

EXPLORATIONS

for *The Science of Food Teacher's Guide* and *The Mysterious Marching Vegetables* storybook.

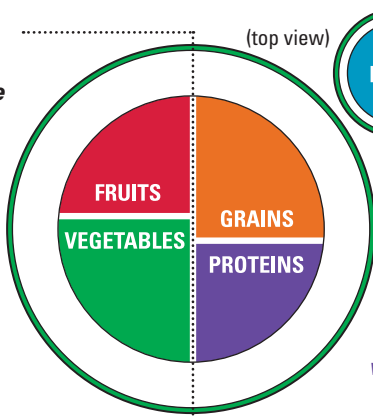
Which food selections are healthy choices for your plate?

Make a list of the food items shown, beginning with "1. Chicken." Next, read the "Food Groups" list. Decide which foods fit within each dish or section of the plate and record your answers. (The "dairy" dish could be a glass, bowl or saucer.) Remember, some foods fit in more than one group!

Make half of your plate fruits and vegetables.

Select whole fruit over juices.

Try raw crunchy vegetables.

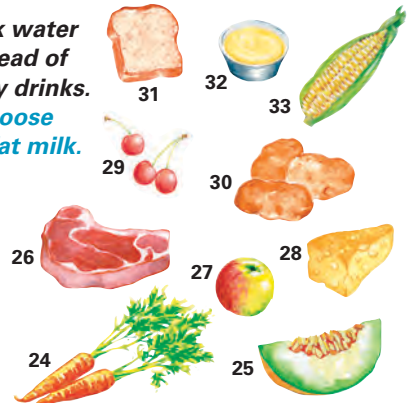
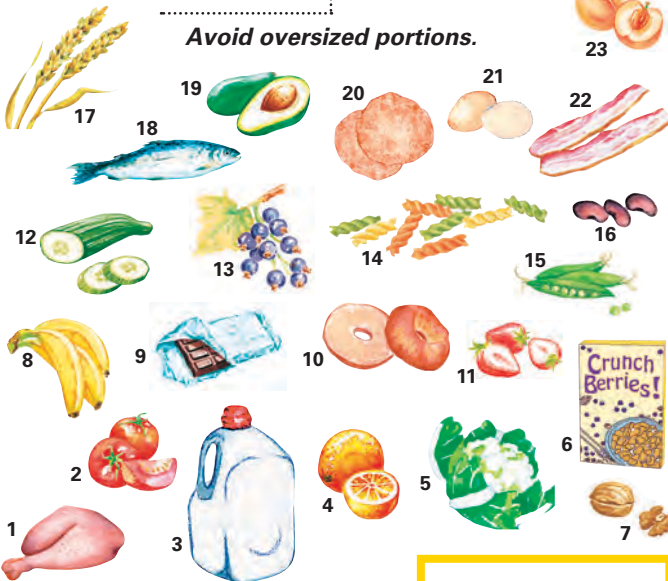


Avoid oversized portions.

Drink water instead of sugary drinks. Choose low-fat milk.

Make half your grains whole.

Go lean with protein!



FOOD GROUPS

FRUITS: Any raw or cooked fruit, dried fruit, or 100% fruit juice.

VEGETABLES: Any raw or cooked vegetable, or 100% vegetable juice.

DAIRY: Low-fat milk, soymilk, yogurt, or cheese.

GRAINS: Bread, mini bagel, muffin, tortilla, crackers, popcorn, cold cereal, or cooked pasta or other grain, like oatmeal.

PROTEINS: Meats, poultry, seafood, dried beans, nuts, tofu, hummus, or peanut butter.

FATS AND OILS: Use healthy liquid fats, such as olive or canola oil.

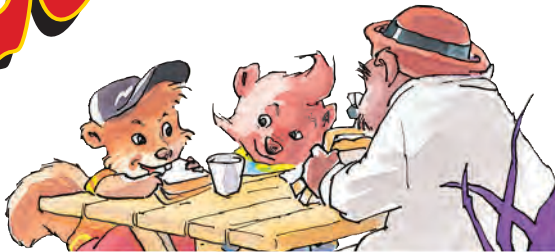
EMPTY CALORIES: Eat just small amounts of foods with high levels of sugar or solid fats, such as butter.

