PE 1- Assignment #3

Name: _____

Per:_____ Date: _____

Teacher:_____

CARDIOVASCULAR FITNESS:

INTRODUCTION:

Of the 5 Components of Fitness, cardiovascular fitness (CVF) is the most important for maintaining your functional health throughout life. Cardiovascular fitness is the ability of the body to work continuously for extended periods of time. If you develop moderate to high levels of CVF, you can reduce your risks for cardiovascular disease, increase your predicted longevity, and help maintain your physical independence. Moderate to high levels of CVF will also increase your energy levels, make you look and feel better, reduce your stress levels, and help you control your weight and body composition. In this unit you will learn about the components that influence CVF, facts about cardiovascular disease, the specific benefits of CVF, and how you can develop moderate to high levels of CVF

Pump, Circulate and Deliver

Cardiovascular Fitness depends on a strong heart, an ability to deliver large amounts of blood to the muscles and organs of the body, and good lung function. You are about to learn more about your heart, lungs, blood, and blood vessels!

Heart: Your heart is a muscle about the size and shape of your fist. It beats at the rate of about 60-80 beats per minute when your body is at rest, pumping about 5 liters of blood per minute (think of 5 1 liter bottles of soda!) The heart is really two pumps in one. The right side of the heart pumps blood to the lungs, and the left side pumps blood to the upper and lower body (see figure 1). During exercise, your heart rate (pulse) increases in response to your body's need for more blood. Your working muscles, tissues, and organs need blood to supply them with oxygen and other nutrients.

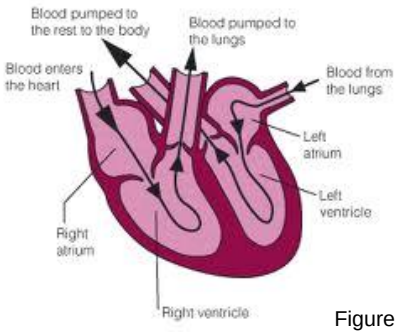


Figure 1

Your heart's ability to supply oxygen to your working muscles and organs is the major factor that determines your level of CVF. Oxygen, which is delivered by the blood, helps your cells produce the energy necessary for you to meet the demands of physical activities and exercise. As the demand for oxygen, and therefore blood, increases with increasing physical work, your heart must be able to meet this demand or you will quickly get tired.

At maximal or "exhaustive" levels of exercise, your heart can beat at a rate that can be estimated by subtracting your age from 220 (for boys) or from 226 (for girls). For example, if you are a 17 year old girl, your maximum heart rate would be approximately (226-17) 209 beats per minute. Also as you reach maximal levels of exercise, your heart beats more strongly. Therefore, you can pump even more blood per minute (about 20 liters per minute).

BELIEVE IT?... Or Not?

Your heart beats over 100,00 times a day and over 40 million times a year!

Following a session of normal cardiovascular activity, your heart gradually returns to resting levels. This is called your ***recovery heart rate***(see figure 2) Your recovery heart rate should drop back towards normal levels within 5-10 minutes of finishing the exercise session. A general rule of thumb is that your heart rate should be 120 beats per minute or lower within 10 minutes of cardiovascular conditioning. If it's higher than 120 beats per minute, either you are working too hard or your CVF level is too low.

