MiSP HUMAN PHYSIOLOGY WORKSHEET #3
CARDIAC RECOVERY TIME

Name _____   Date_____

Key Question: How much time does it take for a person's heart to return to its resting heart rate after vigorous exercise?

Safety – In this lab, you will be exercising to increase your heart rate. DISCUSS WITH YOUR TEACHER ANY HEALTH CONDTIONS THAT YOU HAVE THAT MAY BE A REASON TO NOT PARTICIPATE IN THE EXERCISE ACTIVITIES. Be careful when exercising. Follow your teacher's instructions for safe exercise.

Introduction

The circulatory system functions to deliver oxygen and nutrients to all parts of your body for growth and respiration and to remove metabolic wastes. The heart pumps blood through a circuit that includes arteries, arterioles, capillaries, venules, and veins. One important circuit is the pulmonary circuit where there is an exchange of gases within the alveoli of the lung. With increased exercise several changes occur within the circulatory system to increase the delivery of oxygen to actively respiring muscle cells.

Earlier in this unit you practiced measuring your heart rate by finding and counting your pulse. Today you will first determine your resting heart rate. You will then vigorously exercise. At the conclusion of your exercise, you will measure your elevated heart rate. At regular intervals, you will measure your heart rate until it returns to your resting heart rate. The time needed after exercise for your heart rate to return to its resting heart rate is called heart rate recovery time.

Procedure – Students may work in pairs or individually

Determining resting heart rate:
1. Sit at ease for two minutes.
2. Take your pulse. (Or your partner can take your pulse.) Count the number of beats for 15 seconds and multiply by 4.   Do this three times. Record this data in the data chart on the next page.
3. Calculate the average of three pulse measurements. This is your resting heart rate.

