Why I Need Energy
To succeed in school, maintain friendships, work a part-time job, interact with family, play sports, and manage other activities, teens need energy. Write an autobiographical paragraph explaining how you get and use your energy. Focus your writing on yourself.

Writing Tips
Follow these steps to write an autobiographical paragraph.
- Write from the first person perspective.
- Focus on yourself, your life, and your experiences.
- Vary your sentences so they do not all start with "I."

Autobiographical Paragraph

This writing activity prompts students to explain how they get and use the energy that they need to function in daily activities. Students' paragraphs will vary but should show why teens require energy to function properly in their lives. Autobiographical writing should let the reader glimpse the writer's self, life, and experiences.
Before You Read

Preview Look at the photos and figures and read their captions. Think about the role that carbohydrates play in your daily diet.

Read to Learn

Key Concepts

- Identify the three types of carbohydrates.
- Explain how plants create carbohydrates
- Identify and describe the forms that carbohydrates take in food.
- Explain how to meet the need for carbohydrates in a healthful diet.

Main Idea

Carbohydrates form the largest part of a healthy diet, are the body’s main source of energy, and come in three different types.

Content Vocabulary

You will find definitions for these words in the glossary at the back of this book.

- carbohydrate
- photosynthesis
- chlorophyll
- sugar
- simple carbohydrate
- monosaccharide
- disaccharide
- starch
- polysaccharide
- complex carbohydrate
- dietary fiber
- added sugar
- sugar substitute

Academic Vocabulary

You will find these words in your reading and on your tests. Use the glossary to look up their definitions if necessary.

- observe
- adequate

Graphic Organizer

Use a graphic organizer like the one below to take notes about carbohydrates in the form of sugars and starches.

<table>
<thead>
<tr>
<th>SUGARS</th>
<th>STARCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Graphic Organizer Go to this book’s Online Learning Center at glencoe.com to print out this graphic organizer.

Develop Concepts

Main Idea Ask students to list their 10 favorite carbohydrate foods. Ask students to write a G next to the foods that have a grain as the source. Then have them write a P next to the foods that come from plant sources and an M next to foods that have a milk or milk product as the source.

Academic Standards

- **English Language Arts**
  - NCTE 4 Use written language to communicate effectively.

- **Mathematics**
  - NCTM Number and Operations Compute fluently and make reasonable estimates.
  - NCTM Data Analysis and Probability Select and use appropriate statistical methods to analyze data.

- **Science**
  - NSES A Develop understanding about scientific inquiry.
  - NSES 1 Develop an understanding of science unifying concepts such as order and organization.

- **Science**
  - NCTE National Council of Teachers of English
  - NCTM National Council of Teachers of Mathematics
  - NSES National Science Education Standards
  - NCSS National Council for the Social Studies

Preteaching Vocabulary

Preview the content vocabulary with students. Remind them to use context clues to unlock the meaning of new words.

Graphic Organizer

The graphic organizer is also on the TeacherWorks CD. (Sugars are mono- and disaccharides; natural sugars give fruits and vegetables a sweet taste and also occur in milk; sucrose is extracted from sweet plants; sucrose is made into brown, white, and powdered sugar; sugar is used to sweeten food; sugars are sucrose, corn syrup, honey, maple syrup, and molasses. Starches are more complex than sugars: glucose in plants is stored as starch; grains are rich in starch; peas, beans, winter squash, and potatoes contain starch; as plants mature, they convert glucose to starch; starches are made from sugars but do not taste sweet.)

FOCUS

Foods with Carbohydrates

On the board, create a list of 30 different foods. The list should include foods from all three types of carbohydrates, plus foods that do not contain carbohydrates. Ask students name the foods that contain carbohydrates. Circle the foods as students name them. Ask students: If you wanted to prepare a meal with severeral sources of carbohydrates, which foods would you select and why?
What are Carbohydrates?

Carbohydrates are the largest part of a healthy diet. Carbohydrates are the body’s main source of energy. Carbohydrates come mostly from plant foods such as fruits, vegetables, grain products, dry beans, nuts, and seeds.

There are three types of carbohydrates: sugars, starches, and fiber. Sugars, starches, and fiber all play an important role in a healthy diet.

