

HOW YOUR HEART WORKS: CARDIOVASCULAR FITNESS

CARDIOVASCULAR FITNESS is the body's ability to continuously provide oxygen to muscles as work (exercise) is performed over an extended period of time.

CARDIOVASCULAR BENEFITS OF EXERCISE:

- * Active people have less heart disease and are less likely to die from heart attacks (& other diseases such as cancer, stroke, and type II diabetes).
- * Active people tend to develop extra coronary arteries in the heart (help to deliver oxygen-rich blood to body)
- * Heart muscle gets stronger
- * Concentration, ability to cope with stress, and positive self-concept are improved



THE HEART:

Left Side of the Heart

The blood coming from the lungs to the heart collects in the Left Atrium, filling it up.

This initiates a contraction of the walls of the Left Atrium forcing the Mitral Valve to open as the blood gushes into the Left Ventricle.

The Left Ventricle fills with blood which forces the Mitral Valve to close and initiates the muscle of the Left Ventricle to contract, open the Aortic Valve, and squeeze the blood through the Aortic Valve and on to the body.

The blood coming out of the Left Ventricle to the Aorta is under high pressure. This pressure is enough to rush it to the different parts of the body at high velocity and give its oxygen and nutrients to the body tissues. The blood comes back from the body to the right side of the heart.

Right Side of the Heart

The blood coming from the body to the heart collects in the Right Atrium, filling it up. This initiates a contraction of the walls of the Right Atrium forcing the Tricuspid Valve to open as the blood gushes to the Right Ventricle.

The Right Ventricle fills with blood which forces the Tricuspid Valve to close and initiates the muscle of the Right Ventricle to contract, open the Pulmonic Valve and squeeze the blood through the Pulmonic Valve and on to the lungs.

This blood will replenish itself with more oxygen and get rid of the carbon dioxide and return to the left side of the heart to begin another cycle.

Heart Beat and Heart Rate

We call this process of filling and emptying a **heart beat** or a **cycle**, and the number of times it occurs per minute is a **heart rate**, e.g. an adult male heart beats 70 times per minute, or we can say his heart rate is 70/min.

In a newborn baby human, this process of filling and emptying occurs 140 times every minute, if the baby cries it can go up to 200 cycles or beats per minute, and when he is calm or sleeping it goes down to 100 beats per minute.

Fast Heart Beat:

As long as we are alive our heart will continue to beat. As soon as you feel scared your heart starts beating faster and harder preparing you to confront or to run, whatever you desire! When your body gets sick it beats faster to meet your extra energy needs.

Slow Heart Beat:

If you are relaxing it will adjust itself to beat gentler and slower. At the time of sleep it slows. Your heart is so responsive to your needs; it is the only friend that can read your mind and body. The heart is the most alert and greatest computer operating system.

If you are in a deep sleep with a heart rate around 50 beats/minute, and your parents wake you up, telling you there is a fire in the house, your heart rate instantaneously jumps to above 100 beats/minute, and you get up in seconds.

How does the heart accomplish this task?

The heart electric system plays the major role, by generating and conducting an electric signal (electric impulse), it provides the instructions needed, for the pumps to time their actions precisely, as when to empty and when to close.

HOW BLUE BLOOD BECOMES RED:

VEINS (blue, oxygen-poor) vs. **ARTERIES** (red, oxygen-rich)

As the blue blood flows through the main pulmonary artery to the lungs the pulmonary artery branches to smaller and smaller pulmonary arteries and then those branch into very tiny blood vessels called capillaries. The capillaries come around and encircle the walls of the air sacs (*aveoli*).

The aveoli contain high oxygen content and low carbon dioxide content. The blue blood contains low oxygen content and high carbon dioxide content. At the surface of contact with the aveoli, the blue blood releases its carbon dioxide to the air sac and gets oxygen from it and becomes red.

The process of air oxygenation starts with inspiring (inhaling) fresh air which has a high concentration of oxygen and a low concentration of carbon dioxide. The blood coming back from the body (**blue blood**) comes in contact with the wall of the air sac where it gives its carbon dioxide and gets oxygen becoming red. This fresh blood (**red blood**) returns back to the Left Atrium to be circulated to the body.

PROBLEMS WITH THE HEART:

HEART DISEASE - Coronary artery disease is caused by a blockage (fat deposits called plaque) in one of the coronary arteries on the heart. The artery cannot supply enough blood to the heart muscle to meet its needs during exertion. The blockages (plaque) inside the arteries is caused by fatty and cholesterol-filled foods, smoking (atherosclerosis - hardening of the arteries), stress, obesity, heredity, and lack of exercise.

