

Chapter 4

Physical Activity for Life

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Personal Health Inventory



What's Your Health Status?

Read each statement below and respond by writing *yes*, *no*, or *sometimes* for each item. Write *yes* only for items that you practice regularly.

- ▶ 1. I participate in some form of physical activity every day.
- ▶ 2. Whenever possible, I walk rather than drive or get a ride.
- ▶ 3. My level of physical activity helps me maintain a healthy weight range.
- ▶ 4. I enjoy a wide variety of physical activities and sports.
- ▶ 5. I participate in aerobic activities such as cycling, swimming, or in-line skating.
- ▶ 6. I follow a nutritious diet; avoid harmful substances such as tobacco, alcohol, and other drugs; and get adequate rest.
- ▶ 7. I do at least 20 minutes of nonstop vigorous exercise a minimum of three times a week.
- ▶ 8. When I buy athletic equipment, safety is a primary consideration.
- ▶ 9. I take proper precautions to minimize the risk of injury while engaging in physical activities.
- ▶ 10. I know and follow safety rules for the activities in which I participate.

Quick Write

Using Visuals. You know that being active is important to your physical health, but do you realize how it affects your mental/emotional and social health? Give two examples of how the physical activity pictured here helps these teens keep their health triangles in balance.

HEALTH Online



For instant feedback on your health status, go to Chapter 4 Health Inventory at health.glencoe.com.

Lesson 1

Physical Activity and Your Health

VOCABULARY


physical activity
physical fitness
sedentary
lifestyle
osteoporosis
metabolism

YOU'LL LEARN TO

- Understand the importance of regular physical activity for enhancing and maintaining personal health throughout the life span.
- Examine the effects of regular physical activity on body systems.
- Analyze the relationship between regular physical activity and disease prevention.
- Discover ways to incorporate physical activity into daily life.



On a sheet of paper, make a list of the physical activities in which you participate on a regular basis. Then add to your list three others you would like to try. Briefly describe why each of these activities appeals to you.

 Tasks such as vacuuming, raking leaves, or washing the car can help you fit more physical activity into your life. *What physical activities do you include in your daily routine?*

What kinds of physical activities do you enjoy? Do you like to play basketball? Maybe you prefer skiing, riding mountain bikes, or playing volleyball. Whatever your preference, regular physical activity enhances your health.

What Is Physical Activity?

Physical activity is any form of movement that causes your body to use energy. It may be purposeful, such as when you exercise or play sports. It may also occur as part of your regular routine—for example, when you wash the car or take the dog for a walk. Many forms of physical activity can improve your level of **physical fitness**, the ability to carry out daily tasks easily and have enough reserve energy to respond to unexpected demands. Maintaining a high level of physical fitness gives you a sense of total well-being and is an important lifelong health goal.



What Are the Benefits of Physical Activity?

Physical activity provides health benefits that last a lifetime. It helps strengthen not only the physical but also the mental/emotional and social sides of your health triangle.

Benefits to Physical Health

Physical activity makes your body stronger, increases your energy, and improves your posture. It can reduce chronic fatigue and stiffness and can improve motor responses. It strengthens your muscles and bones and helps reduce the risk of many serious diseases.

Regular physical activity also contributes to the functioning of many body systems, including the following:

- ▶ **Cardiovascular System.** Regular physical activity strengthens the heart muscle, allowing it to pump blood more efficiently.
- ▶ **Respiratory System.** When you engage in regular physical activity, your respiratory system begins to work more efficiently—you can breathe larger amounts of air, and the muscles used in respiration don't tire as quickly. This helps you perform such activities as running farther without getting out of breath.
- ▶ **Nervous System.** By helping you respond more quickly to stimuli, physical activity can improve your reaction time. This is especially helpful when driving or cycling.

Benefits to Mental/Emotional Health

Being physically active has many positive effects on your mental/emotional health. It can help reduce stress. Doing some stretching exercises before bed, for example, can help you relax tense muscles and sleep better after a difficult day at school. Physical activity also allows you to manage anger or frustration in a healthy way. By stimulating the release of certain chemicals that affect the brain, physical activity can improve your

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cardiovascular and respiratory systems To learn more about the cardiovascular and respiratory systems, see Chapter 16, page 414.
nervous system For more information on the nervous system, see Chapter 15, page 399.

Participating in a community event such as the one shown here is a good way to be physically active, to help others, and to engage in positive social interaction.



mood and decrease your risk of depression. Other ways that physical activity benefits your mental/emotional health include

- ▶ helping you look and feel better, which can increase your self-confidence.
- ▶ contributing to a positive self-concept by giving you a sense of pride and accomplishment in taking care of yourself.
- ▶ reducing mental fatigue by bringing more oxygen to the brain. This improves your concentration, allowing you to think more clearly and work more productively.
- ▶ giving you a “can-do” spirit when faced with new challenges.

Hands-On Health **ACTIVITY**

Promote the Benefits of Physical Activity

In this activity you will think of ways that different activities benefit all three parts of the health triangle. Then you'll choose an activity and create a plan to try it out.

What You'll Need

- paper and pencil
- markers or colored pencils

What You'll Do

1. Make a four-column chart on a sheet of paper. Label the columns “Activity,” “Physical,” “Mental/Emotional,” and “Social.”
2. Work in a group of three. Take turns identifying and recording a physical activity that you enjoy. Then work

together to think of a physical, mental/emotional, and social benefit of each activity listed. Record these in the appropriate columns.

3. Choose one of the activities on your chart. Using markers or colored pencils, create an ad that illustrates the physical, mental/emotional, and social benefits of that activity. Present your finished ad to the class.

Apply and Conclude

Based on class presentations, choose an activity that you're interested in but have never tried. Write a plan to try the activity to see if you like it.

Benefits to Social Health

Are you a member of a recreational or school team? Do you swim laps at a neighborhood pool? Do you like hiking or exploring trails in your community? If so, you have probably met—and possibly formed friendships with—others who share your interests. Participating in a fitness regimen with friends can be fun and may motivate you to stick with your fitness program; in turn, you can help motivate your friends. Physical activity can also benefit social health by

- ▶ building self-confidence, which helps you cope better in social situations, such as when you meet new people.
- ▶ giving you the opportunity to interact and cooperate with others.
- ▶ helping you manage stress, which can enhance your relationships with others.

Risks of Physical Inactivity

According to the Centers for Disease Control and Prevention (CDC), some teens do not make physical activity a part of their lives. The CDC's findings, compiled in its *CDC Fact Book 2000/2001*, include these troubling facts about the level of physical activity among U.S. high school students.

- ▶ More than one in three teens (35 percent) do *not* participate regularly in vigorous physical activity (that is, for at least 20 minutes three times a week).
- ▶ Regular participation in vigorous physical activity declines significantly during the teen years, from 73 percent of ninth graders to 61 percent of twelfth graders.
- ▶ Only 29 percent of teens attend a daily physical education class—a serious decline from 42 percent in 1991.

Clearly, many teens have a **sedentary lifestyle**, or *a way of life that involves little physical activity*. They may spend much of their time watching TV, playing video games, or working on the computer rather than being physically active. The negative effects of a sedentary lifestyle may include

- ▶ unhealthful weight gain, which is linked to several potentially life-threatening conditions, including cardiovascular disease, type 2 diabetes, and cancer. Cardiovascular disease is the leading cause of death among Americans. **Diabetes** is a serious disorder that prevents the body from converting food into energy.

CHARACTER CHECK

Responsibility. When you participate in regular physical activity, you take responsibility for your health. By taking care of yourself, you are saying that you are worth investing in. Be positive about the benefits these activities bring you, and don't forget to compliment yourself: "I like how I feel, and I like how I look!" **Write three other positive statements that reflect the benefits you receive from regular physical activity.**

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diabetes For more information on reducing your risk of developing diabetes, see Chapter 26, page 691.



Did You Know?



The number of obese adult Americans doubled between 1980 and 1999. During the same period, the number of overweight teens tripled. In children and teens, these weight increases correspond to higher occurrences of asthma and type 2 diabetes. Eating a well-balanced diet and increasing the amount of physical activity can help reverse these trends.

- ▶ an increased risk of **osteoporosis**, a condition characterized by a decrease in bone density, producing porous and fragile bones. Porous and fragile bones fracture more easily than healthy bones.
- ▶ a reduced ability to manage stress.
- ▶ decreased opportunities to meet and form friendships with active people who value and live a healthy lifestyle.

You can lower your risk of these and many other health problems by including more physical activity in your daily life. For example, when you go shopping, walk to the store or, if you have to drive, park farther away from the entrance. **Figure 4.1** suggests other healthful alternatives to sedentary activities.

FIGURE 4.1

APPROACHES TO EVERYDAY ACTIVITIES

Instead of . . .

- Taking an elevator or escalator
- Playing video or computer games
- Getting a ride to a friend's house
- Using a shopping cart
- Watching TV or taking a nap
- Taking the car through a car wash

Try . . .