How Plants Create Carbohydrates

Plants create carbohydrates through photosynthesis. Photosynthesis (ˌfoʊˈθə-sɪnθisis) is the process by which plants use the sun’s energy to convert carbon dioxide and water into oxygen and glucose. Chlorophyll (ˌkloʊrəˈfɪl), the green pigment in plants, is necessary for photosynthesis. Figure 6.1 shows the process of photosynthesis.

Plants use glucose to build leaves, flowers, fruits, and seeds. They also use it to help form the fiber that strengthens and supports their cell walls. Plants store extra glucose as starch in roots, stems, and leaves.

Sugars: Simple Carbohydrates

To make glucose, plants absorb water (H₂O) through their roots and carbon dioxide (CO₂) from the air. These sources provide carbon (C), hydrogen (H), and oxygen (O), the chemical elements needed to build sugars. A sugar is the form of carbohydrate that supplies energy to the body. Sugars end with the suffix -ose.

Figure 6.2 shows six different kinds of sugars.
In nutrition, sugars are known as simple carbohydrates. A **simple carbohydrate** is a carbohydrate with a simple chemical structure.

### Monosaccharides

A **monosaccharide** (mə-nə-sak′-ə-rid) is a sugar with a single chemical unit. Mono means “one” and saccharide means “sugar.” These are the monosaccharides most often found in food:

- **Glucose** This mildly sweet sugar is found in fruits, vegetables, honey, and corn syrup. Glucose is also known as dextrose.
- **Fructose** Fruits, many vegetables, and honey contain fructose, a highly sweet sugar.
- **Galactose** This sugar is in a few foods, including milk. Galactose helps create milk sugar (lactose). Galactose is not very sweet.

### Disaccharides

A **disaccharide** (di-sak′-ə-rid) is a sugar made of two monosaccharides. Di means “two.” Disaccharides are combinations of glucose and another sugar. These are the disaccharides most often found in food:

- **Sucrose** (glucose + fructose) is found in fruits, sugar cane, and sugar beets.
- **Lactose** (glucose + galactose) is found only in milk and milk products.
- **Maltose** (glucose + glucose) forms when starch is digested.

### Starches: Complex Carbohydrates

A **starch** is a carbohydrate with a more complex chemical structure than a sugar. The word starch is derived from Middle English sterten, meaning to stiffen. This is appropriate because starch can be used as a thickening agent when dissolved in water and heated. Starches are polysaccharides. A **polysaccharide** (pol′-ə-sak′-ə-rid) is a sugar made of several monosaccharides. Poly means “many.”
In nutrition, starches are known as complex carbohydrates. A complex carbohydrate is a carbohydrate that requires more work for the body to digest (see Figure 6.3).

### Dietary Fiber

The third type of carbohydrate is fiber. Dietary fiber is plant material that cannot be digested. Fiber is not a nutrient, but it is essential for good health.

### Digesting Carbohydrates

During digestion, your body converts carbohydrates to glucose. Glucose is a single-unit sugar that fuels body processes. Digestive enzymes help break down disaccharides and polysaccharides into single units. For example, the enzyme lactase breaks down the disaccharide lactose, found in dairy products. People who do not produce enough lactase may feel discomfort after they eat milk products. Dietary fiber is not digested. It is important because it helps you feel full and creates weight that helps the body eliminate waste. It leaves the body in waste.

#### Figure 6.3 Starches: Complex Carbohydrates

**Starches: Complex Carbohydrates**

- **Starches for Energy** Starches have a complex chemical structure. Starches therefore take longer to break down in the body than simple sugars. **What simple sugar makes up starches?**

- **Polysaccharides**

### Carbohydrates in Food

When you eat foods from plants, you get carbohydrates in all forms—sugar, starch, and fiber.

### Sugars in Food

An apple tastes sweet because it has sugar. Strawberries, oranges, carrots, beets, and many other fruits and vegetables have a sweet taste that comes from natural sugars called sucrose, fructose and galactose. Another natural sugar, lactose, is found in milk.

