Name _____ Date _____ Period _____

EFFECT OF EXERCISE ON CO_2 PRODUCTION

PURPOSE:

The purpose of this lab is for students to observe how exercise affects the body's ability to produce carbon dioxide.

PRE-LAB NOTES:

Students will exercise and then blow into a flask of water. Carbon dioxide will be measured indirectly. In other words, students will not actually be measuring the amount of carbon dioxide released by the lungs. After blowing into the water, the CO_2 will react with the water to form carbonic acid. Students will use the Vernier pH probe to record the level of carbonic acid in the water. There is a direct relationship between the amount of CO_2 and the amount of carbonic acid.

HYPOTHESIS:

_____

_____

_____

MATERIALS:

125 mL flask
125 mL water
straw
Vernier pH probe
LabQuest

PROCEDURE:

1. Pour 125 mL of water into a 125 mL flask. Use the Vernier probe and the LabQuest to record the initial pH. Record your data using 2 decimal points.

2. Decide if you are going to exercise by performing jumping jacks or running sprints. You are not allowed to change your exercise after beginning the experiment.

3. Exercise for 1 minute.

4. Immediately blow into the flask of water using the straw. Breathe as hard as you can for 15 seconds. Swirl the flask a few times to allow the carbon dioxide to diffuse and react with the water to form carbonic acid.

5. Place the pH probe into the flask. Wait 15 seconds and then record the pH using 2 decimal points.

6. Exercise for 2 minutes. Repeat steps 4 and 5.

7. Exercise for 3 minutes. Repeat steps 4 and 5.

8. Exercise for 4 minutes. Repeat steps 4 and 5.

9. Exercise for 5 minutes. Repeat steps 4 and 5.

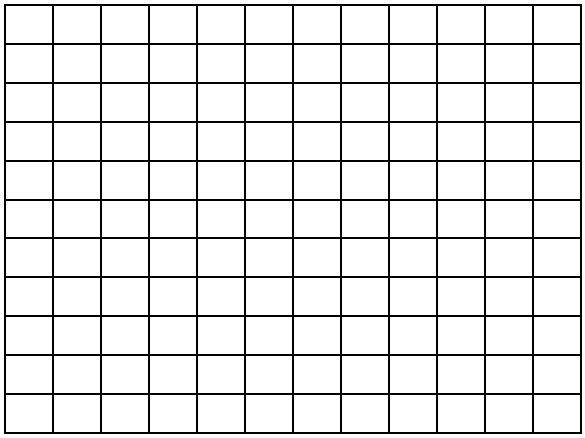
RESULTS:

Data Table #1: _____

# of Minutes of Exercise	pH
0	
1	
2	
3	
4	
5	

Data Table #2: _____

(Remember to include a label and units for the X and Y axes)



ANALYSIS QUESTIONS:

1. Describe the relationship between exercise and carbon dioxide production. Explain using CLAIM → EVIDENCE → REASONING.

2. Identify the relationship between exercise and pH as either *direct* or *inverse*. Explain your answer.

3. Identify the relationship between pH and carbonic acid as either *direct* or *inverse*. Explain your answer. Recall that a pH of 7 is neutral.

4. What was the purpose of recording the pH before you exercised?

5. Why was it necessary to exercise the same way for each trial during the experiment?

6. During this lab, you exhaled CO_2 as you exercised. During which phase of cellular respiration is carbon dioxide produced? Provide a brief explanation of what happens during this phase.

7. Why is it a ***complete and utter lie*** to say that humans convert oxygen into carbon dioxide? Use your lecture notes on the three stages of cellular respiration to answer this question. HINT: What does "oxygen is the final electron acceptor" mean? Compare that to your answer to question 6.

QUESTIONS TO HELP YOU WITH YOUR LAB REPORT:

1. Identify the independent variable, dependent variable, and control group for this lab.

2. Was your hypothesis correct? Explain using CLAIM → EVIDENCE → REASONING.

3. Identify 1 or 2 sources of error for this lab. Explain your answer(s).

4. Identify 1 or 2 ways to improve this lab. Explain your answer(s).