Enjoy your food, but eat less.

Let's Talk

about...

The



Fuel for Minds and Bodies. When you had breakfast, you probably weren't thinking about powering your brain and your body, but that's exactly what your meal was doing. Food gives your body the fuel and raw materials it needs every day, especially in the morning.

Calories are units used to measure energy in food. A calorie is defined as the amount of heat necessary to warm a kilogram of water (about one liter) by one degree Celsius.



Just like a car needs gasoline, you need energy to move, think and grow. The usable energy you get from food is measured in calories. The more calories a

food has, the more energy it can supply. The amount of calories a person needs each day depends on his or her size, age and level of activity. The body stores extra calories as fat, which can be used later. It is important to have some body fat, but too much fat is unhealthy.

Of course, food provides more than just energy. It supplies building materials, such as proteins and minerals, for muscles, bones

and other body parts. Food also has vitamins that help make energy available for muscles and the brain, and make other body functions possible.

Sun Power. One way or another, all food on Earth comes from green plants and their relatives that capture energy from the sun. They do this through a process called photosynthesis. The word photosynthesis means to make something new ("synthesis") from light ("photo"). Plants make all their own food from sunlight, water, air and nutrients in soil. Organisms that make their own food from light energy are called producers.



Animals are called consumers, because they are not able to make their own food. Instead, they get the energy and other materials they need by eating plants or other animals.

Some organisms, like various members of the fungus kingdom (mushrooms and their relatives), get all of their nutrients from pieces of dead plants and animals in soil. These organisms are known as decomposers. Many microbes, tiny organisms too small to see without a microscope, also live off rotting things.



Food We Eat



Microbes, such as bacteria, are found everywhere. Some microbes are helpful, but others can make people sick. Sometimes, harmful microbes even can be found on or growing inside food.

Food that is Safe to Eat. Most of the food you eat is grown on farms far away from your community. It is transported over long distances to reach your grocery store.

Tips for Healthy Living

- **Eat a variety of foods, including plenty of vegetables, fruits, and grain products, such as pasta, cereals, tortillas and breads.**
- **Don't eat too many sugary foods.**
- **Eat less of foods that have a lot of butter, lard, oil or other fats.**
- **Wash hands with soap and warm water before preparing food and after using the bathroom, changing diapers or handling pets.**
- **Rinse fruits and vegetables under running tap water before eating or cooking them.**
- **Wash knives, cutting boards, utensils and cooking areas with soap and hot water.**
- **Avoid using the same knives and cutting boards for different raw foods, especially meats, fish and poultry.**
- **Cook eggs, chicken, turkey, meats and fish until they are well done.**
- **Refrigerate fresh foods and leftovers promptly.**

Most of the food in stores is either packed in boxes, cans and jars, or kept cold or frozen to prevent it from spoiling. Food spoils when too many bacteria and other microbes are growing on it. Eventually, this food will rot and smell bad. Sometimes, however, even food that looks and smells okay may not be safe to eat.

Cooking food kills bacteria and other microbes that can make you sick. It also makes food easier to digest.

Many food packages are printed with words like “use by,” followed by a date. This information is provided to help you know whether foods are still good to eat. Foods that are old may have too many bacteria or other microbes.

It's important to wash your hands after using the bathroom or before preparing food. Microbes on your hands could end up in your meal! They also can end up on knives, spoons, cutting boards and other things you use to prepare food.

Sometimes, you hear about people getting “food poisoning.” This means that they got sick from microbes in food. Keep yourself safe by following the “Tips for Health Living.”



Look for more information about food and food safety on the Internet at:
www.choosemyplate.gov
www.myfoodapedia.gov
www.foodsafety.gov

From the Label to the Table!



Beginning in 1994, the U.S. government began requiring manufacturers to put information about nutritional value on food labels. You can use this information to make better choices about what you eat.

What is in food?

