Which of the statements below are true, and which are false? Check your answers on p. 642.

1. Your friends, family, and environment can influence what foods you eat.
2. Eating breakfast can help your performance in school.
3. It is possible for a person with a high body weight to have a healthy level of body fat.
4. Weight loss is the focus of any weight management plan.
5. Eating disorders are serious problems that require medical help.
6. Diarrhea can be life threatening.
7. Most food-borne illnesses are caused by food eaten at restaurants.
SECTION 1
Food and Your Body Weight

SECTION 2
Maintaining a Healthy Weight

SECTION 3
Eating Disorders

SECTION 4
Preventing Food-Related Illnesses

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www.scilinks.org/health
www.cnnstudentnews.com

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Have you ever found yourself feeling full after a meal and then digging into a piece of pie for dessert? You’ve probably never thought of how you seem to make room for more food, even when you feel full. Many things influence why and when you eat.

**Why Do You Eat?**

Why do people eat even when they aren’t hungry? **Hunger** is the body’s physical response to the need for food. It is triggered by signals in your body that tell you to eat. The food you eat provides you with energy and nutrients that you need to remain healthy.

**Are You Really Hungry?** But most people don’t eat just to stay healthy. Most people also eat because of their appetite. **Appetite** is a desire, rather than a need, to eat certain types of foods. For example, the decision to eat an ice-cream cone with your friends, even though you just ate a meal, was triggered by appetite rather than hunger. Appetite may be triggered by many factors, including the sight or smell of food, the time of day, or the time of year. What your friends are eating—and even what mood you are in—can trigger your appetite.

You skipped breakfast because you got up late. You’re in class, and your stomach is growling. It is almost lunchtime, and you are feeling a little lightheaded and are unable to concentrate. These feelings are your body’s way of telling you that you are hungry and your body needs fuel. They are caused by a number of different signals in your body.

Some of these signals come from your digestive tract, and some come from other parts of your body. For example, your empty
SECTION 1
Food and Your Body Weight

stomach tells you to eat by sending messages to your brain. The levels of nutrients and other substances in your bloodstream also signal the brain that you need to eat. When you have eaten enough, other signals from the brain and digestive system make you feel full and satisfied. This full feeling is called satiety (suh TIE uh tee). Food in your stomach causes the stomach to stretch. This stretching is sensed by nerves, which send a “stop eating” message to the brain. The sensations of hunger and satiety help you eat the right amount to feed your body and to stay at a healthy weight.

What Foods Do You Choose? The amount and type of food you choose to eat are affected by many factors as shown in Figure 1. These factors include

- the smell and taste of the food
- mood
- family traditions and ethnic background
- social occasions
- religious traditions
- health concerns
- advertising
- cost and availability

For example, you may eat sandwiches for lunch because they are easy to carry to school. Americans often eat turkey on Thanksgiving day because of tradition. Where you grew up also plays a role in what you generally eat. If you grew up in the southwestern United States, you may eat Mexican food regularly, even if it isn’t part of your ethnic background. And someone who is growing up on the East Coast may eat more seafood than someone in the Midwest does. Some of us eat when we are bored or upset. We also avoid foods because we think they are unhealthy.

Figure 1
There are many reasons for choosing the foods we eat. Some of these reasons can lead you to choose healthy or unhealthy foods.

ACTIVITY List the reasons why these teens are eating. Did they make healthy choices?
Food Provides Energy

Carbohydrates, fats, and proteins are the energy-giving nutrients. This energy is measured in units called Calories. The amount of energy in a certain food depends on how much carbohydrate, fat, and protein the food contains. Carbohydrates and proteins each provide 4 Calories per gram. Fats provide 9 Calories per gram. Foods high in fat are high in Calories because fat provides the most Calories per gram.

After you have eaten a meal, your digestive system breaks down the food. Some of the energy released from food is used almost immediately to fuel the thousands of reactions in your body that keep you alive. Extra food energy that is not needed immediately is stored by the body in two forms—glycogen and fat. Figure 2 shows how excess food energy is stored by the body. Most of the energy stored in the body is stored as fat. Fat can provide most of the body’s energy, but small amounts of glucose are also needed. Glycogen can be broken down quickly to glucose. When the limited glycogen stores are used up, body proteins are needed to form glucose.

The Right Breakfast Keeps You Going

When you wake up in the morning, you usually haven’t eaten for 10 to 12 hours. If you go to school without breakfast, you must depend on stored energy to fuel your body and brain. By lunchtime, you may not have eaten for more than 16 hours! The food you eat at breakfast gives you a quick source of energy for your body and glucose for your brain.

How long your breakfast or any other meal keeps you going depends on how much you have eaten and what foods you eat. Meals with fat and protein keep you feeling full longer than meals made of mostly carbohydrates. So a slice of dry toast and orange juice for breakfast will likely cause you to feel hungry long before lunchtime. However, a meal with a mixture of carbohydrate, protein, and some fat, such as yogurt, cereal, and fruit, will keep you feeling full and energized longer.

How Much Energy Do You Need?

How much food energy, or Calories, you need depends on how much energy your body is using. Everyone knows you need energy for running, swimming, and playing basketball. But did you know that your body needs energy even when you aren’t moving?

Most of the food energy the body needs is used for basic functions, such as breathing, circulating blood, and growing. The amount of energy needed for these basic functions is called the basal metabolic rate. Basal metabolic rate (BMR) is the minimum amount of energy needed to keep you alive when you are in a rested, fasting state, such as just after you wake up in the morning. The amount of energy that is used for BMR is different for each person.

Also, the Calorie requirements of boys and girls differ. On average, boys require more Calories per day than girls do. For example, active 15-year-old boys need about 3,000 Calories per day, and active 15-year-old girls need about 2,300 Calories per day.
The more active you are, the more energy your body uses. **Figure 3** provides several examples of the amount of energy burned during different activities. For example, it takes more energy for a person to run for 15 minutes than to walk for the same amount of time. But if you walk for an hour, you may use more energy than you would during a 15-minute run. The amount of energy needed for an activity also increases as body weight increases. For example, it takes more energy for a 130-pound person to walk a mile than for a 110-pound person to walk the same distance.

