## Fitness Career Opportunity

### Aerobics Instructor

Aerobics instructors are responsible for developing and leading safe exercise routines and aerobic classes at fitness centers or other health facilities, municipal recreation centers, and colleges or other school settings. They have basic knowledge in exercise physiology, anatomy, kinesiology, injury prevention, nutrition, and body composition.

Qualified aerobic instructors are certified by nationally recognized fitness organizations. They are also certified in cardiopulmonary resuscitation (CPR) and standard first aid.

Certification programs train aerobic instructors to evaluate exercise, give fitness assessments, choreograph and design exercise classes, and modify exercises for various populations.

There are many types of aerobic and fitness classes that require separate certifications or training. They include step training, low and high-impact aerobics, aquatic fitness, youth fitness, adaptive fitness, prenatal fitness, senior fitness, fitness for the overweight, funk aerobics, boxing aerobics, interval or circuit training, slide training, and muscle endurance training.

For more information regarding certification, contact:

IDEA: The Association for Fitness Professionals
6190 Cornerstone Court East, # 204
San Diego, CA
92121-3773
(800) 999-4332
www.ideafit.com

The American Council on Exercise (ACE)
4851 Paramount Dr.
San Diego, CA
92191
(800) 825-3636
www.acefitness.org

Aerobics & Fitness Association of America (AFAA)
15250 Ventura Blvd., Suite 200
Sherman Oaks, CA
91403-3297
(800) 365-5326
www.aerobics.org

The American College of Sports Medicine (ACSM)
401 W. Michigan St.
Indianapolis, MN
46202-3233
(317) 637-9200
www.asmg.org

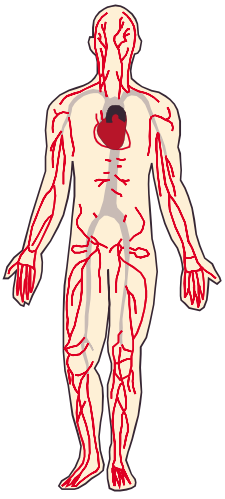
## Unit 5: Cardiovascular Fitness

### Introduction

*Do you often find yourself gasping for air when you exercise?*

Do you often find yourself gasping for air when you exercise or participate in a sport? Have you ever become winded after walking up a flight of stairs? If you sometimes are short of breath, your body may not be delivering enough oxygen to its muscles and tissues. The body sends oxygen to the muscles through the blood. And the blood can only flow to the many muscles in the body if it is pumped by the heart. Your heart must be strong enough to continuously pump blood through the blood vessels to all parts of your body. No other muscle in your body works as hard as your heart. If your heart cannot meet your body's needs for oxygen, you will feel out of breath and tired.

Your heart is one of the body's many remarkable features. It is a hollow, muscular organ a little larger than the size of your fist. It is pear-shaped and weighs a mere 12 ounces, about the weight of a large orange. It lies behind the breastbone and between the lungs, slightly to the left of the midline of your body.



*The body has thousands of miles of blood vessels.*

The heart, the body's thousands of miles of blood vessels, and the body's 12 pints of blood make up the **cardiovascular** *system*. (*Cardio* means heart; *vascular* means blood vessels.) Together, these parts work to deliver oxygen and nutrients to the muscles in the body.

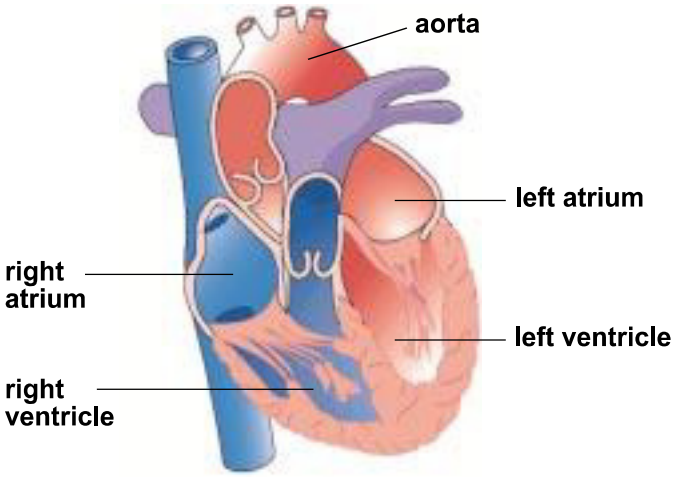
**Cardiovascular fitness** is the body's ability to deliver oxygen to the working muscles. Improving your cardiovascular fitness will give you more energy, make you feel better, and make you look healthier. By keeping your heart strong and fit, you decrease the chance of developing heart problems. A fit heart increases the chance that you will lead a long and healthy life.

## The Cardiovascular System: The Heart, Blood Vessels, and Blood

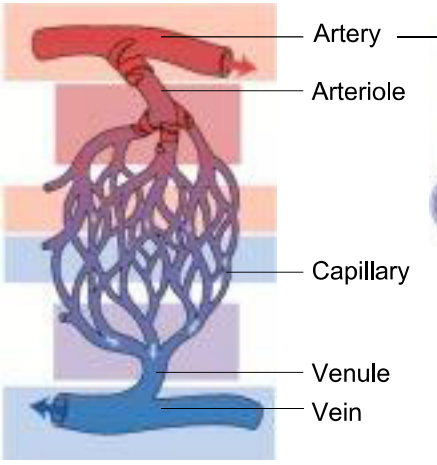
All of the muscles in the body use oxygen as a fuel. The muscles need oxygen, or they will eventually die. The cardiovascular system, also called the **circulatory system**, circulates blood throughout the body. This system works by pumping blood through a circular network of blood vessels. Your body holds about 12 pints of blood circulated continuously throughout the body. The heart beats at a rate of about 50-80 beats per minute. As the blood passes muscles, it delivers oxygen and nutrients and carries away waste products.

Your blood receives oxygen from the air you breathe into your lungs. This *oxygen-rich* blood has a bright red color. It travels to your heart, which will pump it throughout your body. You may think of the heart as a single pump. However, the heart is actually two pumps that are side by side.

Each pump contains two chambers, or room-like spaces, making a total of four chambers. The blood carrying oxygen flows into the two chambers on the left side of the heart. First this oxygen-rich blood fills the top left chamber, called the *left* **atrium**. A **valve**, or flap of tissue that works like a swinging gate, then opens. This allows the blood in the left atrium to flow into the lower left chamber, called the *left* **ventricle**. The ventricle then pumps the oxygen-rich blood out of the heart through a very large blood vessel called the **aorta**.



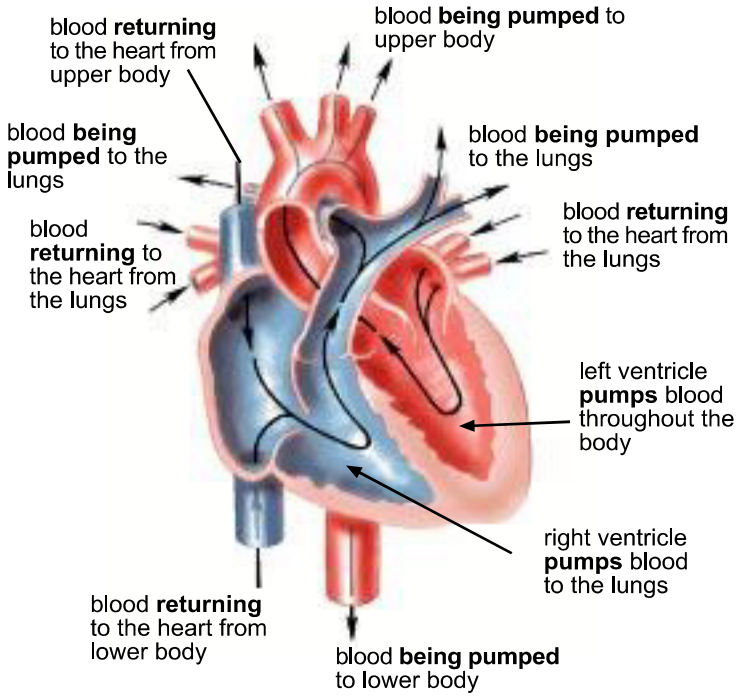

*The Four Chambers of the Heart*




*Blood vessels of the circulatory system: arteries, capillaries, venules, and veins.*

From the aorta, many smaller blood vessels branch out through the body. These blood vessels that carry oxygen-rich blood to the body's muscles are called **arteries**. As arteries branch out through the body they become smaller and smaller.

The smallest blood vessels located between the arteries and veins are called **capillaries**. The oxygen and nutrients in the blood pass through the thin walls of capillaries and into the cells in the muscles. As the cells in a muscle use oxygen, they produce waste. This waste material passes back through the thin capillary walls and is carried away by the blood. This blood without oxygen carrying waste has a dark, bluish-red color.




*Heart Flow*

*Arteries **pump** oxygen-rich blood **away from** the heart to the body and veins **return** oxygen-empty blood back **to** the heart.*

The oxygen-empty, waste-filled blood is pumped towards the heart. From the capillaries, the blood flows into larger blood vessels called **veins**. When the blood reaches the heart, it flows into the top chamber on the right-side of the heart. This chamber is called the *right atrium*. A valve in the atrium then opens, letting the blood flow down into the *right ventricle*. From there, the heart pumps the blood into the lungs. In the lungs, the blood exchanges its wastes for oxygen. The oxygen-rich blood then repeats its circular journey. The gaseous waste left in the lungs is exhaled as **carbon dioxide**.

