Wellness, Fitness, and First Aid

Unit 4

Chapter 1

Achieving a Healthy Lifestyle

Lesson 1

Choosing the Right Exercise Program for You

Chapter 1

Key Terms

aerobic
anaerobic
calisthenics
cardiorespiratory
isokinetic
isometric
isotonic
obesity
tone

What You Will Learn to Do

- Develop a personal exercise program

Linked Core Abilities

- Take responsibility for your actions and choices

Skills and Knowledge You Will Gain Along the Way

- Classify exercises as aerobic, anaerobic, isometric, and isotonic
- Compare the benefits of aerobic, anaerobic, isometric, and isotonic exercise
- Identify the benefits of regular exercise
- Determine the essential components of a good exercise program
- Define the key words contained in this lesson

Introduction

Key Note Term

tone – a degree of tension or firmness, as of muscle

What you eat and how much you exercise can directly affect how you look and feel. When it comes to your appearance, diet and exercise help you maintain proper weight, **tone** muscles, and healthy hair and skin. When it comes to your health, diet and exercise can lower your risk of heart disease, high blood pressure, and other health problems, including depression. Staying healthy and looking good means following a balanced diet and exercising regularly. This chapter discusses guidelines for a healthier lifestyle that will help keep you fit and feeling great, now and throughout your life. This first lesson specifically covers exercise, including types of exercises and how to stick with an exercise program.

Some people consider exercise a chore; others think it's fun. There are even those who avoid it altogether. With the right outlook, however, everyone can find an exercise program that they enjoy. More and more people find ways to keep fit, from walking to joining fitness clubs, because more and more people recognize the importance of exercise for physical and mental health.

Although the fitness craze has hit many older Americans, it has not yet reached most of America's youth. This is unfortunate because not only is exercise good for you, it can also be fun. You can form friendships with people you meet while exercising on the track or basketball court or at the gym or pool. You will feel better about yourself, improve your resistance to disease, and relieve stress found at school and work. Basically, being fit improves your overall health—both physically and mentally.

Do you think you are physically fit? Physical fitness is the ability of the heart, blood vessels, lungs, and muscles to work together to meet the body's needs. When you are physically fit, your body's systems work as a team allowing you to breathe easily and contract muscles in coordinated movement.

Your body is made for activity. Stimulating your muscles, bones, heart, lungs, and blood vessels with regular exercise helps you gain or maintain physical fitness. A program of vigorous exercise, however, is not the only important factor in fitness and a healthy lifestyle. Rest, sleep, and good nutrition are just as important. What muscles are required to move the furniture in Figure 1.1.1?

Components of Fitness

Each individual has his or her own potential of fitness. For example, you may not have the capability of becoming an Olympic weightlifter or a professional gymnast; yet you can reach your own personal best. Physical fitness can be broken down into four health-related areas: cardiorespiratory endurance, muscular strength and endurance, flexibility, and body composition. Each component is a necessary part of fitness.

Figure 1.1.1: Physical fitness is necessary for performing many tasks, such as moving furniture.
Courtesy of Ken Karp.

Cardiorespiratory Endurance

The first component, cardiorespiratory endurance, is the ability of your heart, blood vessels, and lungs to distribute nutrients and oxygen and to remove wastes. When you exercise, your heart and lungs must supply more oxygen to your muscles than they need when you are resting. When you are at rest, for example, your heart pumps about 5 to 6 quarts (5.5 to 6.6 liters) of blood per minute, but it pumps about 20 to 25 quarts (22 to 27 liters) when you are exercising.

If your heart and lungs function easily during hard exercise and recover quickly afterward, you probably have good cardiorespiratory endurance. People with poor cardiorespiratory endurance might be left short of breath and have a very high heart rate after light exercise. Their lungs and heart are unable to keep up with the muscles' demand for oxygen.

Muscular Strength and Endurance

The capacity of a muscle or a group of muscles to exert or resist a force is called muscular strength. In contrast, muscular endurance is the ability of muscles to keep working for an extended time. For example, the amount of weight you can lift is one measure of your muscular strength, as depicted in Figure 1.1.2. How long you can hold that weight—or how many times you can lift it—is a measure of your muscular endurance. You need muscular strength for all sports and most everyday activities. Acts of muscular endurance include repeated actions, such as raking leaves, shoveling snow, or doing sit-ups.

Figure 1.1.2: Which components of physical fitness are especially important in lifting weights?
Courtesy of David Madison.

Flexibility

The ability to use a muscle throughout its entire range of motion is called flexibility. This means that you can bend, stretch, and twist your joints easily. The sit-and-reach test measures the flexibility of specific groups of muscles in the back and legs, but it is also used to indicate overall flexibility. However, flexibility can vary in different joints. Some people may show poor flexibility in the sit-and-reach test, for example, yet have excellent flexibility in the shoulders and arms. Stretching exercises, if done correctly, can increase flexibility and may reduce the risk of injury during exercise.

Body Composition

The fourth component of physical fitness, body composition, is the amount of body fat compared to lean tissue, such as muscle and bone. Skinfold measurement is one method for assessing body fat. Excessive body fat has been linked with heart disease, diabetes, arthritis, cancer, and other harmful health conditions.

History Connection

Great emphasis was placed on physical fitness in the schools of ancient Greece. Students received instruction in exercise and sports such as wrestling, running, and jumping. In fact, the word *gymnasium* comes from the ancient Greek word *gymnasion,* meaning "school."

The Benefits of Exercise

What happens inside you when you run, swim, dance, play hockey, or enjoy some other form of exercise? As the muscles in your arms, shoulders, or legs alternately contract and relax, they use energy that comes from chemical reactions in which oxygen combines with nutrients. Because of the increased needs of your muscles, your heart beats faster, and you breathe more rapidly and deeply. The flow of blood to your heart, lungs, and skeletal muscles increases as your blood vessels dilate, or widen. Your blood pressure and body temperature rise, and you begin to sweat. How do these responses benefit your body? Refer to Figure 1.1.3 to help you answer this question.

Physical Benefits

Because blood circulates more rapidly through vessels during exercise, the rate at which it brings oxygen and nutrients to, and removes wastes from, your tissues is increased. This increased circulation rate is one reason why you feel refreshed and energetic after a hard workout. In addition, over time, regular exercise may increase the number of capillaries in your body. These additional capillaries provide muscles with a greater supply of blood, not just when you are exercising but at all times.