**Balancing Energy Intake with Energy Used**

When the amount of food energy you take in is equal to the amount of energy you use, you are in *energy balance*. Eating more or less food than you need will cause you to be out of energy balance. Eating extra food energy increases the body’s fat stores and causes weight gain. Eating less food than you need decreases the body’s fat stores and causes weight loss.

Some body fat is essential for health. It is needed for normal body structures and functions, as an energy store, for insulation, and for protection of the body’s internal organs. A healthy amount of body fat for young women is 20 to 30 percent of body weight. For young men, the amount is 12 to 20 percent of body weight. We build up storage fat when we put on weight. Most people who are overweight have excess stored fat.

**Overweight** is the term used to describe a person who is heavy for his or her height. Generally, people who are overweight have excess body fat.

---

**Research has shown that students who eat breakfast perform better in school than those who skip breakfast.**

---

**Figure 3**

Different activities have different energy demands. The more intense the activity level, the greater the number of Calories that are burned per hour.
**Being Overweight Can Cause Health Problems**

Having excess body fat increases the risk of suffering from many long-term diseases. Some of these health problems include:
- heart disease and high blood pressure
- certain forms of cancer, including prostate, colon, and breast cancer
- type 2 diabetes
- sleeping problems such as sleep apnea

**Overweight and Obesity: A Growing Problem**

*Obesity* (oh BEE suh tee) is a condition in which there is an excess of body fat for one’s weight. A person is considered obese if he or she weighs more than 20 percent above his or her recommended weight range. Being obese or being overweight is most common in developed countries, such as the United States.

More people are overweight or obese than ever before. As Figure 5 shows, more than 60 percent of all adult Americans are currently overweight, and almost 30 percent of those who are overweight are obese. Adults are not the only ones getting heavier. About 14 percent of children and teenagers in the United States are overweight. This trend is worrisome because being overweight, especially when young, increases the risk of suffering from chronic diseases such as diabetes and heart disease. Overall, physical inactivity and poor diet pose the greatest risk to health. However, an overweight person who is active regularly is at lower risk than a person of correct weight who is not active.

**Figure 4**

Over the years, the size and the number of Calories in a fast-food meal have increased dramatically.

**ACTIVITY** Use the Calorie table on pp. 622–627 to compare the Calories in a plain, single-patty hamburger, a small order of fries, and a small soda with the Calories in an extra large meal.

**Figure 5**

Lack of physical activity and poor dietary habits have led to an increase in the percentage of people who are overweight or obese.

![Source: Centers for Disease Control and Prevention and National Center for Health Statistics.](image-url)
Why Are So Many People Overweight? There are two main reasons why increasing numbers of Americans are overweight. The first reason is our lack of physical activity. Many modern conveniences have helped decrease our daily levels of activity. We drive more often than we walk, and we play video games and watch TV more often than we ride our bikes.

The second reason people are gaining so much body fat is our changing diet. Many Americans eat more food than they need to, and choose foods high in fat and sugar. Supermarkets, fast-food restaurants, and all-night shopping marts provide easy access to food. High-Calorie snack foods, drinks, baked goods, and candy tempt us at the checkout counter of the supermarket. In these busy days, grabbing a snack from the vending machine or buying lunch at a fast-food restaurant is far more convenient for many people than preparing a healthy meal is.

What Can You Do? With a little preplanning and goal setting, maintaining a healthy weight is something everyone can do. It is important to avoid becoming overweight in the first place. Exercise and a healthy diet can help you stay in a healthy weight range.

Every year, about 44 percent of American women and 29 percent of American men try to lose weight. Many never lose any weight, and most who do lose weight eventually regain it. When trying to lose weight, people often have unrealistic goals (such as losing 7 pounds per week) and try very strict diets. Failure to achieve these unrealistic goals often causes a cycle of dieting and disappointment throughout life. A weight management plan that is suited just to you will have the most success.

SECTION 1

REVIEW

Answer the following questions on a separate piece of paper.

Using Key Terms

1. Identify the term that means “the body’s physical response to the need for food.”
   a. appetite  b. obesity  c. basal metabolic rate  d. hunger
2. Name the term used to describe the minimum amount of energy that is needed to keep you alive when your body is in a rested and fasting state.
3. Compare the terms overweight and obesity.

Understanding Key Ideas

4. Summarize why appetite is more likely to lead to overeating than hunger is.
5. State the advantages of eating breakfast.

6. Describe how your energy balance and body weight would be affected if you walked home from school every day instead of taking the bus.
7. Describe what happens when energy intake exceeds the body’s energy needs.
8. Describe how excess body fat affects health.
9. Name two reasons for the increase in the number of overweight or obese people.

Critical Thinking

10. **LIFE SKILL** Being a Wise Consumer You are cooking dinner for your family. You go to the grocery store to buy the ingredients. List four factors that may influence your food choices.
Do you know someone who appears to eat and eat and never gain an ounce? Do you know someone who is overweight yet seems to eat nothing at all? You are not imagining these differences. Some people gain weight more easily than others.

**Why Do You Weigh What You Weigh?**

Whether you gain or lose weight easily is in large part due to heredity. **Heredity** is the passing down of traits from parent to child. Having a body shape that is similar to the body shape of one of your parents is due to heredity. In fact, all of your genes, including the ones that control your energy balance, body size, and body shape, are inherited from your parents.

Genes are pieces of the hereditary material called DNA. Genes carry information on how your body is built and how your body works. Many genes play a role in controlling body weight. Some of these genes control the amount of body fat that you have, some control the signals of hunger and satiety, and some regulate activity. If one of these genes is defective, information about body fat, hunger, satiety, and activity levels may not be sent and received correctly.

If one or both of your parents are obese, your chances of becoming obese are high. However, the genes you inherit are not completely responsible for determining your body weight. Some of the differences in our body shapes and sizes are caused by lifestyle. For example, the choices you make about what you eat and how much you exercise affect your energy balance and body weight. Someone who has obese parents but who makes healthy food choices and exercises regularly may never be overweight.