## Why is Cardiovascular Fitness Important?

If your muscles are weak, you still may be able to carry your body. Your muscles may be inflexible, and you still may be able to bend. But if your cardiovascular system cannot deliver enough oxygen to your muscles, you will quickly run out of energy. Without energy, your muscles cannot continue to work. Cardiovascular fitness is *the* most important fitness component. Exercising your cardiovascular system is just plain "heart smart." And, like all of the other fitness components, cardiovascular fitness will improve your overall health.

### Exercise Provides…

#### Physical Benefits

- Tones and strengthens muscles
- Burns off calories for weight control
- Improves body composition in favor of more lean body mass and less body fat
- Helps control appetite
- Improves posture
- Increases reaction speed
- Increases sensory awareness
- Decreases risk for injuries

#### Health Benefits

- Lengthens life
- Improves the quality of life
- Reduces risk of premature heart attack and stroke
- Lowers resting blood pressure
- Creates healthy blood cholesterol levels
- Decreases body fat and helps in weight control
- Improves bone mass
- Improves digestion
- Reduces risk of diabetes
- Creates healthy blood vessels
- Improves circulation
- Increases the lungs' ability to process oxygen
- Increases heart's ability to pump blood
- Increases resistance to illnesses and diseases

#### Personal Benefits

- Increases energy levels
- Improves self-esteem and self-confidence
- Helps in coping with stress
- Increases resistance to fatigue
- Increases mental efficiency
- Helps counter anxiety and depression
- Helps in relaxation and decreasing tension
- Enhances sleep
- Provides an activity to do with family and friends

## The Best Exercise for Developing a Healthy Heart: Aerobic Exercise

The word **aerobic** means *with* oxygen. During **aerobic exercise**, the body uses oxygen for energy. The more oxygen the body uses, the harder the cardiovascular system will work. When the cardiovascular system works hard, it becomes more fit. Aerobic exercise increases cardiovascular fitness better than any other type of activity.

Aerobic exercises, also called *cardiovascular exercises*, are continuous activities that use the large muscle groups of the body, especially in the lower body. The muscles need additional energy to keep working for an extended period of time. The muscles get their energy or fuel from oxygen-rich blood. This increased need for more oxygen-rich blood makes the heart beat faster and pump more blood. Increasing your **heart rate** exercises your heart muscle and makes it stronger.

**Aerobic Exercises**

| High Level | Moderate Level | Low Level |
|---|---|---|
| jogging | bicycling | baseball |
| rowing | basketball | softball |
| stationary cycling | handball | golf |
| uphill hiking | soccer | bowling |
| jumping rope | swimming | volleyball |
| running in place | tennis singles | |
| | walking | |
| | racquetball | |

*The **high-level** exercises are very vigorous and are sustained exercises that promote cardiac fitness.*

*The **moderate-level** exercises are moderately vigorous exercises that can promote cardiac fitness if done briskly.*

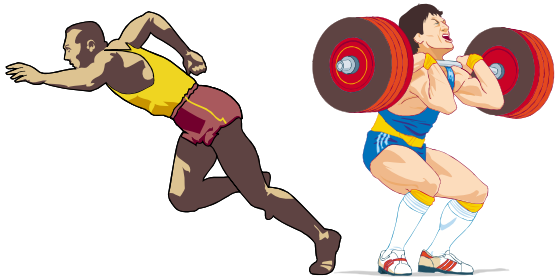
*The **low-level** exercises may be vigorous at times but are usually not sustained long enough to promote good cardiac fitness alone.*

Jogging for at least 15 minutes is a good example of an aerobic exercise. Jogging uses the large muscle groups, such as your leg and arm muscles, to move you forward. These muscles need fresh supplies of oxygen-rich blood to replace the energy used. To meet these needs, your heart rate increases.

All activities that use the large muscle groups will raise your heart rate. However, some activities do not raise your heart rate enough to improve cardiovascular fitness. An activity must raise your heart rate to a level called the **target heart rate zone (THRZ)**. Continuous activities such as jogging, walking, rope jumping, cycling, and swimming are all aerobic exercises. Inline skating, step aerobics, aerobics classes, and cross-country skiing are also aerobic activities. All of these exercises train your body to use oxygen more efficiently.

*Continuous exercises train your body to use oxygen more efficiently.*

**Anaerobic** (*without* oxygen) activities are those performed at a pace which use oxygen faster than the body can replenish it. **Anaerobic exercises** are very strenuous. A person can only do anaerobic activities for a short period of time before rest is needed. Anaerobic exercises demand short bursts of energy. They also involve quick starts and stops. Sprinting and weight lifting are examples of anaerobic activities.



*Sprinting and weight lifting are examples of anaerobic activities.*

Your heart, brain, and most body organs have very limited anaerobic ability. These tissues are mostly aerobic and require a continuous supply of oxygen, or they will die. Skeletal muscles, on the other hand, have both anaerobic and aerobic ability.

## Effects of Aerobic Exercise: Strengthening the Heart and Other Muscles

As you become aerobically fit, your heart and muscles become stronger and work more efficiently. Aerobic exercise leads to many healthy *adaptations,* or changes, in the cardiovascular and **respiratory systems**. The *respiratory system* includes the lungs—air passages that help supply the body with air.

**Increased Stroke Volume.** *Stroke volume* is the amount of blood pumped by the heart during a beat. Regular aerobic exercise allows a fit individual to pump more blood per heartbeat. A fit heart takes fewer beats than an unfit heart to pump the same amount of blood. A fit heart also will have a lower resting heart rate.

**Increased Heart Rate.** During aerobic exercise, your heart rate can increase to almost double your resting heart rate. A fit person can comfortably train aerobically at the target heart rate zone. Your target heart rate zone is the range within which you need to exercise to gain cardiovascular benefit.

**Increased Cardiac Output.** **Cardiac** *output* is the amount of blood pumped by the heart in one minute. Aerobic training can increase the ability of the cardiac output to pump at almost eight times its resting rate.

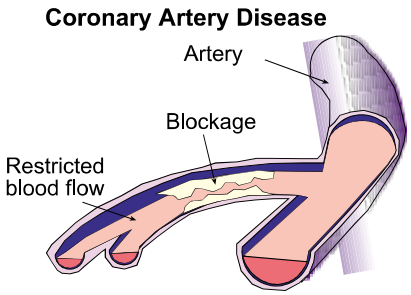
**Increased Ability to Regulate Blood Flow.** Regular aerobic exercise trains the body to circulate more blood to the muscles during exercise.

**Increased Oxygen Delivery to the Body.** Oxygen and carbon dioxide exchange is more efficient as you become more fit. Aerobic training increases the body's ability to remove carbon dioxide and other waste products.

**Improved Rate and Depth of Breathing.** This training adaptation allows you to work harder without getting out of breath.

## Cardiovascular Diseases: The Heart of the Matter

The number one killer in America is **cardiovascular disease (CVD)**. More than two out of every five Americans die from CVD. In fact, someone dies from CVD every 34 seconds. Most forms of CVD start early in a person's life. Therefore, you should begin a regular program of cardiovascular exercise now and make it a permanent part of your lifestyle.




Coronary artery disease (CAD) is the major cause of heart disease and **heart attack**. The most common CAD is known as *atherosclerosis*. Atherosclerosis is a thickening and hardening of the medium- and large-sized arteries. When this affects the coronary arteries, it may cause a heart attack.

**Coronary arteries** are the blood vessels that provide the heart muscle with oxygen. Even though the heart's chambers are filled with blood, this blood cannot cross the heart's walls. The heart can only receive oxygen from the blood flowing through the coronary arteries.

CAD develops when fatty deposits build up on the inner walls of the coronary arteries. When these walls harden and narrow, the heart cannot receive oxygen-rich blood. When oxygen cannot get to the heart muscle, part of the heart muscle is damaged or dies. A heart attack is the damage or death of part of the heart muscle caused by a lack of blood.

## Risk Factors for Heart Disease

A **risk factor** is a habit or condition that may increase an individual's chance of developing an illness or disease. There are several risk factors that may increase your chance of developing CAD. Individuals with CAD have an increased chance of having a heart attack. Many risk factors for heart disease are habits that people can eliminate from their lives.

### Risk Factors That You Can Control: Habits and Choices

How you live your life plays a major role in determining your risk for heart disease. The more risk factors you have, the greater your chance for heart disease. You can eliminate or control most of the risk factors by practicing good health habits.

Good health habits begin with what we put into our bodies. Most of us know we should eat healthy food and limit the unhealthy food we eat. In addition, when we fill our lungs and blood with poisons from cigarettes, we risk heart disease. A person who smokes is twice as likely to have a heart attack as a nonsmoker. Similarly, a person who abuses alcohol increases the chances that he or she will develop heart disease.

*A person who abuses alcohol and smokes increases the chances that he or she will develop heart disease.*

"Heart smart" practices also include what we do with our bodies. Regular cardiovascular exercise helps keep the heart healthy. Other "heart smart" practices include relaxation techniques to lower stress and tension.

Two more risk factors we can lower through good health habits are **high blood pressure** and high levels of **cholesterol**.

**High Blood Pressure.** Each time the heart beats, blood is pushed against the walls of the arteries. The measure of the force of blood against artery walls is called **blood pressure**. If the arteries become hardened or filled with fatty substances, their passageways will narrow. In these cases, blood will back up and put dangerous pressure on the heart. The heart will strain to push blood through the narrow walls of the arteries. This condition is called *high blood pressure*. It is also called *hypertension*.