- Taking the stairs
- Playing soccer, basketball, or tennis
- Walking, skating, or riding your bike there
- Carrying groceries to the car
- Gardening or mowing the lawn
- Washing the car yourself

Physical Activity and Weight Control

The CDC reports that more than one-half of American adults and 14 percent of teens are overweight. This situation can be traced to a sedentary lifestyle and overeating. To stay within a weight range that is healthy for you, it's important to develop good eating habits and be physically active on a regular basis.


Understanding how the food you eat gets converted into energy can help you maintain a healthy weight. **Metabolism** is the process by which your body gets energy from food. Food's energy value is measured in units of heat called calories. Your body needs a sufficient number of calories each day to function properly. Additional calories must be burned through physical activity or they will be stored in the body as fat. When you are physically active, your metabolic rate rises and your body burns more calories than when it is at rest. The number of calories burned depends in part on the nature of the

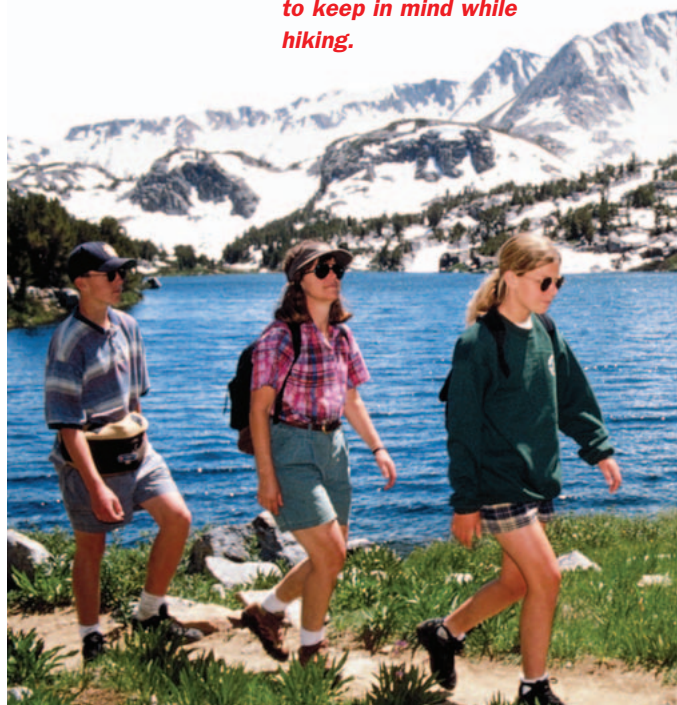


activity. When you stop being active, your metabolic rate slowly returns to normal. For several hours afterward, however, you continue to burn more calories than you did before you began the activity.

Fitting Physical Activity into Your Life

Health professionals recommend that teens incorporate 60 minutes of moderate physical activity into their daily lives. This may sound difficult, but it doesn't have to be. Any activities that get you moving count toward your daily total. For example, walk or bike to school instead of getting a ride. Suggest to your family that you go for a hike or a swim on the weekend. Organize a basketball game with friends. Be sure to include some activities that you can participate in throughout your life. Hiking, swimming, golfing, biking, racquetball, tennis, and bowling are just a few examples of lifelong activities.

 **Hiking is a physical activity that you can enjoy throughout your life. Name two safety considerations to keep in mind while hiking.**



Lesson 1 Review

Reviewing Facts and Vocabulary

1. What is the difference between *physical activity* and *physical fitness*?
2. Examine and briefly describe the effects of regular physical activity on three body systems.
3. Analyze the relationship between regular physical activity and disease prevention.

Thinking Critically

4. **Analyzing.** Explain why watching television and walking affect metabolism differently.
5. **Synthesizing.** Why does it take longer to get the maximum health benefit from a leisurely walk than from swimming laps?

Applying Health Skills

Advocacy. Design a pamphlet with eye-catching headlines and graphics to educate younger students about the importance of physical activity. Your pamphlet should encourage and guide them to determine and then participate in the types of physical activity best suited to their interests and abilities.



WORD PROCESSING Word processing can give your pamphlet a professional look. See health.glencoe.com for tips on how to get the most from your word-processing program.



Fitness and You

VOCABULARY

cardiorespiratory endurance
muscular strength
muscular endurance
flexibility
body composition
exercise
aerobic exercise
anaerobic exercise

YOU'LL LEARN TO

- Identify and describe the five areas of health-related fitness.
- Examine the relationship among body composition, diet, and fitness.
- Understand how to improve each of the five areas of health-related fitness.
- Examine the effects of fitness on body systems.




What does it mean to be physically fit? Write “Physical Fitness” at the top of a sheet of paper. Then write all the ways you can think of to describe a person’s level of physical fitness.



Do you have trouble running a mile even though you work out three times a week? Does your best friend excel at track but have a hard time doing push-ups? As you can see from these examples, every person’s level of physical fitness is different.

Elements of Fitness

To have total fitness, you need to take into account the five areas of health-related fitness. These are the areas that affect your overall health and well-being.

 These teens are improving their fitness levels. **Explain how this activity improves cardiorespiratory endurance.**

- ▶ **Cardiorespiratory endurance**—the ability of the heart, lungs, and blood vessels to utilize and send fuel and oxygen to the body’s tissues during long periods of moderate-to-vigorous activity.
- ▶ **Muscular strength**—the amount of force a muscle can exert.
- ▶ **Muscular endurance**—the ability of the muscles to perform physical tasks over a period of time without becoming fatigued.

► **Flexibility**—the ability to move a body part through a full range of motion.

► **Body composition**—the ratio of body fat to lean body tissue, including muscle, bone, water, and connective tissue such as ligaments, cartilage, and tendons.

Various activities and tests can help you evaluate each area of fitness. When you know your strengths and weaknesses, you can take steps to improve your physical fitness through exercise. **Exercise** is purposeful physical activity that is planned, structured, and repetitive and that improves or maintains personal fitness.

Measuring Cardiorespiratory Endurance

Cardiovascular disease is the leading cause of death in the United States. Keeping your cardiovascular system healthy is the most effective way of reducing your risk of developing this life-threatening disease. Cardiovascular health depends on maintaining good cardiorespiratory endurance. Can you run a mile without stopping or hike for most of the day without getting tired? If so, you have good cardiorespiratory endurance.

CARDIORESPIRATORY ENDURANCE—STEP TEST

The three-minute step test can be used to measure your cardiorespiratory endurance. This test enables you to determine the rate at which your heart beats following a period of physical activity.

1. Use a sturdy bench about 12 inches high. Fully extending each leg as you step, step up with your right foot and then with your left. Then step down with your right foot first.
2. Repeat at the rate of 24 steps per minute for three minutes.
3. Take your pulse. To do this, find a pulse point on your wrist using the first two fingers of your other hand. *Do not use the thumb, which has its own pulse.* If you have trouble finding the pulse in your wrist, try finding the pulse point in your neck just below your jaw. Count the number of beats you feel for one minute.
4. Find your pulse rate on the chart to evaluate your cardiorespiratory endurance.

Measuring Muscular Strength and Endurance


You need muscular strength for activities that involve lifting, pushing, or jumping and muscular endurance to perform such activities repeatedly. Having good muscular strength and endurance gives you the necessary power to carry out your daily tasks without becoming fatigued. People with good muscular strength and endurance often have better posture and fewer back problems.

▼ As you do the step test, your heart rate increases. Explain why physical activity causes your heart to beat faster.



STEP TEST SCORING CHART


Beats/Minute	Rating
85–95	Excellent
96–105	Good
106–125	Fair
126 or more	Needs Improvement

 Curl-ups measure abdominal strength. *How might abdominal strength improve your posture?*



CURL-UPS HEALTHY RANGE SCORING CHART

Age	Male	Female
13	21 or more	18 or more
14+	24 or more	18 or more

 The arm hang is used to measure upper body strength and endurance. *What are the benefits of having good upper body strength and endurance?*



ARM HANG HEALTHY RANGE SCORING CHART

Age	Male (Time in Seconds)	Female (Time in Seconds)
12	7-14	7-14
13-15	12-20	7-14

ABDOMINAL MUSCLE STRENGTH AND ENDURANCE—CURL-UPS

The body has different muscle groups, so there are different ways to measure muscular strength and endurance. Curl-ups often are used to measure abdominal strength.

1. Lie on your back with your knees bent at about a 45-degree angle and your feet slightly apart. Position your arms at your sides.
2. With your heels flat on the floor, curl your shoulders slowly off the ground, moving your arms forward toward your feet as you rise.
3. Slowly return to the original position. Do one curl-up every three seconds; continue until you can't do any more at the specified pace.
4. Find your score on the chart to rate your abdominal strength.

UPPER BODY STRENGTH AND ENDURANCE—ARM HANG

The arm hang is one test that is used to measure upper body strength and endurance. For this test, work with two other people.

1. Grasp the horizontal bar with your palms facing away from you.
2. Raise your body so that your chin is above the bar and your elbows are flexed to hold your chest near the bar. One person should act as a spotter to make sure that you are not swinging as you hang from the bar.
3. Hold the position described in Step 2 for as long as possible. The third person will time you with a stopwatch and will stop the watch if your chin touches the bar, your head tilts backward, or your chin falls below the bar.
4. Compare your score with those in the chart to rate your upper body strength and endurance.

