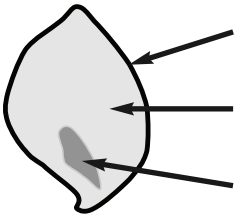
Chapter 9
Grains

Wheat, rice, corn, oats, barley and rye are all ***grains*** (plants that belong to a family of grasses). Grains are used to make foods like bread, breakfast cereal, rice and pasta. These products can be made from whole grains or processed grains. Whole grains have three parts called the bran, endosperm and germ. The ***endosperm*** contains carbohydrates. The ***bran*** and ***germ*** are full of vitamins, minerals and fiber. Sadly, the bran and germ are removed from processed grains. Processed grains are left with mostly endosperm. Most Americans need to eat more whole grains.

Enjoy learning about brainy grains!



Bran: Vitamins, minerals, fiber and some protein

Endosperm: Carbohydrates and some vitamins, minerals and protein

Germ: Vitamins, minerals and fat

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Selecting Cereal

Did you know some breakfast cereals are healthier than others?

Almost half of all Americans start their day with a bowl of cereal. However, some people choose healthier cereals than others. Eating whole grain breakfast cereals is a great way to fuel your body for the day.

Whole grains have all three healthy parts of the grain including the bran, endosperm and germ. Cereals made from whole wheat, rice, corn or oat grains are full of starch, fiber, vitamins and minerals. ***Starch*** gives you energy for the day. ***Fiber*** keeps your digestive system clean and healthy. And ***vitamins*** and ***minerals*** are needed to keep you healthy.

Sadly some cereals are not made from whole grains and may have too much added sugar. In fact, 816 million pounds of sugar are added to breakfast cereal each year. That's a lot of sugar. You can use the Nutrition Facts label to help you choose healthier cereals. Look for cereals with more fiber, less sugar and whole grain ingredients. If a whole grain is an ingredient, you'll see the word "whole" before the grain on the ingredient list. For example, look for "whole wheat" or "whole grain rolled oats" on ingredient lists. In today's lesson, you will practice choosing healthier breakfast cereals.

Doodle Bugs

In the reading, circle the three parts of a whole grain.

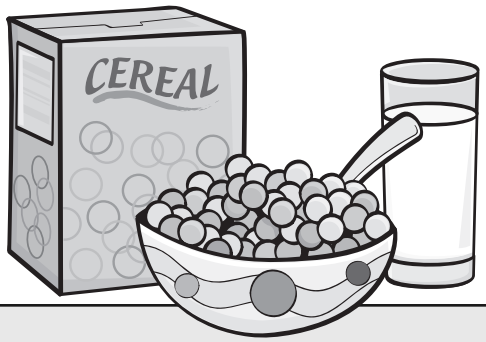
Underline the sentence that tells what you should look for in a healthy cereal.

Which is a whole grain choice? (Circle one.)

Wheat Whole wheat Multi-Grain

SCIENTIFIC INQUIRY:

Label Logic



Your class will need:

24 plates
1 box Wheat Squares
1 box Toasted O's
1 box Shredded Wheat (Frosted)
1 box Corn Flakes (Frosted)
1 box Frosted O's

Look at the Nutrition Facts on the food labels. Fill out the table below.

