LESSON OUTLINE

Lesson #4: **Refueling with Whole Grains**

Lesson Objective: **Students will identify what makes a grain or flour "whole" and will know why eating whole grains more often than processed grains is a higher-quality choice.**

Classroom Lesson Outline:

1. **Review** from lesson #3, fats *(2 minutes)*
    a. Identify what beneficial fats do for our bodies
    b. Discuss what new, higher-quality fats the kids are now eating
2. **Introduction** *(2 minutes)*
    a. Lesson today is about whole grains, a fuel type called carbohydrates
3. **Main concepts:** whole grain flour versus white flour *(25 minutes)*
    a. What is a whole grain?
    b. Definition of processed
    c. Why we want to eat whole grains more often than highly-processed grains
4. **Activity:**
    a. students discover different types of whole grains
    b. Students "process" whole grains
5. **Review** *(2 minutes)*
6. **Optional food sample** *(5 minutes)*

Recommended Reading (Provided in training packet)

- The Carbohydrate Controversy *by Daryn Eller, Vegetarian Times*
- The Whole Truth About Whole Grains *by Sally Squires*

California State Standards met by grade

3rd grade:
Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations.
- Students will:
    Collect data in an investigation and analyze those data to develop a logical conclusion.

4th grade:
Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations.
- Students will:
    Follow a set of written instructions for a scientific investigation.

5th grade
Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials.
As a basis for understanding this concept:
- Students know that plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO_2) and water (respiration).

SCRIPT

Lesson #4:
Refueling with Whole Grains

Docent note:

1. Before starting the lesson, have ready the labeled baggie of wheat berries, an empty baggie, the coffee grinder and a baggie of white flour

a. PLEASE NOTE: the baggie of wheat berries will be used

i. As a prop to be passed around the classroom

ii. In the coffee grinder during the lesson milling demonstration

2. Hand out the grain diagram and the whole grain activity worksheet. The grain diagram will be used first.

Review –

Question: Who can remember from our last lesson why we want to eat beneficial fats?

Answers:
- Helps us concentrate and think clearly
- Fats help us feel satisfied longer
- It is a source of energy, so we can perform at our best all day
- Keeps our joints moving as in our knees or hands

Question: Who can name a type of low-quality fat often used in snack foods?

Answer: Hydrogenated or partially hydrogenated oil.

Question: Can anyone name a higher-quality fat they have started eating since the last lesson?

Today's lesson is about whole grains.

Today you will learn:
- How to identify whole grains and flour made from them
- Why we want to include them in our diets everyday

Question: Who can tell me what a grain is?

Answer: A grain is the seed part of certain plants which we use to make foods, such as bread, crackers, pasta, and even treats.

Question: Who can name some common types of grains that we find in many of the foods we eat?

Answers: Wheat, oats, rice, barley, rye, corn, spelt, quinoa, millet

Docent note: Write their choices on the board; include the answers above if they do not mention them.

Question: Which fuel type do grains belong in?

Answer: Carbohydrates

Question: When whole grains are all ground up into a powder, what is it called?

Answer: Flour

Flour is used to make all kinds of foods which we eat every day. A few examples of foods made from flour are bread, pasta, crackers, cookies and cereal.

When a grain is ground up and becomes flour, we call this "processed".

When something is processed, it is changed from its original source. USUALLY, when a food is processed, nutrients are taken away.

 *Docent note: Write on the board: processed = changing a food, usually by taking something away*

Let's take a look at the journey a grain goes through, starting from the farm when it is whole, and closest to its source through the different ways it can be processed into its final product, flour.

First we start out on a farm.

I need someone to come up and be our farmer.

 PROP *Hand farmer the stalk of wheat, explain that this is his/her crop*

Question: Can you tell me what type of grain you just harvested?

Answer: Wheat. This is a stalk of wheat.

Question: Now this is whole, and closest to the source. Farmer, can you just pop this into your mouth and eat it?

 *Docent note: try to ham this up act like you are going to eat it!*

Answer: No, it would be pretty chewy, and these spiky things might even hurt!

We need to change it into a form we can use and for that job I need a miller.

 *Docent note: call up another volunteer to be a miller*

To get to the actual wheat grain, the farmer sells his stalks of wheat to a person called a miller.

 PROP: *Instruct farmer to give wheat stalk to miller*

Question: Miller, can you show me which parts of this stalk you take off to get to the grains?

Docent note: The miller should point out the stem and the upper parts covering the grain. Have them use the stalk of wheat to demonstrate which parts need to be removed. Talk the miller through this part if necessary.

Here is what the grains look like when they have been removed. These are called wheat "berries."

PROP: *Hand farmer and miller the baggie of wheat berries. We want them to say they are very hard.*

Question: How do these feel to you?

Miller, I need you to pour some wheat berries into this grinder.

Docent note: Help student pour half of the bag into the coffee grinder. Seal bag before passing around.

Now I am going to pass around a bag of wheat berries so all of you can get a closer look at how hard they are. As you look at the wheat berries, I want you to notice their color and texture.

Docent note: Start the bag circulating around the classroom, making sure the kids pass it around as you talk.

Question: OK, these wheat berries are also whole, and very close to its source, (ask farmer and miller) can you just pop those grains into your mouth like nuts and eat them?

Answer: No, they are way too hard and would probably crack your teeth! Something has to happen first!

We need to either cook them in boiling water, like you do rice, or grind them up in a mill and make flour.

OK, miller, we need to grind up some of these wheat berries in our mill. Hold down the lid and mill for about 30 seconds.