Cardiorespiratory endurance is significantly improved by an exercise program. Your heart becomes stronger and pumps blood more efficiently. Regular exercise can also lower your blood pressure and can improve the function of your lungs. An exercise program can help prevent atherosclerosis and coronary heart disease.

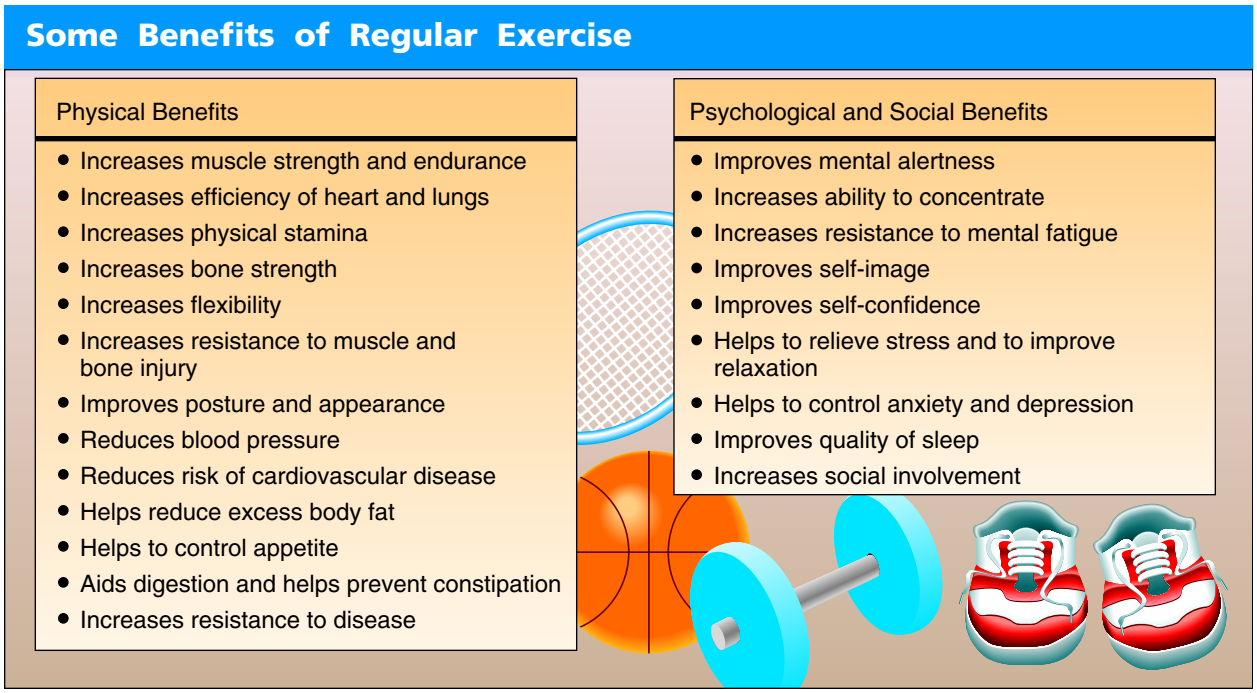

Figure 1.1.3: Regular exercise helps both physical and mental health.
Courtesy of Function thru Form.

As you stretch your muscles when you exercise, you can improve your flexibility by loosening stiff muscles and joints. When you run, swim, or do other endurance exercises on a regular basis, your muscles become stronger and are able to work longer. Regular exercise also strengthens your bones, making them thicker and denser. Strong bones and muscles are less likely to be injured than are weak ones. Table 1.1.1 show ratings of various exercises.

Table 1.1.1:

Fitness Ratings of Physical Activities

Activity	Cardiorespiratory Endurance	Muscular Strength	Muscular Endurance	Flexibility
Aerobic dancing	3-4	2	2	3
Ballet	3	2	2	4
Baseball/Softball	1	1	1	2
Basketball	3-4	1	2	2
Bicycling (at least 10 mph)	3-4	2	3-4	1
Bowling	1	1	1	2
Calisthenics	3	3-4	3-4	3-4
Canoeing	2-3	3	3	2
Football	2-3	2	2	2
Golf	1	1	1	2
Gymnastics	1	4	3	4
Handball/Squash	3	2	3	2
Hiking (uphill)	3	1	2	2
Hockey	2-3	2	2	2
Jogging/Running (at least 6 mph)	3-4	1	3	2
Judo/Karate	1	2	1	3
Jumping Rope	3-4	1	3	2
Racquetball	3-4	1	3	2
Rowing	3-4	3	3	2
Skating (ice, roller)	2-3	1	2-3	2
Skiing (cross-country)	4	2	3-4	2
Skiing (downhill)	3	2	2-3	2
Soccer	3	2	2	2
Swimming	4	2	3	2
Tennis/Badminton (singles)	2-3	1	2-3	2
Volleyball	2	1	2	2
Walking (brisk)	3	1	3	2
Weight training	1-2	4	3	2
Wrestling	3-4	2	3	3

Rating Scale: 1 = Low, 2 = Moderate, 3 = High, 4 = Very high

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Exercise can also improve or maintain body composition. A regular workout is important in keeping body fat within recommended levels. A program of regular exercise is an important factor in successful weight loss or weight maintenance.

Psychological Benefits

People who exercise regularly are likely to sleep better, feel more self-confident, and focus more productively on their work. Exercise may also increase creativity by releasing body chemicals that stimulate the brain's centers of creativity.

One of the most important psychological benefits of exercise is the reduction of emotional stress. Simple stretching exercises, for example, can help you relax tense muscles and allow you to sleep better. If you are feeling depressed, exercise can generally help make you feel better. In fact, many health professionals consider exercise an important part of a complete treatment for depression, whether the depression is mild or serious.

Have you ever experienced a sense of physical and emotional exhilaration after a hard workout? This feeling is at least partly the result of certain substances called endorphins. **Endorphins**, which are chemicals produced in your brain, help to give you a sense of satisfaction and pleasure. During vigorous exercise, cells within your brain produce greater amounts of endorphins.

Types of Exercise

No single exercise can improve or maintain all four components of physical fitness. Table 1.1.1 compares the fitness benefits you can receive from many activities. Notice, for example, that recreational activities such as basketball and rowing provide many health benefits. Swimming, as shown in Figure 1.1.4, is also an excellent exercise.