Measuring Flexibility

When sitting on the floor with your legs outstretched, can you reach forward and touch your toes? If so, you have good flexibility. Being flexible can increase your athletic performance, help you feel more comfortable, and reduce the risk of muscle strains and other injuries. It can also help prevent lower back problems. Some track and field events, gymnastics, ballet and other forms of dance, figure skating, and the martial arts require a great deal of flexibility.

BODY FLEXIBILITY—SIT-AND-REACH

You can use the back saver sit-and-reach test, developed by the Cooper Institute of Aerobics Research in Dallas, Texas, to assess the flexibility of your lower back and the backs of your thighs. Before taking the test, do some light stretching to warm up your muscles.

1. Tape a yardstick on top of a 12-inch-high box so that it protrudes 9 inches toward you. The “zero” end should be nearest you. Put the back of the box against a wall.
2. Sit on the floor. Remove your shoes, and fully extend one leg so that the sole of your foot is flat against the side of the box beneath the yardstick. Bend your other knee so that your foot is flat on the floor two to three inches from the side of the extended leg.
3. Place the palm of one hand over the back of the other hand. Extend your arms over the yardstick, reaching forward as far as you can.
4. Repeat Step 3 four times. On the fourth try, hold the position for at least one second and notice where your fingertips are on the yardstick. Record your score to the nearest inch.
5. Switch the position of your legs and repeat the test.
6. Find your scores on the chart to determine your flexibility.

SIT-AND-REACH HEALTHY RANGE SCORING CHART

Gender	Number of Inches
Male	8
Female	10 (ages 13–14) 12 (ages 15+)

Measuring Body Composition


Being physically active and eating a balanced diet can improve the way you look. These healthful practices can also help you avoid the health problems associated with being overweight. To look and feel your best, it is helpful to have some idea of your body composition—that is, how much of your body is composed of fat and how much is composed of everything else. In general, males with 25 percent or more body fat and females with 30 percent or more body fat are at risk of developing cardiovascular problems. Carrying too much weight also places added stress on the skeletal system. To maintain a healthy body composition, eat a nutritious, balanced diet and participate in regular physical activity.

The “pinch test” is a common method of determining body composition. It is conducted with a tool called a *skinfold caliper*, a gauge that measures the thickness of the fat beneath a fold of skin. The tester measures folds of skin on three to seven different parts of the body, usually including the back of a shoulder, the back of an arm, the abdomen, hip, and thigh. The average of the measurements is then calculated to estimate the total proportion of body fat.



Improving Your Fitness

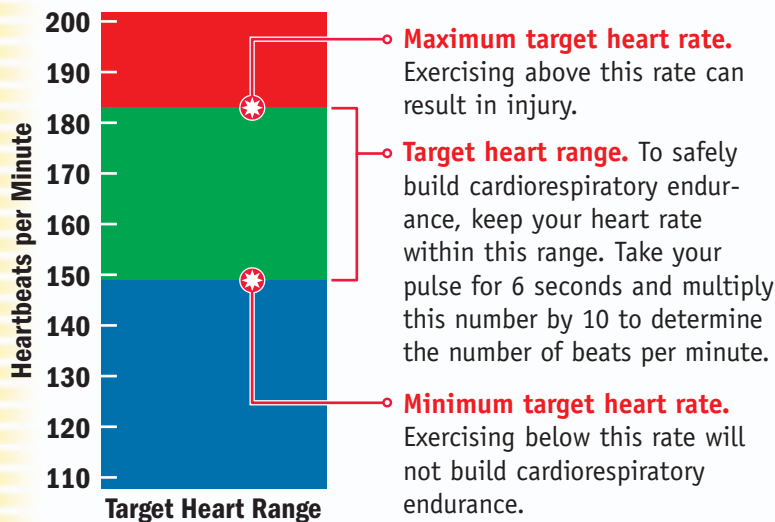
You can choose from many different physical activities and exercises to improve your fitness level, but most fall into one of two categories: aerobic exercise or anaerobic exercise. **Aerobic exercise** is any activity that uses large muscle groups, is rhythmic in nature, and can be maintained continuously for at least 10 minutes three times a day or for 20 to 30 minutes at one time. Examples of aerobic exercise include running, cycling, swimming, and dancing.

 The pinch test is often used to determine how much of a person’s body is composed of fat.

Real-Life Application

Targeting Cardiovascular Fitness

Use these steps to find your target heart range—the ideal range for your heart rate during aerobic activity. Then do the activity to help you apply this information.



ACTIVITY

Prepare a written plan describing how you will apply this information. Include your target heart range (with your calculations), two aerobic activities, how you will check your heart rate while you are doing each activity, and how you will keep your heart rate within the target range.

Finding Your Target Heart Range

1. Sit quietly for five minutes, and then take your pulse. This is your resting heart rate. Suppose that it is 66 beats per minute.
2. Subtract your age from 220 to find your maximum heart rate. For example, if you are 16, your maximum heart rate will be 204.
3. Subtract your resting heart rate from your maximum heart rate. (Example: $204 - 66 = 138$)
4. Multiply the number you arrived at in Step 3 by 60 percent and again by 85 percent. Round to the nearest whole numbers. (Example: $138 \times 0.60 = 83$; $138 \times 0.85 = 117$)
5. Add your resting heart rate to the numbers you arrived at in Step 4. (Example: $83 + 66 = 149$; $117 + 66 = 183$) The resulting totals represent your target heart range (between 149 and 183).

Anaerobic exercise involves *intense short bursts of activity in which the muscles work so hard that they produce energy without using oxygen*. Running a 100-meter dash and lifting weights are examples of anaerobic exercises.

Improving Cardiorespiratory Endurance

When you do aerobic exercises, your heart rate increases and your heart sends more oxygen to your muscles to use as energy. Over time, this strengthens the heart muscle, allowing it to pump blood more efficiently. Aerobic exercise also affects your respiratory system by increasing the lungs' capacity to hold air. **Caution:** Don't force

yourself to continue an aerobic activity if you become exhausted. Before beginning a fitness program that includes aerobic activities, consult a health care professional. This is especially important if you have asthma or another respiratory disorder. It is also recommended for people with heart disease.

Improving Muscular Strength and Endurance

Anaerobic exercises improve muscular strength and endurance. The more work the muscles do, the stronger they become. Sprinting is an example of an anaerobic activity. Resistance or strength training, which builds muscles by requiring them to move in opposition to a force, is also a form of anaerobic exercise. Free weights, exercise machines, or your own body weight can provide resistance. In addition to building and strengthening muscle, resistance exercises help the body keep blood sugar levels normal and help maintain healthy **cholesterol** levels.

As indicated in **Figure 4.2**, there are three types of resistance training exercise. Exercises such as these tone muscles, improve muscular strength, and increase muscular endurance.

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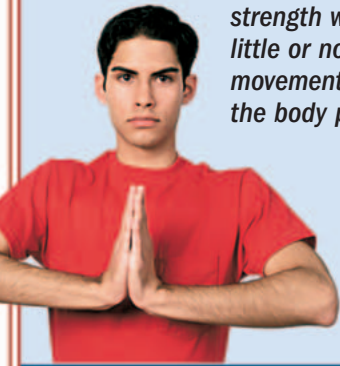

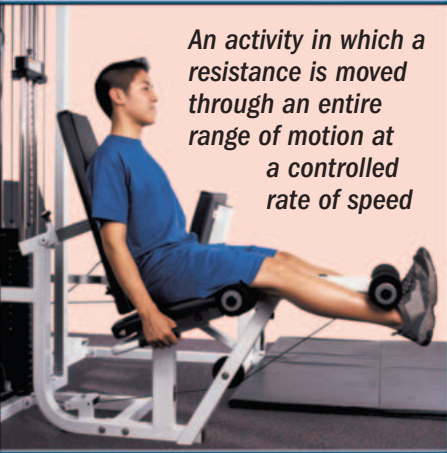
cholesterol See Chapter 5, page 118 for information on cholesterol.


Improving Flexibility

When you have good flexibility, you can easily bend, turn, and stretch your body. You can improve your flexibility through regular

FIGURE 4.2

TYPES OF RESISTANCE EXERCISE

Isometric Exercise	Isotonic Exercise	Isokinetic Exercise
<p><i>An activity that uses muscle tension to improve muscular strength with little or no movement of the body part</i></p> 	<p><i>An activity that combines muscle contraction and repeated movement</i></p> 	<p><i>An activity in which a resistance is moved through an entire range of motion at a controlled rate of speed</i></p> 
<p>Other Examples: pushing against a wall or any other immovable object</p>	<p>Other Examples: doing calisthenics, push-ups, pull-ups, sit-ups; using a rowing machine</p>	<p>Other Examples: using a stationary bike or treadmill designed to control resistance and speed</p>

 **Regular, gentle stretching of muscles and joints helps increase flexibility. *What exercises do you include in your routine to increase your flexibility?***



stretching exercises. Just be sure to move slowly and gently. For example, to stretch the muscles of your upper body, stand with your arms extended behind your back, hands clasped; raise your arms until you feel tightness in your shoulders and chest; and hold for 20 seconds.

