LAB # ____The Effect of pH on Living Things

Lab Instructor _____ Name_____
Date_____ Period_____

Objective: To investigate how pH affects the heart rate of *Daphnia*

******Use full sentences when answering all questions******

Pre-Lab

1. a. What is a *Daphnia*? Include the scientific name and classification:
   b. What is a common use of *Daphnia*?

2. State two common examples of each of the following:
   a. An acid:

   b. A base:

LAB ----------

Materials

Daphnia culture, petri dish, microscope, depression slide, wide mouthed eyedropper, stopwatch, paper towel, various solutions of differing pH values, acid/base indicator

Procedures and Observations

A. Calculating the normal heartbeat rate

1. Remove four to five *Daphnia* from the container and place them in the petri dish.
   a. Use the dropper to transfer one *Daphnia* to a clean depression slide.
   b. Remove excess water so that the *Daphnia* is contained in a small field.

2. Observe the slide using the 10X objective to locate the *Daphnia*.
   a. With the help of your partner, count the number of heartbeats that occur within 10 seconds.
   b. Repeat your count at least three more times.
   c. Give a title to Table 1 and record all information on it.

TABLE 1: _____

TRIAL #	BEATS PER 10 SECONDS	BEATS PER MINUTE
1		
2		
3		
4		
AVERAGE		

B. Effect of pH

1. Use the acid/base indicator to select a **low pH**, acidic solution.
   a. Write the name and pH of the selected solution here:

   b. Write your prediction for the effect of the solution on the heart rate of the *Daphnia*.

   c. Why did you make this prediction?

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2. Add one drop of the acidic solution to the *Daphnia* under the microscope.
   a. Wait a few seconds for the acid to take effect.
   b. Determine the average number of beats per minute of the *Daphnia*'s heart.
   c. Give a title to Table 2 and record all information on it.

TABLE 2: _____

TRIAL #	BEATS PER 10 SECONDS	BEATS PER MINUTE
1		
2		
3		
4		
AVERAGE		

3. Put a fresh Daphnia on a clean depression slide.
4. Use the acid/base indicator to select a **high pH**, acidic solution.
   a. Write the name and pH of the selected solution here:

   b. Predict the effect of the solution on the heart rate:

   c. Why did you make this prediction?

5. Add one drop of the solution to the *Daphnia* under the microscope.
   a. Wait a few seconds for the base to take effect.
   b. Determine the average beats per minute of the *Daphnia*'s heart.
   c. Give a title to Table 3 and record all information on it.

TABLE 3: _____

TRIAL #	BEATS PER 10 SECONDS	BEATS PER MINUTE
1		
2		
3		
4		
AVERAGE		

6. Clean up and wash your hands before leaving the lab.

CONCLUSIONS (Cite collected data to support your answer)

1. Why is it important to take several readings to get an average heartbeat?

2. How did the average heartbeat in low pH acid compare to that in only water? Why?

3. How did the average heartbeat in high pH acid compare to that in only water? Why?

4. Why was it necessary to get an average heartbeat using water only?

5. State two conclusions about the effects of pH on the heartbeat of *Daphnia*. **State the information that you used to draw these conclusions.**

6. Which acidic solution would have the most negative effect on organisms living in a lake? Why?