Exercises can be classified into different types, depending on what their performance involves. Included among these are **aerobic**, **anaerobic**, **isotonic**, **isometric**, and **isokinetic** exercise.

Figure 1.1.4: Swimming is an excellent all-around exercise that is especially good for developing cardiorespiratory and muscular endurance.
Courtesy of David Madison.

Key Note Terms

aerobic – allowing sufficient amounts of oxygen to be delivered to the muscles

anaerobic – working in the absence of adequate amounts of oxygen being delivered to the muscles

isokinetic – exercise in which muscles contract, but very little body movement takes place

isometric – building muscle strength using resistance without joint movement

isotonic – building muscle strength using resistance with joint movement

Aerobic Exercise

Nonstop, repetitive, strenuous physical activity that raises the breathing and heart rates is called aerobic exercise. Aerobic exercises increase the amount of oxygen that is taken in and used by the body. Aerobic exercise works the heart, lungs, and blood vessels. As you exercise aerobically, your heart beats faster and you breathe in more air, so your blood can supply more oxygen to your hard-working muscles. This type of physical exercise improves blood and oxygen flow to vital organs, as well as lung capacity (the ability to take in and use more air). Swimming, riding a bike, running, brisk walking, and cross-country skiing are all forms of aerobic exercise. If aerobic exercises last for at least 20 minutes at a time and are done frequently, on a regular, ongoing basis, they will improve cardiovascular endurance. Aerobic exercises are therefore especially important in maintaining the health of your circulatory and respiratory systems. As the information in Table 1.1.1 indicates, activities that provide good aerobic exercise do not always improve muscular strength. They do, however, generally improve your muscular endurance.

Anaerobic Exercise

Anaerobic exercise, on the other hand, works the muscles intensely in fast bursts of movement and does not require as much oxygen as aerobic exercise. Instead of endurance, anaerobic exercise requires bursts of power and energy and the ability to maneuver quickly. For example, a sprinter working his or her leg muscles hard in a burst of energy to cross the finish line in a few seconds is performing an anaerobic exercise. Many sports, from tennis to football, require anaerobic work to move from one point to another as quickly as possible. Imagine that for 20 minutes you exercise like the weight lifter in Figure 1.1.2. Although your overall exercise time is 20 minutes, the periods of intense physical activity come only when you actually lift the weight. Anaerobic exercise is intense physical activity that lasts only from a few seconds to a few minutes, during which time muscles use up more oxygen than the blood can supply. Anaerobic exercises usually improve the flexibility, strength, and sometimes speed at which muscles work. However, it does not specifically condition the cardiovascular and respiratory systems. Most anaerobic exercises are designed to develop specific skills, agility, flexibility, or strength. Lifting weights, sprinting, push-ups, and some forms of gymnastics, for example, are usually considered anaerobic activities.

Isotonic, Isometric, and Isokinetic Exercise

Other forms of exercise concentrate specifically on firming and toning muscles and building muscle strength. Working against resistance builds muscle strength. You work against resistance when you try to open a tight lid on a jar or push a heavy piece of furniture across a room. Three types of exercise—isotonic, isometric, and isokinetic—can increase the strength and endurance of specific groups of muscles. Isometric exercise builds muscle strength by using resistance without joint movement, while isotonic exercise uses resistance with joint movement. For example, when you try to pull your locked hands apart, you perform an isometric exercise. You contract your muscles but do not move any joints. Most weight training, on the other hand, is isotonic. When you do bicep curls, you contract your muscles and

bend your elbows to raise the weights to shoulder level. Isotonic exercise involves the contraction and relaxation of muscles through the full range of their motion. You can perform isotonic exercises with or without weights. Through repetition of isotonic exercises, you can develop muscle strength.

Place your palms together and push them against each other. You are performing an isometric exercise in which muscles contract but very little body movement takes place. Pushing against a wall is another example of isometric exercise. Even though this activity involves little movement, your muscles are contracting and thus working. If you continue isometric exercises over a long period, the muscles you use will become stronger.

Perhaps you have seen an accident victim or injured athlete use a special machine in order to recover the use of specific muscle groups. They are performing isokinetic exercises. Isokinetic exercises are exercises that involve moving a muscle through a range of motion against a resistance, or weight that changes. Unlike isotonic exercises, isokinetic exercises, as shown in Figure 1.1.5, always use special machinery to provide the resistance. Many exercise machines in gymnasiums and fitness centers provide isokinetic exercise.

Defining Your Goals

Do you want to obtain total fitness, increase your stamina, have a trimmer body, achieve better coordination, or just feel more alert? Your goals help to determine the best exercise program for you. Reexamine Table 1.1.1, which lists different types of exercises and their benefits. If your goal is to strengthen muscles, for example, your program might include anaerobic exercises such as lifting weights. If you want to improve your cardiorespiratory endurance, you may develop a program of aerobic exercise. Basketball, jumping rope, or brisk walking will fit into this type of program. Most likely, you have a combination of goals in mind. For example, you may want to increase both your cardiorespiratory endurance and your flexibility.

Figure 1.1.5: Physical therapists help people perform isokinetic exercises using special machinery to recover the use of muscles.
Courtesy of Larry Mulvehill/The Image Works.

Youth Fitness Fact Sheet

- Youth fitness in the United States has not improved in the last 10 years and, in some cases, has declined.
- Approximately 50 percent of girls ages 6 to 17 and 30 percent of boys ages 6 to 12 cannot run a mile in less than 10 minutes.
- Fifty-five percent of girls ages 6 to 17 and 25 percent of boys ages 6 to 12 cannot do a pull-up.
- Boys generally perform better than girls on fitness tests, except in the area of flexibility.
- Girls' scores increase until age 14, where they plateau and then decrease (except for flexibility, which continues to improve to age 17).
- American children have become fatter since 1950 (U.S. Public Health Service).
- Forty percent of children between the ages of 5 and 8 show at least one heart disease risk factor, e.g., **obesity** (overweight), elevated cholesterol, or high blood pressure.
- Only 36 percent of America's schoolchildren in grades 5 through 12 are enrolled in daily physical education, with the average number of gym classes per week in grades 5 through 12 being 3.6.

Adapted from the President's Council on Physical Fitness.