**OBJECTIVES**
- Describe how heredity and lifestyle affect body weight.
- Summarize the components of a healthy weight management plan.
- Evaluate the dangers of fad diets and weight-loss practices.
- Calculate your body mass index. **LIFE SKILL**
- Determine if your weight is in a healthy weight range. **LIFE SKILL**

**KEY TERMS**
- **Heredity** the passing down of traits from parents to their biological child
- **Body composition** the proportion of body weight that is made up of fat tissue compared to lean tissue
- **Body mass index (BMI)** an index of weight in relation to height that is used to assess healthy body weight
- **Weight management** a program of sensible eating and exercise habits that keep weight at a healthy level
- **Fad diet** a diet that requires a major change in eating habits and promises quick weight loss

The genes you inherit from your parents influence your body size and shape.
What Is a Healthy Weight for Me?

There is more to a healthy body weight than just what the scales read. Healthy weights are different for different people, so weight recommendations are given as a range. When your weight is within a healthy weight range, your risk of getting diseases from having too much or too little body fat is low.

**Body Composition**  
Body composition is a measure of the proportion of body weight that is made up of fat tissue compared to bone and muscle (lean tissue). The percentage of body weight that is body fat is affected by sex and age. Women have a higher percentage of body fat than men do, and body fat percentage increases with age.

The term **overweight** makes no allowances for body composition. Therefore, using body weight alone to decide the need for fat loss is unreliable. A person can have excess body weight (be overweight) but not be obese. Obese individuals carry a large proportion of their body weight as fat tissue rather than as lean tissue. Because health risks are linked to amount of excess body fat, not body weight, it is important to be able to measure body composition.

Many methods of measuring body composition require large, expensive equipment. A simpler method is the measurement of **skinfold thickness**. An instrument called a caliper is used to pinch a portion of skin and the underlying fat at one or more locations on the body. The caliper measures the thickness of the pinched skin and fat. Body fat percentage can then be worked out using a mathematical equation. Another common method measures the flow of a low-level electric current through the body.

**Body Mass Index (BMI)** A popular way to find out if you are in a healthy weight range is to calculate your body mass index. Body mass index (BMI) is an index of weight in relation to height that is used to assess healthy body weight. The BMI is commonly used because it correlates well with body composition measurements.

Adults are said to have a healthy body weight if their BMI is between 18.5 and 25. Generally, adults who are overweight (BMI of 25.1 to 29.9) or obese (BMI of 30 or more) have too much body fat and are at a higher risk for diseases, but there are some exceptions. For example, athletes who have a lot of muscle and little fat, such as a weight lifter, may appear to have an unhealthy BMI. But if their body composition is measured, it can be seen that their level of body fat, and therefore their risk for disease, is low.
Children, Teens, and BMI  Adult BMI guidelines are not suitable for people younger than 20 years old. The definitions of overweight and underweight for children and adolescents are less clear because young people grow and develop at such different rates. A chart that compares BMI to age has been developed specifically for children and teens to account for changing body shapes and sizes. One chart is used for boys, and another chart is used for girls.

A Healthy Weight Management Plan  Once you have determined whether you are within a healthy weight range, you can develop your weight management plan. Weight management is a program of sensible eating and exercise habits that will help keep weight at a healthy level. For most overweight children and teens, the focus of weight management programs should be to slow or stop weight gain, not to cause weight loss. This approach allows the child or teen to continue to grow in height so they “grow into” their weight. Weight loss in children and teens is recommended only for those whose excess weight has caused health problems such as high blood pressure or difficulty breathing. Regular exercise in a weight management plan is just as important as a healthful diet.

Analyzing DATA  Understanding Body Mass Index

Malik is 15. He is 5 feet 8 inches tall and weighs 158 pounds. He wants to find out if he is at a healthy weight. To do this, he needs to find his BMI by using the following equation:

\[ BMI = \frac{weight \ (lb)}{height \ (in.)} \times 703 \]

Malik’s BMI calculations would be

\[ 158 \div 68 \div 68 \times 703 = 24.0 \]

Malik has a BMI of 24.

Malik now needs to find the healthy BMI range for 15-year-old boys.

His BMI of 24 is higher than the healthy range for his age. If he has a lot of muscle mass, the BMI chart may not be right for him. If he does not have a lot of muscle mass, he should then change factors such as his activity level and his snacking habits. Doing so will help him grow in height without growing in weight.

Your Turn

1. Calculate your BMI.
2. Is your BMI in the healthy range?
3. Why is the healthy BMI range different for each age group?
4. CRITICAL THINKING  Let’s say your BMI is slightly above the healthy range for your age. Predict what will happen to your BMI over the next year if your weight remains the same, but you grow an inch taller.

<table>
<thead>
<tr>
<th>Age</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>14.9–21</td>
<td>14.8–21.6</td>
</tr>
<tr>
<td>13</td>
<td>15.4–21.8</td>
<td>15.3–22.5</td>
</tr>
<tr>
<td>14</td>
<td>15.9–22.6</td>
<td>15.8–23.3</td>
</tr>
<tr>
<td>15</td>
<td>16.5–23.4</td>
<td>16.2–24</td>
</tr>
<tr>
<td>16</td>
<td>17.1–24.2</td>
<td>16.7–24.6</td>
</tr>
<tr>
<td>17</td>
<td>17.6–25</td>
<td>17.3–25.2</td>
</tr>
<tr>
<td>18</td>
<td>17.8–25.6</td>
<td>17.5–25.7</td>
</tr>
</tbody>
</table>

Source: National Center for Health Statistics and National Center for Chronic Disease Prevention and Health Promotion.
Eat Smart, Exercise More  The simplest and healthiest way to decrease the number of Calories you eat is to reduce portion sizes and to keep high-Calorie choices as a treat. This decision can be difficult to make if your friends are going out for ice cream. Sometimes the best way to avoid excess Calories is to skip the outing. But another way is to learn some lower-Calorie options. For example, instead of a double scoop ice cream, choose an ice pop, low-fat frozen yogurt, or sherbet. These options have fewer Calories than ice cream does.

Exercise increases your energy needs and makes managing your weight easier. Even small changes in activity levels, as shown in Figure 6, can result in weight loss. Exercise will also increase your muscle strength, improve fitness, and relieve boredom and stress. The recommended exercise goal for teens is at least 60 minutes of moderate activity daily.

Changing either eating habits or exercise involves changing your behavior. Keeping a log of your food intake and exercise may help you to make such changes. You can then review the log to see when you are likely to eat more than you intend or to see what prevents you from getting the exercise you planned.