Cereal Nutrition Facts

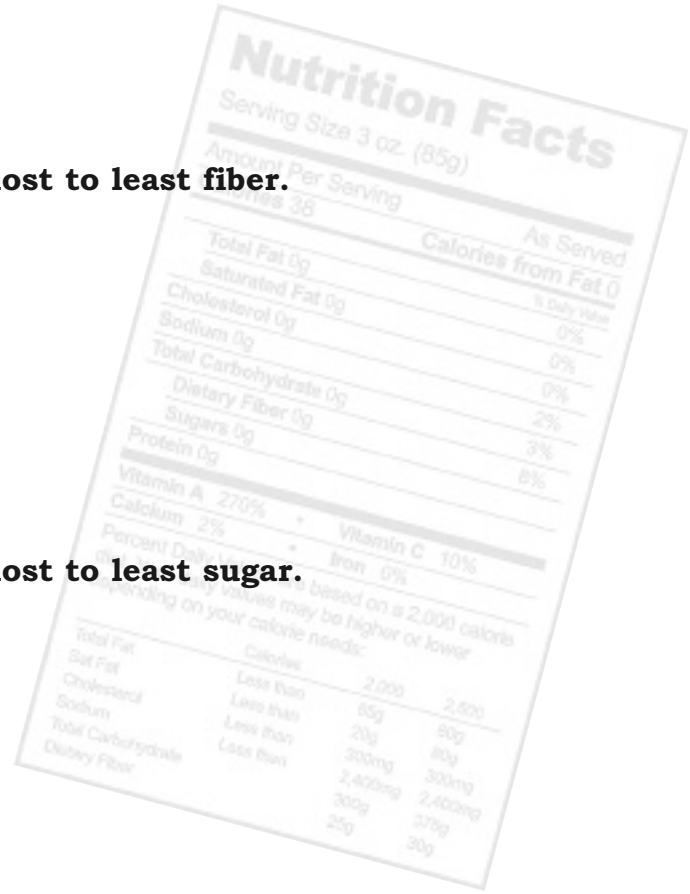
Type of Cereal	**Calories** (per serving)	**Fiber** (grams per serving)	**Sugar** (grams per serving)	**Are there any whole grain ingredients?** (Yes or No)
Wheat Squares				
Toasted O's				
Shredded Wheat (Frosted)				
Corn Flakes (Frosted)				
Frosted O's				

Circle the cereal with the least sugar.

Put a star by the cereal with the most fiber.

SCIENTIFIC INQUIRY:

Label Logic (continued)



1. List the cereals in order from most to least fiber.

1. _____
2. _____
3. _____
4. _____
5. _____

2. List the cereals in order from most to least sugar.

1. _____
2. _____
3. _____
4. _____
5. _____

3. Which cereal do you think is the healthiest choice? Why?

Tasting Time:

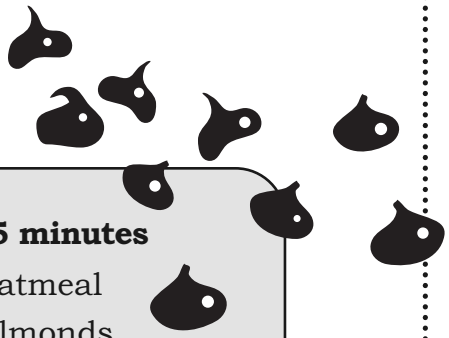
Taste each cereal.

4.Which cereal do you like best? Why?

5. Do you think it's a healthy cereal? Why?

TRY THIS AT HOME:

Crunchy Munchy Cereal Bar



You will need:

1/2 cup chocolate chips (semi-sweet)
3 tablespoons butter
1/4 cup peanut butter
1 1/2 cups crisp rice cereal
1 cup uncooked oatmeal
1/4 cup toasted almonds (optional)

PREP TIME: 20-25 minutes

Help from an adult

Enjoy a crunchy munchy whole grain snack!

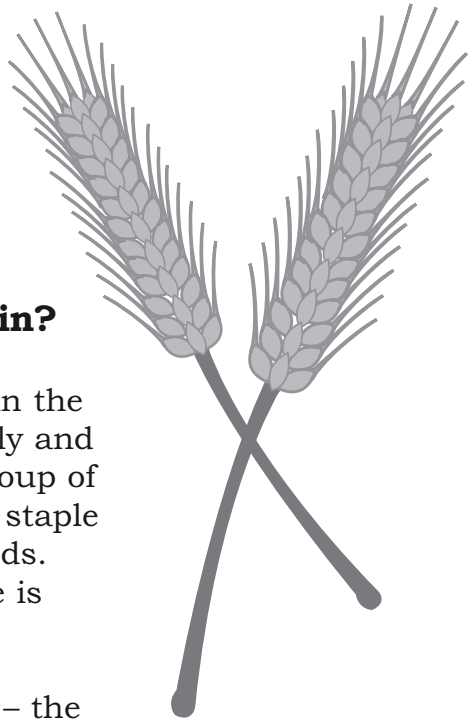
1. Put chocolate chips, butter and peanut butter in a heavy saucepan.
2. Gently melt by heating over medium heat on the stovetop. Stir frequently.
3. Once everything is melted, stir in cereals and nuts (if you want).
4. Carefully spread mixture evenly into an 8-inch by 8-inch by 2-inch pan coated with cooking spray.
5. Let cool and cut into 8 bars.