Key Note Term

obesity – overweight to the point of injuring health

As you create your exercise program, remember that your fitness program should be fun! Choose activities or a sport that you enjoy and will look forward to. Combine exercise with social activities; for example, take a hike with a group of your friends. You can often develop an enjoyable fitness program by expanding on the activities that are already a part of your life, as shown by the weekly exercise record in Figure 1.1.6.

The FIT Principle

The effectiveness of your exercise depends on three factors: how often you exercise, how hard you exercise, and how long you exercise at each workout session. These ingredients make up the FIT principle, which stands for frequency, intensity, and time. To achieve fitness, you need to meet minimum standards for each FIT factor. Do you think the students in Figure 1.1.7 are FIT?

Frequency of Exercise

To stay physically fit, you should exercise frequently, preferably three or more times a week. As you become more fit, some studies suggest that if the intensity of your exercise is moderate, four times a week is most effective in increasing cardiorespiratory endurance and weight loss. If you exercise vigorously, however, do not do so more than five times a week; otherwise, injuries can result.

No matter what your goal is, you should spread your exercise out over the week. Being inactive during the week does not prepare your body for an intense weekend workout. Weekend athletes are more likely to injure themselves than those who exercise regularly throughout the week.

A Weekly Exercise Program	
Sunday • Slow, 20-minute run around the pond • Two flights of stairs taken three times	**Wednesday** • Bike to school • Gym class • 40-minute basketball practice
Monday • 20-minute brisk walk to school • Gym class at school • 20-minute walk home	**Thursday** • 20-minute walk to school • Basketball game
Tuesday • Walk to school • 30-minute swim after school • Walk home	**Friday** • Gym class • 30-minute aerobics class • 20-minute walk home
	Saturday • Leaf raking for 40 minutes • Slow 20-minute run

Figure 1.1.6: What changes would you make in this weekly exercise program to suit your own needs and interest?
Courtesy of Boston Graphics.

Intensity of Exercise

If your goal is increased cardiorespiratory endurance, you must work your cardiovascular and respiratory systems with greater-than-normal effort through aerobic exercise. The intensity of a workout is indicated by the number of times your heart beats per minute. The more intense the exercise, the faster your heart rate.

Your maximum heart rate is your heart's top speed or your heart rate when you have exercised to the point of exhaustion. For teenagers, this rate is about 200 beats

Figure 1.1.7: Basketball is one of many fitness-building activities that you can do with friends.
Courtesy of Mark Burnett/ Stock Boston.

per minute. You should not try to work out at your maximum heart rate, since exercise at that intensity puts a strain on your heart. Your target heart rate, which is lower than your maximum heart rate, is the approximate heart rate you need to maintain during aerobic exercise in order to benefit from the workout. Your target heart rate depends on your age, your current level of fitness, your resting heart rate, and your maximum heart rate. It is often expressed as a range, such as 145 to 170 beats per minute. Do you think that cross-country skiing is intensive exercise (see Figure 1.1.8)?

During exercise, you need to check your heart rate regularly to determine whether it is within your target heart range. To check your heart rate, you need to stop exercising briefly and count your pulse. Your heart rate slows down quickly, so take your pulse for only six seconds and multiply by ten to get an accurate count of the number of heartbeats per minute.

The "talk test" is an easy way to check your exercise intensity. If you are so out of breath while exercising that you cannot talk, your exercise level is too intense. If you can sing while you exercise, however, you probably are not working hard enough. You are working at the proper intensity if you can talk comfortably.

Exercise Time

Finally, the amount of time spent exercising affects your level of fitness. If you are just beginning an exercise program, start out with only a short period of exercise—about 10 or 15 minutes. Then increase the exercise time gradually, by no more than 10 percent a week. Once your workout program is well established, most research suggests that 20 to 30 minutes of vigorous exercise four times a week will lead to greater fitness. If your goal is cardiorespiratory improvement, you must exercise within your target heart range for 20 to 30 minutes each session. If your goal is to reduce body fat, your exercise period should be a minimum

Figure 1.1.8: Cross-country skiing is good aerobic exercise. The faster you ski, the more intense the exercise becomes.
Courtesy of David Stoechklein/The Stock Market.

of 30 minutes, which is longer than the 20-minute minimum required for a cardiorespiratory workout. You should, however, exercise only at a moderate level of intensity—about 60 percent of your maximum heart rate. This is because, at a moderate level of intensity, your muscles tend to use body fat as an energy source, rather than the glucose that is used to provide energy for high-intensity exercise. In order to burn a significant amount of fat, you need to exercise for at least 30 minutes.

Phases of Exercise

A complete fitness workout should be preceded by warming up and followed by cooling down. Although skipping these preliminary and follow-up procedures does not always result in injury, the safest and most healthy exercises include these two phases. Increasing your exercise program needs to take place over several weeks, as illustrated in Figure 1.1.9.

Warming Up and Stretching

Before doing any type of exercise you must warm up. A warm-up is a 5- to 10-minute period of mild exercise that prepares your body for vigorous exercise. During a warm-up, your body temperature begins to rise, your heart rate picks up, blood flow to your muscles increases, and your muscles become more elastic and less likely to become injured.

Some people suggest that you go through the motions of your planned activity when you warm up. Rather than doing these movements at full intensity, do them at a slower pace. If you are planning to run, for example, start out by walking. Then gradually increase your speed until reaching your usual pace, as illustrated in Figure 1.1.10.

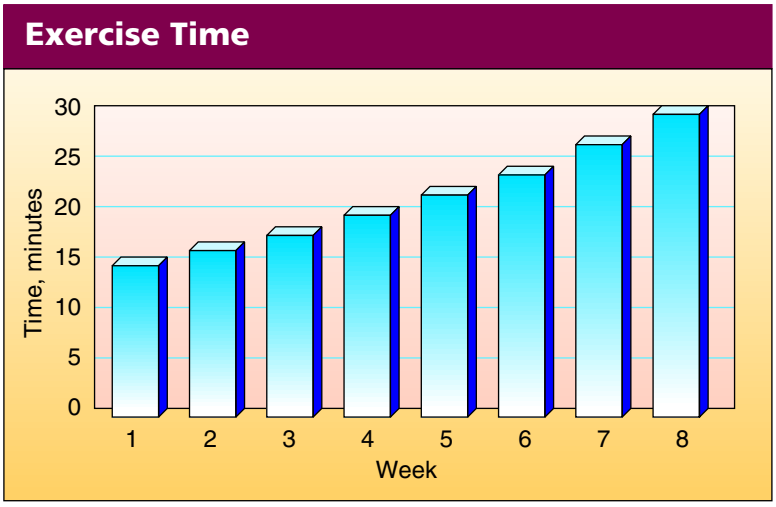

Figure 1.1.9: If you want to increase the time of your workout, do it gradually, at a rate of about 10 percent a week.