Lose Fat, Not Muscle!  For those who need to lose weight, the goal for weight loss is to lose fat without losing muscle. A weight-loss rate of a half pound to one pound per week is recommended to prevent the loss of muscle. Faster weight loss is usually due to the loss of water and muscle, not fat. To lose a pound a week, an average person would need to eat 500 fewer Calories each day or burn 500 more Calories each day. Weight loss while dieting often stops and starts. Weight can drop one week and stay the same the next. This process can be frustrating to the dieter and can sometimes lead to dangerous weight-loss practices.

“Your choice of diet can influence your long-term health prospects more than any other action you can take.”

—Former Surgeon General  
C. Everett Koop

Even small changes in your daily activity levels can lead to weight loss.  

ACTIVITY Record and analyze your food intake and level of activity for a week. Do you need to make changes to improve your activity levels and eating habits?

Instead of this:  Try this:  

Riding the bus . . .  Ride your bike or walk to school  

Using the elevator . . .  Take the stairs  

Watching TV all evening . . .  Take your dog for a brisk 15-minute walk  

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If You Are Underweight  Consult with your doctor to help determine if your low weight is due to an illness. If you are otherwise healthy, a low weight may result from eating too little or exercising too much or may be due to heredity. To gain weight, gradually increase your food intake by having meals and snacks more frequently. Instead of junk food, choose nutritious foods that are high in Calories. Exercise, especially strength training, can also help an underweight person gain lean mass. Increasing muscle mass increases body weight.

Dangerous Weight-Loss Practices

People spend millions of dollars each year on weight-loss programs, low-Calorie foods, and diet aids. Many of these products and programs promise quick and easy weight loss. Programs that promise quick fixes generally do not promote long-term weight management. Some of these diets are presented in Table 1. Such diets do nothing to encourage exercise or promote permanent changes in eating habits that will maintain a healthy body weight for the long term. Many of these programs can even be dangerous.

Fad Diets  A fad diet is a diet that requires major changes in your eating habits and promises quick results. Some fad diets suggest that specific foods, such as grapefruit, have weight-reducing properties. Others are based on incorrect ideas that the wrong combination of

<table>
<thead>
<tr>
<th>Diet or product</th>
<th>How it works</th>
<th>Is it dangerous?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low carbohydrate diets</td>
<td>Restricting carbohydrate intake causes fat to be broken down to provide energy.</td>
<td>They are not healthy in the long term because they are low in grains, fruits, and vegetables.</td>
</tr>
<tr>
<td>Liquid formulas</td>
<td>A low-Calorie liquid “meal” is taken in combination with one regular meal per day to lower the number of Calories a person eats.</td>
<td>Consuming only the liquid formula can be dangerous and should not be done without medical supervision.</td>
</tr>
<tr>
<td>Stimulants ephedra, caffeine</td>
<td>They reduce one’s appetite and give a feeling of extra energy.</td>
<td>Side effects can range from nervousness, dizziness, and headache to increased blood pressure, heart attacks, and seizures.</td>
</tr>
<tr>
<td>Fasting</td>
<td>Energy intake is drastically reduced by cutting down on food consumption and, therefore, the number of Calories.</td>
<td>Weight loss is initially rapid as the body uses fat stores for energy. Then, body proteins are broken down to provide the missing energy which will cause loss of muscle mass.</td>
</tr>
<tr>
<td>Diuretics water pills</td>
<td>Increasing the amount of water lost through urination causes weight loss.</td>
<td>Taking diuretic pills can cause dehydration and does nothing to reduce body fat.</td>
</tr>
</tbody>
</table>
foods or the times at which you eat promote weight gain. Some fad diets do result in some weight loss, but the weight loss is usually due to the decrease in energy intake that occurs while trying to eat the odd mix of foods. However, these diets often do not meet nutrient needs and are difficult and boring to follow.

**Diet Pills** Many attempts have been made to develop the perfect pill to cause weight loss without the need for low Calorie diets and exercise. However, no such safe drug exists. Drugs that do help with weight loss are available, but the lost weight is usually regained when the drug is no longer taken.

**Surgery** Surgery is a drastic method of reducing body weight. One such procedure changes the structure of the digestive tract by bypassing part of the stomach and sometimes the intestine. This procedure is called a *gastric bypass*. It reduces the amount of food you can eat, the nutrients absorbed, or both. This surgery is very risky and is recommended only for individuals whose weight-related health risks are so great that the health risks are more serious than the risk of surgery.

**What Should You Do?** Remember that the only safe and reliable way to manage your weight is to balance your food intake with your exercise. Also, work to change the habits that lead to weight gain. Although there is no single quick way to lose weight, many good diet programs promote healthy weight reduction and management.

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**SECTION 2**

**REVIEW** Answer the following questions on a separate piece of paper.

**Using Key Terms**

1. **Name** the term that means “the passing down of traits from parents to their biological child.”
2. **Identify** the term that describes the proportion of body weight that is lean tissue compared to fat tissue.
   a. BMI
   b. weight management
c. body composition
3. **Write** the term that means “an index of weight in relation to height that is used to assess healthy body weight.”
4. **Name** the term for “a diet that requires a major change in eating habits and promises quick weight loss.”
5. **Define** the term *weight management*.

**Understanding Key Ideas**

6. **Compare** the roles of heredity and lifestyle in determining your body shape and body weight.
7. **Identify** which of the following is *not* an important part of a healthy weight management program.
   a. well-balanced diet
c. diet supplements
   b. exercise program
d. changes in behavior
8. **LIFE SKILL Assessing Your Health** Calculate what your BMI will be next year if you grow 1 inch and gain 5 pounds.

**Critical Thinking**

9. Should you expect your BMI to change in the next year? Explain.

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For more information about health product claims, see the Express Lesson on p. 562.
Eating Disorders

OBJECTIVES
Discuss the relationship between body image and eating disorders.
Describe the type of individual who is most at risk for an eating disorder.
List the symptoms and health dangers of the most common eating disorders.
Identify ways to help a friend who you think is developing an eating disorder.
Identify health organizations in your community that help people with eating disorders.