SERVING SIZE: 1 bar

Fun Fact

Nutrition experts recommend making half of your grains whole. This means you should eat about 3 whole grain foods a day. This cereal bar makes a delicious whole grain breakfast or snack!

Rice Review



Did you know brown rice is a whole grain?

Rice is a ***staple food*** for over half the people in the world. A staple food is a food that is eaten daily and provides most of the nutrients needed for a group of people. In the United States, wheat bread is a staple food. In Mexico, beans and corn are staple foods. Yams are a staple food in West Africa. But rice is the most common staple food in the world.

Brown rice is unprocessed. It has all its parts – the bran, endosperm and germ – so it's a whole grain. Brown rice is a little crunchy and tastes kind of nutty. Processed rice is called polished or white rice. The bran and germ are taken taken away to make it white. Nutrients and fiber are lost when the bran and germ are removed. Many Americans eat white rice more often than brown rice, but brown rice is healthier. Brown rice has more fiber and other nutrients. Today you will cook and taste brown rice.

DOODLE BUGS

In the reading, circle examples of staple foods.

Draw a box around the three parts of a whole grain.

Underline the sentence that tells what else is taken away when the bran and germ are removed from rice.

SCIENTIFIC INQUIRY:

Nice Rice

Your class will need:

Double burner hot plate	Food scale
1 liquid measuring cup	Timer or clock
1 set dry measuring cups	1 serving spoon
1 pot with lid	24 plates & 24 forks
Plastic bowl	1 package instant whole grain brown rice

Read the measurements and directions on the brown rice package. Fill in the table below to make 4 servings of rice.

Rice Cooking Facts

	Amount of Rice (cups)	**Amount of Water** (cups)	**Cooking Time** (minutes)	**Standing Time** (minutes)
Brown rice				

Use the amounts from the table above to make 4 servings of rice. Then record your findings in the Rice Facts table.

1. Measure the water and pour it into the pot. Bring water to a boil.

2. Measure the rice.

3. Place an empty bowl on the food scale and zero the scale. Add the measured rice to the bowl and weigh the uncooked rice. Record the weight.

4. Follow the rice package directions to prepare 4 servings of rice. Be sure to set a timer or watch the clock closely.

5. Let the rice cool slightly. Then weigh the cooked rice. Record the weight.

6. Study a piece of uncooked rice and a piece of cooked rice. Describe the color, size, shape and feel of each piece of rice. Then draw a picture of each piece of rice.

SCIENTIFIC INQUIRY:

Nice Rice (continued)

Rice Facts

Rice Type	Weight (grams)	Description (color, size, shape, feel)	Picture of Rice
Uncooked brown rice			
Cooked brown rice			

What happened to the water when you cooked the rice?

Do you think one piece of uncooked or cooked rice weighs more? (Circle one.)

Uncooked Rice Cooked Rice

Why do you think it weighs more?

Tasting Time:

Taste the cooked rice and circle the face that shows how well you like or dislike the rice.

WHILE YOU WAIT:

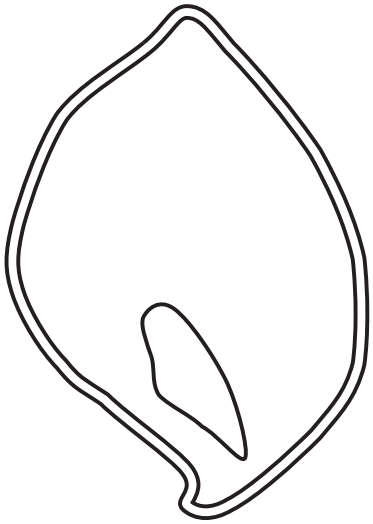
Main Grain

You will need:

Colored pencils

Brown rice is a whole grain. Experts say that half of the grain foods we eat should be whole grains.