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Your warm-up should include 5 to 10 minutes of stretching. As you know, stretching increases your flexibility, and proper stretching may decrease your chance of injury. However, it is very important to know your limits and stretch according to safe guidelines, such as those given in Building Health Skills in Lesson 2 (page 466). Don't overstretch, as that can damage ligaments and weaken joints. Stretching should be a constant, even pull on the muscles on both sides of your body. Because muscles work in pairs, you need to stretch both muscles in a pair. As you stretch each muscle group, you should feel tension but not pain. Do not bounce when you stretch, since bouncing can tear muscle fibers.

The Workout

The goal of this phase of exercise is to improve one or more of the components of physical fitness. Figure 1.1.11 summarizes the parts of a total fitness workout, which includes strength/endurance exercises as well as those designed to improve cardiovascular fitness. Depending on your goals, you may not plan on doing both cardiovascular and strength/endurance exercises. Alternatively, you might switch between cardiorespiratory and strength/endurance workouts in successive exercise sessions. If you do both in the same session, however, the cardiorespiratory workout should be done first.

It is important to do strengthening exercises on alternating days because a full day is needed for your muscles to recover from such a workout. Also, when doing muscle-strengthening exercises, you should plan on short periods or sets of physical activity followed by rest periods during which the muscles can recover.

Figure 1.1.10: Walking is a good way to warm up for running.
Courtesy of Ken Karp.

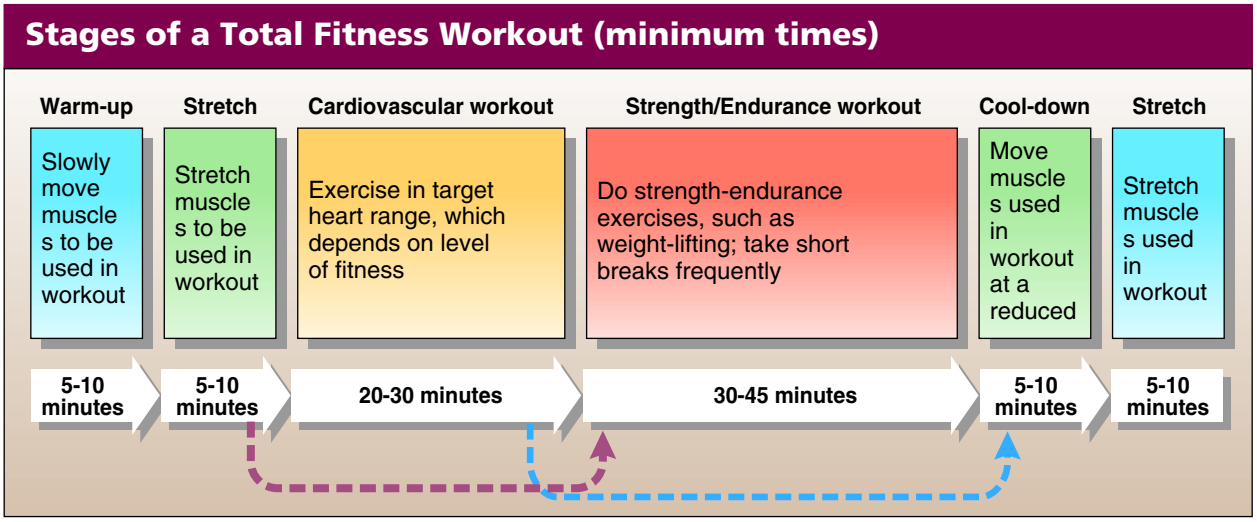


Figure 1.1.11: An exercise session may have up to six parts. Why do you need to warm up and cool down?
Courtesy of Function thru Form.

Cooling Down and Stretching

A slow warm-up period brings you safely from minimal to maximal activity. The cool-down is a period of milder exercise that allows your body and your heart rate to return slowly and safely to their resting states. Your cool-down should be at least as long as your warm-up. If you stop exercising abruptly, blood can collect in the muscles you were using. When this happens, blood may not return fast enough to your heart and brain. As a result, you may become dizzy and faint. Walking is a common method of cooling down.

Stretching after your cool-down loosens muscles that have tightened from exercise and prevents muscle and joint soreness. Spend at least five minutes repeating the stretches you did before your workout.

Checking Your Progress

One of the most exciting and gratifying aspects of sticking with a fitness program is seeing your progress. Your fitness will improve only gradually, so wait three or four weeks before retesting your fitness. In most exercise programs, you will begin to notice significant changes within 12 weeks. You may find that you look better, sleep better, or feel more alive. Perhaps you will notice that you have gained muscle strength, lost weight, or lowered your resting heart rate.

Your Resting Heart Rate

Someone with average cardiovascular fitness has a resting heart rate between 72 and 84 beats per minute. In general, girls and women have higher resting heart rates than boys and men. In either sex a resting heart rate below 72 beats per minute usually indicates a good fitness level. A young athlete in top competitive condition may have a resting heart rate as low as 40 beats per minute. The athlete's heart is so strong and efficient that it doesn't need to beat more rapidly to meet the body's needs. Your resting heart rate will probably not drop that low, but you may notice a drop of five to ten beats per minute after three to four weeks of exercise.

Your Changing Shape

If one of your goals is to lose body fat, you need to combine your exercise program with changes in your eating habits. As you track your progress, keep in mind that to be healthy, your body must store some fat; you cannot expect to lose all your body fat. In addition, remember that it is possible to lose fat tissue without losing weight. If you lose fat and gain muscle, you may even find that you weigh more than when you began your program. This is because muscle tissue is heavier than fat.

You will, however, have a trimmer body. To get an idea of whether you are losing body fat, you might measure and record the circumference of your upper arm at the start of your exercise program. Then measure your arm again every three to four weeks to track any changes.

To keep track of your overall progress in your workout program, you might keep a record in a table such as that shown in Figure 1.1.12. About every three or four weeks, write your fitness data in the table. Then, as the weeks go by, you can compare early data with later test results.

A Safe Workout

Anyone who exercises faces the risk of injury. Although some injuries may be unavoidable, most can be prevented by following some common-sense practices.

