Name _____

Partner _____

Per._____

Work of Muscles

Introduction:
Muscles are attached to bones. As muscles contract they move the bones to which they are attached. This is a basic type of work accomplished by the human body. As muscles are used, lactic acid builds up, resulting in burning and fatigue.

Purpose:
To determine how much work a muscle can do before muscle fatigue occurs.

Materials:
Watch with a second hand *Graph paper* *Tennis ball*

Procedure:
1. Perform this investigation with a partner. Designate one laboratory partner to observe and record while the other performs the experiment then switch roles.

Number of Muscle Contractions (Squeezes) in 10-Second Intervals

Time	Trial 1	Trial 2	Trial 3
1st 10 sec.			
2nd 10 sec.			
3rd 10 sec.			
4th 10 sec.			
5th 10 sec.			
6th 10 sec.			
7th 10 sec.			
8th 10 sec.			
9th 10 sec.			
10th 10 sec.			
11th 10 sec.			
12th 10 sec.			
13th 10 sec.			
14th 10 sec.			

2. **Experimenter:** Place a tennis ball in your left hand if you are right handed, or in your right hand If you are left handed. Squeeze the ball rapidly and as hard as possible at a steady pace, until complete fatigue is experienced in the muscles of your hand and forearm.

3. **Recorder:** Count and record the **number of squeezes for every 10 seconds**.
4. Allow the experimenter to **rest for 30 second between intervals** and repeat the procedure for two more trials.
5. Record the data in the chart provided. Some spaces may be left blank.
6. Switch roles with your partner and repeat the procedure.
7. Plot the results of your three trials on a *line graph*. **Be sure to include a *title* and *labeled axis*.**

<u>Analyses and Conclusions</u>:
1. How are the three trials different from one another?

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2. Account for any differences in the amount of work done by the muscles during the three trials. Perhaps you should focus on warming-up or muscle fatigue occurring during the lab.

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3. How does the work done in the muscles of your hands and arms relate to the work done by the muscle of your heart? Focus your discussion on skeletal muscle physiology vs. cardiac muscle physiology, and fatigue. (refer to your text for help- chapter 10)

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<u>Extension</u>:
Compare the graphs of the athletes and non-athletes, or male vs. female in your class. Perhaps a comparison of strength and fatigue between subjects? (Indicate the names of subject's for who are being compared)