Food provides your body with all of the materials it needs to grow, and to be healthy and active. These are some of the building blocks in food.

CARBOHYDRATES are the body's main source of fuel. Starchy foods like breads, spaghetti, rice, potatoes, corn and cereals are made up mostly of carbohydrates. Sugary foods like candy, jelly and syrups also are carbohydrates. Some carbohydrates, called fiber or roughage, are hard to digest. They help move waste through the digestive system.

FATS include butter, margarine, lard, shortening and cooking oil. Cheese, cream, chocolate, some meats and many desserts have a lot of fat. Fats are very concentrated sources of energy, so only a little is needed.

PROTEINS are important for growth and repair of the body. Protein-rich foods include eggs, milk products, meat, dried beans, chicken, turkey and fish. The body also can use protein as fuel for movement and growth.

MINERALS are found in small amounts in foods. They are needed for many of the body's functions. For example, calcium is used to build bones and

Pay close attention to serving sizes.

Look for foods with lower levels of saturated fats.

This tells you how much salt is in food.

Calcium is important for bones and teeth.

Use this section as a guide for daily planning.

The amount of calories a person needs each day depends on many factors, including exercise.

teeth, and also is important for muscles and the nervous system. Iron becomes part of red blood cells.

VITAMINS are other chemicals found naturally in food. They are needed in very small amounts by the body.

Did you know that **WATER** also is a major part of almost all food?

Nutrition Facts

Serving Size 1/2 cup (114g)
Serving Per Container 4

Amount Per Serving

Calories 90 Calories from Fat 30

0% Daily Value*

Total Fat 3g **5%**

Saturated Fat 0g **0%**

Cholesterol 0mg **0%**

Sodium 300mg **13%**

Total Carbohydrate 13g **4%**

Dietary Fiber 3g **12%**

Sugars 3g

Protein 3g

Vitamin A 80% • Vitamin C 60%

Calcium 4% • Iron 4%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories:	2,000:	2,500:
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

Products labeled "light" or "lite" must have 1/3 fewer calories or 1/2 the fat of the foods to which they are compared. "Light" also can mean that salt has been reduced by one-half.

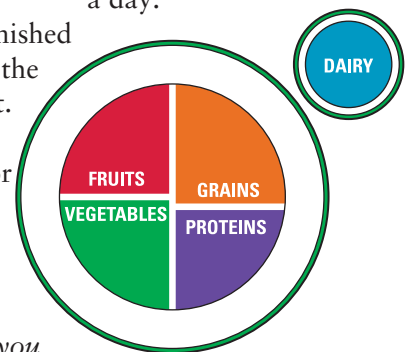
Look for products that have more fiber and less sugar.

Vitamins and minerals help your body function properly.

Make a food diary for each member of your family. Leave spaces to record the foods and approximate amounts eaten. *This is where estimation skills come in handy!* Ask each person to complete the diary over the course of a day.

Compare the finished food diaries with the dishes to the right. (The small dish could be a glass or saucer.) *Did each person get what he or she needs from every food group? How did you do? What recommendations can you make?*

Eating a healthy diet doesn't mean giving up your favorite foods. Just balance your food choices and eat smaller amounts of oils, fats and sweets.



We Can Make A Difference!

We are students at MacArthur Elementary School in Galena Park, Texas. We are learning about nutrition and food safety.



We washed our hands before starting.



We included some healthy ingredients.



We measured,



and mixed,



and shaped the cookies.



We had a nutritious snack of healthy cookies and milk.



We put the extra cookies in covered containers in the refrigerator.



We cleaned everything with soap and water.