Equipping for Safety

You do not need expensive equipment in order to be safe. Depending on the activity you choose, you may need nothing more than sneakers. The key point is to choose the right equipment for your particular kind of exercise. Proper clothing, footwear, and protective gear help you to avoid discomfort and injury, as shown in Figure 1.1.13.

Clothing should be comfortable and allow unrestricted movement. Avoid clothing that inhibits your body's ability to cool itself through the evaporation of sweat. Also avoid any clothing that can trip you or get caught. For example, do not wear loose-fitting long pants or skirts when bicycling. Long pants and long sleeves are appropriate in sports such as skating, where falls and skin scrapes are a risk.

Progress Record

Week	Weight	Upper Arm Measurement	Resting Heart Rate	Appetite	Sleep Pattern
0					
3					
6					
9					

Figure 1.1.12: A record of your progress might take the form of the table shown.

Reprinted from *Health Skills for Wellness*, third edition, by B. E. (Buzz) Pruitt, Kathy Teer Crumpler, and Deborah Prothrow-Stith (2001), Prentice Hall, Inc.

Figure 1.1.13: Proper safety equipment can help prevent injuries.
Courtesy of Bob Daemmrich.

To protect your feet from injury, footwear must fit properly, be in good condition, and provide support and protection. Although athletic footwear is highly specialized, you probably do not need to buy expensive shoes. For example, do not waste your money on shoes meant for professional runners if your main activities are walking and bicycling.

Shoulder pads, helmets, mouth guards, and other protective gear are designed to prevent injuries in contact sports such as football and hockey. Hard-shell helmets worn by football players, hockey players, and baseball players at bat are designed to protect the head from a direct blow. Of course, you would not play a contact sport without a helmet, but did you know that you should regard a helmet as standard operating equipment anytime you get on wheeled sports equipment? A helmet should be worn each time you bike, skateboard, or roller skate. Knee and elbow pads are important equipment for skateboarders and roller skaters.

Fluids and Food

Your body can require water even when you are not thirsty. If you exercise for more than 45 minutes, you should take fluids during your exercise period. This is especially important in hot weather. To help prevent dehydration on warm days, you should have a cup of fluid a few minutes before you exercise and every 15 minutes during your exercise.

You need energy for exercising, and you get that energy from the food you eat.

Avoiding Overexertion

You may feel unusually tired during the session or even a few hours after if you exercise too intensely, too long, or too often. This tiredness is a signal that you have overworked your body. Other signs of overexertion include nausea or vomiting during or after a workout, and muscle or joint aches and pains that do not go away quickly. If you experience any of these symptoms, you need to cut back the intensity

and length of your exercise. Avoid overexertion by sticking to a consistent exercise schedule, rather than occasional bursts of activity followed by periods of inactivity. In addition, always keep your exercise within your comfort level. Do not make the mistake of pushing yourself too hard in order to reach your fitness goal quickly.

Weather Considerations

Make sure your clothing is appropriate for the weather. Regardless of the air temperature, you should feel slightly cool at the beginning of your workout. When you exercise outdoors on warm, sunny days, wear light-colored clothing to reflect the sun's rays, and dress lightly to prevent overheating. The lighter or more sun-sensitive your skin is, the more you will need to protect yourself from sunburn with a sunscreen lotion.

When it is cold, your clothing should protect you from frostbite. Cover your hands and head, since you lose a lot of heat from these parts of your body. You may need a sweat suit for warmth but do not overdo it. Clothing that is too thick or heavy can inhibit the evaporation of sweat and possibly cause overheating. If you wear layers of clothing, you can regulate your temperature by taking off or adding layers as necessary.

Exercise Myths and Facts

1. MYTH: "No pain, no gain"; exercise to the point of feeling pain is the only way to improve your abilities.
   - FACT: Pain is a danger signal, a signal that you are causing harm. Sharp or sudden pain should be a signal to stop immediately.
2. MYTH: Sit-ups and other abdominal exercises will decrease fat in the stomach area.
   - FACT: You cannot "spot reduce" or lose fat just in one area.
3. MYTH: Drinking fluids before exercising can cause stomach cramps.
   - FACT: Plain water will not cause cramps. Without adequate water, you can become dehydrated, which can lead to muscle cramps and other more serious problems.
4. MYTH: Being thin is a sign of fitness.
   - FACT: Thin people who do not exercise are likely to have poor heart, lung, and muscular fitness. Cardiovascular fitness is a better indication of overall fitness than your appearance.
5. MYTH: If women lift weights, they will develop large muscles.
   - FACT: Women actually have less muscle tissue and more fat tissue than men. They also have a balance of hormones that is different from men and that prevents the development of large muscle mass.
6. MYTH: Exercise is unsafe for older people.
   - FACT: The health of elderly people can benefit greatly from moderate exercise.

Opportunities for Fitness

Aerobic dance programs, in which people perform a set of exercises in time to music, are offered by many community centers, YMCAs, YWCAs, and health clubs. However, recreational dance of almost any kind can be substituted for aerobic

dance. To increase your cardiorespiratory endurance, you must dance vigorously enough to reach your target heart rate for a minimum of 20 minutes.

Do you still think you just cannot bring yourself to plan and carry out a fitness program? Then at least try to increase your daily level of activity. Make a game out of trying to add just a little more exercise each day. If you travel mostly by car or bus, bicycle or walk instead. Use stairs instead of an elevator. If you already walk quite a bit, pick up your pace or jog for a short distance. A small amount of exercise is better than none at all. People who get even a little bit of exercise have less risk of cardiovascular disease than those who are totally inactive.

Choosing the Right Exercise Program

Your exercise program should be based on your current fitness ratings and your own interests, needs, and abilities. Even if you think you are perfectly healthy, it makes good sense to check with a physician or other health-care professional to be sure your new activities will not put you at risk. After you have a physician-approved exercise plan, an exercise specialist, such as your physical education teacher, can help you select the best exercises. Moreover, he or she can give you specific pointers on the techniques that will make the activities safe and effective.

The type of exercise program you choose should have three parts: warm-up, conditioning, and cool-down.

The warm-up period allows for a slow increase in the heart rate and sends extra blood through muscles to warm them up. Your warm-up could include slow walking, mild stretching, or **calisthenics**. Remember, warm-up for five to seven minutes.