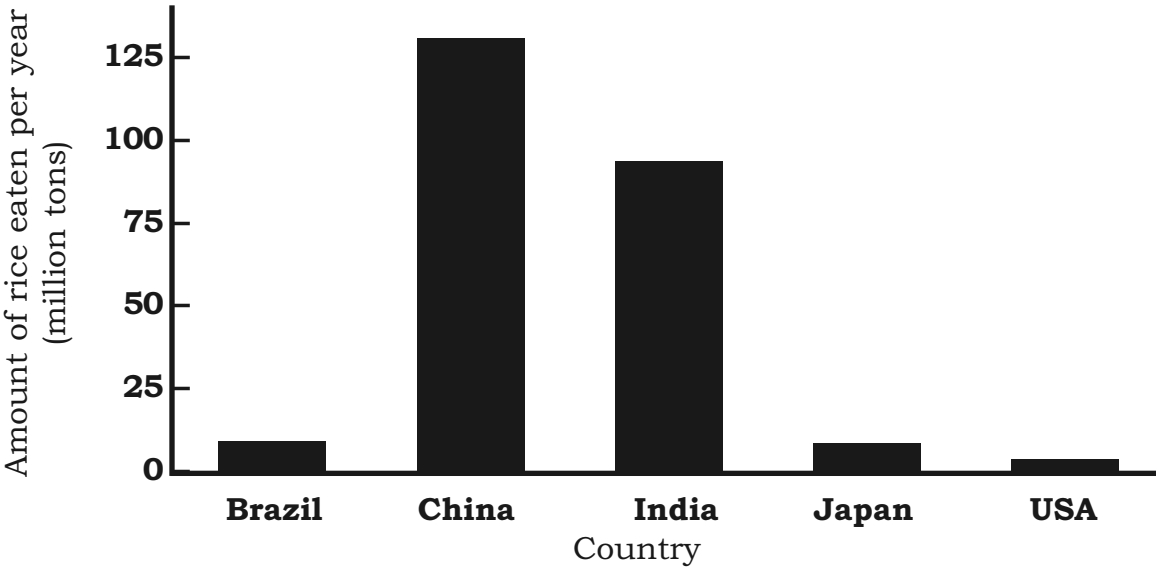
1. **Color the whole grain rice:**
   Color the bran brown.
   Color the endosperm orange.
   Color the germ yellow.



2. **Now draw and color a processed rice or white rice grain.** (Remember which parts are removed.)

WHILE YOU WAIT:

Main Grain (continued)



Source: http://www.irri.org/science/ricestat/data/may2008/WRS2008-Table17-USDA.pdf

Use the graph to help you answer the next questions.

3. Which country eats the most rice each year?

a. How much rice do they eat a year? (Circle one.)
   1. 128 million tons
   2. 4 million tons
   3. 90 million tons
   4. 25 million tons

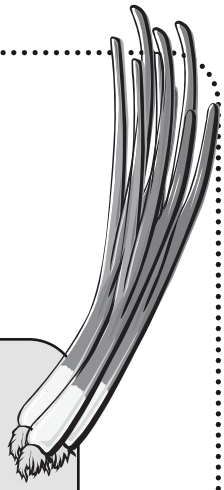
b. Do you think rice is a staple food in this country? Why?

4. Which country eats the least rice each year?

a. How much rice do they eat a year? (Circle one.)
   1. 128 million tons
   2. 4 million tons
   3. 90 million tons
   4. 25 million tons

TRY THIS AT HOME:

Bountiful Brown Rice Casserole



You will need: **PREP TIME: 30 minutes**

2 1/2 cups cooked brown rice
1 cup low-fat cottage cheese
1/2 cup skim or 1% milk
1/4 cup freshly grated parmesan cheese
1/2 teaspoon Dijon mustard or regular mustard
4 green onions, chopped
1 teaspoon dried dillweed
Nonstick cooking spray
Help from an adult

There is a new rice in town!

1. Combine cooked rice, cottage cheese, milk, parmesan cheese, mustard, green onions and dillweed in a mixing bowl.

2. Stir gently until well blended.

3. Pour into a casserole dish sprayed with nonstick cooking spray.

4. Bake at 350 degrees Fahrenheit in the oven for 15 to 20 minutes.

SERVING SIZE: ½ cup, serves 6

Quick Fix:
To make whole grain rice really fast, buy "boil in the bag" brown rice. It makes a great dinner side dish.

