

## Lesson 2

# Endurance, Strength, and Flexibility

### Guide to Reading

#### ● Building Vocabulary

List each term below in your notebook. As you come across it in your reading, write the definition.

- heart and lung endurance (p. 210)
- muscle strength (p. 211)
- muscle endurance (p. 211)
- flexibility (p. 212)
- body composition (p. 213)
- heredity (p. 214)

#### ● Focusing on the Main Ideas

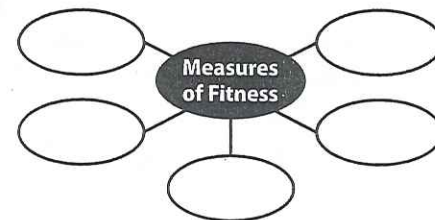
In this lesson, you will learn to

- **identify** the four measures of physical fitness.
- **describe** exercises that improve different areas of physical fitness.
- **develop** behaviors that will improve your body composition.

#### ● Reading Strategy

##### Organizing Information

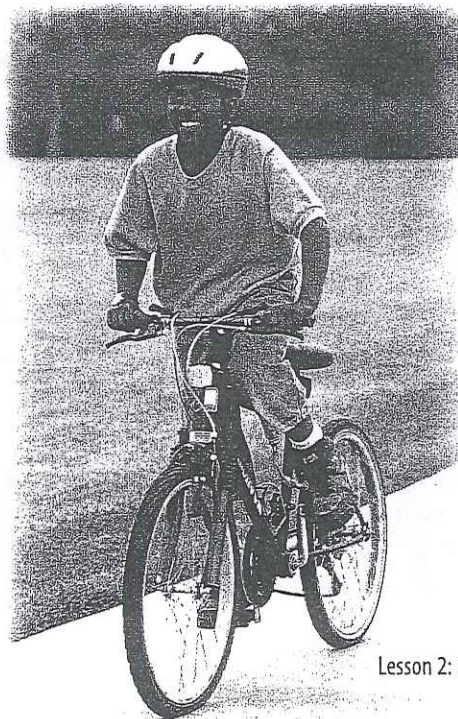
Copy the graphic organizer below onto a sheet of paper. Complete the organizer with information from the lesson.



## Measures of Fitness

When you feel sick, your parent or guardian may take your temperature. When you go for a medical checkup, the doctor takes your blood pressure. It is also possible to measure a person's level of physical fitness. There are four separate measurements of physical fitness. These are heart and lung endurance, muscle strength and endurance, flexibility, and body composition.

- ▶ Types of physical activity that can improve heart and lung endurance include running, walking, and cycling. **Why are activities that involve endurance important to the health of your heart and lungs?**



### Quick Write

Write a paragraph describing why you think flexibility is important. What activities do you think can help improve flexibility?

## Heart and Lung Endurance

Blood pressure is a measure of how well your heart pumps blood through your body. It is an indicator of heart health. In a way, the same thing can be said about **heart and lung endurance**. This endurance is *a measure of how efficiently your heart and lungs work when you exercise and how quickly they return to normal when you stop*. The word *endure* means "to last." When you have high heart and lung endurance, you can work or play for long periods without running out of "steam." **Figure 9.2** shows a test that measures heart and lung endurance.

If your score is low, do not be discouraged. Heart and lung endurance can be improved. Try doing nonstop moderate to vigorous exercise for at least 20 minutes, three to five times a week. You will notice an improvement after a few weeks.

Activities that build heart and lung endurance include swimming and cycling. Swimming carries the added advantage of providing a total body workout.

Other related exercises that can improve heart and lung endurance are walking, jogging, and running. If you walk, your goal should be 30 minutes at a brisk pace. If you jog or run, aim for at least 20 minutes. If that is difficult, try alternating walking and jogging and slowly work up to 20 minutes of jogging.

