**Muscle Fatigue**

**Purpose**: To determine how long it takes for your muscles to move from aerobic respiration to anaerobic respiration for energy.

**Materials**: A partner, a tennis ball/clothespin/test tube holder, a clock or watch, graph paper, pen/pencil.

**Procedure**: You will work with a partner. Each person will have one job. After you and your partner have finished, switch jobs with each other. **Each person should record their own data in a data table.**

**Jobs:**

**Squeezer**

1. Grasp the clothespin/test tube holder in between your pointer finger and thumb in your non-writing hand.
2. Squeeze without stopping. Count your Squeezes while your partner times 10 seconds. NEVER STOP SQUEEZING DURING THE DATA COLLECTION!! Record your count then start squeezing again for the next round of 10 seconds.

**Timer**

1. As the squeezer is squeezing the clothespin/test tube holder, time 10 seconds
2. Pause only briefly for the squeezer to write their number of squeezes.
3. Start timing again as soon as possible.
4. Repeat steps 1-2 until the table is complete for all 10 rounds.
5. **Do not allow resting between each trial. Try to being the next 10 seconds as soon as possible.**

**Results/Data**: Re-create your data table on your own paper.

Table 1. The number of squeezes over time.

|  |  |  |  |
| --- | --- | --- | --- |
| Round | Number of Squeezes | Round | Number of Squeezes |
|  1 |  | 6 |  |
| 2 |  | 7 |  |
| 3 |  | 8 |  |
| 4 |  | 9 |  |
| 5 |  | 10 |  |

**When your data is complete, graph your results.**

**Conclusion:**

**Academic use complete sentences / Honors write a paragraph that answers all questions.**

1. What happened to the number of squeezes over time?
2. How did your squeezing hand and arm feel towards the end of your squeezing-time period?
3. *Information*: When you work your muscles a lot in a short amount of time, your muscles cannot get the oxygen they need for aerobic respiration. Instead, your muscles undergo anaerobic respiration so they can continue to function and produce lactic acid as a byproduct. When the lactic acid builds up, you get a burning sensation followed by pain in that muscle. With this Information, answer the following questions:
4. By looking at your results, pinpoint when you first had a lot of lactic acid build up. How do you know?

 B. Approximately how long does it take for the burning feeling to disappear?

1. Do you think your results would be different if you held your breath while

 you were squeezing? Explain.

 4. Honors only: Design a similar experiment that would answer this question: How long does it take for lactic acid to build up in your thigh muscle? Don’t forget to include how you would test this and what data you would record.