KEY TERMS
- **body image** how you see and feel about your appearance and how comfortable you are with your body
- **anorexia nervosa** an eating disorder that involves self-starvation, a distorted body image, and low body weight
- **bulimia nervosa** an eating disorder in which the individual repeatedly eats large amounts of food and then uses behaviors such as vomiting or using laxatives to rid the body of the food
- **binge eating/bingeing** eating a large amount of food in one sitting; usually accompanied by a feeling of being out of control
- **purging** engaging in behaviors such as vomiting or misusing laxatives to rid the body of food

Jenny had carried her dieting too far. She barely ate a thing and exercised all the time. When she was rushed to the hospital after fainting, she weighed only 85 pounds. Jenny didn’t listen when her friends said that she was too thin. She hated how “fat” she looked.

What Are Eating Disorders?

Normally we eat when we are hungry and stop eating when we are full. However, eating patterns that are inflexible and highly structured are not normal. Abnormal eating patterns may include never eating enough, dieting excessively, eating only certain types of foods, eating too much, and not responding to natural feelings of fullness or hunger. These patterns may be warning signs of an eating disorder.

Eating disorders are complex illnesses that can involve having a distorted body image.

Body Image and Eating Disorders Your **body image** is how you see and feel about your appearance and how comfortable you are with your body. Your body image can change with your mood, your environment, and your experiences. Your body image can also affect your eating habits and health. People who believe they are too fat may limit the food they eat even if they are not overweight. People

Eating disorders are complex illnesses that can involve having a distorted body image.

For more information about self-concept, see Chapter 2.
with eating disorders often do not see themselves as they really are. In other words, they have a distorted body image.

Culture and society often define what we think of as a perfect body. In the 1950s, many women wanted to look like Marilyn Monroe—curvy and full figured. In the United States today, clothing styles and fashion models on television and in magazines suggest that thin is in and a perfectly toned, muscular body is best. The models we see in magazines and on television act as a standard for attractiveness and acceptability. But in fact, the women and men on magazine covers represent less than 1 percent of the population!

**A Healthy Body Image** Having a healthy body image means you accept your body’s appearance and abilities. It also means that you listen to what your body tells you. Developing a healthier body image requires paying attention to, appreciating, and caring for your body. You should have realistic expectations about your size that are based on your heredity and should realize that weight and body shape can change frequently and rapidly in teens.

---

**real life**

**Activity**

**Materials**
- colored paper
- teen, fashion, and fitness magazines
- scissors
- paste

**Procedure**

1. **Cut** out images of teenage girls and boys from the magazines.
2. **Paste** the images onto the colored paper to create a collage.

---

**SOCIETY AND BODY IMAGE**

**Conclusions**

1. **Summarizing Results** Describe the body sizes and shapes in the images that you have collected.
2. **Comparing Information** How are these images like those of your friends and classmates? How are they different?
3. **Analyzing Results** Are these images used to sell a product? If so, what product is each image selling?
4. **CRITICAL THINKING** How can behaviors such as drug use and dieting develop from having an unrealistic body image?

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**LIFE SKILL**

**Evaluating Media Messages**

The men and women on magazine covers represent less than 1 percent of the population.
A Closer Look at Eating Disorders

Thousands of people die each year from complications related to eating disorders. Eating disorders often develop during adolescence, when children’s bodies and responsibilities change from those of children to those of adults.

Many factors contribute to the development of eating disorders. Genetics, culture, personality, emotions, and family are all believed to play a role. Eating disorders are on the rise among athletes in sports that require athletes to be thin, such as gymnastics and figure skating. Eating disorders are also found in athletes who must fit into a particular weight class, such as wrestlers. Eating disorders are most common in young women, overachievers, perfectionists, and adolescents who have a difficult family life. Eating disorders are also most common in people from cultures in which being thin is equated with being attractive, successful, and intelligent and also in people whose jobs depend on their body shape and weight, such as dancers, gymnasts, and models.

Common Eating Disorders Three of the most common eating disorders, anorexia nervosa, bulimia nervosa, and binge eating disorder are summarized in Table 2.

- **Anorexia nervosa** is an eating disorder that involves self-starvation, a distorted body image, and low body weight.
- **Bulimia nervosa** is an eating disorder in which an individual repeatedly eats large amounts of food and then uses behaviors such as vomiting or using laxatives to rid the body of the food.
- **Bingeing** or binge eating is the eating of a large amount of food in one sitting. In some eating disorders, bingeing may be followed by purging.
- **Purging** is behavior that involves vomiting or misusing laxatives to rid the body of food.

Dangers of Eating Disorders

- Hair loss
- Dental problems
- Broken blood vessels in the face and eyes
- Dry, scaly skin
- Severe dehydration
- Loss of menstrual period in females
- Low bone density
- Heart irregularities
- Organ failure
- Death
### Table 2 Common Eating Disorders

<table>
<thead>
<tr>
<th>What is it?</th>
<th>Signs and symptoms</th>
<th>Treatment</th>
</tr>
</thead>
</table>
| **Anorexia nervosa** is an obsession with being thin that leads to extreme weight loss. Some people with anorexia binge and then purge as a means of weight control. Sufferers often have very low self-esteem and feel controlled by others. The average teen consumes about 2,500 Calories per day. But someone with anorexia may consume only a few hundred Calories. | - intense fear of weight gain  
- overexercising  
- preferring to eat alone  
- preoccupation with Calories  
- extreme weight loss  
- loss of menstrual periods for at least 3 months  
- hair loss on head  
- depression and anxiety  
- weakness and exhaustion | - medical, psychological, and nutritional therapy to help the person regain health and develop healthy eating behaviors  
- family counseling |
| **Bulimia nervosa** is a disorder that involves frequent episodes of binge eating that are almost always followed by behaviors such as vomiting, using laxatives, fasting or overexercising. A person with bulimia may consume as many as 20,000 Calories in binges that last as long as 8 hours. | - preoccupation with body weight  
- bingeing with or without purging  
- bloodshot eyes and sore throat  
- dental problems  
- irregular menstrual periods  
- depression and mood swings  
- feeling out of control  
- at least two bulimic episodes per week for at least 3 months | - therapy to separate eating from emotions and to promote eating in response to hunger and satiety  
- nutritional counseling to review nutrient needs and ways to meet them |
| **Binge eating disorder** is a disorder that involves frequent binge eating but no purging. It is frequently undiagnosed. About one-quarter to one-third of people who go to weight-loss clinics may have binge eating disorder. | - above-normal body weight  
- bingeing episodes accompanied by feelings of guilt, shame, and loss of control | - psychological and nutritional counseling |
| **Disordered eating patterns** are disordered eating behaviors that are not severe enough to be classified as a specific eating disorder. They are often referred to as “disordered eating behaviors.” Many teens are believed to have disordered eating behaviors that could lead to serious health problems. | - weight loss (less than anorexia)  
- bingeing and purging less frequently than in bulimia  
- purging after eating small amounts of food  
- deliberate dehydration for weight loss  
- hiding food  
- overexercising  
- constant dissatisfaction with physical appearance | - psychological and nutritional counseling |
Could You Be at Risk? People at risk of developing an eating disorder may find they have traits such as preferring to eat alone, being overly critical about their body size and shape, thinking about food often, weighing themselves every day, and/or eating a lot of “diet” foods. If your concerns about food or your appearance have led to trouble in school, at home, or with your friends, you should discuss your situation with a parent, a school nurse, a counselor, a doctor, or another trusted adult.