### Reading Check

**Describe** What are some ways of improving heart and lung endurance?

▼ FIGURE 9.2

## MEASURING HEART AND LUNG ENDURANCE

This test will help you determine if you need to improve your heart and lung endurance. **Why is heart and lung endurance important?**

1. Work with a partner, taking turns. Using a sturdy bench about 8 inches high, step up in 2 seconds and down in 2 seconds for 3 minutes.
2. Fully extend each leg as you step. Step up with your right foot, then your left. Step down with your right foot first. Stepping should be continuous.
3. Step at the rate of 24 steps per minute for 3 minutes.
4. Find your pulse on the side of your neck. Count the number of pulses you feel for 1 minute.
5. To rate your heart and lung endurance, find your recovery heart rate on the chart. This term refers to how quickly your heart rate returns to normal right after exercise is stopped.

Scoring (number of heartbeats)

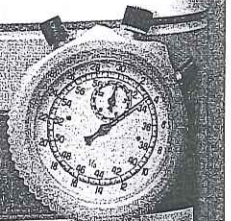
Rating

70-100

Acceptable heart and lung endurance

101 or more

Low heart and lung endurance



## Muscle Strength and Endurance

The ability of your muscles to exert a force is called strength. **Muscle strength** is a measure of the most weight you can lift or the most force you can exert at one time. **Muscle endurance** is a measure of a muscle's ability to repeatedly exert a force over a prolonged period of time. Both measures are important to overall fitness.

**Figures 9.3 and 9.4** provide two different tests of muscle strength and endurance. Figure 9.3 tests the strength and endurance of the muscles in your mid-section. These muscles make up what fitness experts refer to as your *core*. Core muscles are important to safe lifting as well as balance. Developing a strong, durable core will lessen the risk of injury to your back.

Figure 9.4 tests strength and endurance of the muscles in your upper body. These muscles, which include those of the arms, shoulders, and chest, provide power. Players in contact sports, such as basketball, baseball, football, all work their upper bodies.

Like heart and lung endurance, muscle strength and endurance can be improved. The tests in Figures 9.3 and 9.4 are great strengthening exercises. Others include step-ups, which you practiced in Figure 9.2, and push-ups. Push-ups strengthen muscles in your arms and chest. **Figure 9.5** illustrates a technique for doing push-ups.

### ▼ FIGURE 9.3

## MEASURING ABDOMINAL STRENGTH AND ENDURANCE

Abdominal strength helps reduce the risk of injury to your back. What are some ways to build abdominal strength?

1. Work with a partner, taking turns. Lie on your back with your knees slightly bent. Your partner should hold your feet.
2. With your arms crossed on your chest, curl your upper body forward. Return to the starting position. Your head should never touch the floor.
3. Continue to do curl-ups at the rate of about 20 per minute, stopping when you can no longer continue, or have completed 60 curl-ups.
4. To rate your abdominal strength and endurance, find your score on the chart. The range shown is acceptable for your age and gender. If you do not score with this range, continue working at this exercise until you do.

Age	Female	Male
12	18-32	18-36
13	18-32	21-40
14	18-32	24-45
15	18-35	24-47

▼ FIGURE 9.4

## MEASURING UPPER-BODY STRENGTH AND ENDURANCE

You can measure your upper body strength and endurance by measuring the time you can hang from a bar with your chin above the bar. **What do you think are the benefits of building upper body strength?**

1. Work with a partner, taking turns. Grasp a horizontal bar with your palms facing toward or away from your body.
2. Raise your body until your chin clears the bar, or you can be lifted into position. Your elbows should be flexed, your chest close to the bar. Your partner should start the stop watch.
3. Hold your position as long as possible. The watch stops when your chin touches or drops below the bar.
4. To rate your upper body strength and endurance, find your score on the chart. The range shown is acceptable for your age and gender. If you do not score with this range, continue working at this exercise until you do.



Age	Female	Male
12	7-12	6-13
13-15	8-12	15-20

Another approach to building muscle strength is weight lifting. Also known as *resistance training*, weight lifting can be used to strengthen every muscle group. Just make sure that a fitness instructor or other expert supervises your workout.