CHOCO-CRUNCH COOKIES

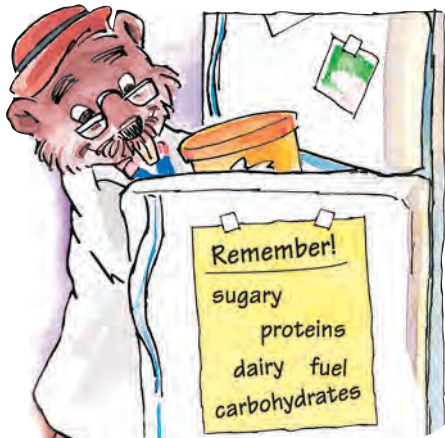
1 cup sunflower seeds
1 cup raisins, chopped
1 cup mini-chocolate chips or large chips, chopped in blender
¼ cup rice crispies
¾ cup peanut butter topping
½ cup powdered sugar or 1 cup coconut

Mix all ingredients together. Form into 1-inch balls by pressing the mixture firmly together with clean hands. Gently roll in either powdered sugar or coconut. Cover and refrigerate any leftovers.



Food For You!

Here is a poem about how to fuel your body. Some words have been left out. Read the poem and fill in the missing words as you go. Choose the right word for each space



from the words on Mr. Slaptail's "Remember!" list. The last word is *not* on the list. Guess what it is, and you will know everything the right foods do for you!

Mom says eat your veggies.
Dad says eat your fruit.
At least five servings daily
of flowers, stems and roots.

Now add nutritious _____ foods
to make strong teeth and bones.
There's chocolate milk and cheeses,
and even ice cream cones!

Breads and rice and cereals,
tortillas, pastas, too;
essential _____
the basics just for you.

Beans and seeds build muscles,
so do fish and chicken.
These _____ help you grow up strong,
and keep your body tickin'!

If you'd like some candy,
or other _____ treats,
only have one serving.
Hey, watch how much you eat!

The foods you choose as _____
help take you through the day.
Food gives you all the things you need
to think and work and _____.

How much fat is hidden in your favorite foods?

Try this!

1. Cut a grocery bag to make a large flat sheet.
2. Fold the sheet to make at least eight equal squares.
3. In each square, write the name of a food you would like to test for fat content.
4. Predict whether each food has fat by writing **FAT** or **NO FAT** on the edge of each square.
5. Find and place similar-sized pieces of food on the squares with their names.
6. The next day, remove the foods and check for fats by holding the sheet up to the light. If any squares are dark and shiny, oil has soaked into the paper and made them translucent. The more oil on the brown paper, the more fat in your food. *Were there any surprises?*



Not Such A New Issue . . .

People always have looked for ways to keep their food from spoiling while it is stored. One way is to remove most of the water from food by allowing it to dry, or **dehydrate**. The ancient Egyptians, native American groups and even early American settlers dried foods to keep them for longer periods of time. Dehydration makes it harder for microbes to grow on food and cause it to spoil. It also makes food lighter and easier to store and transport.

Today, we still dry foods to preserve them. For example, most foods for astronauts are dehydrated (see photo, above). *Can you think of more examples?*



Photo of bags of Space Station food courtesy of NASA.



Rosie and Riff talk to...

Marta Fiorotto, Ph.D.

Growth Biologist

What do you do at your job?

I study the influence of diet on growth in babies. Also, I'm working to learn more about how to promote muscle growth in children. One of the most interesting parts of my job has been to develop a machine that compares levels of muscle and body fat in babies who are breast fed with those levels in babies who are fed baby formula.

How did you decide to do this kind of work?

I grew up in a remote part of Tanzania, in Africa. My family lived on a farm, where we grew coffee and corn, so much of our lives revolved around the table and food. Also, I noticed that other children I met often seemed small and unhealthy. I began to understand that many of these children did not get enough milk and were malnourished. Ever since, I have been interested in nutrition and its role in maintaining good health.



Have you always been interested in science?

Yes. From the time I was young, my father showed me how things worked. Without knowing it, he taught me many fundamental science concepts, which made me inquisitive at a very early age. In fact, sometimes I think my whole life has been an ongoing experiment!

What do you like most about your work?

I'm always learning new stuff. It's exciting, like a detective story. You start with a question, or a mystery, and you have to use your wits and knowledge to solve it.

Is there anything else you would like to tell our readers?

Be curious about everything. Take nothing for granted. And remember that your health and dietary habits today will affect you later on in life. We all need to take a role in caring for ourselves and our planet.