*High blood pressure is a risk factor for heart disease.*

Some of us may inherit high blood pressure from our parents. However, everyone can practice healthy habits that will help us lower high blood pressure. One way to prevent high blood pressure or lower high blood pressure is through regular cardiovascular exercise. Another good way to avoid or lower high blood pressure is to eat a diet low in salt and fat.

**High Cholesterol Levels.** *Cholesterol* is a fat that is made in our bodies. Cholesterol also comes from foods. There are two kinds of cholesterol, HDL (good) and LDL (bad). Our tissues need a certain amount of

cholesterol to stay healthy. To be healthy, our bodies need a greater amount of HDL or good cholesterol, than LDL or bad cholesterol. However, if we take in or produce too much cholesterol in our bodies, the extra cholesterol will clog the passageways in arteries. High levels of cholesterol can lead to coronary artery disease.

The tendency to have high levels of cholesterol, like high blood pressure, can be inherited. Everyone, however, can practice healthy habits to reduce cholesterol levels. Not smoking and avoiding fatty foods are two "heart smart" ways to lower your cholesterol level. Regular cardiovascular exercise and maintaining the right body composition are also good ways to control cholesterol.

| Risk Factor | Risks | Good Health Habits |
|---|---|---|
| **High Blood Pressure** | Increases the force of the blood being pushed against the walls of the arteries as it is pumped; blood pressure remains constantly higher than healthy range. | Regular cardiovascular exercise lowers blood pressure. |
| **High Levels of Cholesterol** | Increases fatty substances in blood that can block arteries and restrict blood flow; high levels contribute to artery disease and other forms of heart disease. | Regular exercise combined with a healthy, low-fat diet keeps cholesterol levels normal. |
| **Cigarette Smoking** | Number one risk factor for heart disease; more than doubles heart attack rate. | Regular and vigorous exercise increases likelihood of not smoking or quitting. |
| **Diabetes** | Increased body weight and unhealthy body composition can increase the body's insulin requirements. | Regular exercise helps to decrease a diabetic's insulin requirements. |
| **Overweight/ Obesity** | Excess body fat increases likelihood of high blood pressure, high blood cholesterol, diabetes, and coronary artery disease. | Regular exercise helps to lose extra fat pounds and develop a healthy body composition. |
| **Physical Inactivity** | Increases incidence of coronary artery disease. | Regular exercise increases life expectancy, improves quality of life, promotes clearer arteries, and reduces risk of heart disease. |
| **Stress and Tension** | Often increases blood pressure and other risk factors that contribute to heart disease. | Regular exercise relieves stress and tension by relaxing muscles. |

## Risk Factors You Cannot Control: Age, Heredity, and Gender

Some risk factors are not influenced by lifestyle. We cannot control or reduce these factors. Therefore, it is especially important that we eliminate those risk factors we can.

**Age.** The older you get, the more susceptible to a heart attack you become.

**Heredity.** Heart disease and other cardiovascular disease in your family increase your chance of developing a heart disease.

**Gender (Sex).** Males are much more susceptible than females to a heart attack.

| Major Risk Factors for Heart Disease | |
|---|---|
| **Factors We Can Control** | **Factors We Cannot Control** |
| • physical inactivity<br>• overweight or obesity<br>• high blood pressure<br>• high stress<br>• high cholesterol<br>• diet high in saturated fat, excess sugar, and salt<br>• smoking, drugs, and alcohol | • age (the older you are, the higher your risk)<br>• gender (males have a higher risk)<br>• heredity (conditions and diseases that run in your family) |

## Determining Your Cardiac Risk

Complete the *Cardiac Risk Index* chart on the following page. Follow the directions at the top of that page to measure your risk of having a heart attack or developing heart disease.

## Risk of Heart Attack

In each of the eight categories in the chart below, choose one box that describes you. Record your score in the space provided. Add the numbers from each box to find your total score. Refer to the scale at the bottom of the chart to determine your risk of heart attack.

**Cardiac Risk Index**

| Risk Factor | Index | | | | | | | Score |
|---|---|---|---|---|---|---|---|---|
| **1. Age** | 10 to 20<br>**1** | 21 to 30<br>**2** | 31 to 40<br>**3** | 41 to 50<br>**4** | 51 to 60<br>**6** | 61 to 70<br>**8** | | |
| **2. Heredity** | No known history<br>**1** | 1 relative over 60 with cardiovascular disease<br>**2** | 2 relatives over 60 with cardiovascular disease<br>**3** | 1 relative under 60 with cardiovascular disease<br>**4** | 2 relatives under 60 with cardiovascular disease<br>**6** | 3 relatives under 60 with cardiovascular disease<br>**8** | | |
| **3. Weight** | 5 lbs or more below standard weight<br>**1** | -5 to +5 lbs standard weight<br>**1** | 6-20 lbs overweight<br>**2** | 21-35 lbs overweight<br>**3** | 36-50 lbs overweight<br>**5** | 51-65 lbs overweight<br>**7** | | |
| **4. Tobacco smoking** | Nonuser<br>**0** | Cigar and/or pipe<br>**1** | 10 cigarettes or less a day<br>**2** | 20 cigarettes a day<br>**4** | 30 cigarettes a day<br>**6** | 40 cigarettes or more a day<br>**10** | | |
| **5. Exercise** | Intensive occupational & recreational exertion<br>**1** | Moderate occupational & recreational exertion<br>**2** | Sedentary work & intensive recreational exertion<br>**3** | Sedentary work & moderate recreational exertion<br>**5** | Sedentary work & light recreational exertion<br>**6** | Complete lack of all exercise<br>**8** | | |
| **6. Cholesterol, or, if unknown, % fat in diet** | Cholesterol below 180 mg% No animal or solid fat in diet<br>**1** | Cholesterol below 181-205 mg% 10% animal or solid fat in diet<br>**2** | Cholesterol below 206-230 mg% 20% animal or solid fat in diet<br>**3** | Cholesterol below 231-255 mg% 30% animal or solid fat in diet<br>**4** | Cholesterol below 256-280 mg% 40% animal or solid fat in diet<br>**5** | Cholesterol below 281-330 mg% 50% animal or solid fat in diet<br>**7** | | |
| **7. Blood pressure** | 100 upper reading<br>**1** | 120 upper reading<br>**2** | 140 upper reading<br>**3** | 160 upper reading<br>**4** | 180 upper reading<br>**6** | Upper reading 200 or more<br>**8** | | |
| **8. Gender** | Female under 40<br>**1** | Female 40-50<br>**2** | Female over 50<br>**3** | Male<br>**5** | Stocky male<br>**6** | Bald stocky male<br>**7** | | |

**Your risk of HEART ATTACK:**

| | |
|---|---|
| 6–11 | Well below average |
| 12–17 | Below average |
| 18–24 | Average |
| 25–31 | Moderate |
| 32–40 | Dangerous |
| 41–62 | Urgent—DANGER—Make lifestyle changes to reduce your score! |

**Total Score**

## Your Heart Rate: A Measurement of Your Cardiovascular Fitness

*Your heart beats at different rates depending upon what activity you are doing.*

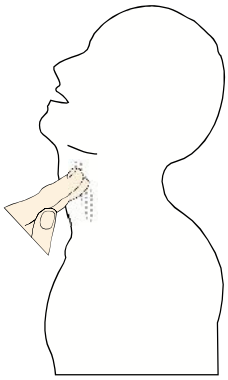
Your heart beats at different rates depending upon what activity you are doing. Many measurements of cardiovascular fitness are based on your heart rate. Your *heart rate* is the number of times your heart beats, or pumps, per minute. There are two important heart rates you should measure in order to monitor your cardiovascular fitness. One important heart rate is your **recovery heart rate**, or your heart rate shortly after exercise. You will read about how to measure your *recovery heart rate* later in this unit.

Another important heart rate is your *resting heart rate*, or how many times your heart beats per minute while you are at total rest.

Many exercisers use technology to monitor their heart rates. One type of heart rate monitor is the pulse bar, which is held in your hand. Another type fits on your ear or on your finger and gives you a **pulse** readout. The most accurate type fits around your chest right over your heart and transmits a signal of your pulse to an accompanying wristwatch. However, you can learn to take your own pulse with a watch and measure your heart rate accurately.

### Taking Your Pulse: Counting Your Heart Beats

Your pulse is a wave of slight pressure which can be felt in certain arteries near your skin. Your pulse is caused by the pressure as each heartbeat forces blood against the artery wall. You can measure your heart rate by taking your pulse at the **radial artery**. The radial artery is located on the underside of your wrist. Place the tips of the first two fingers of your right hand just below the wrist bone of your left hand. Then



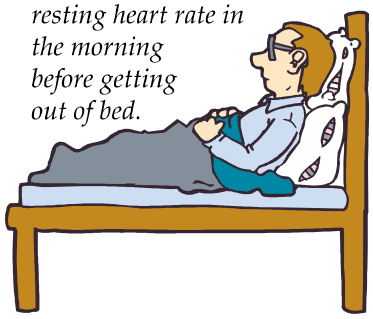
*To find your carotid artery, place the tips of your first two fingers into the groove on either side of your neck by your windpipe (trachea). Then slide your fingers until they are about one inch below the top of your jaw bone.*

slowly slide your fingertips until they are straight down from your thumb. You should feel a rhythmic beating just below the skin. This beat from your radial pulse is a true measure of your heart beat. **Note:** Do not use your thumb to take your pulse since it has a pulse of its own.