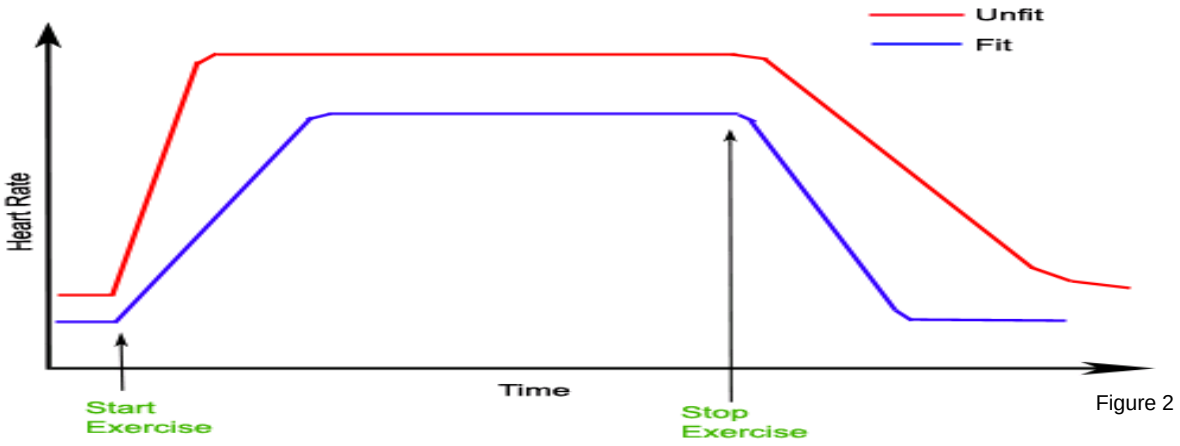


Figure 2

By engaging in regular physical activity or exercise, you can condition your heart to become more efficient at rest as well as during exercise. After 8 to 30 weeks of conditioning, your resting heart rate will be much lower than it was before conditioning. It could drop from 72 to 60 beats per minute! The extra conditioning causes the nerves that control your heart rate to adapt to make your heart more efficient. Your heart will also beat with greater force if you begin and maintain a conditioning program. Your heart will be able to pump with greater force both while you are at rest and during exercise. This means that you can pump even more blood (and oxygen) to your muscles and tissues, possibly as much as 5 liters more than your maximum before you began conditioning.

Lungs: Your lungs exchange oxygen and carbon dioxide during rest, as well as during exercise. If your lungs are healthy, you can breathe about 6 liters of air per minute at rest and up to 100 liters of air per minute during vigorous exercise. When you move air through your lungs, you can get more oxygen into your blood and to your body. You can also remove carbon dioxide from your body more effectively. If your lungs have been damaged (for example by smoking), it reduces your ability to breathe large amounts of air, which would result in a lower level of CVF than those with healthy lungs.

With cardiovascular conditioning, you improve your ability to breathe large amounts of air. Following several weeks of cardiovascular conditioning, the muscles that you use to breathe (diaphragm, intercostals, and the abdominal muscles) do not fatigue as easily.

During exercise, the air passages in your lungs relax and open up so that you can move more air to meet the demands for oxygen in your muscles and other tissues. When some people engage in exercise, their air passages constrict instead of relax. These people often have trouble moving large amounts of air and may even get very short of breath. This is very often the case with asthma sufferers.

DID YOU KNOW? **Someone who doesn't exercise much often gets a "sideache" during cardiovascular activity. This type of problem usually goes away after a few weeks of regular physical activity as the muscles that control breathing become conditioned**

Blood and Blood Vessels: Your blood and blood vessels are important to your CVF.

Hemoglobin is an iron rich compound in your blood that helps carry oxygen from your lungs to your muscles, tissues, and organs. Hemoglobin levels can increase with cardiovascular training, which results in more effective delivery of oxygen to your body. Your blood also carries carbon dioxide from the cells of your muscles, tissues, and organs back to the lungs so the carbon dioxide can be removed from the body (when you exhale). Your blood contains additional substances needed for good cardiovascular health (for example, the substances that help keep your blood from clotting inside your blood vessels).

The arteries, capillaries, and veins are blood vessels that, along with the heart, make up the circulatory system. ***Arteries*** carry blood away from the heart and branch out to supply the muscles, tissues, and organs of the body with oxygen and other nutrients. Blood moves through the arteries to the ***capillaries***, which are near the cells of the body. The small capillaries deliver oxygen and other nutrients to the individual muscle, tissue, and organ cells. The blood from the capillaries is then collected in the ***veins*** and carried back to the heart (see figure 3). The veins have a series of one-way valves that cause blood to move back towards the heart. When the muscles in your body (especially your legs) contract, they squeeze the veins to help blood move back to the right side of your heart. This action is called the muscle pump by doing your cardiovascular cool-down, you can prevent blood from pooling by activating the muscle pump. Therefore you are less likely to feel dizzy after a vigorous cardiovascular exercise!

