**Muscle Fatigue Lab** Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Purpose: To determine how long it takes for your muscles to become tired and full of lactic acid.

Materials: Partner, test tube clamp, clock or watch, graph paper, pencil

Procedure: You will be assigned a partner. Each person will have one job. After you have finished all 20, 10-second trials, switch jobs.

Job 1 Squeezer 1. Pinch the test tube clamp together in your non-writing hand as many times as possible. Count the number silently. When timer says “time”, tell him/her the number of times you squeezed the clamp together in each 10 second trial.  
 Job 2 Timer 1. Say “start” and after 10 seconds say “stop”. Record the number the squeezer shouts in the data table below. Immediately start the next trial.

|  |  |  |  |
| --- | --- | --- | --- |
| Trial # | Squeezer #1 , # of squeezes | Trial # | Squeezer #2 , # of squeezes |
| 1 |  | 1 |  |
| 2 |  | 2 |  |
| 3 |  | 3 |  |
| 4 |  | 4 |  |
| 5 |  | 5 |  |
| 6 |  | 6 |  |
| 7 |  | 7 |  |
| 8 |  | 8 |  |
| 9 |  | 9 |  |
| 10 |  | 10 |  |
| 11 |  | 11 |  |
| 12 |  | 12 |  |
| 13 |  | 13 |  |
| 14 |  | 14 |  |
| 15 |  | 15 |  |
| 16 |  | 16 |  |
| 17 |  | 17 |  |
| 18 |  | 18 |  |
| 19 |  | 19 |  |
| 20 |  | 20 |  |

Graph the data below using a line graph. Title:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

1. Looking at your graph, what trends do you notice?

2. **Scientifically explain WHY** the overall trend was downward. In other words, why weren’t you able to do as   
 many in later trials as you did in earlier trials.

3. How did your squeezing hand and arm feel towards the end of your trials?

Information: When you work your muscles a lot in a short amount of time, your muscles cannot get the oxygen they need for the aerobic respiration. Insead, your muscles undergo anaerobic respiration and produce lactic acid. When the lactic acid builds up, you get a burning sensation followed by pain in the that muscle. With this information, answer the following questions:

4. By looking at your results, pinpoint the trial number (or trial range) when you think you first had a lot of lactic acid build-up. How do you know?

5. What was the independent variable in this experiment? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. What was the dependent variable in this experiment? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7. Write the equation below for the reaction that was happening in your muscles during this lab.

8. From an energy perspective, why can you perform aerobic activities for much longer than you can perform   
 anaerobic activities. EXPLAIN from an ENERGY perspective!