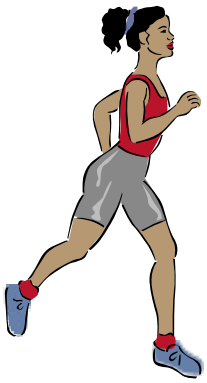
You can also take your pulse at your **carotid artery**. To find your carotid artery, place the tips of your first two fingers into the groove on either side of your neck by your windpipe (trachea). Then slide your fingers until they are about one inch below the top of your jaw bone. Press gently until you feel regular pressure just below the skin. This beat is your carotid pulse, another measure of your heart beat. Do not press hard or on both sides of the neck at the same time. Doing this can reduce the blood flow and cause light-headedness and an inaccurate reading.

### Resting Heart Rate: Measuring Heart Beats While at Rest

One important measure of the condition of your heart is your *resting heart rate*. The resting heart rate is the number of times your heart beats in a minute while at rest. It is best to take your resting heart rate in the morning before getting out of bed.



*It is best to take your resting heart rate in the morning before getting out of bed.*



*The resting heart rate of an aerobically fit person is probably lower than the average resting heart rate.*

The average resting heart rate is 78 to 84 beats per minute for an adult female. It is 72 to 78 beats per minute for an adult male. The resting heart rate of an aerobically fit person is probably lower than the average resting heart rate. A low resting heart rate is desirable and indicates a strong and efficient heart. A strong heart pumps more blood with each beat, leaving more rest time in between beats. This means more energy for you!

You can measure your progress in a cardiovascular fitness program by occasionally recording your resting heart rate. You may notice a decrease of 10 to 25 beats per minute in your resting heart rate after a few months in a cardiovascular fitness program.

**Monitoring Your Resting Heart Rate (RHR)**

Use the chart on the following page to record your resting heart rate. Measure your resting heart rate once a week. **Note:** a restless night with little sleep, smoking, alcohol, stress, caffeine, a recent meal, or certain medications can increase your resting heart rate.

1. The best time to take your resting heart rate is before you get out of bed in the morning. **Note:** You may also measure your resting heart rate when you are relaxed. Be sure you have not done any physical activity for at least 30 minutes and have not eaten for several hours.

2. Find your pulse at either your radial (wrist) artery or your carotid (neck) artery.

3. Use your index and middle finger of your right hand to find your pulse. **Remember:** Use fingertips, and not your thumb since it has a pulse of its own.

4. Apply a slight but steady pressure with your fingertips until you feel a pulse.

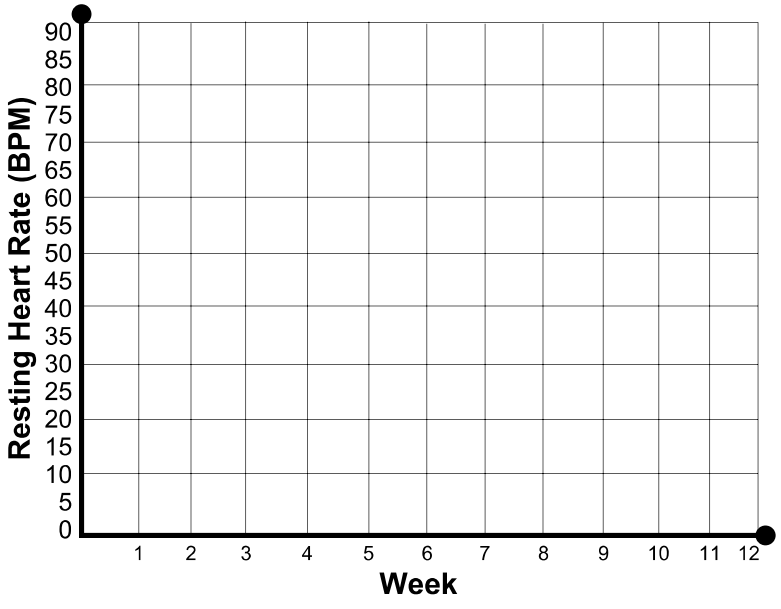
5. When measuring your resting heart rate, count your heartbeats for 30 seconds and double it. You may need to measure your pulse more than once to get an accurate reading. If you lose count, begin again. Be patient; it takes practice!

6. Plot your beats per minute (BPM) on the graph on the following page.

| Date | Current Resting Heart Rate | Measured for : | |
|---|---|---|---|
| | | 30 Seconds | 1 Minute |

# Heart Rate Monitoring Activity

| Week | Date | Time | Resting Heart Rate (BPM) |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |
| 11 | | | |
| 12 | | | |

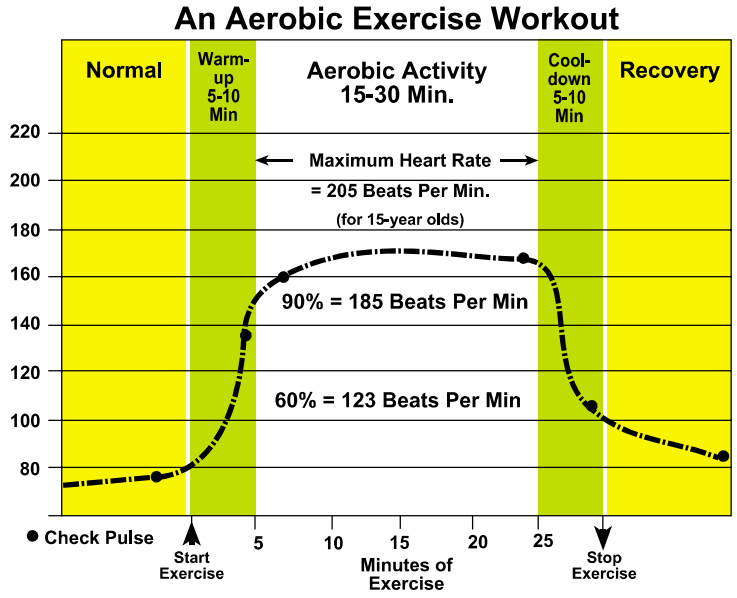


## Improving Cardiovascular Fitness Using Training Principles: Overload, Progression, and Specificity

### The Principle of Overload: Frequency, Intensity, Type, and Time (F.I.T.T.)

You can improve your cardiovascular fitness by regularly making your heart work harder than it normally does. Working hearts grow stronger. A stronger heart can pump more blood with each beat than a weaker heart. There are *four general ways to overload* and gradually increase the work your heart does during aerobic exercise.

**(F) Frequency.** You must work out at least three days per week to develop cardiovascular fitness. Begin an exercise program with three workouts per week. Add workouts to your week after your body has adjusted. To improve your cardiovascular fitness, you must do a minimum of four aerobic workouts per week. Eventually, you will be able to exercise aerobically on a daily basis.




**(I) Intensity.** You can measure the intensity of your aerobic exercise by checking your heart rate. During exercise, your heart should beat between the 60 percent and 90 percent range of your **maximum heart rate**. This range is also called your *target heart rate zone (THRZ)*. Exercising at a lower heart rate will not improve your cardiovascular fitness. Exercising at a higher rate puts a dangerous

strain on your heart muscle. If you are starting an aerobic program, stay near 60 percent of your target heart rate. Gradually increase to higher ranges as your body adapts. (Refer to *Target Heart Rate Zone* section on the following pages.)

**(T) Type.** You need to change the type of exercise you are performing, going from normal to advanced techniques. If you have been walking on only a flat course, you can try walking on an incline or hilly course. You will notice the difference in your heart rate. Keep checking your target heart rate zone as you add more advanced activities to your exercise program.

**(T) Time.** Work your heart in the target heart rate zone for at least 15 minutes. If you are beginning a fitness program, start with 15 minutes of low intensity aerobic exercise. As your fitness improves, lengthen your workout time to 30 minutes. Over time, you can lengthen it to 60 minutes.

### The Principle of Progression: Continually Improving Cardiovascular Fitness

At first your workout will work your body beyond its normal level. However, your heart will eventually adjust to your workout. If you continue to work out for the same length of time and number of times per week, you will *maintain* your cardiovascular fitness. To *improve* your fitness level, you must *overload* your body, or increase your workout. Increasing the difficulty of your workout is called *progression*.

*Your heart will eventually adjust to your workout.*

Gradually lengthening the time you exercise from a minimum of 15 minutes to a maximum of 60 minutes is a good way to increase your fitness level. After your body adapts to 60 minutes of exercise, add another exercise session per week. Each time you increase the number of exercise sessions, decrease the time of each session. As your body adjusts to these additional sessions, gradually add more time to each session. Remember to monitor your heart rate and resting heart rate as you become more fit. From time to time, recalculate your heart rate zone and resting heart rate.