Improving and Maintaining Bone Strength

The decisions you make concerning physical activity and nutrition can affect the health of your skeletal system now and later in life. You probably already know that calcium—found in dairy products and certain green vegetables—is essential for building strong bones. Resistance training and weight-bearing aerobic activities—those that force you to work against gravity, such as walking and stair climbing—can also help increase bone mass, strengthening your skeletal system.

It's very important to build strong bones during your teen years because this time period is your last opportunity to significantly increase bone mass. During a person's late twenties and early thirties, bone mass and density begin to decline. This can lead to osteoporosis.

Lesson 2 Review

Reviewing Facts and Vocabulary

1. Identify and describe the five areas of health-related fitness.
2. Examine and briefly describe the relationship among body composition, diet, and fitness.
3. Examine and briefly describe the effects of resistance training on the muscular and skeletal systems.

Thinking Critically

4. **Analyzing.** Sam has been doing 50 curl-ups each day. Explain what area of health-related fitness this exercise benefits. What other types of physical activities or exercises should Sam add to his routine to improve his total health-related fitness?
5. **Evaluating.** Keesha, who has asthma, wants to begin an exercise program. She is thinking of signing up for a high-impact aerobic class. Is this a good strategy for Keesha? Explain your answer.

Applying Health Skills

Practicing Healthful Behaviors. Help family members determine their target heart ranges. Then make a list of aerobic activities you could do together. Determine how you all could use this information to improve your cardiorespiratory endurance. Remember: get a health screening before beginning an exercise program.



SPREADSHEETS Using spreadsheet software, design a table that lists target heart ranges for people of various ages and with different resting heart rates. See health.glencoe.com for information on how to use a spreadsheet.

Planning a Personal Activity Program

VOCABULARY

overload
progression
specificity
warm-up
workout
F.I.T.T.
cool-down
resting heart rate

YOU'LL LEARN TO

- Set realistic fitness goals.
- Synthesize information and apply critical-thinking, decision-making, and problem-solving skills to develop a personal physical activity program.
- Identify the basic principles of a physical activity program.




List the physical activities in which you have participated during the past week. Classify each activity as *aerobic*, *anaerobic*, or *other*, and explain your choice.

Knowing the many health benefits of physical activity may inspire you to begin a personal activity program—but having a reason or goal for being physically active is even more inspiring. Setting fitness goals can help you get started by providing you with a plan of action.

Setting Physical Activity Goals

How can you be sure to include physical activity in your daily routine? The first step is to set realistic fitness goals. Then you can develop a plan to meet your goals. To meet the USDA recommendations, teens should get 60 minutes of physical activity every day. This may include all sorts of activities, from participating in physical education classes and playing sports to doing household tasks such as mowing the lawn and cleaning your room.



 Participating in a school sports program may inspire you to set fitness goals and begin a physical activity program.

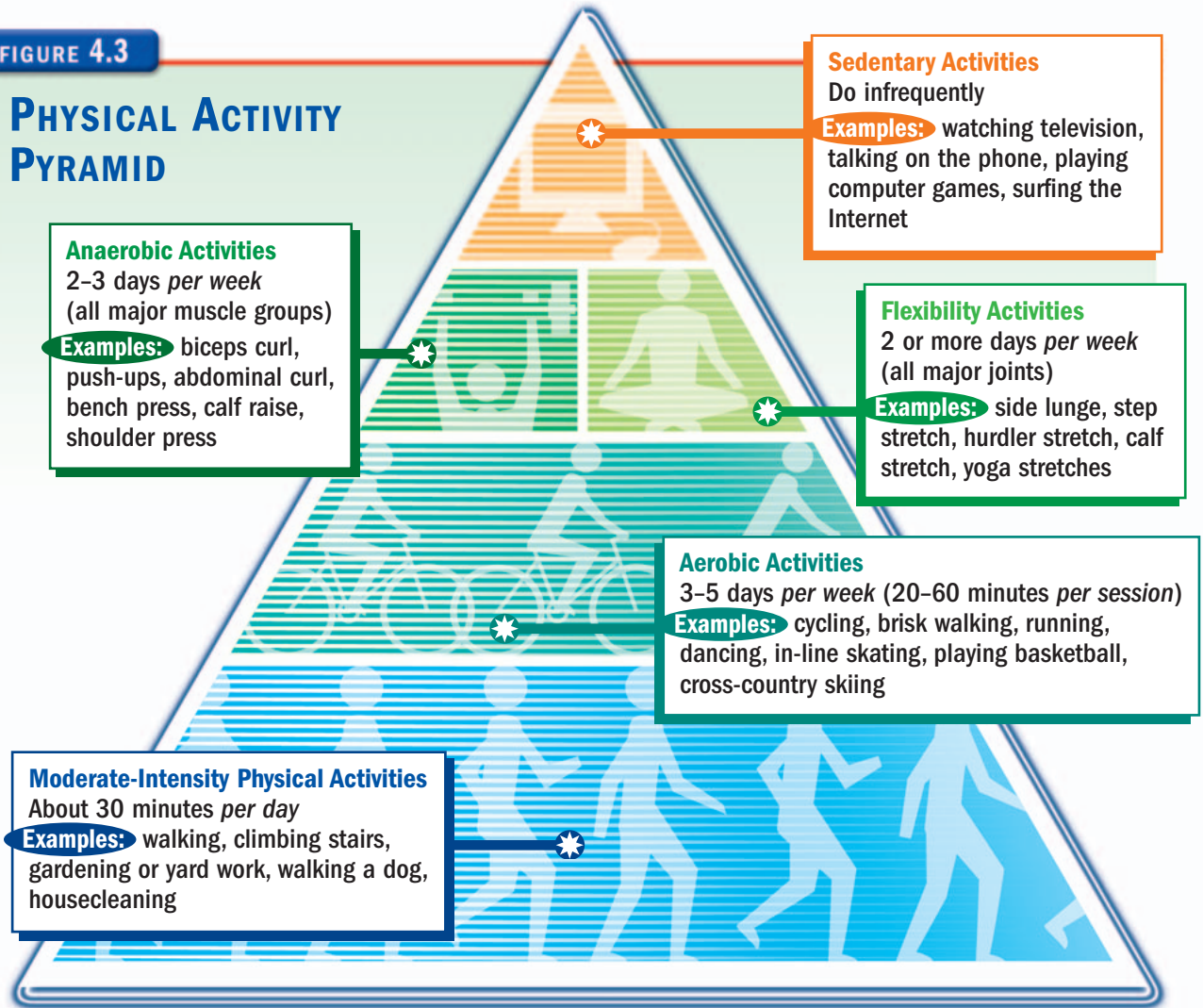
Your school or community may offer programs that provide a variety of fun and healthful physical activities.

Getting Started

Figure 4.3 provides suggestions about how to divide your time when doing various types of physical activity.

FIGURE 4.3

PHYSICAL ACTIVITY PYRAMID



Choosing Activities

Including different types of physical activities in your fitness program can help make it more enjoyable. As your fitness level increases and your interests change, you can alter your program. Other factors that may affect your activity choices include:

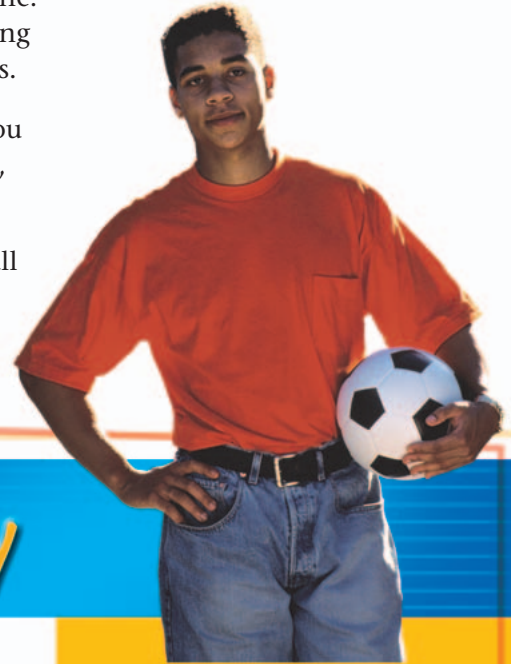
- ▶ **Cost.** Some activities require specialized—and possibly expensive—equipment. Think about what you can afford, and keep in mind that you may discover after a time that an activity just doesn't suit you.

- ▶ **Where you live.** For convenience you'll want to choose activities that you can do locally, without spending a lot of time traveling. Think about the features of your local area. Is the land flat or hilly? What type of climate do you live in? To what activities does the region best lend itself?
- ▶ **Your level of health.** Some health conditions have risks that need to be considered when planning physical activities. For example, some types of physical activity can aggravate **asthma**, a disease of the respiratory system.
- ▶ **Time and place.** Build your program into your daily routine. Do not schedule jogging at 6:00 a.m. if you are not a morning person. Design your schedule to help you achieve your goals.
- ▶ **Personal safety.** Think about your **personal safety** as you develop a fitness program. If you plan to run long distances, avoid going through unsafe areas or running after dark.
- ▶ **Comprehensive planning.** Select activities that address all five areas of health-related fitness.