Fun Fact

Eat three ounces of whole grain foods a day. Try eating brown rice (1/2 cup servings) instead of white rice to get on your way to 3 whole grains a day!

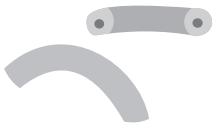
Pasta Perfection

Did you know whole wheat pasta is better for you than regular pasta?

Pasta is eaten all over the world, but people in Italy eat the most pasta. Each person in Italy eats about 62 pounds a year. That's about the weight of some third graders. In America, people eat much less pasta, but each person still eats about 20 pounds a year.

Pasta can be long, skinny strands of spaghetti or short bent tubes of ***macaroni***. There are even wheel shaped pasta called ***rotelle*** and bow tie shaped pasta called ***farfalle***. Some kinds of pasta, like ***ravioli,*** are stuffed with meat or cheese. No matter how different the sizes and shapes, most pastas are made from the same basic ingredients, flour and water.

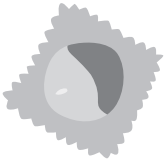
Spaghetti



Macaroni

Rotelle

Farfalle



Ravioli

First, you mix flour and water to create dough. You might add eggs and oil too. Then you shape the dough by rolling it flat and cutting it into different shapes. You can also shape dough using a pasta machine. Regular pasta is made from processed white flour. Whole wheat pasta is made from whole wheat flour. Regular pasta is lower in fiber and it has to be enriched with vitamins and minerals. Whole wheat pasta is healthier because it has more fiber, vitamins and minerals. Today you will cook and taste regular pasta and whole wheat pasta.

DOODLE BUGS

In the reading, circle the different types/shapes of pasta.

Which type/shape of pasta is your favorite? Why?

Draw a box around the basic ingredients used to make pasta.

Underline the sentence that tells why whole wheat pasta is healthier for you.

SCIENTIFIC INQUIRY:

Cooking Pasta

Your class will need:

2 large pots	1 medium pot
Liquid measuring cup	1 serving spoon
1 set measuring spoons	24 plates
Double burner hot plate	24 forks
2 timers	Water
2 stirring spoons	Salt
Colander or strainer	16-ounce box regular pasta
Hot pad holders	16-ounce box whole wheat pasta
Tongs	26-ounce jar pasta sauce

1. Fill two pots with 2-4 quarts of water.

2. Add 1/4 teaspoon of salt to each pot.

3. Heat water over medium-high heat. Bring the water to a rolling boil.

4. Read the pasta boxes for cooking times.

   Regular Pasta Cooking Time: _____ **minutes**

   Whole Wheat Pasta Cooking Time: _____ **minutes**

5. Break the regular pasta in half and carefully drop it into one pot. Start a timer.

6. Break the whole wheat pasta in half and carefully drop it into the second pot. Start a timer.

7. Use the stirring spoons to occasionally stir the pastas so they don't stick.

8. When the timers ring, the pastas should be done. Use the colander or strainer to drain the water from each pot.

SCIENTIFIC INQUIRY:

Cooking Pasta (continued)

9. Use the tongs to place a small amount of each kind of pasta on everyone's plate.

10. If desired, heat spaghetti sauce in the medium pot. Top the pasta with spaghetti sauce.

Tasting Time:

Taste each kind of pasta and fill in the following table. Be sure to list the color and how the pasta looks under appearance. Use descriptive words like nutty, salty and sweet to write about the taste of each pasta.

Regular and Whole Wheat Facts

Pasta Type	Appearance (size, shape and color)	Taste
Regular pasta		
Whole wheat pasta		

WHILE YOU WAIT:

Brainy Grains

You will need:

Food label for regular pasta

Food label for whole wheat pasta

Practice Problems:

1. 1 box of spaghetti costs $1.00. There are 5 servings in one box. How much does one serving of spaghetti cost?

2. 1 box of macaroni costs $1.80. There are 6 servings in one box. How much does one serving of macaroni cost?

Look at your pasta food labels and fill in the table below.