Teeth are alive. Even though the outside of your teeth seems very hard, it can be attacked by bacteria that cause decay. The slime you feel on your teeth in the morning is made mostly of bacteria. *YUCK!*

Use a brush with soft bristles to brush your teeth gently up and down after meals. Next, you need to floss. Dental floss looks like string. Slide it between your teeth and rub it along the sides of each tooth.

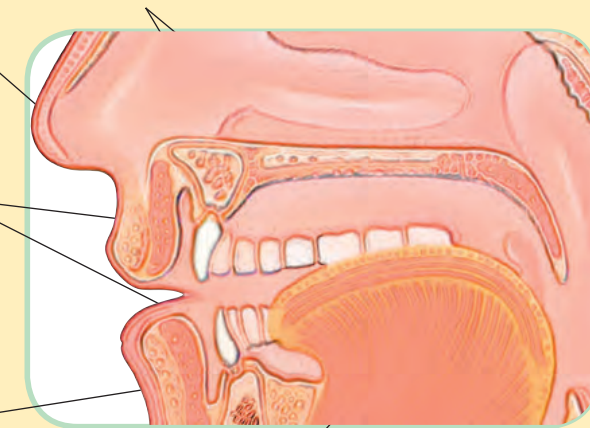
Food Comes Into Your Body Through Your Mouth.

Taste buds on your tongue and in your mouth send messages to your brain about flavors in food, including salty, sweet, sour and bitter.

Smell is important for sensing flavors in food, too!

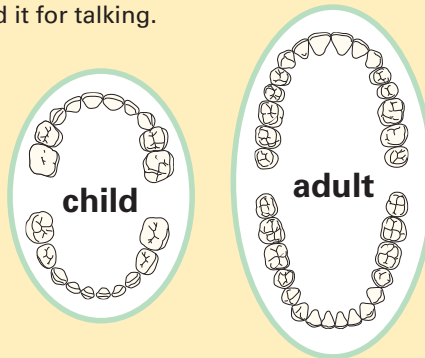
Your teeth cut, mash and grind foods into small pieces that mix with saliva.

Saliva, from glands in your mouth, starts digesting starchy foods, like bread.



Your tongue helps in chewing and swallowing. You also need it for talking.

Try holding your nose while you taste an apple. What do you notice?



Younger kids have 20 teeth that eventually fall out to make way for 32 permanent teeth.



Pearly whites or choppers, incisors or canines, molars or bicuspid.

You need them at all times.

They cut and chew and grind.

They bite and break and tear.

They mish and mash and mush.

They get a lot of wear.

They have a messy job, but clean they need to stay.

For that you brush and floss, to keep decay away!

COVER ANSWERS

- | | | |
|--------------------|-----------------|-----------------|
| 1. Chicken | 12. Cucumber | 23. Peaches |
| 2. Tomatoes | 13. Grapes | 24. Carrots |
| 3. Milk | 14. Pasta | 25. Melon |
| 4. Oranges | 15. Peas | 26. Beef steak |
| 5. Cauliflower | 16. Dried beans | 27. Apple |
| 6. Cereal | 17. Grain | 28. Cheese |
| 7. Walnuts | 18. Fish | 29. Cherries |
| 8. Bananas | 19. Avocados | 30. Potatoes |
| 9. Chocolate candy | 20. Tortillas | 31. Bread slice |
| 10. Bagel | 21. Eggs | 32. Butter |
| 11. Strawberries | 22. Bacon | 33. Corn |

FRUITS: 4, 8, 11, 13, 23, 25, 27, 29

VEGETABLES: 2, 5, 12, 15, 16, 19, 24, 30, 33

DAIRY: 3, 28

GRAINS: 6, 10, 14, 17, 20, 31

PROTEIN: 1, 7, 16, 18, 21, 22, 26

FATS AND OILS: 1 (chicken fat and skin), 3 (milk fat), 7 (nut oil), 9 (cocoa butter), 19 (avocado oil), 22 (bacon fat), 26 (beef fat), 28 (milk fat), 32 (butterfat)

EMPTY CALORIES: 6 (added sugar), 9 (added sugar and milk fats)

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