The conditioning period brings you into **cardiorespiratory** endurance and/or muscle strengthening activities. This is where most of your exercising occurs. These exercises should push your body to its normal limit, and when you are feeling strong, a little beyond. As exercising becomes easier, your normal limit should change. Walk or jog a little farther; do a few more sit-ups or push-ups. When weight training to gain bulk, increase to heavier weights; to build strength without bulk, keep lighter weights and increase repetitions. With muscle strengthening exercises, give your muscles a day off between workouts to rest. Or work your upper body one day and your lower body the next. The conditioning period generally lasts twenty minutes.

Figure 1.1.14 is a sample of a weekly physical fitness training schedule. Notice how it includes the warm-up and conditioning periods as well as a cool-down period.

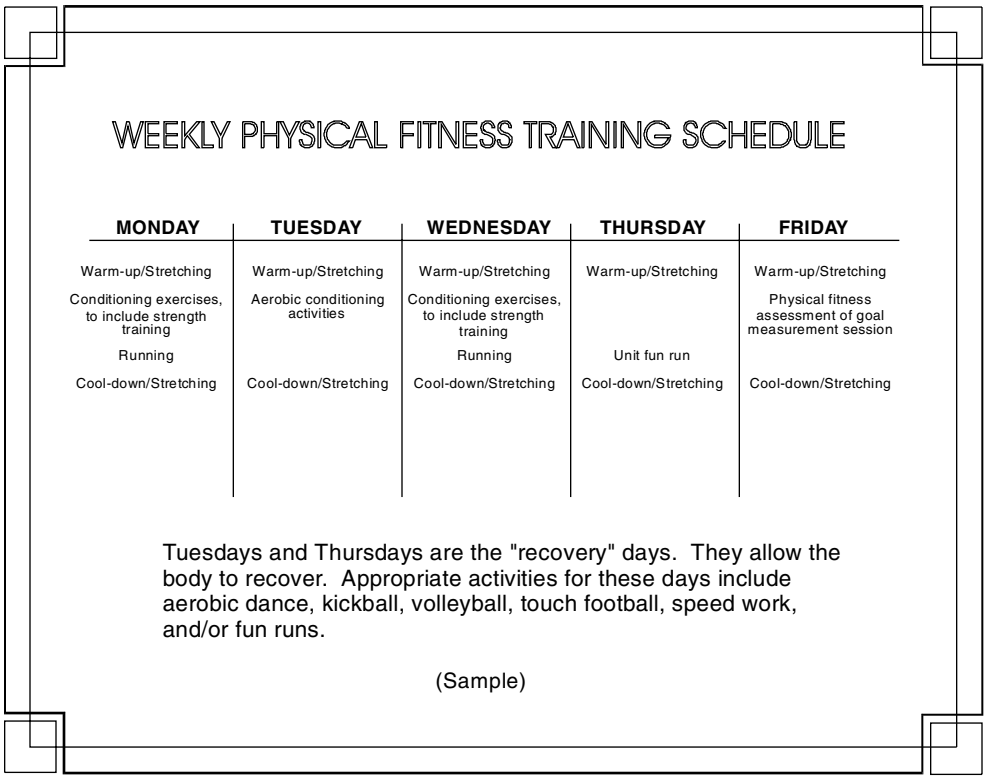
The cool-down period allows your heart rate to slow down, relaxes muscles, and cools the body. Slow walking, simple calisthenics, and mild stretching are good ways to cool down. Stretching during cool-down can prevent muscle cramps and soreness. Cool-down should last four to six minutes.

Key Note Terms

calisthenics – light gymnastic exercise designed to promote good health by developing strength and grace

cardiorespiratory – of or relating to the heart and the respiratory system

Figure 1.1.14: What changes would you make in this weekly exercise program to suit your own needs and interests?
Courtesy of CACI and the U.S. Army.



WEEKLY PHYSICAL FITNESS TRAINING SCHEDULE

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Warm-up/Stretching	Warm-up/Stretching	Warm-up/Stretching	Warm-up/Stretching	Warm-up/Stretching
Conditioning exercises, to include strength training	Aerobic conditioning activities	Conditioning exercises, to include strength training		Physical fitness assessment of goal measurement session
Running		Running	Unit fun run	
Cool-down/Stretching	Cool-down/Stretching	Cool-down/Stretching	Cool-down/Stretching	Cool-down/Stretching

Tuesdays and Thursdays are the "recovery" days. They allow the body to recover. Appropriate activities for these days include aerobic dance, kickball, volleyball, touch football, speed work, and/or fun runs.

(Sample)

Sticking with an Exercise Program

Even though many people know how important exercise is to a healthy lifestyle, they have trouble sticking with an exercise program. Follow these tips and you will find it easier to keep your resolution to become or remain physically fit.

- **Think of fitness as part of your daily routine, just like brushing your teeth, going to class, or eating dinner.**
- **Set realistic and specific goals for yourself. If you have never jogged before, do not expect to jog three miles your first time out. You may become discouraged. Plan to jog one mile and stick with it, even if you have to walk part of the way. You will find that you progress quickly, building your self-confidence.**
- **Exercise at least three times a week. If you exercise less than this, you probably will not see much progress, giving you an easy excuse to give up.**
- **Keep track of your progress in a journal. It is motivating to look back at where you started and see how far you have come.**
- **If you are a routine person who likes for things to remain the same, keep the same exercise routine from week to week. If you get bored easily and like change, develop several exercise routines that you can alternate from week to week.**
- **Exercise with a friend or group. You will get support from others and feel more committed to stick with it.**
- **Choose a place to exercise that is convenient for you. If the place you plan to exercise is far from home or school, you may not get there as often as you should.**

- **Wear comfortable clothing and shoes to make your exercise experience as pleasant as possible.**
- **Stay positive and have fun. Remember that you are doing something good for yourself. Be serious and consistent with your exercise routine, but enjoy it as well. If you choose an exercise program that you just cannot learn to enjoy, try something else. There is an exercise program for everyone!**

CAUTION: BEFORE BEGINNING ANY EXERCISE OR DIET PROGRAM, IT IS IMPORTANT THAT YOU HAVE THE APPROVAL OF YOUR PHYSICIAN.