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asthma To learn more about asthma, see Chapter 26, page 690.

personal safety For more information on issues related to personal safety, see Chapter 13, page 330.



Health Skills Activity

Goal Setting: Starting a Physical Activity Program

William wants to start a physical activity program, but he's not sure where to begin. He really wants to improve his cardiorespiratory and muscle endurance, and he knows that his flexibility and muscle strength need work, too. He's also thinking about signing up for soccer; tryouts are in three months. What can William do to improve his fitness level and make the soccer team?

What Would You Do?

Apply the five goal-setting steps to William's situation.

1. Identify a specific goal and write it down.
2. List the steps you will take to reach your goal.
3. Identify potential problems and ways to get help and support from others.
4. Set up checkpoints to evaluate your progress.
5. Reward yourself once you have achieved your goal.



Health Minute

Avoiding Boredom in Your Workout Routine

If your workout becomes boring:

- ▶ Vary your routine by cross training. For example, skate one day and swim the next.
- ▶ Work out with a friend. This can be more fun than working out alone and can help you both stay motivated.
- ▶ Try listening to music while working out. When you have something else to focus on, the workout session may seem to pass more quickly. (**Note:** Listen to music only when participating in indoor activities. When exercising outdoors, you need to be alert to possible dangers.)
- ▶ Take a break to give your body time to recharge.

Cross Training

Engaging in a variety of physical activities to strengthen different muscle groups is known as cross training. Jumping rope, swimming, jogging, and cycling are good cross-training activities for athletes.

Basics of a Physical Activity Program

Because it focuses on *your* goals and interests, your fitness program is unique. However, all effective fitness programs are based on these three principles:

- ▶ **Overload**, *working the body harder than it is normally worked*, builds muscular strength and contributes to overall fitness. It is achieved by increasing repetitions or by doing more sets (groups of 6 to 12 repetitions) of an exercise.
- ▶ **Progression** is *the gradual increase in overload necessary to achieve higher levels of fitness*. As an activity becomes easier to do, increase the number of repetitions or sets or increase the amount of time spent doing the activity.
- ▶ **Specificity** indicates that *particular exercises and activities improve particular areas of health-related fitness*. For example, resistance training builds muscular strength and endurance, while aerobic activity improves cardiorespiratory endurance.

To gain the most benefit from an exercise program, you'll want to include three basic stages for each activity. These are the *warm-up*, the *workout*, and the *cool-down*. Include each stage in every session even when you're in a hurry.

The Warm-Up

The **warm-up**, *an activity that prepares the muscles for work*, is the first stage in any physical activity routine. Begin the warm-up by taking a brisk walk to raise your body temperature. Then, slowly stretch large muscles to increase their elasticity and reduce the risk of injury. After stretching individual muscles, perform the physical activity slowly for about five minutes. For example, if you are running, jog slowly for about five minutes and then increase your pace to a run. Warming up allows your pulse rate to increase gradually. A sudden increase in pulse rate places unnecessary strain on the heart and blood vessels.

The Workout

The part of an exercise program when the activity is performed at its highest peak is called the **workout**. To be effective, the activity needs to follow the **F.I.T.T.** formula—*frequency, intensity, time/duration, and type of activity*—outlined in **Figure 4.4**.



FREQUENCY

You should schedule workouts three to four times each week, with only one or two days between sessions. The frequency of your workouts depends partly on your fitness goals and the type of activity you do—as well as on your schedule and possibly even the weather. Exercising more than three times each week for six months should help *get* you physically fit. To *maintain* your fitness level, continue your program at least three times each week.

INTENSITY

Working your muscles and cardiorespiratory system at an intensity that allows you to reach overload will help you improve your fitness level. Begin slowly to build endurance. Doing too much too soon is harmful and can cause chronically sore muscles.

When weight training, start with a light weight and build to heavier weights. For aerobics, work toward your target heart range. If you are out of shape, it may take about six months before you can work out for 20 to 30 minutes within your target heart range.

TIME/DURATION

Slowly build up the amount of time you spend doing aerobic exercises. The goal in aerobics is to work within your target heart range for 20 to 30 minutes. When weight training, do the exercises slowly, taking at least two seconds to lower a weight. Rest for one or two minutes between sets. Also, vary the exercises to strengthen your muscles in the full range of motion.

TYPE

To get the maximum health benefits from your workout routine, devote 75–80 percent of your workout time to aerobic activity and 20–25 percent to anaerobic activity. Choose activities that you enjoy, or you may find it difficult to complete your workouts.

The Cool-Down

Ending a workout abruptly can cause your muscles to tighten and may make you feel dizzy. To avoid these effects, you need to cool down after a workout. The **cool-down** is *an activity that prepares the muscles to return to a resting state.*

FIGURE 4.4


THE F.I.T.T. FORMULA

Include each of these elements in your workout.

- F** **requency**
how often you do the activity each week
- I** **ntensity**
how hard you work at the activity per session
- T** **ime/duration**
how much time you devote to a session
- T** **ype**
which activities you select



👉 The warm-up is an important part of any physical activity routine. *Explain how stretching prepares muscles for exercise and prevents injuries.*

 Using a calendar or journal can help you keep track of your fitness program.



Begin the cool-down by slowing down the activity. Continue the activity at this slower pace for about five minutes, then stretch for five minutes.

Monitoring Your Progress

To monitor your progress, keep a fitness journal. In your journal, list your goals and note the frequency, intensity, duration, and type of each activity in which you participate. At the end of 12 weeks, and every 6 weeks after that, compare the figures to evaluate your progress.

Resting Heart Rate

Your **resting heart rate** is the number of times your heart beats in one minute when you are not active. Your resting heart rate can also be used to evaluate your progress. A person of average fitness has a resting heart rate of about 72 to 84 beats per minute. Just four weeks of a fitness program can decrease that rate by 5 to 10 beats per minute. A resting heart rate below 72 indicates a good fitness level.

Lesson 3 Review

Reviewing Facts and Vocabulary

1. How can using the Physical Activity Pyramid help you meet your fitness goals?
2. Identify and define the three principles upon which all effective fitness programs are based.
3. What do the letters in the *F.I.T.T.* formula stand for?

Thinking Critically

4. **Analyzing.** How is your resting heart rate an indication of your level of fitness?
5. **Synthesizing.** Maria is a runner. Describe how she could include the three stages of an effective exercise program in her fitness routine.

Applying Health Skills

Goal Setting. Use the goal-setting steps to develop a personal fitness program. Synthesize information from this lesson and apply critical-thinking and decision-making skills to determine what activities to include and how you will incorporate them into a formal plan. Think of obstacles that could prevent you from following your plan, and apply problem-solving skills to figure out how to overcome these obstacles.



SPREADSHEETS Use spreadsheet software to design a table that can help you organize your physical activity schedule and track your progress. See health.glencoe.com for information on how to use a spreadsheet.

Training and Safety for Physical Activities

VOCABULARY

training program
hydration
anabolic steroids
health screening

YOU'LL LEARN TO

- Recognize health-promoting strategies that can enhance a training program.
- Understand the importance of preventive health screenings before beginning a physical activity program.
- Identify safety concerns related to various physical activities.



Divide a sheet of paper into two columns. In the first column, list five physical activities you enjoy doing. In the second column, list any special equipment, including safety gear, needed for each activity.


Beginning a new physical activity can be exciting. It also requires some preparation to make sure that you stay safe and get the most out of the activity.

Training and Peak Performance


The first step in becoming fit is to take good care of your body. Eat nutritious foods and drink plenty of fluids, especially water. Getting adequate rest is also essential. To keep your body in top form, it is also important that you avoid harmful substances such as tobacco, alcohol, and other drugs.

The next step in improving fitness often involves beginning a training program for your chosen activity. A **training program** is a *program of formalized physical preparation for involvement in a sport or another physical activity*. Consult your physical education teacher, coach, or another trusted adult to help you set your training goals.



 A physical education teacher or coach can help you establish your goals for a training program.



 **Drinking water is important before, during, and after vigorous physical activity.**
Explain why hydration is so important during any physical activity.

hotlink

anabolic steroids For more information on the harmful effects of anabolic steroids, see Chapter 23, page 601.

Nutrition and Hydration

What you eat and drink is an important part of any training program. Food provides the energy necessary for peak performance. You will learn more about nutrition and healthy food choices in Chapter 5. Equally important is hydration, especially when you are engaged in vigorous physical activity. **Hydration** is *taking in fluids so that the body functions properly*. When you are adequately hydrated, you are more alert and focused, your reaction time is faster because your muscles respond more quickly and are less likely to cramp, and your endurance is greater. To stay hydrated, drink plenty of water before, during, and after vigorous physical activity.

Adequate Rest

Sleep, which helps your body rest and reenergize, is also essential for any training program. Getting too little sleep can disrupt the nervous system, causing slowed reaction time, lack of concentration (increasing the possibility of errors and accidents), forgetfulness, irritability, and even depression. On average, teens need 8 to 10 hours of sleep every night to function at their best.