Your blood vessels are also important because they help you shift blood around in your body during exercise. When you are at rest, much of your blood is in the large veins of your lower stomach area and legs. During exercise, you must be able to shift blood quickly from the large veins to the arteries that deliver blood to the muscles, tissues, and organs. You do this by increasing your heart rate, by constricting the blood vessels in some areas of your body and by relaxing blood vessels elsewhere. This constricting and relaxing of blood vessels in controlled by nerve activity that your body does automatically- you do not even need to think about it. However, you can improve your ability to shift blood by increasing your CVF level.

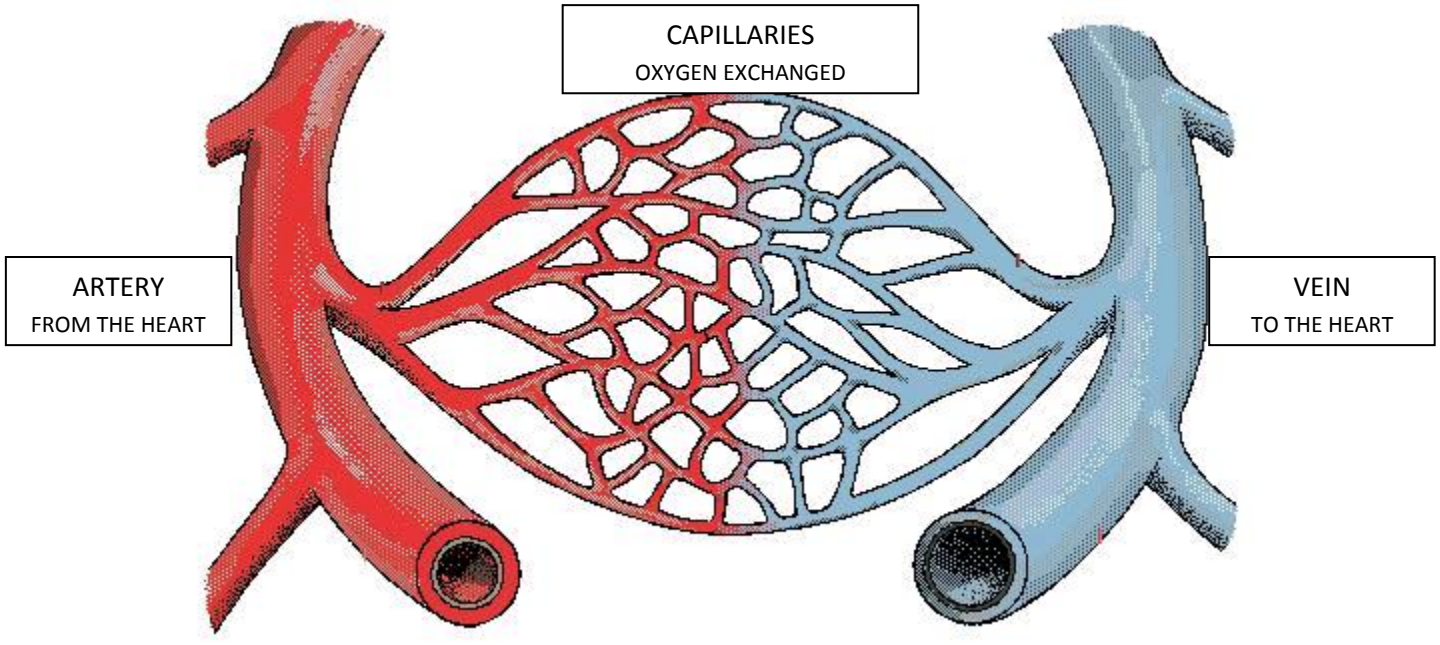


Figure 3

PE 1- Assignment #3a

Name: _____

Per:_____ Date: _____

Teacher:_____

Leave In/Leave Out

Text: _____

1. **Your group will read the assigned text and highlight ALL information you decide is important.**
2. **All groups will present their findings**
3. **Class will highlight entire text based on group findings and number each statement.**
4. **Your group will read and evaluate each numbered statement and decide whether it to "Leave In or Leave Out" that information. Place your findings in the appropriate place on the chart.**
5. **Class will discuss findings and chart results**
6. **You will summarize the text.**

