____________________________________
Parent name______________________________________
Teacher name______________________________________
Word Scramble: Characteristics of whole and refined grain foods

Let’s see if you and your child can figure out the characteristics of whole and refined grain foods. Unscramble the words in brackets to fill in the blanks. Have fun!

1. Eating whole grain foods is _______ (doog) for your health.
2. White bread is __________ (tosf).
3. Whole wheat breads have a variety of __________ (etxteur).
4. Muffins made from whole grain flour are _________ (ardrke) than muffins made from _________ (weiht) flour.
5. Whole grain pizza crust includes the _______ (rban), _______________ (doesmernp) and ________ (ergm).
6. White flour contains only the_________________ (spenomerd).
7. Whole grain foods have a _________ (untyt) flavor and are also rich in ________________ (ntriseutn)

Answer key:


Characteristics of whole & refined grain foods:
1. good, 2. soft, 3. texture, 4. darker, white, 5. bran, endosperm, germ, 6. endosperm, 7. nutty, nutrients

Add:
Name of organization
Contact information