Getting Help Professional help from physicians, psychologists, and nutritionists is essential to manage and recover from an eating disorder. Unfortunately, people with eating disorders often deny that they have a problem and believe that their behavior is normal and a chosen lifestyle. As a result, they may not seek help early on when treatment can help prevent severe physical problems.

If you believe a friend has an eating disorder, it is important to encourage your friend to seek help. In private, let your friend know of your concern for his or her health. Listen to your friend. If you are unsuccessful, tell a trusted adult, or contact an agency that provides eating disorder counseling in your area. Remember, even if you are sworn to secrecy by your friend, it is important that a responsible adult knows about your fears. When a life is in danger, there is no confidentiality to keep.

SECTION 3 REVIEW Answer the following questions on a separate piece of paper.

Using Key Terms
1. Define the term body image.
2. Identify the eating disorder that involves extreme weight loss.
   a. anorexia nervosa    b. bulimia nervosa
   c. purging    d. binge eating disorder
3. List the symptoms of bulimia nervosa.
4. Name the term that means “a rapid consumption of a large amount of food.”

Understanding Key Ideas
5. Describe how a negative body image can affect eating behavior.
6. Describe how you could tell if a friend or family member was at risk of an eating disorder.
7. Compare the symptoms of anorexia with those of bulimia, and describe how the disorders affect health.

LIFE SKILL Communicating Effectively Describe how you could help a friend you think is developing an eating disorder.

9. LIFE SKILL Using Community Resources Identify resources in your local community that help people with eating disorders or their families.

Critical Thinking
10. Should someone who binges and purges about once a month be worried about the consequences of bulimia? Explain.
While in the library, Aaron started to feel bad. His stomach hurt, and he felt a little sick. It couldn’t have been the burger he’d had for lunch—it was so good! He had barely packed up his bag before he had to run for the bathroom.

Food and Digestive Problems

To provide the body with nutrients, food must be digested and then the nutrients must be absorbed. Problems in any part of the digestive system can affect your health. Most digestive problems like Aaron’s are not serious. But if you have severe or persistent symptoms, you should see a doctor.

Heartburn Have you ever had a burning feeling in your chest after a large meal? This burning feeling is called heartburn and is caused by stomach acid leaking into the esophagus. The esophagus is the tube that connects your throat with your stomach. The main cause of heartburn is overeating foods that are high in fat. Stress and anxiety can also cause heartburn by increasing the amount of acid made by the stomach. Heartburn is usually a minor problem that can be prevented by eating small, low-fat meals frequently and by not lying down soon after eating.

Ulcers Pain after eating can also be a symptom of a more serious ailment, such as an ulcer. Ulcers are open sores in the lining of the stomach or intestine. Recent studies have shown that most ulcers are caused by a bacterial infection of the stomach lining. Fortunately, the infection is treatable with antibiotics. Stress and an unhealthy diet can make ulcers worse.
Embarrassing Digestive Problems  Some intestinal problems are as embarrassing as they are uncomfortable. Gas, diarrhea, and constipation can be difficult to discuss. However, they can often be avoided by changes in the diet.

Gas is produced when bacteria living in the large intestine break down undigested food. Normally, you don’t notice the daily activities of these bacteria. Some foods, such as beans, contain a large amount of indigestible material. Although you cannot digest this material, it acts as a huge meal for the millions of bacteria that live in your large intestine. The bacteria produce a lot of gas while feasting on the beans. The end result for you is gas, or flatus. The buildup of this gas can make you feel bloated and can give you flatulence.

Diarrhea refers to frequent watery stools. Diarrhea can be caused by infections, medications, or reactions to foods. Occasional diarrhea is common and mostly harmless. But because diarrhea increases water loss from the body, prolonged diarrhea can lead to dehydration. Dehydration occurs when the amount of water in the body decreases enough to cause a drop in blood volume. Dehydration can make it difficult for the blood to carry nutrients and oxygen around the body and can become life threatening. Every year dehydration from diarrhea kills millions of children in the developing world. If you experience diarrhea, drink a lot of fluid, such as water or sports drinks, to replace lost water.

Constipation is difficulty in having bowel movements or is having dry, hard stools. Constipation can be caused by weak intestinal muscles or by a diet that is low in fiber or fluid. It can be prevented by getting plenty of exercise, drinking a lot of water (at least eight glasses a day), and eating a diet high in whole grains, fruits, and vegetables.

Food Allergies  A food allergy is an abnormal response to a food that is triggered by the body’s immune system. The immune system reacts to the food as if it were a harmful microorganism. The allergic reaction can cause symptoms throughout the body. Sometimes reactions are mild, but they can be life threatening. An upset stomach, hives, a runny nose, body aches, difficulty breathing, and a drop in blood pressure can all be food allergy symptoms. In some cases, these symptoms appear immediately. In others, they take up to 24 hours to appear.