Ideas to Leave In	**Ideas to Leave Out**
Criteria	**Criteria**
New Information Interesting Facts Repeated Multiple Times	Information I already know Similar to something we already recorded Not related to the topic
Summary of Text	

PE 1- Assignment #3b

Name: _____
Per:_____ Date: _____
Teacher:_____

FLIP IT: Find definitions or descriptions for the following types of Heart Rates. Make sure you use credible/trusted resources. Be ready to share your information during the next class period.

- Heart Rate

Calculating Heart Rates Reference Chart						
Measure for:	6	10	15	20	30	60
Multiply by:	10	6	4	3	2	1

- Resting Heart Rate

- Maximal Heart Rate (include formulas)

- Target Heart Rate Zone (include formulas)

- Recovery Heart Rate

RESTING HEART RATE

Your resting heart rate is the heart pumping the lowest amount of blood you need because you're not exercising. If you're sitting or lying and you're calm, relaxed and aren't ill, your heart rate is normally between 60 (beats per minute) and 80 (beats per minute).

But a heart rate lower than 60 doesn't have to be a sign of a medical problem. A lower heart rate is common for people who get a lot of physical activity or are very athletic. Active people often have lower heart rates because their heart muscle is in better condition and doesn't need to work as hard to maintain a steady beat. Measure your resting heart rate using the same method used for finding your heart rate. This measurement should be taken when your body is at REST. Best time to measure your Resting Heart Rate is as soon as you wake up in the morning. If you are taking this measurement during class, try to relax for a few minutes before you find your pulse. This will help you to find an accurate reading of your resting heart rate.

RESTING HEART RATE:_____ b.p.m

HOMEWORK: Calculating Your Target Heart Rate

Purpose: To identify a target heart rate zone which is a safe and comfortable level of overload that should be maintained to achieve an ideal training effect.

Procedures for finding your heart rate:

1. Find your pulse using the carotid artery (on the neck) or the brachial artery (on the wrist). Be sure not to use your thumb because it is possible to feel the pulse there also. Be sure to sit quietly and relaxed in order to get an accurate assessment of your heart rate.

2. Count the number of times your heart beats in fifteen seconds. You then multiple that number by 4. This will give you the total number of heart beats per minute.

Procedures for finding Maximum Heart Rate (MHR) and Target Heart Rate (THR):

1. You must first obtain your **MHR**.
   You will subtract your age from 220 (boys) and 226 (girls) and this will give you your MHR.

BOYS: **220-_____(age)= _____YOUR MHR**

GIRLS: **226-_____(age)= _____YOUR MHR**

2. Heart Rate Reserve: Subtract your Resting Heart Rate (RHR) from your MHR (above)

(MHR)-(RHR)= YOUR Heart Rate Reserve (HRR)

Do the math: _____ - _____=_____

see above

3. Target Heart Rate Zone: Multiply your HRR by the overload percentage at which you want to work then add the RHR back into the equation. This will give you the lower limit of your Target Heart Rate Zone**.** The lower limit is 60% for training effect and a safe upper limit is 80%.