Docent note: if you want you can talk about how a real miller has large machines that mill large quantities of grains at one time, etc…

Question: Before I pour these milled grains into a bag for you to see, class, what color do you think the flour will be?

Answer: Brown.

Docent note: Docent pours the ground up wheat into a baggie and holds it up for the class to see. Show bag to miller and farmer first, then start the bag at one end of the class to be passed around to everyone.

Question: Why do you think this flour is brown and not white, like we are used to seeing?

Answer: It is brown because we used the whole grain. These grains are minimally processed. We changed the whole wheat berry by grinding it, but we did not take anything away!

Docent note: on the board write "minimally-processed = slightly changed with little or nothing taken away".

Docent note: thank miller and farmer and have them sit down

As you look at our freshly ground flour, I want you to look at the different colored flakes and the coarse texture.

What you are seeing as you look at this flour is the 3 different parts of the grain.

Look at the side of your handout with the diagram of a grain.

All grains, no matter what kind, have 3 parts: a bran covering, a germ and an endosperm.

Docent note: use your copy of the diagram of the grain to walk them through this

The parts of the grain which are most beneficial are the bran and the germ. The bran and germ hold the vitamins, minerals and fiber, and are also what make the flour you are looking at brown in color.

Question: Looking at your diagram, who can guess which parts of the whole grain the miller takes away to create white flour?

Answer: He takes away the bran and the germ which contain the nutrients, leaving only the white endosperm.

Remember our definition of "processed?"

Question: Who would like to read this definition to the class?

Docent note: Volunteer should read what you wrote on the board: "processed = changing a food, usually by taking something away".

So, in the case of white flour, the miller not only changed the look, and the feel of the grain, but he also TOOK SOMETHING AWAY - the beneficial parts.

Question: So when our miller ground up the wheat berries, what do you think happened to the nutrients? Did they disappear?

Answer: NO! They are all still there: the miller took nothing away, he/she only changed the way they look and feel by grinding them up. This is a very high quality source of grains.

PROP: *Hold up bag of white flour for this part*

Question: Who can tell me something you either cooked or ate recently with white flour?

Answers: Cookies, breads, biscuits, muffins, cereal, crackers, cake...

PROP: *Start the bag at one end of the class to be passed around to everyone.*

This type of flour's texture is a lot softer and finer than whole wheat flour, which is what makes our treats and white bread soft and chewy. And, in some baked goods, we use white flour to make the food taste and look a certain way.

Question: Do we get the nutrients our bodies need if we were to ONLY eat foods made from white flour?

Answer: No.

Here are 2 reasons you want to eat foods made with the whole grains MORE OFTEN than those made with only white flour:

1. Whole grains have all their original vitamins, minerals and fiber which are beneficial to our body.
2. Whole grains make us feel full longer, and give us longer-lasting energy.

When we only choose snacks made with white flour, it's like filling up a car with a hole in the gas tank. You run out of gas really quickly. Your stomach digests these "white" foods really fast, leaving you feeling tired and hungry sooner.

Eating and baking foods with white flour is perfectly fine. Just remember, it is important to try to eat foods that contain whole grains and whole grain flour MORE OFTEN.

I think you understand about whole grains and where flour comes from. Now let's see if you can identify different kinds of whole grains.

Wheat is the most familiar grain in the United States, but there are many others that other countries rely on.

Question: Who knows which grain is eaten in China at almost every meal?

Answer: Rice.

I am dividing you into groups.. Together you are going to discover different types of grains using the activity sheet on the back side of the grain diagram and six grain props.

Docent note: Create the groups based on where the kids are sitting so if possible, no one has to move from their desks. You know your classrooms best, so think about this before you go in.

We have 6 bags of grains, each labeled with a clue and a letter. When your group receives a set of grains, read the clue, look at the grains, and identify the grain on your sheet with the letter from the bag.

PROP: *Six different whole grains bagged and labeled with clues for activity*

Directions for grain activity:

- Give kids 1-2 minutes to look at each bag of grains and record their answers.
- Rotate the grains until all groups have gone through all 6 different grains.

Let's review the answers to the activity.

Docent note: (optional if there is time: call on groups to get their answers and involve them a little more)

See answer sheet to review clue and give answer

1. **d** rolled oats – minimally processed
2. **f** whole oats (groats)
3. **e** quinoa
4. **a** brown rice
5. **b** polenta or corn meal
6. **c** buckwheat – really a seed, not a grain - not even part of the wheat family

Docent note: groats are whole oats. Rolled oats are made from the oat groats that are extracted from the oat grain, the tough outer hull is removed and the grain is run through an oat roller creating flat rolled oats

Let's review today's lesson:

- You learned
  - Processed means a food has been changed from its original source, often with some parts taken away
  - how grains are processed to make whole wheat flour and white flour

- Why do we want to try to eat whole grain foods more often than white flour foods?
  - Whole grains are packed with vitamins, minerals and fiber which are all beneficial to our bodies
  - the other reason is whole grains make us feel full longer, and give us longer lasting energy.

Docent note: optional activity if time permits

Docent directions for milling activity

- Use the baggie of whole wheat berries that was passed around the class
- Adds all the grains to the mill (this will be used for all the kids)
- Docent selects one group at a time come to the mill
- Students take turns holding down the grinder for a few seconds each
- Show each group the progress of the milled grains, discussing how the texture gets finer after each group

You were outstanding and learned a lot today!

- Look for whole grains in your food
- Be adventurous, try a new whole grain
- Share your Grill Me About handout with your family. Check out the whole grain oatmeal recipe and more facts about whole grains.