Early people probably chewed on sweet plants such as sugarcane to satisfy their “sweet tooth.” Sugarcane is a tall, thick grass that grows in tropical areas. People later discovered how to extract sucrose from sugarcane, as well as sugar beets. Sucrose from plants is made into brown, white, and powdered sugar.

A sugar that is extracted from plants and used to sweeten foods is an added sugar. Sucrose, corn syrup, honey, maple syrup, and molasses are added sugars. Added sugars give pastries, candies, and soft drinks their sweet taste.

#### Smart Consumer: Added Sugar Adds Up

Not only can added sugar increase the number of empty calories in your diet, it can also increase the amount of money you spend on food. This is because processed foods with added sugars may cost more than some healthier options. The next time you crave a food or drink containing added sugar, stop and consider whether there is a healthful, whole food or beverage that will satisfy the craving without the additional sugar and calories. Not only will you help to preserve your health, you may also conserve money.

**Challenge** Brainstorm healthful, low-cost substitutes for the following foods with added sugars: cherry soda, fruit flavored gummy candy, bottled salad dressing.

#### Figure 6.3 Starches: Complex Carbohydrates

**Caption Answer** Starches are polysaccharides, which are made of several monosaccharides (simple sugars) such as glucose.

**Discussion** Ask students: What complex carbohydrate cannot be digested? Where can it be found? (Fiber. Students can find fiber in cereals, fruits and vegetables, whole-grain bread, whole-wheat crackers, and popcorn.)

#### Answer

Students’ suggestions will vary. For example, a healthful, low-cost substitute for cherry soda is juice. Fresh fruit can replace gummy candy. Substitutes for bottled salad dressing include oil and vinegar, or lemon juice.
Starches in Food

In plants, glucose is stored as starch. Grains, or grass seeds, are rich in starch. Peas, corn, beans, winter squash, and potatoes also contain starch.

You may have heard someone say, “I like corn best early in the season when it’s nice and sweet.” Why is early-season corn sweeter than late-season corn? As a young plant grows, it makes glucose. As the plant matures, it converts glucose to starch. Glucose is sweeter than starch. That is why ears of corn from a young plant taste sweeter than ears of corn from an older plant.

Starches are made of sugars, but they do not taste sweet. Why? Starch molecules are too large to fit your taste buds’ receptors. As starches break down in your mouth, however, they taste sweeter. Try chewing a cracker slowly to observe this change.

The Need for Carbohydrates

Our bodies need carbohydrates. If you do not eat enough foods with carbohydrates, your body will not have an adequate supply of glucose. Glucose powers all your activities — breathing, walking, running, thinking. Your brain runs on glucose. Although the brain is only a small part of the human body, it consumes around 20 percent of the body’s energy. Fewer carbohydrates in your diet means less glucose for your body. Less glucose means less energy.

The body stores glucose as glycogen in the muscles and liver. When your body needs energy, it converts glycogen back into glucose.

Carbohydrates in the Diet

Teens and adults should get 45 to 65 percent of their daily calories from carbohydrates. Does it matter which carbohydrate foods you eat? Yes! Choose mostly complex carbohydrates, which have more vitamins, minerals, and fiber than simple carbohydrates. Choose foods with natural sugars, not added sugars.

Carbohydrates cause bacteria in the mouth. The bacteria produce acids that stick to the teeth. This acid can cause tooth decay. This is one reason why it is very important to brush your teeth regularly for healthy teeth and gums.

No-Carb, Low-Carb Diets

What happens if you do not eat enough carbohydrates? Your body uses fat and protein for energy, which takes protein away from tissues. A low-carb diet may also rob your bones of minerals, raise your blood cholesterol, and increase your risk of developing kidney stones. Diets that rely on low-carbohydrates or no-carbohydrates may even cause problems in the nervous system.

Added Sugar in the Diet

Small amounts of foods with added sugar, such as cookies and fruit drinks, can be part of a healthy eating plan. Most people, however, eat far too much added sugar. Added sugars show up in soda, fruit drinks, and pies. Added sugars can lead to overweight and other health problems, such as diabetes and heart disease.
How Much Added Sugar Should You Eat?

The U.S. Department of Agriculture suggests a limit of 10 teaspoons of added sugars per day on a 2,000-calorie diet, and 18 teaspoons of added sugars on a 2,800-calorie diet. Very active people with high energy needs can eat a little more sugar.