Is It a Food Allergy?  True food allergies are relatively rare. To find out if symptoms are due to a specific food, you must cut from your diet for 2 to 4 weeks all foods suspected of causing an allergic reaction. Then, a “food challenge” can be done by eating a small amount of one suspected food. You should do a food challenge in a doctor’s office in case you have a serious reaction. If a reaction occurs, a diagnosis of a food allergy can be made. If no reaction occurs, a larger amount of the food can be eaten. If you still have no reaction, then an allergy to that food may be ruled out.
A food challenge should not be done with a suspected allergy to peanuts because reactions to peanuts can be deadly. Individuals who are allergic to peanuts can be so sensitive that exposure to tiny amounts, such as contamination from peanut-containing foods nearby, can cause serious reactions. Once this allergy is suspected, peanuts must be avoided.

**Managing Food Allergies**  The best way to prevent an allergic reaction to food is to avoid eating the food to which you are allergic. Don’t be afraid to ask about ingredients in food served in restaurants or at a friend’s house. Food labels can help you find out if a food contains the ingredient. Individuals who have serious food allergies need to carry epinephrine with them. Injecting themselves with this hormone after exposure to the food can prevent a fatal reaction.

**Food Intolerances**

Although the symptoms of a food intolerance can be similar to those of a food allergy, food intolerances do not cause a specific reaction of the immune system. Food intolerances can be caused by eating foods or ingredients in a meal that irritate the intestine (such as onions).

An example of a food intolerance is lactose intolerance. **Lactose intolerance** is a reduced ability to digest the milk sugar lactose. It is not an allergy to milk. Lactose is found in dairy products, such as milk and cheese. Lactose intolerance causes gas, cramps, and diarrhea. These symptoms occur because undigested lactose passes into the large intestine, where it is digested by bacteria that produce acids and gas from the lactose. Lactose intolerance is rare in children but affects about a quarter of the American adult population. The incidence of lactose intolerance varies worldwide. Lactose intolerance affects less than 5 percent of people in northwestern Europe but nearly 100 percent of people in some parts of Asia and Africa.

**Food-Borne Illness**

A **food-borne illness** is an illness caused by eating or drinking a food that contains a toxin or disease-causing microorganism. Each year, about 76 million people in the United States suffer from food-borne illness. Food-borne illness can be caused by any kind of contamination in food. However, most food-borne illnesses in the United States are caused by eating food contaminated with pathogens, such as bacteria, viruses, fungi, or parasites. Many cases of food-borne illness are so mild that they are not reported to a doctor. So, in most cases the cause of the food-borne illness is never discovered. Most cases of food-borne illness are due to foods that are prepared or eaten at home.
Selecting and Storing Foods Safely

- Avoid dented, rusting, or bulging cans.
- Meat and fish should be very fresh and free of odor.
- Refrigerate leftovers promptly.
- Store eggs in the refrigerator.
- Never defrost foods at room temperature. Leave them in the refrigerator to defrost overnight.
- If you suspect a food is unsafe, play it safe. When in doubt, throw it out.

Is It the Flu? Symptoms of food-borne illness (nausea, vomiting, and diarrhea) are often thought to be a stomach flu. These symptoms may appear as soon as 30 minutes after eating a contaminated food, or they may take several days or weeks to appear. When treated with rest and a lot of fluids the symptoms usually last only a day or two. However, sometimes food-borne illnesses can be life threatening, especially for young children, pregnant women, the elderly, and the ill. When symptoms are severe, the patient should see a doctor as soon as possible.

Preventing Food-Borne Illness The majority of food-borne illnesses can be avoided by selecting, storing, cooking, and handling food properly. Proper handling and storage of food is vital to avoid cross-contamination. Cross-contamination is the transfer of contaminants from one food to another. Cross-contamination can occur at home, for example, if the same cutting board is used to cut up raw chicken and to prepare vegetables for a salad or if raw and cooked foods are stored together. Cross-contamination can also happen in food-processing plants and restaurants. Contamination of foods in these locations could potentially affect hundreds of people. Therefore, there are many strict federal hygiene regulations that apply to food-processing plants and restaurants and that aim to minimize health risks to the public.

To reduce the risk of food-borne illness in the kitchen
- replace and wash dishcloths and hand towels frequently
- keep your refrigerator at 41°F
- wash your hands, cooking utensils, and surfaces with warm soapy water between each food preparation step
- cook food to the recommended temperatures to kill microorganisms

**SECTION 4**

**REVIEW** Answer the following questions on a separate piece of paper.

**Using Key Terms**

1. **Identify** the term used to describe an abnormal response to a food that is triggered by the immune system.
   a. food allergy  
   b. lactose intolerance  
   c. constipation  
   d. food intolerance

2. **Write** the term that means “an inability to digest lactose.”

3. **Name** the term for “an illness caused by eating a food that contains a contaminant such as a microorganism.”

4. **Define** cross-contamination.

**Understanding Key Ideas**

5. **Describe** how excess gas can form in the intestines.

6. **Describe** how diarrhea can cause dehydration.

7. **Compare** the symptoms of a food allergy to the symptoms of a food intolerance.

8. **Life Skill** Practicing Wellness Identify steps to reduce your chances of getting a food borne illness.

**Critical Thinking**

9. Can the bacteria on raw chicken that you buy from the store end up in your fresh fruit salad? Explain your answer.
CHAPTER 8

Features

Key Terms

SECTION 1

- hunger (190)
- appetite (190)
- basal metabolic rate (BMR) (192)
- overweight (193)
- obesity (194)

SECTION 2

- heredity (196)
- body composition (197)
- body mass index (BMI) (197)
- weight management (198)
- fad diet (200)

SECTION 3

- body image (202)
- anorexia nervosa (204)
- bulimia nervosa (204)
- binge eating (bingeing) (204)
- purging (204)

SECTION 4

- food allergy (208)
- lactose intolerance (209)
- food-borne illness (209)
- cross-contamination (210)

The Big Picture

- What you eat and how much you eat are affected by both hunger and appetite.
- Personal choices as well as friends, tradition, ethnic background, availability of food, and emotions affect food choices.
- Your body weight is affected by your food intake and by your activity levels.
- Eating breakfast every day is important for good health.
- Being overweight or obese increases the risk of heart disease, diabetes, cancer, and other chronic diseases.