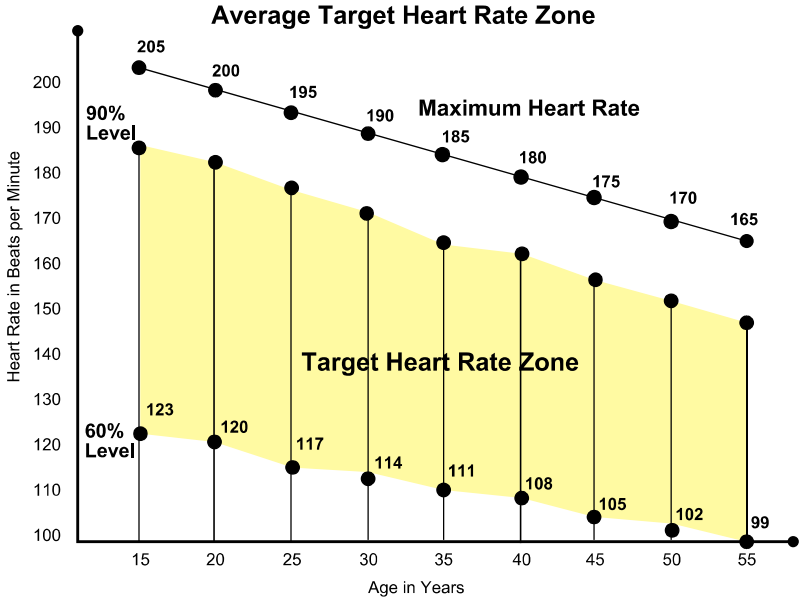
### Principle of Specificity: Training to Reach Certain Goals

If you want to improve a specific area of your body, you must work on that specific area. This idea is called the *principle of specificity.* For example, to improve your cardiovascular fitness, you need to do aerobic exercises. Aerobic exercises are best for improving the fitness of the heart and lungs. To tone the stomach muscles, or abdominal muscles, do sit-ups and crunches to work these particular muscles.

## Target Heart Rate Zone: Determining Exercise Level

To improve your cardiovascular fitness, you need to work your heart within your *target heart rate zone*. Your target heart rate zone is between 60 percent and 90 percent of your *maximum* heart rate. Estimate your maximum heart rate by subtracting your age from 220. Design your workouts to reach the THRZ, but do not exercise beyond this zone. Exercising at your maximum heart rate *can be extremely dangerous*.

Exercising in the target heart rate zone will bring about a **training effect**. *Training effects* are the positive physical fitness changes in the body that occur as a result of exercise. A lower resting heart rate is one possible example of a training effect gained from cardiovascular exercise. Greater endurance is another example of a training effect. The target heart rate zone helps you determine whether to increase or decrease your aerobic exercise.



When beginning an aerobics program, aim your workout towards the lower range of your target zone (60 percent). As you get into better shape, slowly build up to the higher range of your target zone (90 percent).

Another way to monitor your exercise intensity is to check yourself with the *talk test*. You should be able to talk during exercising. If you are breathing deeply but not gasping for air, you are probably exercising aerobically. For example, when walking briskly or jogging you should be able to talk comfortably without getting out of breath. However, if you are able to sing or shout, then you are not exercising hard enough.

## Calculating Target Heart Rate Zone (THRZ)

**Purpose:** To identify your target heart rate zone to achieve a *training effect*.

**Procedure:** To figure your individual THRZ, you need to know your resting heart rate. Study the example provided and then follow each step to determine your own THRZ. **Remember:** Your fitness level will have an effect on your personal target heart rate zone.

| The Steps | The Examples | The THRZ Formula |
|---|---|---|
| 1. First, determine your **maximum heart rate (MHR)** by subtracting your age from **220.** | 220<br>**– 17**<br>203 | **220 – Age = MHR** |
| 2. Next, subtract your current **resting heart rate (RHR)** from your **MHR.** | 203<br>**– 70**<br>133 | **MHR – RHR = HR Reserve** |
| 3. Multiply both the **lower limit (.60)** & the **upper limit (.90)** by the answer in #2. | 133 x **.60** = 79.8<br>133 x **.90** = 119.7 | **HR Reserve x .60 = Lower limit**<br>**HR Reserve x .90 = Upper limit** |
| 4. Add your **RHR** to both **lower** & **upper limits**. Round off your answers to find your **THRZ.** | **79.8** + 70.0 = **149.8**<br>**119.7** + 70.0 = **189.7** | **RHR x Lower limit = Lower zone**<br>**RHR x Upper limit = Upper zone** |

Rounded off, the target heart rate zone for the individual in the chart above is 150–190 beats per minute.

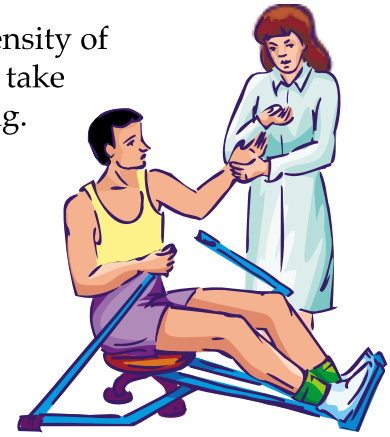
What is your individual target heart rate zone? _____

Is your THRZ higher or lower than the average for your age that appears on the graph?

_____

## Monitoring Heart Rate during Exercise

Use your target heart rate zone to check the intensity of your workouts. To see if you are in your THRZ, take your pulse immediately after you stop exercising. Quickly find your pulse either at your radial (wrist) artery or your carotid (neck) artery. Count your pulse for 10 seconds. Multiply the number of beats by six to determine your heart beats per minute. If your pulse falls within your target zone, your intensity is just right. If your heart rate is higher than the recommended upper range, reduce the intensity of your exercise. If your heart rate is lower than the recommended lower range, increase the intensity of your exercise.



*To see if you are in your THRZ, take your pulse immediately after you stop exercising.*

Experts recommend that you take your heart rate three different times during an exercise session. First, take a **warm-up** heart rate, or a pulse taken before actual exercise.

Second, take a workout heart rate just after you finish the hardest part of your aerobic exercise. (**Remember:** Your exercising heart rate should be in your THRZ, somewhere between 60 percent and 90 percent of your maximum heart rate.)

Finally, take your heart rate after your **cool-down**. This rate will show whether you have completely recovered from your workout.

## Recovery Heart Rate: How Quickly the Heart Returns to Normal

*Recovery heart rate* is the heart rate taken shortly after exercise. This measure can help indicate if your workout was too strenuous for your fitness level.

After five minutes of cool-down, your heart rate should be no more than 120 beats per minute. After 10 minutes, your heart rate should be 100 beats or less per minute. If your heart rate fails to drop to those levels, then perhaps you did not complete your cool-down. If your cool-down was complete, then perhaps your workout was too hard and needs to be easier.

## Heart Rate Response to Exercise

**Purpose:** To measure how your heart rate responds to a variety of situations. To keep track of your actual heart rate *before*, *during*, and *after* a workout.

**Materials:** stopwatch, jump rope, jogging track or area

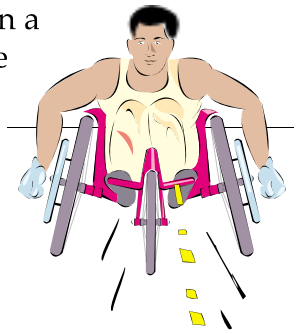
**Procedure:**

- Measure and record your heart rate in each of the situations and exercises listed.
- Measure your heart rate *during* each activity in which you do *not* move.
- Measure your heart rate *immediately after* each exercise.
- Count your pulse for 10 seconds. Take your pulse either at your carotid (neck) artery or at your radial (wrist) artery.
- Then multiply the number of beats counted by six. The product is your heart rate or beats per minute (BPM).
- Record your BPM in the spaces provided.

| Heart Rate Response to Exercise | Heart Rate (BPM) 10-second pulse count x 6 |
|---|---|
| 1. Your RHR | |
| 2. Sitting relaxed | |
| 3. Standing | |
| 4. Warm-up & stretch (3 minutes) | |
| 5. Jumping jacks *or* pedal an erogometer (1 minute) | |
| 6. Jogging in place *or* push your wheelchair (1 minute) | |
| 7. Jump rope *or* wheel-chair pushups (1 minute) | |
| 8. Jog *or* push your wheelchair (440 yards) | |
| 9. Walk slowly & stretch (5 minutes) | |
| 10. Relax & stretch (5 minutes) | |

## Determining Your Level of Aerobic Fitness

Many tests designed to measure cardiovascular fitness require special equipment and trained personnel. One such test performed in a doctor's office or hospital is called a *stress test*. A stress test measures your heart rate during and after strenuous exercise on a treadmill or stationary bicycle. A doctor then uses the results to evaluate your cardiovascular system.



However, there are easier ways to measure your level of cardiovascular fitness. These methods include distance runs and step tests.

## One-Mile Run/Walk

**Purpose:** To measure cardiovascular fitness (heart and lung endurance) by walking, jogging, or running a mile as fast as you can.

*Wheelchair adaptation*—push yourself in your wheelchair as fast as you can.

**Materials:** stopwatch, quarter-mile track or marked off jogging path

**Procedures and Guidelines:**

**Note:** You should only take this test *after* you have been exercising regularly for several weeks.

1. Warm up with a brisk walk or easy jog. Gently stretch all your major muscle groups. Drink water before beginning your test.

2. Begin the test at a pace, or speed, that you can maintain throughout the mile. Avoid starting out too fast and having to stop or slow down. Walking is permitted, but try to finish the mile in the shortest amount of time possible.

3. Do the best you can for your own current level of cardiovascular fitness. Avoid competing with others.

4. At the completion of the mile run, note your time in minutes and seconds.

5. Continue jogging slowly or walking for an additional lap (quarter mile) to cool down. Stretch all of your major muscle groups after you have cooled down to reduce muscle soreness.