How many calories do you get from sugar? Probably more than you realize. Sugar is used in many processed foods, such as ketchup, salad dressings, and convenience foods.

You can estimate the amount of sugar in food. Use the nutrition label to find the grams of sugar in a serving. Four grams of sugar equal 1 teaspoon of sugar, which has 15 calories. A tablespoon of ketchup contains about 2 teaspoons of sugar.

Read the ingredient list on the food label. Look for the terms in Figure 6.4. All of these are added sugars. Make a habit of examining food labels for these sugars so you can keep track of how much sugar you are consuming.

Many teens drink more soft drinks than healthy beverages such as milk, water, and unsweetened juice. What are the risks of eating too many high-sugar foods?

Possible risks include becoming overweight and an increased risk for diabetes and heart disease.

Discussion Ask students: Why are soft drinks and other high-sugar foods poor sources of carbohydrates? (Answers will vary but may include: They are considered empty-calorie foods because they contain sugars but have very few or no other nutrients.)
Sugar Substitutes

A **sugar substitute** is a substance that tastes sweet but has few or no calories. Foods sweetened with sugar substitutes can still be high in calories and fat, however. Artificial sweeteners and sugar alcohols are the most common types of sugar substitutes.

**Artificial Sweeteners** Artificial sweeteners have no calories. You can buy four kinds of artificial sweeteners: aspartame (ˈə-spar-təm), ace-sulfame-K (ˈa-səl-fəm-ˌkē), saccharin (ˈsak-ə-rin), and sucralose (ˈsük-ral-əsō). Food safety advocates question the safety of some artificial sweeteners.

**Sugar Alcohols** Despite their name, sugar alcohols do not contain sugar or alcohol. They are manufactured from carbohydrates and provide about one-half to one-third fewer calories than sugar. Common sugar alcohols include sorbitol (ˈsör-bə-təl), mannitol (ˈmän-nə-təl), and isomalt (ˈi-zə-məlt). Sugar alcohols are used in sugar-free candies, cookies, ice cream, and chewing gum. Eating too much sugar alcohol can cause diarrhea.

### Fiber in the Diet

Dietary fiber is only found in foods from plant sources, such as fruits, vegetables, whole-grain products, nuts, seeds, and dry beans, peas, and lentils. Dietary fiber is sometimes called bulk, cellulose, or roughage.

**Figure 6.5** Dietary Fiber in Selected Foods

<table>
<thead>
<tr>
<th>Food</th>
<th>Approximate Measure</th>
<th>Grams of Dietary Fiber</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple or pear</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Orange</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Strawberries</td>
<td>1 cup</td>
<td>4</td>
</tr>
<tr>
<td>Orange juice</td>
<td>½ cup</td>
<td>0–1</td>
</tr>
<tr>
<td>Baked potato with skin</td>
<td>1 medium</td>
<td>4</td>
</tr>
<tr>
<td>Corn, cooked</td>
<td>½ cup</td>
<td>3</td>
</tr>
<tr>
<td>Broccoli or spinach, cooked</td>
<td>½ cup</td>
<td>2</td>
</tr>
<tr>
<td>Peanut butter</td>
<td>2 Tbsp.</td>
<td>2</td>
</tr>
<tr>
<td>Mixed nuts</td>
<td>¼ cup</td>
<td>2</td>
</tr>
<tr>
<td>Black-eyed peas, cooked</td>
<td>½ cup</td>
<td>8</td>
</tr>
<tr>
<td>Baked beans</td>
<td>½ cup</td>
<td>7</td>
</tr>
<tr>
<td>Refried beans</td>
<td>½ cup</td>
<td>6</td>
</tr>
<tr>
<td>Split pea soup</td>
<td>10 oz.</td>
<td>4</td>
</tr>
<tr>
<td>Raisin bran</td>
<td>1 cup</td>
<td>8</td>
</tr>
<tr>
<td>Cooked oatmeal</td>
<td>1 cup</td>
<td>4</td>
</tr>
<tr>
<td>Bran muffin</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Whole wheat bread</td>
<td>2 slices</td>
<td>4</td>
</tr>
<tr>
<td>White bread or bagel</td>
<td>2 slices 1 bagel</td>
<td>1</td>
</tr>
<tr>
<td>Brown rice, cooked</td>
<td>1 cup</td>
<td>3</td>
</tr>
<tr>
<td>White rice, cooked</td>
<td>1 cup</td>
<td>1</td>
</tr>
<tr>
<td>Spaghetti, cooked</td>
<td>1 cup</td>
<td>2</td>
</tr>
<tr>
<td>Air-popped popcorn</td>
<td>3 cups</td>
<td>4</td>
</tr>
</tbody>
</table>