- The genes you inherit from your parents and your lifestyle choices determine your body size and shape.
- Body mass index is an index of weight in relation to height that is used to assess healthy body weight.
- Keeping body weight in the healthy range requires a plan that encourages healthy food choices and good exercise habits.
- Fad diets may cause initial weight loss but can be dangerous and do not promote behaviors for long-term weight management.

- Individuals with eating disorders often have a distorted body image.
- Eating disorders are more common in teenage girls, especially overachievers who have a poor self-image, and in athletes who must restrict their weight.
- Anorexia nervosa is an overwhelming fear of gaining weight and can result in self-starvation. Bulimia nervosa involves frequent bingeing and purging, which can cause many health problems.
- Eating disorders should be identified and treated early to avoid long-term health problems.

- Common digestive disorders include heartburn, ulcers, constipation, diarrhea, and flatulence.
- Diarrhea causes water loss and can result in dehydration, which is very dangerous, especially to children and the elderly.
- A food allergy involves a reaction by the body’s immune system to particular foods. A food intolerance may cause symptoms similar to those of an allergic reaction, but it is not a specific immune reaction.
- Proper handling and storage of food can prevent a food-borne illness.
CHAPTER 8

Review

Using Key Terms

- anorexia nervosa (204)
- appetite (190)
- basal metabolic rate (BMR) (192)
- binge eating/bingeing (204)
- body composition (197)
- body image (202)
- body mass index (197)
- bulimia nervosa (204)
- cross-contamination (210)
- fad diet (200)

- food allergy (208)
- food-borne illness (209)
- heredity (196)
- hunger (190)
- lactose intolerance (209)
- obesity (194)
- overweight (193)
- purging (204)
- weight management (198)

1. For each definition below, choose the key term that best matches the definition.
   a. eating a large amount of food at one time
   b. forcefully ridding the body of Calories
   c. heavy for one’s height
   d. how you see and feel about your appearance
   e. sensible eating and exercise habits that keep weight at a healthy level
   f. a diet that promises quick weight loss

2. Explain the relationship between the key terms in each of the following pairs.
   a. anorexia nervosa and bulimia nervosa
   b. hunger and appetite
   c. obesity and body mass index
   d. food allergy and lactose intolerance
   e. cross-contamination and food-borne illness
   f. body composition and heredity

Understanding Key Ideas

Section 1

3. Is eating a piece of chocolate cake for dessert after a big dinner more likely to be motivated by hunger or by appetite? Explain your answer.

4. Why does eating breakfast each morning help you perform better in school?

5. Explain what happens to the extra energy if you eat more food than your body needs.

6. For what health conditions are people with excess body fat at increased risk?

7. What is the best plan for avoiding obesity?

Section 2

8. Explain why a person whose parents are obese may not necessarily become obese.

9. What is the BMI of an individual who is 5 feet 1 inch tall and weighs 127 pounds?

10. Explain why following a weight management plan that has a menu for only one week of meals is unlikely to promote long-term weight loss.

11. CRITICAL THINKING A magazine features the “tomato and lemon juice” diet. The diet promises a weight loss of 5 pounds a week. Why is this diet not a good way to manage weight?

Section 3

12. Explain why someone who has a poor body image is more likely to develop an eating disorder.

13. What types of individuals are most at risk for eating disorders?

14. Which of the following is not a symptom of an eating disorder?
   a. healthy body image
   b. fear of gaining weight
   c. extreme weight loss
   d. binging and purging

15. Identify people or health organizations you could look to for help with a friend who has an eating disorder.

Section 4

16. Identify actions you can take to help prevent heartburn and constipation.

17. Identify the main reason why diarrhea can be life threatening.

18. Identify ways you can avoid having a food intolerance.

19. Describe how washing your hands can protect you from food-borne illness.

20. CRITICAL THINKING You are at camp with a friend who is allergic to peanuts. How can you help determine which foods are safe for him to eat?
**Interpreting Graphics**

*Study the figure below to answer the questions that follow.*

**Calories Burned During Different Activities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Calories burned per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Playing computer games</td>
<td>100</td>
</tr>
<tr>
<td>Bowling</td>
<td>200</td>
</tr>
<tr>
<td>Housework</td>
<td>300</td>
</tr>
<tr>
<td>Easy swimming</td>
<td>400</td>
</tr>
</tbody>
</table>

21. Which of these activities requires the least bodily movement?

22. Estimate how many Calories in total are burned during 30 minutes of housework and 30 minutes of swimming.

23. **CRITICAL THINKING** Which of these activities would be most effective as part of your weight management plan?

**Activities**

24. **Health and You** Find an advertisement for a diet plan in a magazine or in another source. Does the diet contain all of the components of a healthy weight management plan? Would it be safe to follow this plan for an extended period of time?

25. **Health and Your Community** Prepare a poster display that explores how body images have changed over the past 30 years.

26. **Health and Your Family** Write a short report that describes ways to avoid a food-borne illness in a home kitchen.

27. **Health and You** Think about how the availability of food can affect what you eat and when you eat. Write a healthy meal plan from what is on your school’s lunch menu today.

**Action Plan**

28. **LIFE SKILL** Assessing Your Health List five things that you can do to improve your body image and to keep your weight in the healthy range.

**Standardized Test Prep**

*Read the passage below, and then answer the questions that follow.*

Ann is studying for a history test. She had to cancel tennis after school because she needed the time to study. But now she is bored. To help apply herself to her studies she makes a bowl of buttery popcorn. When that is gone, she gets a bag of chips from the kitchen. When she discovers she has finished off the bag of chips too, she is angry with herself. She has been putting on weight lately. Skipping tennis and eating all this junk food is going to add to her weight gain. She decides that she needs a plan to help her focus on studying without gaining weight.

29. In the passage, the word *apply* means
   A to put into action or use.
   B to concentrate one’s efforts.
   C to ask for something.
   D to select something.

30. What can you infer from reading this passage?
   E Ann has an eating disorder.
   F Ann is obese.
   G Ann eats junk food when she is bored.
   H Ann is not a good cook.

31. By skipping tennis, Ann uses 150 fewer Calories than usual that day. By eating popcorn and a bag of chips, she eats about 500 extra Calories. What has that done to her energy balance that day?

32. Write a paragraph describing some of the things Ann can do to help her study without gaining weight.