6. Record your score and rating below.

**One-Mile Run/Walk Ratings**
(minutes/seconds)

| Age | Male (minutes/seconds) Good—Better | Female (minutes/seconds) Good—Better | Fitness Zone* |
|---|---|---|---|
| 13 | 10:00 - 7:30 | 11:30 - 9:00 | **Healthy** |
| 14 | 9:30 - 7:00 | 11:00 - 8:30 | **Healthy** |
| 15 | 9:00 - 7:00 | 10:30 - 8:00 | **Healthy** |
| 16 | 8:30 - 7:00 | 10:00 - 8:00 | **Healthy** |
| 17 | 8:30 - 7:00 | 10:00 - 8:00 | **Healthy** |
| 17+ | 8:30 - 7:00 | 10:00 - 8:00 | **Healthy** |

**Scores below age-appropriate numbers are considered low.*

1. What was your time on your mile run? _____

2. What was your rating on your mile run? _____

3. Did you perform better or worse than you expected? _____

## Three-Minute Step Test

**Purpose:** To measure the heart rate as an indicator of your level of cardiovascular fitness.

**Materials:** 12-inch high step bench, metronome for accurate pacing, watch or timer, partner

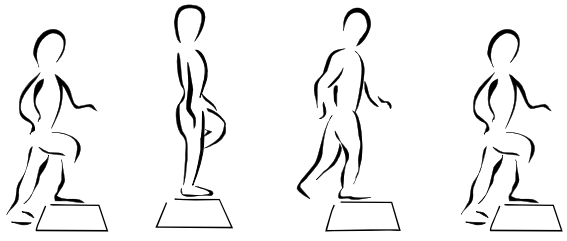
**Procedures and Guidelines:**

1. The step test is done by stepping up and down off a 12-inch step bench. Continue for three minutes to a rhythm of 96 beats per minute (bpm). Four clicks equals one step cycle for a stepping rate of 24 steps per minute. A *step* counts as stepping on to the bench or stepping off the bench.

2. Warm up and stretch the major muscle groups before the test. Practice stepping up and down off the bench for a few cycles as a warm-up. Step to a four-beat cycle—up, up, down, down.

3. You can choose which foot you will lead with during the test. Half-way through the test you may want to switch the lead foot.

4. When given the signal to begin, start stepping up and down off the step bench. Make sure to contact the bench with your whole foot. Keep your arms down by your sides and your body upright during the three-minute test. Do not talk during the test.



5. After three minutes, sit down immediately on the step and begin counting your pulse within five seconds. Find your pulse at your carotid (neck) artery and count the beats for one minute. Your partner will count your pulse at the radial (wrist) artery at the same time. It may help to close your eyes and take deep breaths to concentrate on the pulse rate.

6. Compare your one-minute recovery heart rate with your partner's count of your heart rate. Average them together for your answer if you both believe you took the pulse correctly. If one of you did not find the pulse or take it correctly, disregard those readings.

7. Record your one-minute pulse rate and rating below.

**Note:** A person's heart rate after exercise reflects the cardiovascular system's ability to recover from exercise.

| Three-Minute Step Test Rating | |
|---|---|
| **Recovery Pulse Rate**<br>**Number of Seconds** | **Fitness Zone** |
| less than 85 | **High** |
| 85-95 | **Healthy** |
| 120 or higher | **Low** |

1. How did you feel after the three-minute step test? _____

   _____

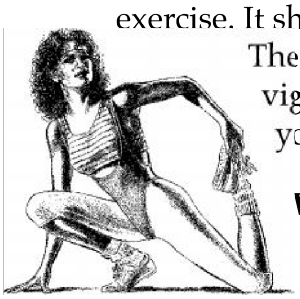
2. What was your one-minute recovery heart rate? _____

3. Did your heart rate seem to lower quickly? _____

## Guidelines for Safe Aerobic Exercise: Smart Exercise

**Get medical clearance.** Make sure you are in good health prior to beginning an aerobic exercise program. If you have a pre-existing medical condition, get medical clearance from a physician before exercising.

**Warm up before exercise.** A *warm-up* is the beginning phase of exercise. It should include mild exercise and static stretching. The warm-up prepares the heart and lungs for more vigorous exercise. It also increases the blood flow to your working muscles.



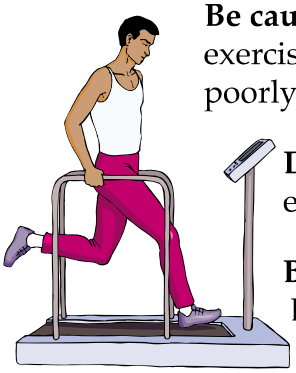
*Your warm up should include mild exercise and static stretching.*

**Wear loose, comfortable, layered clothing.** Dress in layers of clothing for outdoor workouts. You can then peel off clothing as you warm up. Wear cotton or other porous materials that will allow sweat to evaporate.

**Wear appropriate footwear.** Shoes should be comfortable and not too small. Do not lace them too tightly. They should have good support and cushioning.

**Exercise on soft surfaces.** Try to exercise on soft, level surfaces such as a level grass field, a dirt path, a nature trail, or a track. Hard, uneven surfaces such as cement or rough fields are more likely to cause injuries.

**Exercise in a well-ventilated room.** Try to exercise in a room that is not too hot or too cold.



*Your shoes should have good support and cushioning.*

**Be cautious in hot, humid environments.** Adjust your exercise intensity and duration in hot, humid weather or poorly ventilated rooms.

**Drink water.** Drink water before, during, and after exercise to prevent dehydration and heat illness.

**Build your fitness gradually.** It takes times to get fit! Build up your level of activity gradually over the weeks. Be careful not to extend yourself too much right away. Many enthusiastic beginners have been side-tracked injuring themselves. Be patient!

**Listen to your body.** Pay attention to early warning pains. Too much exercise can cause injuries to your joints, feet, ankles, and legs.

**Check your intensity.** Take your pulse before exercise, immediately after the most intense portion, and after the cool-down.

**Be aware of signs of heat stroke.** Early signs include feeling dizzy, weak, lightheaded, excessively tired. Seek medical attention if you stop sweating or your body temperature becomes dangerously high.

**Jog using the correct technique.** If you walk, jog, or run, land on your heels. Then roll onto the balls of your feet. This will reduce the strain on your feet and lower legs.

*Jog with correct technique.*

**Avoid wearing rubberized or plastic exercise suits.** Such clothing will not help you lose weight any faster by making you sweat more. The weight lost will quickly be replaced as soon as you begin drinking fluids again. This type of clothing can cause dangerously high body temperatures, possibly resulting in heat stroke.

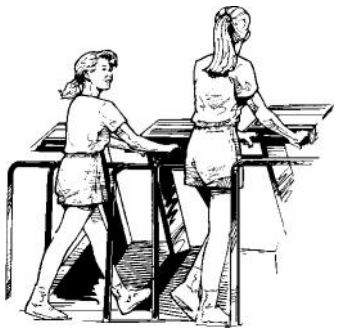
**Always cool down.** A cool-down is the tapering-off period after exercise that helps the body to *gradually* return to a resting state. The cool-down helps the body readjust to less strenuous physical demands. It also helps prevent blood from pooling in the muscles that have been active. The first part of the cool-down should include walking or another light activity. The last part should include static stretching.

## Selecting Your Cardiovascular Program

Exercise that improves the condition of your heart and lungs must be brisk, sustained, and regular. Excellent cardiovascular programs include walking, jogging, swimming, bicycling, aerobics classes, rowing, and cross-country skiing. For an activity to be considered aerobic it must raise the heart rate and breathing rate. It must be performed continuously for at least 15 minutes. And it must be done at least three times per week.

### Considerations Before Choosing an Activity: A Checklist

**How physically fit are you?** Before choosing an activity, determine your health needs. What are your strengths and what are your weaknesses? Looking back to the fitness assessments will help you see the areas of fitness you should focus on most.



*Do you like to exercise with other people?*

**Do you like to exercise alone or with other people?** Many people like to be alone during physical activity. Others like to exercise with a group. Some people are more likely to stick to their exercise program if they exercise with others. You need to decide what type of person you are and select an activity that fits.

**Do you prefer to exercise outdoors or indoors?** Outdoor activities offer a variety of scenery and weather, which helps to prevent boredom. Indoor activities, such as stationary cycling, bench stepping, or jumping rope, can always be relied upon even if the weather can't be!

**Do you like sports and competition?** Your skill level can influence your success and participation in sports activities. If you enjoy competition, find a variety of sports activities in which you can participate. **Remember:** Exercise at your own level. Don't let the excitement of competition push you to over-extend yourself and risk injury.

What activities are available to you where you live? Do you live in an area that is safe to exercise outside alone? Are there programs in your area that support activities for your age group?

**Are you willing and able to purchase sports/fitness equipment or a membership in a health facility?** Some individuals need an instructor or coach to motivate them. There are many inexpensive public recreation facilities and physical activity classes. Private clubs cost more but may fit your needs. An activity such as fitness walking only requires buying a good pair of walking shoes.

## Aerobic Activities

The following programs will help you plan an aerobic exercise program that increases safely week by week. **Remember:** Do not begin a program at a level that is too difficult for your present fitness condition. Start slowly and work up to a more intense level. You have a lifetime to improve your fitness level.

### Fitness Walking: An Exercise for Everyone

Walking is a great cardiovascular exercise that can be done by nearly everyone anywhere! Walking is an everyday activity that you can make into a regular exercise program. Walking is a good way to develop and maintain fitness.