Heart disease is the leading cause of death in the U.S. At some point in your life, you or one of your loved ones will be forced to make decisions about some aspect of heart disease.

HEART ATTACK - A heart attack happens when a coronary artery is completely blocked and no blood or oxygen is getting to the heart muscle served by that artery. This causes death to the heart muscle served by that artery. The muscle will never grow back. This cell death of the heart muscle is called a Myocardial Infarction.

CARDIAC ARREST - Some people think that when you have a heart attack your heart stops beating. This is not correct; although heart attacks can lead to this, the proper term for when your heart stops beating is cardiac arrest.

HEART FAILURE - The inability of the heart to pump out enough blood to meet the needs of the body. If 20-25% of the left side of the heart becomes damaged from a heart attack, heart failure will result. Death usually results if over 40% of the heart has an attack.

ARE YOU AT RISK?

- * Hypertension (high blood pressure)
- * Type II Diabetes
- * High cholesterol
- * Smoking
- * Sedentary lifestyle (lack of exercise)
- * Stress
- * Obesity
- * Being a male
- * Family history of heart disease
- * Older age

PREVENTION:

- * Lower blood pressure
- * Lower cholesterol
- * Control blood sugar in diabetes
- * Quit smoking
- * Healthy eating habits
- * Reduce and relieve stress
- * Maintain a healthy weight
- * Get regular doctor check-ups
- * Don't take drugs
- * EXERCISE!!! 1 hour a day, at least 5 days a week

ANSWER THE QUESTIONS ON THE FRONT PAGE.

NAME _____

HOUR _____

DATE _____

+ _____/30 POINTS

USE THE INFORMATION PROVIDED TO YOU ON THE INFORMATION PAGES.

- 1.) Name **3 steps** blood takes when entering into the lungs and to the left side of the heart (**oxygen-rich blood**) going to the body's muscles (look on **LEFT SIDE OF HEART** section on front page).
 - 1.
 - 2.
 - 3.

- 2.) Name **3 steps** blood takes when coming back from the body and to the right side of the heart (**oxygen-poor blood**) to the lungs (look on **RIGHT SIDE OF HEART** section on front page).
 - 1.
 - 2.
 - 3.

- 3.) What elemental gas in the air that we breathe everyday makes blood the color **RED**? _____

- 4.) **Describe** why are veins blue and arteries red.

- 5.) How can **Heart Disease** eventually lead to a **Heart Attack**? What happens to part of the heart muscle when it suffers from a Heart Attack?

- 6.) What is the phrase used to describe when the **heart stops beating**? _____

- 7.) Feel your pulse with your two fingers under your jaw. Count how many times your pulse/heart beats for 1 minute. Is it above or below the average adult resting pulse (72 BPM)? Record it below. Now, jog around your house or yard for 1 minute. Find your pulse again & record it below.

Resting Pulse _____ **Beats Per Minute (BPM)** **Jogging Pulse** _____ **(BPM)**

- 8.) Why, exactly, does your heart beat faster when you are running as opposed to sitting? Other than your heart beating fast, what else is physically happening to your body?

- 9.) What do you think is the **best** way to make your heart stronger? What exercise would you suggest and for **how long**? What would happen to your heart if you did not exercise at all?

- 10.) What can you do **NOW** to start lowering your chances of having heart problems as an adult?

NAME _____

MRS. JAZWINSKI'S CLASS

ALL ABOUT MY HEART!



- 1.) What is in the air that we breathe everyday that makes our muscles work and that makes blood the color **RED**?

- 2.) Feel your pulse with your two fingers under your jaw. Count how many times your pulse/heart beats for 1 minute.

Write it here: **Resting Pulse** _____ **Beats Per Minute (BPM)**

Now, jog around your house or yard for 1 minute.

Find your pulse again & write it down here: **Jogging Pulse** _____ **(BPM)**

- 3.) Why, exactly, does your heart beat faster when you are running rather than sitting?

Circle three other things that are physically happening to your body.

I AM SWEATING MORE I GET COLDER MY MUSCLES BECOME WARM
I AM BREATHING HARDER MY SKIN TURNS PINK

- 4.) Circle the activities that you think are the **best** way to make your heart stronger.

RUNNING SITTING BIKING SWIMMING EATING JUNK
WALKING READING SLEEPING DRINKING JUMPING ROPE

What would happen to your heart if you did not exercise at all?

Circle all of the right answers and cross out the wrong answers.

GET FATTER HEART DISEASE UNHEALTHY GET STRONGER
GET THINNER BE HAPPIER GET WEAKER PUMP MORE BLOOD

- 5.) What can you do **NOW** to start lowering your chances of having heart problems as an adult? _____