### Starch in the Diet

To stay healthy, eat more complex carbohydrates than simple carbohydrates. Starchy foods not only provide glucose to keep your body running, but also supply protein, vitamins, minerals, phytochemicals, and fiber.

Some people believe that starchy foods like bread, potatoes, and pasta cause weight gain. These foods are not high in calories, but high-fat sauces, spreads, and and gravies are. In fact, complex carbohydrates are filling and low in fat and can help people manage weight. A healthy meal is full of complex carbohydrates.

**Figure 6.5** Dietary Fiber in Selected Foods

### Writing Support

**Letter Writing**

**Sugar Consumption** Point out to students that most people enjoy sweets but do not really know how much they eat. Ask students to write a letter to a friend, explaining how extra sugar might be consumed, and how to reduce sugar intake.

(Students may suggest keeping a diary or food log, and reading labels as sugar detecting strategies. Choose foods with less added sugar, or no sugar. Letters should be well organized and conversational.)

**Critical Thinking**

**Problem Solve** Tell students that safety advocates question the safety of some artificial sweeteners because they may pose health risks. Read this scenario to students: Danielle and Sharon are hosting a birthday party for a friend. Danielle is baking a cake and wants to use an artificial sweetener to cut back on calories. Sharon thinks it is a bad idea to use an artificial sweetener in the cake. What should they do?

(Suggestions may include: avoid the substitute, since even if the cake is sweetened with the artificial sweetener, it can still be high in calories and fat due to the cake’s other ingredients; compromise on the recipe and use both sugar and artificial sweetener; or serve a naturally sweet food as a dessert instead.)
Dietary fiber is eliminated as waste, so why do you need it? Fiber does not provide energy, but it is vital to digestion. Fiber absorbs water, much like a sponge. It creates mass that helps food move through the large intestine. This promotes regular bowel movements and helps prevent constipation. Fiber may also help reduce blood cholesterol by absorbing it and helping remove it from the body.

Teens need between 26 and 38 grams of dietary fiber a day, depending on their age and gender. Adults need 19 to 38 grams.

How can you get more fiber in your diet? Choose whole-grain breads, cereals, and crackers instead of white bread or refined cereals and crackers. Try brown rice instead of white rice. Add wheat germ, barley, or bulgur to soups, stews, and casseroles. Eat more vegetables, fruits, and dry beans, peas, and lentils. These foods are rich in fiber as well as vitamins, minerals, and phytonutrients.

If you plan to increase the amount of fiber in your diet, do so gradually. This allows your body to adjust. Drink more water as you increase the amount of fiber you eat.

### Menu Planning

One of your classmates is concerned about getting enough fiber in her diet, and has asked you for advice in choosing what to eat. Using Figure 6.5 as a guide, devise a full-day menu for your classmate consisting of three meals that, combined, will provide the necessary amount of fiber. Note that your classmate is allergic to nuts.

**Math Concept**

**Problem Solving**

When presented with a problem requiring calculations, read it carefully, and identify all facts. Make sure you understand what it is asking you to do.

**Starting Hint**

First, determine how many grams of dietary fiber are necessary for your classmate. Select foods for your menu, being careful to avoid items that would trigger allergies. Add up the grams of fiber in your menu. If you do not have the recommended amount, adjust your menu.