Avoiding Harmful Substances

Avoiding harmful substances such as tobacco, alcohol, anabolic steroids, and other drugs is another part of maintaining an athletic training program.

ANABOLIC STEROIDS

Anabolic steroids are *synthetic substances that are similar to the male hormone testosterone*. Because these substances cause the body to make muscle tissue, some athletes take them to increase muscle mass and enhance performance. However, anabolic steroids have very harmful effects, including increased risk of cancer and heart disease; sterility, or the inability to produce children; skin problems such as acne and hair loss; unusual weight gain or loss; sexual underdevelopment and dysfunction; and violent, suicidal, or depressive tendencies.

It is illegal to use anabolic steroids without a prescription, and those who test positive for steroid use are disqualified from competitions. Thus, abstinence is the best choice when it comes to the use of steroids.

NUTRITIONAL SUPPLEMENTS

Nutritional supplements are nonfood substances that contain one or more nutrients that the body needs, such as vitamins or minerals. The best way to get nutrients is from food, but sometimes a multiple vitamin and mineral supplement may be appropriate.

Should Random Drug Testing of Athletes Be Performed?

A number of high schools in the United States have adopted a policy of random drug testing of student athletes even if there is no indication that the athletes are using drugs. What's your position on the subject of random drug testing of school athletes? Here are two points of view.

Viewpoint 1: Maya D., age 17

Random drug testing of school athletes is unfair and an invasion of privacy, especially if there's no evidence that the person has been using drugs. Students who want to participate in school sports shouldn't have to give up their privacy just to be on an athletic team. Besides, why should athletes be singled out—isn't that discrimination?

Viewpoint 2: Graham H., age 16

I understand Maya's argument, but I think that schools have a right to know whether students are using drugs. They aren't out to catch us doing something wrong. They're concerned about our health and the environment in which we live and learn. People may not like the rules, but schools must follow the policy. We don't want our school to be represented by athletes who use drugs and get away with it. That's dangerous *and* embarrassing.

ACTIVITIES

1. Take the pro or con position, and expand upon it. Use online or print resources to back up your views. Be sure to investigate each supporting point raised in an argument.
2. Some school districts are advocating drug testing of all students who want to be involved in any extra-curricular activities. What might be the pros and cons of such an approach?

A health care provider can advise you about whether you need this type of supplement. It's important to take the recommended dosage of any supplement. High doses, or *megadoses*, of a nutritional supplement can be harmful.

Safety First!

Safety should be a major concern when you participate in sports and other physical activities. You can reduce your risk of injury by

- ▶ visiting a health care professional for a health screening before beginning a new activity. A **health screening** is a search or



What Are Herbal Supplements?

Herbal supplements are chemical substances derived from plants that may be sold as dietary supplements. Little research has been conducted on their effects or safety, and not much is known about how they work. Nutritionists recommend eating a variety of fruits, vegetables, and whole grains to get the plant chemicals your body needs.


check for diseases or disorders that an individual would otherwise not have knowledge of or seek help for. This screening helps ensure that you do not have a health condition that could make the activity dangerous for you and that you're fit enough to begin the activity you've chosen.

- ▶ using the proper safety equipment for your chosen activity.
- ▶ being alert to the surrounding environment, including other players and spectators.
- ▶ playing at your skill level and knowing your physical limits.
- ▶ warming up before and cooling down after every activity.
- ▶ staying within areas that have been designated for physical activities, such as skateboarding parks and bicycle paths.
- ▶ obeying all rules and restrictions—for example, those that restrict swimming to certain areas or that prohibit skateboarding on sidewalks.
- ▶ practicing good sportsmanship.

If you should become injured or ill during physical activity, tell a physical education teacher, coach, or another adult immediately.

Personal Safety

You can reduce risks to your personal safety by selecting the right time and place for your activity. This is especially true if you work out alone. If you run or jog, choose a well-used park during daylight hours, when other people are there. If you can't avoid nighttime physical activity, wear reflective clothing so that others can see you. Wearing a whistle that you can blow to attract attention if you are in danger is also a good idea. Also, be aware of the effects of weather: bicycling or running—and even walking—can be a health risk when it's wet and slippery outside.

 **To avoid sports injuries, choose the proper athletic gear. Match each piece of equipment with an appropriate sport or other physical activity.**




Using Proper Equipment

Before you begin any new physical activity, learn to use the equipment involved. Check the equipment to make sure that it fits and is in good condition. Always wear the safety gear recommended for that particular activity. Many sports have strict requirements for protective equipment. These tips may also help.

- ▶ Wear a helmet when bicycling, skateboarding, or skating. Also, when skateboarding or skating, wear knee and elbow pads, gloves, and wrist guards.

- ▶ Avoid riding at night, if possible. If you must, make sure your bike has reflective tape, a rear reflector, and a headlight. Skateboards and skates also should be outlined with reflective tape. When participating in any outdoor activity at night, wear light-colored clothing with reflective patches on the front and back so that drivers and pedestrians can see you more easily.
- ▶ Males participating in contact sports—such as football and hockey—should wear athletic supporters or cups to protect the groin area. Females should wear sports bras to prevent stretching of the ligaments that support the breasts.

Proper footwear and clothing also are important. Athletic shoes should be comfortable and should have a cushioned heel, good arch support, and ample toe room. Laced shoes are best for proper control of your foot in the shoe. Wear socks to cushion your feet and keep them dry. In general, choose comfortable, nonrestrictive clothing. When it's warm outside, dress lightly. In cool weather, wear several loose-fitting layers that you can easily remove as you warm up.

 Whatever activity you choose, it's essential to use the proper safety equipment. *What safety equipment are the teens pictured here using?*



Lesson 4 Review

Reviewing Facts and Vocabulary

1. Define the term *hydration*.
2. What are *anabolic steroids*? Name three ways they can harm health.
3. Why is it important to get a preventive health screening before beginning a physical activity program?

Thinking Critically

4. **Evaluating.** How can practicing good sportsmanship help you stay safe when participating in a sport?
5. **Analyzing.** Enrique wants to play on the school football team in the fall. To prepare, he plans to participate in a training program in the spring and summer. List five things Enrique should do before and during his training program.

Applying Health Skills

Accessing Information. Working with a classmate, search the Web for three schools that have adopted the policy of random drug testing of school athletes. Compare your school's policy with theirs, noting both similarities and differences.



WEB SITES Use the information you find to develop a Web page explaining your school's approach to random drug testing of school athletes. See health.glencoe.com for help in planning and building a Web site.



Physical Activity Injuries

VOCABULARY

overexertion
heat cramps
heatstroke
frostbite
hypothermia
muscle cramp
strain
sprain

YOU'LL LEARN TO

- Identify weather-related risks associated with various physical activities.
- Analyze strategies for preventing and responding to accidental injuries related to physical activity.
- Identify physical activity injuries requiring professional health services for people of all ages.



List activities you do only during specific seasons of the year. Next to each activity, describe how you prepare for the weather conditions of that season.



▲ These teens are taking specific precautions to prevent sports injuries. *What safety precautions did you take in your most recent outdoor activity?*

With any activity that involves movement, there is always a risk of accident or injury. The risk of injury during physical activity increases when a person is not in good physical condition or has not sufficiently warmed up or cooled down. Attempting physical activities that are beyond your level of ability also increases the risk of injury.

Weather-Related Risks

Taking your physical activity routine outdoors can be a great change of pace, but some weather-related health problems need to be taken into consideration. These problems can be avoided by not participating in outdoor physical activity when temperatures are extremely high or extremely low. Factors such as wind, humidity, and air pollution can increase your risk of injury or illness. Be aware of wind chill factors, ultraviolet (UV) indexes, and air quality alerts. You also should pay attention to weather warnings. Stay inside if there is a threat of tornadoes, thunderstorms, flash floods, or blizzards.

Hot-Weather Health Risks

Two concerns during hot weather are dehydration, or excessive loss of water from the body, and poor air quality. Smog can damage the lungs, so avoid outdoor physical activities during smog alerts. To avoid dehydration, drink plenty of water before, during, and after physical activity.

Many hot-weather health problems are related to **overexertion**, or *overworking the body*. For example, heat exhaustion—an overheating of the body that results in cold, clammy skin and symptoms of shock—is caused by overexertion in a hot, humid atmosphere. Other symptoms include dizziness, headache, shortness of breath, and nausea. Heat exhaustion may be preceded or accompanied by **heat cramps**, *muscle spasms that result from a loss of large amounts of salt and water through perspiration*. If you experience any of these symptoms, move to a cool place and lie down with your feet elevated. Take small sips of water as you start to recover. If symptoms are severe, or if vomiting occurs, get medical help immediately.


Continuing to exercise with the symptoms of heat exhaustion and dehydration can lead to **heatstroke**, *a condition in which the body loses the ability to rid itself of excessive heat through perspiration*. This causes hyperthermia, a sudden increase in body temperature, which can be life-threatening. A person suffering from heatstroke may have difficulty breathing and may collapse suddenly. If heatstroke occurs, immediately call for medical help. Then move the person to a cool place, and sponge him or her with cold water until help arrives.