Example of 60%: HRR x .60+ RHR = **lower limit at 60%**

Example of 85% HRR x .80 =RHR = **upper limit at 80%**

3. **Do the math**: Calculate YOUR Target Heart Rate ZONE

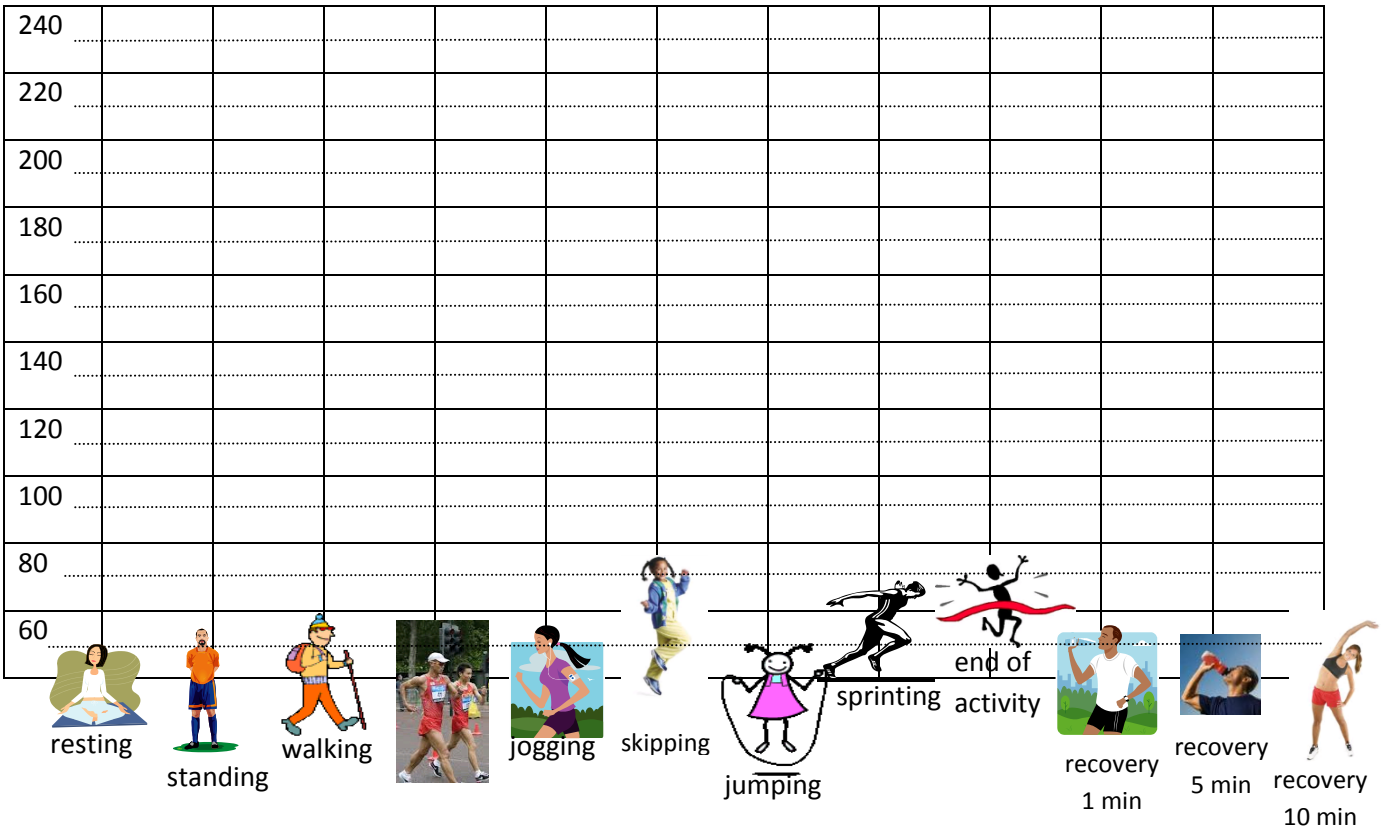
Lower Limit Your HRR _____ x .60 + RHR = _____bpm **(THR low end at 60%)**
Upper Limit Your HRR_____ x .80 + RHR = _____bpm **(THR high end at 80%)**

Your Target Heart Rate ZONE _____bpm - _____ b.p.m

(lower limit) (upper limit)

How Exercise Affects Your Heart Rate

Your THR zone: _____bpm- _____bpm (from your homework page)



1. With your pencil- Shade the area of the graph which corresponds with YOUR target heart rate zone

2. **Measure** your heart rate after each activity and **PLOT** it on the graph above.

3. Complete the chart showing which activities fell into your THR, which were below and which were above. For activities outside of your THR- try to figure out why? (Do not include resting, standing, or recovery heart rates.)

In the Zone:

Out of the Zone	Why?

4. What changes could you make to get more of the activities into your target heart rate zone?

5. How does your heart change with cardiovascular conditioning to make it more efficient at rest, as well as during exercise?