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**Kitchen Math**

**Answer**

Students should devise a menu that features appropriate items (such as orange juice and cereals) at breakfast, and heartier fare (such as soups, rice, and vegetables) at lunch and dinner. Teens need between 26 and 38 grams of dietary fiber a day.
Content and Academic Vocabulary Review

1. Use each of these content and academic vocabulary words in a sentence.

**Content Vocabulary**
- carbohydrates (p. 76)
- photosynthesis (p. 76)
- chlorophyll (p. 76)
- sugar (p. 76)
- simple carbohydrate (p. 77)
- monosaccharide (p. 77)
- disaccharide (p. 77)

**Academic Vocabulary**
- starch (p. 77)
- polysaccharide (p. 77)
- complex carbohydrate (p. 78)
- dietary fiber (p. 78)
- added sugar (p. 78)
- sugar substitute (p. 81)

Review Key Concepts

2. **Identify** the three types of carbohydrates.
3. **Explain** how plants create carbohydrates.
4. **Identify** and describe the forms that carbohydrates take in food.
5. **Explain** how to meet the need for carbohydrates in a healthful diet.

Critical Thinking

6. **Describe** how a severe drought might affect the body’s access to energy.
7. **Plan** a meal that contains three different types of simple sugars. What foods would your meal include? Where would the simple sugars be found?
8. **Describe** a good choice of food for an athlete who has a long bike race coming up tomorrow. Explain your choice.
9. **Explain** why it is important to limit added sugars.
10. **Design** a menu that provides 26 grams of fiber for Mary. Mary is allergic to nuts and gluten, a type of protein found in wheat, rye, and barley. Bread, muffins, pasta, and cereals contain gluten.

Critical Thinking

6. A drought would adversely affect the body’s access to energy because carbohydrates come mostly from plant foods, and plant foods require water to grow. Lack of water would mean fewer plant foods.
7. A sample meal may include: baked macaroni and cheese (lactose), a side dish of applesauce (fructose), and tea with honey (glucose).
8. Answers will vary, but should include complex carbohydrate-rich foods such as pasta, bread, or rice.
9. Answers will vary, but should indicate an understanding that added sugars should be limited to 10 teaspoons per day on a 2,000-calorie eating plan. More than that may promote weight gain and may cause health problems.
10. Menus should be set for a full day’s worth of meals and snacks that add up to 26 grams of fiber. Students should structure the menu so that the amounts of fiber are listed beside each menu item. Menus should contain reasonable amounts of food to be consumed throughout a day. Menus must not include nuts or any food that contains gluten.
11. Carbohydrate Recipes How can you sustain your body’s energy throughout the day, and enjoy tasty food? With the range of good foods that contain complex carbohydrates, it is easy to include them in every meal.

Procedure Create a simple recipe that uses at least two sources of complex carbohydrates, such as a salad, sandwich, main dish, or dessert. Prepare and evaluate your recipe.

Analysis Verbalize your responses to the following questions. What foods did you choose as carbohydrate sources? How did they increase your recipe’s appeal? What are other advantages of choosing carbohydrate-rich foods?

12. Selecting Snacks You need a snack to eat before your big math test and you have two choices: a chocolate chip muffin sprinkled with sugar, or a whole grain bagel spread with peanut butter. Which should you choose and why?

13. Simple or Complex How do you know whether a food is a simple or a complex carbohydrate? Conduct research to identify 10 foods that contain simple carbohydrates, and 10 foods that contain complex carbohydrates. Use word processing software to create a table that lists simple carbohydrate choices on one side and complex ones on the other. Include foods you eat often as well as foods you eat occasionally or have never tried. Rank the foods in order of the amount of carbohydrates in each. Put the item with the most carbohydrates per ounce at the top and work down.

14. Naturally Sweet Most desserts, such as cakes, cookies, and ice cream, contain added sugars. Brainstorm three naturally sweet foods that you would serve for dessert at a party. What are they? How would you present them in an appealing way?

15. Conduct a Survey Follow your teacher’s instructions to form into groups. Take a survey of each group member’s five favorite snack foods. Categorize the results into simple and complex carbohydrates. What do the results show about your group’s overall eating habits and health? Share your findings with the class.

16. Compare Cereal Costs Visit a local supermarket. Identify five types of fiber-rich cereals, and research their costs. Calculate their costs per ounce. Compare the amount of fiber per serving in each. If you are looking for maximum fiber, which is the best value? Why?