Assessing Cardiovascular Fitness and Determining Target Heart Rate

When you exercise, your heart and lungs must supply your muscles with more oxygen than they need when you are resting. Your heart, for example, pumps about 5 quarts (about 5.5 liters) of blood per minute when you are at rest and 20 to 25 quarts (about 22 to 27 liters) when you are exercising vigorously. Running track, as shown in Figure 1.1.15, is a great way to get a cardiovascular workout.

Your target heart rate is the heart rate you need to maintain during exercise in order to improve your cardiovascular fitness. The following is a simple test for assessing your cardiovascular fitness and the procedure for determining the range in which your target heart rate should fall. These are followed by some guidelines for improving cardiovascular fitness.

Test Your Cardiovascular Fitness

Before you do this test or start an exercise program, have a physical examination to make sure that you do not have any health problems that rule out vigorous exercise. The examination should include a check of your blood pressure and resting heart rate. Do not attempt this test if you are ill or if you have a history of health problems.

Figure 1.1.15: Running is one way to exercise your heart and muscles.
Courtesy of Bob Daemmrich/ Stock Boston.

Table 1.1.2

Mile Walk/Run Times in Minutes and Seconds		
Age	Girls	Boys
14	10:30	7:45
15-18	10:30	7:30

Reprinted from *Health Skills for Wellness,* Third Edition, by B.E. (Buzz) Pruitt, Kathy Teer Crumpler, and Deborah Prothrow-Stith, (2001), Prentice Hall, Inc.

Figure 1.1.16: Taking your pulse is easy and tells you your heart rate before and after exercise.
Courtesy of Boston Graphics.

Note

To prepare for the test, do the warm-up and stretching exercises described in this lesson.

To test your cardiovascular fitness, you must walk and/or run one mile as fast as you can. You can alternate running with walking, but your goal is to cover one mile in as little time as possible. You will need to work with a partner. Your partner should use a watch with a second hand to measure the time, in minutes and seconds, it takes you to complete the distance of one mile.

Compare Your Results to Recommended Results

Compare your score to the scores listed in Table 1.1.2. To be at a good fitness level, your time should be no greater than the minimum times listed in the table.

Take Your Resting Pulse and Determine Your Target Heart Range

To determine your resting heart rate, you will need a watch or clock with a second hand. Use your index finger or middle finger to find your pulse, either in your wrist or in your neck, as shown in Figure 1.1.16. Then count the number of pulse beats during one minute.

Subtract your resting heart rate from 200, which is approximately your maximum heart rate. Then multiply the resulting number first by 0.6 and then by 0.8.

Add your resting heart rate to each of the two numbers you obtained in the previous step. The two sums give you the range in which your target heart rate should be.

Choose an Appropriate Cardiovascular Exercise Program

Ask your physical education teacher to help you select appropriate activities for building cardiovascular fitness, such as those in the table. Select moderate intensity activities first; then switch to activities of higher intensity as your fitness improves.

Do these activities three to four times a week. Take your pulse rate immediately after you stop exercising to see if you are exercising in your target heart range. (Because your heart rate begins to decrease as soon as you stop exercising, count the beats in 6 seconds and multiply this number by 10 to get the total number of beats for 60 seconds.)

After you have been exercising regularly for a while, repeat the cardiovascular walk/run fitness test to monitor your progress.

Apply the Skill

1. Complete the timed one mile walk/run to determine your cardiovascular fitness level. Record your results. Be sure to do warm-up stretches before you begin.
2. Determine the range in which your target heart rate falls.
3. After a physical checkup by a qualified health-care professional, design a cardiovascular fitness program that will improve your fitness level.

Fitness Throughout Life

One of the most important and challenging things you can do for yourself is to start exercising now and continue your program for your entire life. If you begin and continue an exercise program when you are young, it will help you stay healthy and fit as you age. Some people are discouraged from achieving this goal because they think that exercise is too difficult or time-consuming. They do not realize that many activities that they already perform may actually be forms of exercise. In addition, fitness activities can actually be a lot of fun. Both aerobic dance classes and recreational dancing can help you become physically fit.

Fitness and Recreation

Do you have fun riding your bike to visit a friend? Is a brisk walk on a cool morning something that you enjoy? At school dances, do you love to jump and turn enthusiastically in time to fast music? Do you and your friends ever get together for a hike, a quick game of basketball, or a swim at a local lake or pool? If you answered yes to any of those questions, you already perform activities that contribute to your physical fitness. Recreational activities that involve exercise, such as walking, biking, dancing, and swimming, are an important part of a fitness program.

Fitness and Aging

As people age, they undergo physical changes. Their bodies become less flexible, and their bones tend to fracture more easily. Those changes do not, however, have to prevent older people from being physically fit. Studies have shown that moderate exercise can help reduce the effects of, and sometimes eliminate, many physical problems associated with old age, such as cardiovascular disease and arthritis. This is true even if exercise begins late in life.

Some older people mistakenly think that they need to avoid exercise to protect themselves from injury. In fact, bones and muscles are more likely to stay strong and function well if they are exercised regularly. Exercise can significantly reduce the risk of osteoporosis, a condition in which the bones of elderly people—particularly elderly women—become fragile. Older people who get little exercise are generally less healthy than those who remain active.

Moderation is especially important in a fitness program for older adults. Older people may not be able to exercise at as high intensity as they once did. Older people are more likely than younger people to develop circulatory-system problems, and the target heart rate for exercise decreases as a person ages. Elderly people also need to be especially careful not to put too much stress on bones and muscles. If older people exercise carefully and moderately, however, they can continue to benefit from regular exercise.

Conclusion

Regular exercise is important to maintaining your health. It can make you feel and look better and help your body fight disease. Different exercise programs have different benefits, like aerobic dancing for a strong heart and weight lifting for strong muscles. No matter what exercise program you close, remember that that most important thing is to stay active. So much in life today makes things easy for us—elevators, escalators, cars, electric appliances—that it is easy to get out of shape. In addition to an exercise program, take the stairs, walk or bike to the store; go bowling with friends instead of watching television. It can be fun, and it is all to your benefit!

In the next lesson, you will do the Cadet Challenge and participate in exercises designed for the Presidential Physical Fitness Award (PPFA) program.

Lesson Review

1. **How does aerobic exercise differ from anaerobic exercise? Give an example of each.**
2. **List three physical benefits of regular exercise.**
3. **Explain how your target heart rate affects the level of intensity of the exercise you perform to improve your cardiorespiratory endurance.**
4. **List two ways to reduce your risk of injury when you exercise.**