Cold-Weather Health Risks

When participating in cold-weather activities, dress in three layers to keep warm. The first layer should pull moisture and perspiration away from your body. Many synthetic fabrics have been specifically developed to help keep the skin dry. The middle layer should provide insulation. Wool or synthetic fleece fabrics can help keep you warm even if they get wet. A coated nylon windshell as the top layer will help keep warmth in and water and wind out. A hat is also a must—70 percent of the body's heat is lost through the head. Removing layers as you warm up or adding them as the temperature drops can help you adjust to changes in the weather.


When you begin any cold-weather activity, start slowly and be sure to warm up your muscles. Staying hydrated is as important in



 **Staying hydrated is essential when working out in hot or cold weather. What other steps can this player take to protect himself from health problems associated with working out in hot weather?**

Did You Know?



 **Altitude sickness is a risk in some mountain sports. It usually occurs at altitudes of 7,000 feet or higher, where there are lower levels of oxygen. Symptoms include severe headache, nausea, and weakness. The best ways of preventing altitude sickness are to give yourself time to adjust to activity at high altitudes, to drink plenty of water, and to avoid alcohol and caffeine.**



▲ Helmets, goggles, and gloves are proper equipment when snowboarding.

cold weather as it is in hot weather. Two specific health risks from cold weather are particularly important to keep in mind: frostbite and hypothermia.

► **Frostbite** is a condition that results when body tissues become frozen, and it requires professional medical treatment. You can avoid frostbite by dressing warmly and covering all exposed skin—especially the ears, face, feet, and fingers, where frostbite most often occurs. An early warning sign of frostbite, called frostnip, is a whitening of the skin of the toes, fingers, nose, or ears. If this happens or if you notice a lack of feeling in any exposed area, get indoors right away and warm the area with warm water.

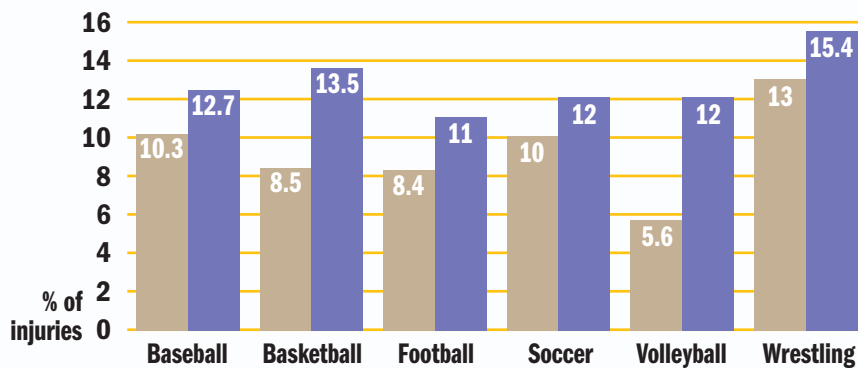
Real-Life Application

Being Safe While Physically Active

Sports and recreational activities are the second most frequent cause of injury for teens. Many such injuries can be prevented by being cautious and by wearing proper equipment. Examine the graph, and choose a sport or recreational activity in which you or your friends participate. Using reliable online and print resources, research your sport to find injury statistics. For example, what injuries are most common for this sport? How many teens are injured each year in this sport? How many of these injuries are treated in emergency rooms? What protective equipment and precautions can reduce injury in this sport?

Frequency (%) of High School Sport Injuries

Major Moderate



Source: Based on data from the National Athletic Trainers' Association

ACTIVITY

Using the activity you have researched, create a poster that explains how teens can get injured while participating in the activity and presents ways of staying safe. Make your poster colorful and attention-getting to appeal to a teen audience. Be sure to give it a catchy title.

► **Hypothermia** is a condition in which body temperature becomes dangerously low. It is usually associated with cold weather, but it also can result from lengthy exposure to wind or rain or from submersion in cold water. When hypothermia occurs, the body loses the ability to warm itself. As body temperature drops, the brain cannot function and body systems begin to shut down. A person with this condition may become disoriented and lose motor control. Because hypothermia can lead to death, it requires immediate medical attention.

When participating in cold-weather activities, pay attention to your body. Shivering is a sign that your body is losing heat. If you begin to feel cold or to shiver, go to a warm, dry place; wrap yourself in a blanket; and drink warm liquids to slowly raise your body temperature.

Protecting Yourself from Sun and Wind

Prolonged exposure to sun and wind is another weather-related risk of outdoor physical activity. Windburn occurs when skin is exposed to freezing wind, causing it to become red, tight, and sore to the touch. Reduce the risk of windburn by wearing protective clothing and using lip balm. The sun's UV rays cause *sunburn*, a burning of the outer layers of the skin. Mild sunburn makes your skin red and slightly sore. Severe sunburn causes blistering of the skin, swelling, and pain. In addition to increasing the risk of sunburn, repeated or prolonged exposure to the sun speeds the skin's aging process and increases your risk of developing **skin cancer**. The most dangerous hours for UV exposure are from 10:00 a.m. to 4:00 p.m. To protect yourself against sunburn:

- Cover as much of the body with clothing as possible when outdoors and wear broad-brimmed hats on sunny days.
- Use sunscreen and lip balm with a sun protection factor (SPF) of *at least* 15. The SPF number indicates the sunscreen's ability to screen out the sun's harmful UV rays. Because UV rays penetrate clouds, you need to wear sunscreen on cloudy days, too.
- Apply sunscreen 30 minutes before you go outside, spreading it liberally and evenly over all areas of your skin that will be exposed. Reapply it at least every two hours.

UV rays can also damage your eyes. A *cataract*, a cloudy covering over the lens of the eye, is caused in part by sun exposure. Wear a visor or a hat with a brim, and use sunglasses, even during the winter months. Because sunlight is reflected off snow, those participating in winter sports need to wear goggles to protect their eyes from both UV exposure and glare.

▼ Apply sunscreen frequently when you participate in outdoor activities. **Why is it important to use sunscreen in both hot and cold weather?**



hot link

skin cancer For more information about skin cancer, see Chapter 26, page 683.

Ligaments are strong bands of tissue that connect the bones to one another at a moveable joint. Sprains result if these bands are stretched or torn.



Many minor sports injuries can be treated by following the R.I.C.E. procedure. Which part of the R.I.C.E. procedure is pictured here?

Minor Injuries

Have you ever had sore muscles after a physical activity or experienced the pain of a twisted ankle? Muscles are often sore 24 to 48 hours after a strenuous workout. Warming up, cooling down, and stretching can prevent or reduce muscle soreness. Other minor injuries that affect the skeletal or muscular systems include muscle cramps, strains, and sprains. A **muscle cramp** is a spasm or sudden tightening of a muscle. It happens when a muscle is tired, overworked, or dehydrated. Drinking cool water may ease muscle cramping. A **strain** is a condition resulting from damaging a muscle or tendon. A **sprain** is an injury to the ligament surrounding a joint. Symptoms of a sprain include pain, swelling, and difficulty moving. Severe sprains require medical treatment. Warming up can help prevent muscle strains and sprains.

Treatment for Minor Injuries

Minor injuries such as muscle cramps, strains, and some sprains are easily treated. Muscle cramps can be relieved through light massage. Minor strains and sprains can be treated using the R.I.C.E. procedure described in **Figure 4.5**.

Major Injuries

Pain—especially extreme pain—may signal that you have a major injury. If you experience extreme pain, numbness, or disorientation or hear a “cracking” sound during a fall, get appropriate medical treatment immediately.

FIGURE 4.5

THE R.I.C.E. PROCEDURE

Rest Avoid using the affected muscle or joint. This may mean not using the affected area for several days.

Ice Ice helps reduce pain and swelling. Place ice cubes in a plastic bag, and wrap the bag in a towel. Hold the towel-wrapped bag on the affected area for 20 minutes. Remove the bag for 20 minutes, and then reapply the bag for another 20 minutes. Repeat this process every three waking hours over the course of 72 hours.

Compression Light pressure through the use of an elastic bandage can help reduce swelling. The bandage should not be so tight that it cuts off the blood supply to the area, and it should be loosened at night.

Elevation Raising the affected limb above the level of the heart helps reduce pain and swelling, especially at night.

Major injuries include:

- ▶ **Fractures and Dislocations.** Fractures are any break in a bone. A fracture causes swelling and often extreme pain, and it usually requires immobilization to heal properly. Dislocations result when a bone is forced from its normal position at a joint. A dislocation sometimes causes a “popping” sound when it occurs. A physician must put the bone back into place and immobilize the joint so that the tissue can heal.
- ▶ **Tendonitis.** This is a condition in which the tendons, bands of fiber that connect muscles to bones, are stretched or torn from overuse. Treatment includes rest, medication, and physical therapy.
- ▶ **Concussions.** Concussions result from blows to the head and can cause swelling of the brain, resulting in unconsciousness or even death. Concussions can lead to serious neurological problems. If you receive any blow to the head and experience headache, dizziness, or loss of memory or consciousness, see a health care professional immediately.