**Technique:** Stroll easily for the first five minutes of your walk to warm up your muscles and reduce your chance of injury. Stretch the muscles of your legs with static stretching. As you walk, keep your head up, eyes forward, and body upright. Gently contract your abdominal muscles, holding them in as you walk. Land on your heel, and roll heel to toe. Let your stride length come naturally. Increase your pace gradually. As you pick up the pace, thrust harder with your legs and arms. Let your elbows bend naturally (up to 90 degrees) as you swing your arms faster. Breathe deeply and naturally. Cool down by strolling leisurely. Finish your cool-down by static stretching the major muscles of your legs.

**Place:** Find a place where you can walk all the time. If outdoors, choose a smooth, soft surface. If weather prevents outdoor walking, find an indoor track, recreation center, or even a shopping mall.

**Attire**: A good pair of walking shoes is important. They should fit comfortably and have a roomy toebox. They should be light yet have a supportive arch.

**Walking Calories Used per Hour**

| Speed | 75 lbs | 100 lbs | 150 lbs |
|---|---|---|---|
| 2.0 mph | 125 | 160 | 240 |
| 3.0 mph | 175 | 210 | 320 |
| 4.5 mph | 245 | 295 | 440 |
| 5.5 mph | 365 | 440 | 740 |
| 7.0 mph | 510 | 610 | 920 |

For example, a 100-pound person walking three mph should use the following formula: number of calories per hour (210) x number of hours (½) = 105 calories.

**10-Week Cycling Program**

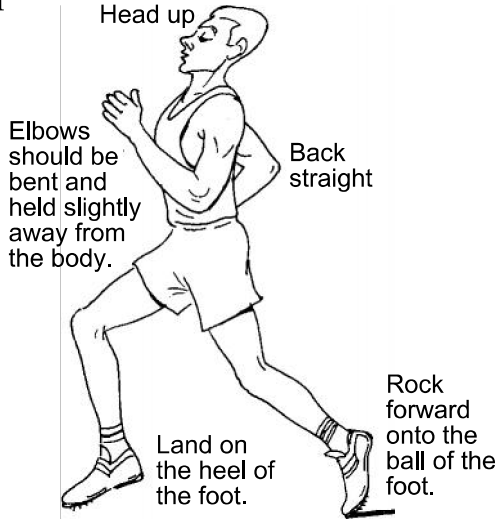
| Week | Distance (miles) | Time Goal (minutes) | | Frequency per Week |
|---|---|---|---|---|
| | | Female | Male | |
| 1 | 5.0 | 30:00 | 28:00 | 3 |
| 2 | 5.0 | 28:00 | 25:00 | 3 |
| 3 | 5.0 | 27:00 | 23:00 | 4 |
| 4 | 6.0 | 34:00 | 26:00 | 4 |
| 5 | 6.0 | 30:00 | 24:00 | 4 |
| 6 | 7.0 | 38:00 | 30:00 | 4 |
| 7 | 7.0 | 35:00 | 28:00 | 4 |
| 8 | 8.0 | 48:00 | 35:00 | 4 |
| 9 | 8.0 | 44:00 | 34:00 | 4 |
| 10 | 8.0 | < 40:00 | < 32:00 | 4 |

During the first four weeks, walk continuously but do not worry about distance covered.

**Jogging: An Exercise to Run for**

Jogging is a great aerobic exercise that requires very little skill or expensive athletic equipment. You can run alone, with someone, or with a group of people. You can run year round, indoors or outdoors.

**Technique:** Jogging can be done by alternately walking and running at a slow to moderate pace. Jogging can also be done by running at a slow, even pace. Warm up by walking or with some light jogging and then stretch the leg muscles. When jogging, keep your head up and back straight. Elbows should be bent and held slightly away from the body. Land on the heel, then rock forward onto the ball of the foot. Avoid landing on the balls of the feet. This places too much strain on the lower legs. Slowly cool down by walking for about three minutes. Finish cooling down by doing static stretching for two minutes.




**Place:** Find a place where you can run all the time. For outdoor running, find a course with a smooth, soft surface. Fitness trails are often located in recreation parks and on school grounds. Fitness trails are established routes with exercise stations along the way. When the weather prevents outdoor running, run around a track at a health club or school.

**Attire:** Good running shoes are an important investment. Running shoes have thick, flexible soles that cushion the bottom of the foot. The soles also absorb shock of the rest of the body. This helps prevent injuries to the bones, ligaments, joints, and muscles.

**Jogging Calories Used per Hour**

| Activity | Speed | 75 lbs | 100 lbs | 150 lbs |
|---|---|---|---|---|
| Jogging | 5.5 mph | 365 | 440 | 660 |
| Jogging | 7.0 mph | 510 | 610 | 920 |
| Running in place | 0.0 mph | 360 | 430 | 650 |
| Running | 10.0 mph | 710 | 850 | 1280 |

For example, a 100-pound person running at 10 mph should use the following formula: number of calories per hour (850) x number of hours (½) = 425 calories.

**10-Week Jogging Program Progression**

| Week | Activity | Distance (miles) | Time Goal (minutes) | | Frequency per Week |
|---|---|---|---|---|---|
| | | | Female | Male | |
| 1 | walk | 2.0 | 32:00 | 30:00 | 3 |
| 2 | walk | 3.0 | 48:00 | 45:00 | 3 |
| 3 | walk/jog | 2.0 | 26:00 | 24:00 | 4 |
| 4 | walk/jog | 2.0 | 24:00 | 22:00 | 4 |
| 5 | jog | 2.0 | 22:00 | 20:00 | 4 |
| 6 | jog | 2.0 | 20:00 | 18:00 | 4 |
| 7 | jog | 2.5 | 25:00 | 23:00 | 4 |
| 8 | jog | 2.5 | 23:00 | 21:00 | 4 |
| 9 | jog | 3.0 | 29:00 | 26:30 | 4 |
| 10 | jog | 3.0 | < 27:00 | < 24:00 | 4 |

**Swimming: An Exercise with a Cushion**

Swimming is one of the most popular activities in this country. Swimming has several advantages that are not found in other sports activities. Water cushions the body. There is less stress put on bones, joints, and muscles than in some dry-land sporting activities. Regular swimming tones and strengthens the major muscles of the body, including legs, arms, back, and waist. The resistance of the water is similar to exercising with weights. However, it is not considered a weight-bearing exercise and will not help with bone density problems.

**Technique:** Each swimming workout should begin with a five- to 10-minute warm-up. This can include flutter kicks, walking in the shallow end of the pool, or slow laps. Perform static stretches on the side of the pool after you warm up.

When starting out, begin with as many laps as you can, even if it's only one or two laps. As your body adjusts, you can increase the number of laps gradually. Focus on building your distance rather than speed, even if that means resting occasionally. Include a variety of swimming strokes. Alternate the crawl, backstroke, or butterfly with the breaststroke and sidestroke.

End your workout with a cool-down. Slowly swim two laps to help reduce your heart rate. Perform static stretching at the side of the pool after your heart rate has decreased. Always wait at least an hour after a heavy meal before you swim.

**Place:** Some people choose to swim in open water, but doing so subjects you to nature's elements. Always make sure there are lifeguards present. Be sure to check with the Marine Patrol, under

the Florida Fish and Wildlife Conservation Commission, for information regarding weather, tides, depth, current, undergrowth, marine life, and other factors that could affect your swim. When swimming at a pool, observe the rules and policies on lap sharing and using kickboards and fins. Don't swim alone. There should always be a lifeguard, or you should swim with a "buddy."

**Attire:** A good swimming suit is lightweight and made of nylon or a nylon blend. The suit should fit snugly to streamline your body but still be comfortable.

**Swimming Calories Used per Hour**

| Activity | Yards Per Min | 75 lbs | 100 lbs | 150 lbs |
|---|---|---|---|---|
| Swimming per hr. | 25 | 155 | 185 | 275 |
| Swimming per hr. | 50 | 270 | 325 | 500 |

For example, a 100-pound person swimming at 50 yds./min. should use the following formula: number of calories per hour (325) x number of hours (1) = 325 calories.

**10-Week Swimming Program**

| Week | Distance (yards) | Time Goal (minutes) | | Frequency per Week |
|---|---|---|---|---|
| | | Female | Male | |
| 1 | 400 | 15:00 | 14:00 | 3 |
| 2 | 400 | 13:00 | 12:00 | 3 |
| 3 | 500 | 15:00 | 14:00 | 4 |
| 4 | 500 | 13:00 | 12:00 | 4 |
| 5 | 600 | 18:00 | 17:00 | 4 |
| 6 | 600 | 16:00 | 15:00 | 4 |
| 7 | 700 | 19:00 | 18:00 | 4 |
| 8 | 800 | 21:00 | 20:00 | 4 |
| 9 | 900 | 23:00 | 22:00 | 4 |
| 10 | 1000 | < 25:00 | < 24:00 | 4 |

**Bicycling: An Exercise That Takes You Places**

Bicycling is a great way to keep fit and have fun. Bicycling is used for many different activities—shopping, getting to and from work or school, or just touring the trails on the weekends. Cycling can be done alone, with a partner, or with a group.

In some countries cycling is considered to be transportation and not exercise. In many countries people cannot afford cars and use bikes as transportation. Cycling would probably not be a choice of exercise or leisure activity in these countries.

**Technique:** Before riding, make sure that your bicycle seat height is adjusted properly. Adjust the handle bars to a position that suits your riding style. A trained technician at a local bicycle store can help you adjust your bicycle.

Begin with a warm-up, which could consist of slowly riding your bike. After you warm up, perform static stretches on the major muscles of your legs.