Pasta Facts

Pasta Type	**Cost** (one box)	**Serving Size** (cups)	**Servings Per Box**	**Calories** (per serving)	**Fiber** (grams per serving)
Regular pasta					
Whole wheat pasta					

WHILE YOU WAIT:

Brainy Grains (continued)

Use the Pasta Facts table to help you answer the questions below.

1. How much does one serving of regular pasta cost?

2. How much does one serving of whole wheat pasta cost?

3. How much more does one serving of whole wheat pasta cost than one serving of regular pasta?

4. If there are 140 spaghetti noodles in one box of spaghetti, then how many noodles are in each serving of spaghetti?

5. You need 25 grams of fiber per day. If you only ate pasta for a day. . .

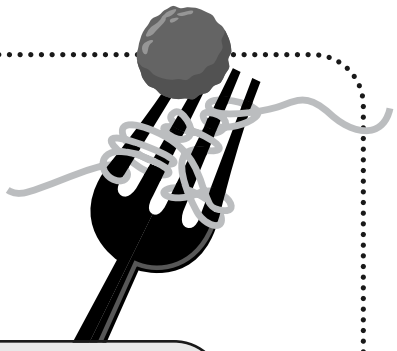
a. How many servings of regular pasta would you need to eat to get 25 grams of fiber?

b. How many servings of whole wheat pasta would you need to eat to get 25 grams of fiber?

Challenge:

You need 25 grams of fiber per day. If you only ate pasta for a day. . .
How many cups of whole wheat pasta would you need to eat to get 25 grams of fiber?

How many cups of regular pasta would you need to eat to get 25 grams of fiber?



TRY THIS AT HOME:

Snazzy Spaghetti and Meatballs

You will need:

3/4 pound extra-lean ground beef or turkey

1/3 cup uncooked quick oatmeal

1 teaspoon dried oregano

1/2 cup finely chopped onion

1 garlic clove, crushed

PREP TIME: 25 minutes

1/4 cup fresh parsley, chopped

8-ounces whole grain spaghetti

2 1/2 cups marinara sauce (low sodium)

1/4 cup canned tomato sauce (no-salt added)

Get going with whole grains!

1. Preheat oven to 400 degrees Fahrenheit. Spray cookie sheet with nonstick cooking spray.
2. Place a large pot of water on the stove and bring it to a boil.
3. Crumble ground beef into a large mixing bowl. Add oatmeal, oregano, onion, garlic, tomato sauce and parsley. Combine ingredients thoroughly by mixing with your fingers or with a fork.
4. Make about 20 meatballs by rolling meatball mixture into 1-inch balls and placing on a cookie sheet. (Be sure to always wash your hands after touching raw meat and sanitize all surfaces or utensils that touch raw meat.)
5. Bake in the oven for 16-20 minutes, turning once in the middle of cooking.
6. Once the pot of water boils follow the directions on the spaghetti package to cook the spaghetti.
7. Heat the marinara sauce in a medium saucepan. Add the cooked meatballs to the sauce and simmer until the pasta is ready.

SERVING SIZE: 1/2 cup

Fun Fact

Spaghetti gives your body carbohydrates. Carbohydrates give you energy for running and playing sports. Spaghetti is a great meal the night before your big game! You need to eat about 5-6 ounces of grain foods a day.

Proficiency Questions

Circle the best answer:

1. Which ingredient is a whole grain?
a. cracked wheat
b. milled corn
c. whole rolled oats
d. white rice

2. Which nutritious thing do you get from eating whole grain cereals?
a. fiber
b. saturated fat
c. zinc
d. all of the above

3. What is a staple food?
a. a new popular food item
b. an unpopular food item
c. a food item eaten daily that provides lots of nutrients
d. a food item eaten only on special holidays

4. What are the parts of a whole grain? (Choose one.)
a. the endosperm and germ
b. the bran and germ
c. the bran, endosperm and flour
d. the bran, endosperm and germ

5. Why is whole wheat pasta healthier than regular pasta?
a. it has less fiber
b. it has more fiber
c. it has less salt
d. it has more salt

6. Which ingredients are mixed to make pasta?
a. water and flour
b. flour and sugar
c. cornstarch and sugar
d. cornstarch and flour