▼ This teen's safety gear helps protect him from serious injury. *What type of serious injury might the face mask prevent?*

Lesson 5 Review

Reviewing Facts and Vocabulary

1. What is *hypothermia*? With which types of weather is this condition often associated?
2. Analyze and describe strategies for preventing muscle soreness after a workout.
3. Identify which injuries described in this lesson require the attention of professional health services.

Thinking Critically

4. **Evaluating.** Explain why muscle cramps might be more dangerous for a swimmer than for a jogger.
5. **Analyzing.** On a hot day, a runner begins to have trouble breathing and also becomes pale, dizzy, and nauseous. From what condition is this runner likely to be suffering? How might the condition have been prevented? Analyze and describe strategies for responding to this condition.

Applying Health Skills

Communication Skills. Imagine that your friend has suffered a minor sprain to her ankle while in-line skating. Analyze and describe how she could use the *R.I.C.E.* procedure to respond to this accidental injury.



WORD PROCESSING Use a word-processing program to create your own chart outlining the *R.I.C.E.* procedure. See health.glencoe.com for tips on how to get the most from your word-processing program.

Truth in Fitness Advertising?

TV infomercials for fitness products usually feature in-shape spokespeople with “rock-hard abs” or bulging biceps. Are these typical results from using the advertised product? In this activity you will explore advertising techniques and evaluate the effectiveness of a fitness product.



ACTIVITY

Watch a TV infomercial for a particular fitness product, and answer the following questions.

1. What product is being advertised? What are the claims being made in the infomercial? Note any key statements describing the product's advantages.
2. What specific information does the advertiser provide about using the product? For instance, how often must a person use the product in order to get the desired results?
3. Who is the spokesperson? Does this person lend any credibility to the advertiser's claims?

Compare your notes with those of your classmates. Discuss the claims

made in these infomercials in light of what you have learned in your text about improving various aspects of health-related fitness.

EXPRESS YOUR VIEWS

Write a paragraph expressing your overall impressions of the infomercial you watched. How much of what is being advertised is based on accurate statements? Explain whether you think the product might provide any fitness benefits, and compare that with the advertiser's claims. If you thought that the product claims were exaggerated, include suggestions on how the advertiser could present a more realistic advertisement about the product's capabilities.

CROSS-CURRICULUM CONNECTIONS



Compose an Essay. “Ripping through the water while swimming laps” or “straining and puffing while on a daily jog” are examples of phrases that illustrate the sensory details of physical activity. Capture the sights, sounds, feel, taste, and smell of your favorite physical activity in a brief descriptive essay. Focus on using adjectives, adverbs, and action verbs. Use metaphors to create an even more vivid picture.



Create a Visual Aid. One of the earliest examples of organized exercise is the Olympic Games in 776 B.C.E. At these first Games, the Greeks hosted just one event—the *stade*, a 180-meter distance race. Research a historical aspect of physical exercise and design a visual aid, like a poster, to present your findings to the class.



Compute the Calories. A foot-pound (ft-lb) is the amount of energy required to lift a 1-pound object one foot. Kilocalories are units of heat that measure food energy as well as the energy used by the body. Kilocalories can be converted to foot-pounds as follows: $1 \text{ kcal} = 3088.025 \text{ ft-lb}$. Walking up one flight of stairs is equal to lifting yourself 10 feet. How many calories would a 180-pound man use walking up one flight of stairs?



Conduct Research. There are three different types of muscles in the human body: skeletal, smooth, and cardiac. Skeletal muscles are used for voluntary motion and are the ones we think of when playing sports or lifting weights. Cardiac and smooth muscles produce the involuntary activities of the body, controlling movement in the heart (cardiac), arterial, and digestive systems. Research the different muscle tissue types, and discuss what kind of exercise is best for each.

CAREER Corner

Sports Medicine

Would you like to work with athletes and others who lead physically active lives? If so, you may enjoy a career in sports medicine. Physicians specializing in sports medicine treat injuries related to sports and other physical activities.

To enter this profession, you will need to complete a four-year college program, four years of medical school, and from one to seven years of residency training. Learn more about this and other related health careers by clicking on Career Corner at health.glencoe.com.



Chapter 4 Review

▶ EXPLORING HEALTH TERMS *Answer the following questions on a sheet of paper.*

Lesson 1 *Replace the underlined words with the correct term.*

physical activity **osteoporosis**
physical fitness **sedentary lifestyle**
metabolism

1. Osteoporosis refers to the process by which your body gets energy from food.
2. Watching television and taking naps are characteristic of a physical activity.
3. Physical fitness is a condition characterized by a decrease in bone density, producing porous and fragile bones.

Lesson 2 *Fill in the blanks with the correct term.*

body composition **muscular strength**
exercise **aerobic exercise**
flexibility **anaerobic exercise**
muscular endurance
cardiorespiratory endurance

Purposeful physical activity that is planned, structured, and repetitive and that improves or maintains fitness is (4). (5) is any rhythmic activity that uses large muscle groups and can be maintained continuously for 20 to 30 minutes at one time. (6) involves short bursts of activity in which the muscles work so hard that they produce energy without using oxygen.

Lesson 3 *Replace the underlined words with the correct term.*

overload **workout**
progression **cool-down**
specificity **F.I.T.T.**
warm-up **resting heart rate**

7. The part of an exercise program when the activity is performed at its highest peak is called the overload.
8. A workout is an activity that prepares the muscles for work.
9. An activity that prepares the muscles to return to a resting state is a progression.

Lesson 4 *Match each definition with the correct term.*

health screening **hydration**
training program **anabolic steroids**

10. A program of formalized physical preparation for involvement in a sport or another physical activity.
11. Taking in fluids so that the body functions properly.
12. A search or check for diseases or disorders that an individual would otherwise not have knowledge of or seek help for.

Lesson 5 *Identify each statement as True or False. If false, replace the underlined term with the correct term.*

overexertion **hypothermia**
heatstroke **muscle cramp**
heat cramps **strain**
frostbite **sprain**

13. Many hot-weather health problems, such as heat exhaustion and heat cramps, are related to hypothermia.
14. Frostbite is a condition that results when body tissues become frozen.
15. A muscle cramp is an injury to the ligament surrounding a joint.

▶ RECALLING THE FACTS *Use complete sentences to answer the following questions.*

Lesson 1

1. Examine and briefly describe the effects of regular physical activity on the nervous system.
2. Analyze the relationship between regular physical activity and disease prevention: How can engaging in regular physical activity now and in adulthood reduce your risks of cardiovascular disease, type 2 diabetes, and cancer?
3. What are three ways to incorporate physical activity into your daily life?



Lesson 2

4. What is muscular strength, and how is it measured?
5. Examine and briefly describe how aerobic exercise benefits the cardiovascular and respiratory systems.
6. What are the three types of resistance training exercises?

Lesson 3

7. In the context of physical activity, what is meant by the term *progression*?
8. What three elements should be part of every physical activity session?
9. How can the *F.I.T.T.* formula help you meet your fitness goals?

Lesson 4

10. Why are proper nutrition and adequate rest important factors in a physical activity training program?
11. Why is starting a fitness program a situation that requires a preventive health screening?
12. List three ways to stay safe when exercising alone outdoors.

Lesson 5

13. What are two advantages to dressing in layers when outside in cold weather?
14. Analyze and describe a strategy for responding to minor strains and sprains.
15. What symptoms signal a major injury that requires treatment by professional health services?

► **THINKING CRITICALLY**

1. **Analyzing.** Why do you think many teens lead a sedentary lifestyle? (*LESSON 1*)
2. **Evaluating.** Samantha does not enjoy participating in formal group exercise programs such as those at a health club. What physical activities might she include in her daily life to obtain the benefits of both aerobic exercise and anaerobic exercise? (*LESSON 2*)
3. **Synthesizing.** Develop a physical activity program that includes all areas shown in the Physical Activity Pyramid in Figure 4.3. (*LESSON 3*)
4. **Explaining.** Why is it important to be alert to the surrounding environment when playing a sport? Give two specific examples. (*LESSON 4*)
5. **Applying.** Brianna is an enthusiastic but inexperienced skier. She accepts an invitation to go skiing even though it is 10°F below zero. What strategies would you give her for preventing illness and injury while participating in this activity? (*LESSON 5*)

► **HEALTH SKILLS APPLICATION**

1. **Practicing Healthful Behaviors.** Identify three sedentary activities from your daily life and suggest a physical activity you could do in place of each. (*LESSON 1*)
2. **Goal Setting.** Identify two areas of your health-related fitness that need improvement. Use the goal-setting steps to develop a plan for improving these areas. (*LESSON 2*)
3. **Advocacy.** Prepare a short presentation in which you encourage teens to develop their own fitness programs based on the principles of overload, progression, and specificity. (*LESSON 3*)
4. **Refusal Skills.** With a classmate, role-play a scenario in which you refuse a friend's offer of an herbal supplement that claims to enhance athletic performance. (*LESSON 4*)
5. **Accessing Information.** Locate three sources in your community from whom you can request information about sports injuries. Summarize the information you receive from each source, and share your findings with the class. (*LESSON 5*)