Real-World Skills

Problem-Solving Skills
14. Naturally Sweet Most desserts, such as cakes, cookies, and ice cream, contain added sugars. Brainstorm three naturally sweet foods that you would serve for dessert at a party. What are they? How would you present them in an appealing way?

Interpersonal and Collaborative Skills
15. Conduct a Survey Follow your teacher’s instructions to form into groups. Take a survey of each group member’s five favorite snack foods. Categorize the results into simple and complex carbohydrates. What do the results show about your group’s overall eating habits and health? Share your findings with the class.

Financial Literacy Skills
16. Compare Cereal Costs Visit a local supermarket. Identify five types of fiber-rich cereals, and research their costs. Calculate their costs per ounce. Compare the amount of fiber per serving in each. If you are looking for maximum fiber, which is the best value? Why?

Interpersonal and Collaborative Skills
15. Results will vary among groups. Encourage groups to research certain foods if they are unsure whether they contain simple or complex carbohydrates.

Financial Literacy Skills
16. Answers will vary. Students should divide total cost by total ounces to find cost per ounce.
Academic Skills

Food Science

17. Starch Indicator  An easy way to detect the presence of starch in a food is with iodine. Chemically, the iodine slips into the starch coil, and changes color from brown to deep blue-black. If no starch is present, then the iodine stays brownish orange.

Procedure  On a sheet of wax paper, place a cracker, pieces of bread, potato, meat, celery, and apple. Add a drop of iodine onto each. Record the color of each food.

Analysis  Consider the color of each food. Record whether or not starch is present.

Mathematics

18. Comparing Carbohydrates  A bottle of cranberry juice cocktail has 34 grams of carbohydrates per serving, while orange juice has 25 carbohydrate grams per serving. Per serving, a bottle of cola has 27 carbohydrate grams, a bottle of natural soda has 17, and milk has 12. Out of the figures observed, what is the minimum value of carbohydrate grams per serving? What is the maximum value? What is the range?

- **Math Concept** Range  Range is a statistical measure used with a set of numbers. It is calculated by subtracting the lowest value in the set from the highest value.

- **Starting Hint**  Find the largest (maximum) value of carbohydrate grams per serving, then find the minimum value given. Subtract to determine the range.

- **Test-Taking Tip** When answering a fill-in-the-blank question, silently read the sentence with each of the possible answers in the blank space. This will help you eliminate wrong answers. The best word results in a sentence that is both factual and grammatically correct.

- **Answer**  c. polysaccharides

STANDARDIZED TEST PRACTICE

FILL IN THE BLANK

Read the statement and select the best word to fill in the blank.

20. Starches, carbohydrates with more complex chemical structures than sugar, are _______.

a. disaccharides  b. bisaccharides  c. polysaccharides  d. monosaccharides

English Language Arts

19. Write a Paragraph  Carbohydrate-rich foods are often the favorite part of a person’s diet. Write a paragraph describing your favorite carbohydrate-rich food. In the paragraph, describe why you enjoy the food, how it looks, how it is made and what it tastes like. Identify whether it is rich in sugars, starches, or fiber. Exchange paragraphs with a classmate. Read each other’s paragraph and suggest changes to make the paragraph better. Make your suggestions in writing. Rewrite your paragraph using at least one of the suggestions from your classmate.

- **NCTE** 4 Use written language to communicate effectively.


t-Taki

Food Science

17. The cracker, bread, and potato will be positive for starch. The rest will be negative. (The apple converts its starch to sugar when ripe.) Plants produce starch in two different configurations: amylose and amylopectin. The first is a linear chain of glucose sugars, and the second, a highly branched form. The amylose is responsible for the blue-black color.

Mathematics

18. The maximum value is 34 g, while the minimum number is 12 g. The range is 34 g – 12 g = 22 g.

English Language Arts

19. Paragraphs will vary. For example, one student might choose to write about bagels, explain that bagels are both filling and tasty and can be eaten hot or cold, and identify bagels as a starchy food. Paragraphs should be well organized, with a topic sentence, body sentences that transition naturally from one to another, and a conclusion.

- **Answer**  20. c. polysaccharides