RESTING HEART RATE

TRIAL	BEATS IN 15 SECONDS	X4 BEATS PER MINUTE
1		
2		
3		

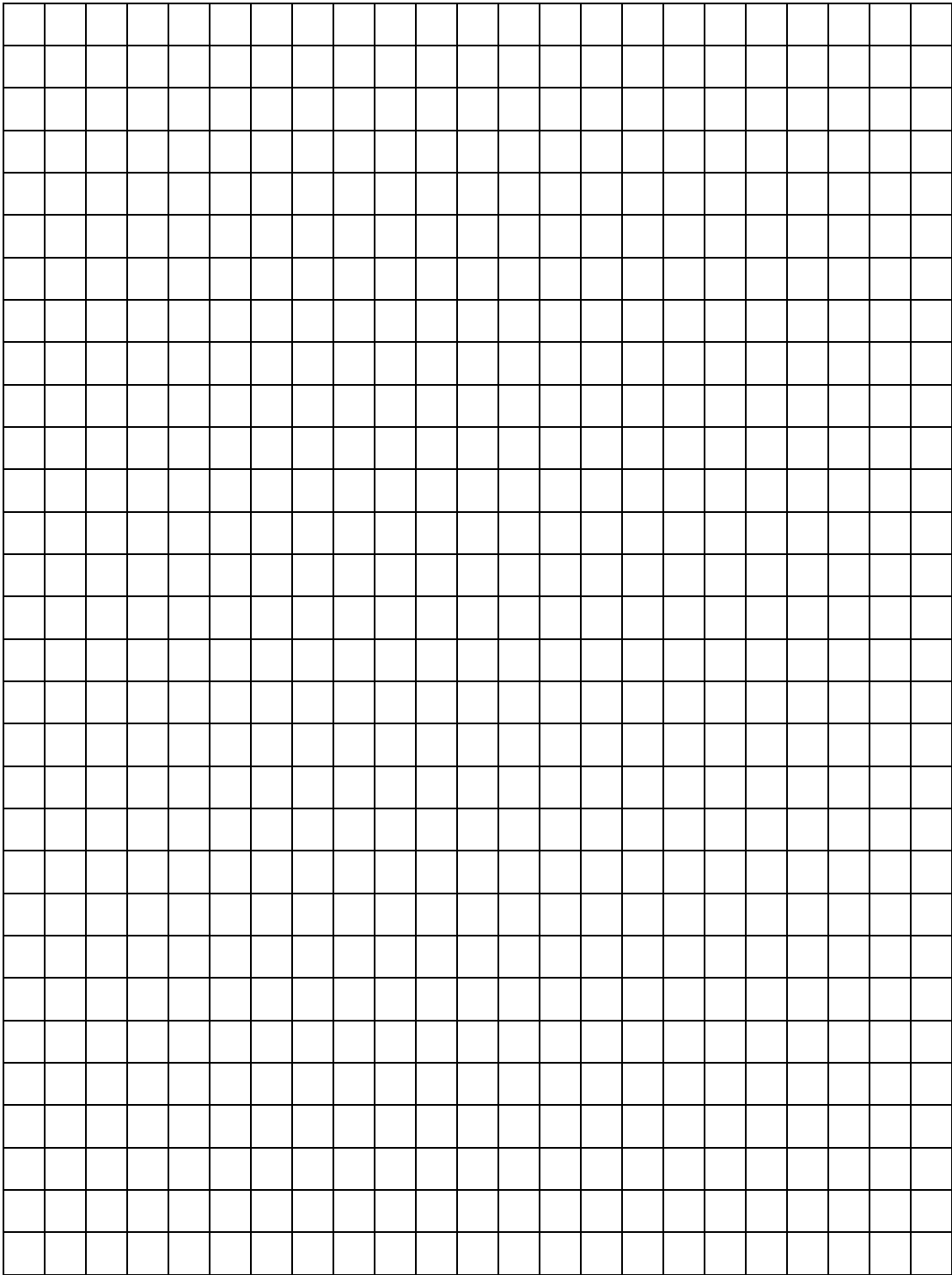AVERAGE/RESTING HEART RATE = _____

Heart Rate Recovery Time:
1. Work with a partner. Take turns exercising and recording data.
2. Exercise vigorously for two (2) minutes. Exercise may consist of jumping jacks, running in place, energetic dancing, etc. Your teacher will tell you what exercises are permitted and the safety rules.
3. Immediately upon the completion of this exercise, sit down and measure your pulse for 15 seconds and record the count in the data chart below. This will be your zero (0) time after exercise measurement. Multiply each 15-second count by four to get the heart rate per minute. Remain seated and measure the pulse rate every one-half minute (30 seconds) until the pulse rate returns to your resting heart rate (within 5 beats per minute).
4. Compare your heart rate recovery time (minutes) with other students' data in the class.

Data:

Time (minutes) after exercise	Beats per 15 seconds	X 4 Beats per minute
0		
.5		
1		
1.5		
2		
2.5		
3		
3.5		
4		
4.5		
5		
5.5		
6		
6.5		
7		
7.5		
8		
8.5		
9		
9.5		

Graph the data on the next page to show the relationship between time (minutes) and heart rate (beats per minute)

- Label the X axis with time (minutes). Is this the dependent or the independent variable? _____
- Label the Y axis with heart rate (beats per minute) . Is this the dependent or the independent variable? _____
- Draw a best fit line of your data
- Give your graph a title

Discussion

1. How many minutes did it take your heart rate to decrease to the resting heart

   rate after exercise? _____

2. How did your results compare to other students'?

   _____

3. Study the graph below, then answer the associated questions. You can assume that resting heart rate is equal to the heart rate in the flat part of the curve at the later times after exercise.

Cardiac Recovery After Exercise
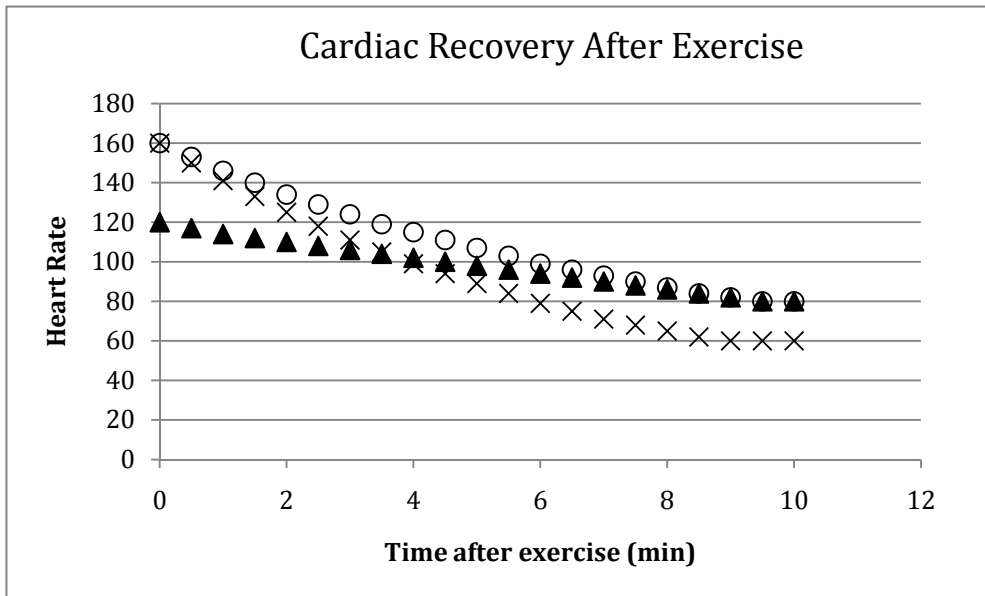
   a. Which student has the fastest recovery to resting heart rate after

      exercise? _____

   b. Student 1 and student 3 have the same resting heart rate and their heart rates return to the resting rate at about the same time, why do the curves look different?

      _____

      _____

      _____

4. Suppose two students had the same resting heart rate and the same post-exercise heart rate but the first student's heart took longer to recover from exercise. How would lines showing the two students' heart rate recovery differ?

_____

_____

5. Calculate the average heart rate recovery for Students 1-3 using the data table below.

Student	Exercise Heart Rate (beats/min)	Resting Heart Rate (beats/min)	Time needed for heart rate to return to resting level after exercise (min)
1	165	80	8
2	170	70	7
3	125	80	8

Average heart rate recovery =   <u>Exercise heart rate – Resting heart rate (bpm)</u>
                                    Time needed for recovery to resting heart rate (min)

Student	Difference between exercise and resting heart rate (bpm)	Time needed for recovery (m1n)	Average heat rate recovery (bpm/min)
1			
2			
3			

6. What are three (3) factors that may affect the length of a person's cardiac recovery time after exercise? For each one you list, explain how that factor affects cardiac recovery time

1. _____

   _____

2._____

   _____

3. _____

   _____