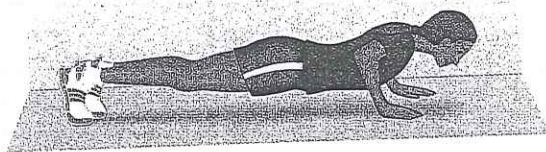
### Reading Check

**Compare** What is the difference between muscle strength and muscle endurance?

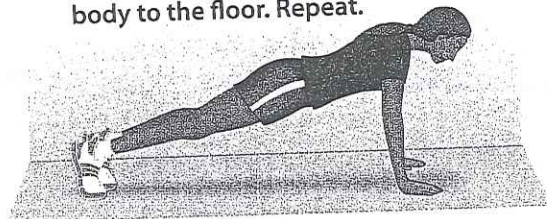
▼ FIGURE 9.5

## DOING A PUSH-UP

1. Lie facedown on the floor. Bend your arms and place your palms flat on the floor beneath your shoulders.



2. Straighten your arms, pushing your entire body upward. Then lower your body to the floor. Repeat.



## Flexibility

Are you able to bend and touch your toes? If you can, you probably have good flexibility. **Flexibility** is the ability of your body's joints to move easily through a full range of motion. Flexibility permits bending, turning, and stretching. It helps you reduce your risk of muscle injury. Gymnasts and dancers need a high level of flexibility.

You can improve your flexibility through regular stretching, bending, and twisting exercises. Move slowly and gently, holding each stretch. This will gradually improve the flexibility of your muscle groups.

## Body Composition

The last measure of physical fitness is body composition. It is different from the other measures you have learned about. **Body composition** is the ratio of body fat to lean body tissue, such as bone, muscle, and fluid. There is no exercise used to measure body composition, and the improvements you make in this area have as much to do with diet as with exercise.

The main method for measuring body composition is the skinfold test, which involves pinching a fold of skin on the back of your upper arm and on the inside of your lower leg. Each fold is measured with an instrument called a skinfold caliper. The two numbers are then added together. Ask your fitness instructor about the skinfold test.

One of the keys to improving body composition is to eat healthy foods and increase your physical activity. Teens with too much body fat generally have a weight problem. Taking in fewer calories and burning more calories through exercise will help shed some of the excess weight. Physical activities and exercise build muscle mass while reducing the percentage of body fat. By decreasing the amount of calories you consume and increasing your physical activity, you are choosing positive health behaviors that can protect your health.

**Reading Check** Explain How do you measure body composition?

- ▶ Eating nutritious foods and exercising regularly can improve your body composition. **What is body composition?**



## Fitness and a Healthy Attitude

How a person performs on fitness tests depends on a variety of factors. An important one is **heredity**, the passing of traits from parents to their children. Speed, for example, is a trait that is often inherited, or passed down, from parents. People who can run fast have more of one type of muscle fiber than another.

Differences like these don't make one person better—or worse—than another. If you want to improve your level of physical fitness, you will need to set goals for yourself. It is perhaps even more important to keep a positive outlook about what you *can* do. Remember that improvement is possible in every area of fitness and that each improvement you make gives a boost to your physical health. Also remember, however, that everyone has limits. You can make only so much progress in a short period of time. In the next lesson, you will learn how to set up a fitness plan.

### Health Online

Visit [health.glencoe.com](http://health.glencoe.com) and complete the Interactive Study Guide for Lesson 2.

#### Reading Check

**Explain** How does attitude affect your fitness level?

## Lesson 2 Review

### After You Read

Review this lesson for new terms, major headings, and Reading Checks.

#### What I Learned

1. **Vocabulary** What is *heart and lung endurance*?
2. **List** Name the four measures of fitness.
3. **Identify** What are some exercises that will improve muscle strength and endurance? What are some that will improve flexibility?
4. **Describe** What are some ways to improve body composition?

#### Thinking Critically

5. **Evaluate** Natalie wants to become a ballet dancer. What area of fitness should she concentrate on improving? How should she go about doing this?

6. **Synthesize** When Don scored low on the test for muscle strength and endurance, he decided that fitness is simply “not for him.” What is wrong with Don’s attitude? What advice could you give him?

#### Applying Health Skills

7. **Accessing Information** Research different activities and exercises that can help you improve your physical fitness levels. With classmates, make a list of your findings. Include reliable sources that teens could go to find more information on the exercises or activities that interest them.