Start your ride at a moderate pace so your leg muscles can adjust to the increased activity. Learn to handle your bike well before attempting difficult situations such as heavy traffic or places with steep, winding roads. Be alert to holes or objects. Know the basics of bike safety. Pedaling needs to be steady, vigorous, and continuous to achieve real benefits. End your workout by slowing down gradually and stretching your leg muscles.

**Place:** Finding a regular place to ride helps you stick to your cycling program. Is there a scenic bike trail nearby that is away from automobiles? If you ride through city streets, take care to avoid dangerously busy intersections. Some cities now have special "bike traffic" lanes designated along major thoroughfares. Always follow traffic rules.

**Attire:** A sturdy, well-made bike and a hard-shell helmet are necessities. Dress for comfort and protection against the weather, chafing, and occasional spills. Heavier fabrics offer more protection from falls.

**Cycling Calories Used per Hour**

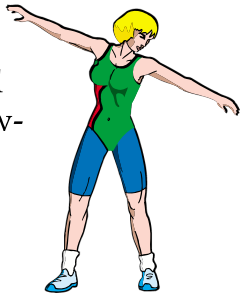
| Activity | Speed | 75 lbs | 100 lbs | 150 lbs |
|---|---|---|---|---|
| Bicycling | 6.0 mph | 155 | 185 | 275 |
| Bicycling | 12.0 mph | 270 | 325 | 500 |

For example, a 150-pound person bicycling at 6 mph for 30 minutes should use the following formula: number of calories per hour (275) x number of hours (½) = 137.5 calories.

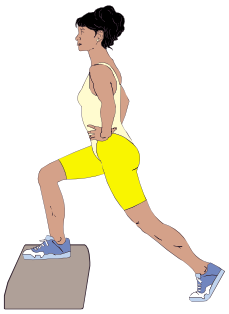
**10-Week Cycling Program**

| Week | Distance (miles) | Time Goal (minutes) | | Frequency per Week |
|---|---|---|---|---|
| | | Female | Male | |
| 1 | 5.0 | 30:00 | 28:00 | 3 |
| 2 | 5.0 | 28:00 | 25:00 | 3 |
| 3 | 5.0 | 27:00 | 23:00 | 4 |
| 4 | 6.0 | 34:00 | 26:00 | 4 |
| 5 | 6.0 | 30:00 | 24:00 | 4 |
| 6 | 7.0 | 38:00 | 30:00 | 4 |
| 7 | 7.0 | 35:00 | 28:00 | 4 |
| 8 | 8.0 | 48:00 | 35:00 | 4 |
| 9 | 8.0 | 44:00 | 34:00 | 4 |
| 10 | 8.0 | < 40:00 | < 32:00 | 4 |

## Other Popular Aerobic Activities



**Aerobic Dance.** Aerobic dance is a fun, popular exercise program set to music. Aerobic classes design routines that incorporate combinations of dance steps and calisthenics. Aerobic classes can be either high-impact, low-impact, or a combination of both. High-impact aerobics includes bouncing, skipping, jumping, and running movements. Low-impact aerobics includes vigorous arm and upper-body movements with one foot kept in contact with the ground at all times. You can participate in these activities at home, on video, or at a fitness club or recreation center.



**Step Aerobics.** Step training consists of stepping up and down on a platform (four inches to twelve inches in height) while performing creative step combinations to music. This low-impact, high-intensity athletic activity appeals to both men and women of all ages.

**Water Aerobics.** Water aerobics uses the basic moves of traditional aerobics classes. However, these movements are performed in the water. Many aquatic classes include water walking, deep-water running, and aquatic bench stepping. They may also include muscle-toning and strengthening exercises with props.

**Rope Jumping.** Jumping rope is a perfect all-around aerobic exercise. It uses maximum energy and a minimum amount of space. Jumping rope can be simple and basic or made complex with advanced step patterns. It not only improves cardiovascular fitness, but develops coordination, speed, and agility as well.

**Slide Training.** Slide training is a form of aerobic and anaerobic conditioning using lateral movements. It is necessary to have a specially designed slide board that allows you to slide in a side-to-side motion similar to speed skating.

**Inline Skating.** Inline skating, often referred to as *roller blading*, is a fun activity that can be done almost anywhere. It involves wearing snow ski-type boots that have a row of three to five wheels underneath. The most important skill in successful skating is to keep your balance as you push

yourself forward. Learning to stop is another tricky skill. The side-to-side motion used to push forward gives your large muscle groups in the lower body a great cardiovascular and muscle-toning workout!

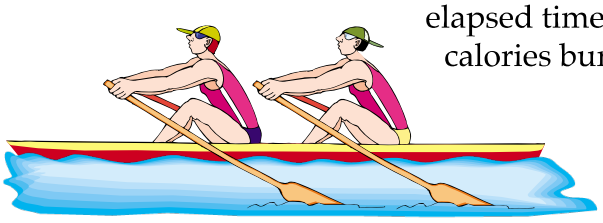
### Cardiovascular Machines

**Steppers.** High-tech steppers have become one of the most popular aerobic exercise machines for home and gym use. These machines work the lower body's large muscle groups. They give your heart and lungs an excellent workout. Steppers are much safer than running up stairs because they reduce impact stress to your joints. Better models have a readout monitor showing your time, speed, steps climbed, and calories burned. These models also let you select pre-designed programs.

**Stationary Bicycles.** Stationary bicycles come in several varieties. Some of these bikes are upright and similar to outdoor bikes. And some stationary bikes work your upper and lower body at the same time. Riding a stationary bike is a low-impact aerobic activity. Stationary bikes can be set at different levels of resistance to fit your needs. You can develop excellent fitness by riding a stationary bike. Better models include a readout of elapsed time, speed, and distance. Models may even include a readout of total calories burned and your heart rate.

**Treadmills.** Treadmills, also known as *running machines*, offer fitness walkers and runners a chance to tackle difficult slopes. Many of the better models can be programmed to change the difficulty of the hills automatically.

**Rowers.** Rowers simulate the workout of being on a rowing team. Rowing provides an excellent non-impact workout for nearly the entire body! Many models monitor your speed, strokes per minute, elapsed time, and total calories burned.



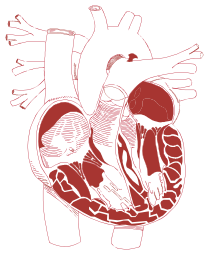
**Cross-Country Ski Simulators.** With a cross-country ski machine, you won't enjoy beautiful snowy landscapes, but this is a good way to exercise all the muscles in your upper and lower body. It takes some time to master the coordination needed for using a cross-country skier, but the effort is worth it! Cross-country skiing uses a great amount of body mass during the exercise, which means more energy and calories are expended. High-quality models let you adjust the level of difficulty. They also have readouts of elapsed time, distance, calories burned, and heart rate. A more advanced cross-country type machine is called the elliptical trainer. The elliptical trainer combines the physical movements of cross-country skiing with the movements used on a stair climber, treadmill, and stationary cycle.

## Summary

Exercising your heart improves your health and wellness more than any other type of exercise. Having a fit and healthy heart improves your energy level, burns off body fat, and helps you to relax. A fit heart also reduces your risk for heart disease and improves your quality of life.

*Cardiovascular fitness*, or the body's ability to deliver oxygen to working muscles, is basic to all fitness programs.

The cardiovascular system, also referred to as the *circulatory system*, includes your heart, blood vessels, and blood. It is this system that circulates oxygen-rich blood to the muscles throughout your body. Your heart is the muscle that continuously pumps blood. It is the most important muscle in your body. The body cannot survive for long once the heart stops beating.



Blood passes through the lungs and picks up oxygen. This oxygen-rich blood then enters the left side of the heart. This side of the heart pumps it out through a large blood vessel, the *aorta*. The blood then continues through the smaller blood vessels called *arteries* to all parts of the body. As the blood delivers oxygen to the muscles, it picks up waste. This waste-filled blood flows to the right side of the heart. The heart then pumps this oxygen-empty blood to the lungs, where it exchanges its waste for oxygen. The blood then returns to the left side of the heart and repeats its circular route.

A fit cardiovascular system efficiently circulates oxygen-rich blood through the body. Having a strong cardiovascular system helps you feel better, look better, and reduces your risk of heart disease. Staying fit helps control *risk factors* for heart disease such as *high blood pressure* and high *cholesterol*. Not smoking, staying at the proper body weight, reducing stress, and being physically active all help reduce your risk of heart disease and keep you healthy.

*Aerobic exercises* are the best types of activities to aid cardiovascular fitness. Aerobic exercises are continuous activities that use the large muscle groups. They create an increased demand for oxygen. The increased need for oxygen-rich blood raises your *heart rate*. There are many ways to

exercise your heart. Walking, jogging, swimming, bicycling, aerobics classes, inline skating, and cross-country skiing are all *aerobic* exercises. Aerobic exercise improves your body's ability to use oxygen.

By monitoring your *pulse* when you exercise, you can be sure you are working in your *target heart rate zone*. The target heart rate zone is 60 percent to 90 percent of your *maximum heart rate*. Exercising in this zone will develop your aerobic fitness.

You will notice a drop in your resting heart rate as your fitness level improves. You will find yourself recovering from exercise more quickly. You will also find that you are able to do more work with less effort.

Factors such as age, gender, race, ethnicity, socioeconomic standing, and culture affect people's decisions about participation in exercise activities. However, no matter who you are or where you live, exercise opportunities are available.

The lifestyle you lead today will affect your health in future years. Treat your heart and body properly, and you can be rewarded with good health! Regular aerobic exercise can lengthen your life and also improve the quality of your life. Have a healthy heart!