Ecology Unit Name_____ Period _____

THE RELATIONSHIP BETWEEN TEMPERATURE AND METABOLIC RATE

III. PROCEDURES

Using a single sheet of your own graph paper, plot "Temperature" on the x-axis and "O_2 Consumption" on the y-axis. Calibrate your x-axis to run from $0^{O}C$ to $70^{O}C$, and your y-axis from 0 to 7000 $ml\ g^{-1}\ h^{-1}$.

IIII. DATA

Temperature ^{O}C	O_2 Consumption $ml\ g^{-1}\ h^{-1}$
10	105
12.5	130
15	160
17.5	185
20	210
22.5	262
25	320
27.5	370
30	420
32.5	525
35	640
37.5	740
40	840
42.5	1050
45	1280
47.5	1480
50	1680

V. ANALYSIS OF DATA

1. What does "$ml\ g^{-1}\ h^{-1}$" mean, in words?
2. Write a few sentences describing the general meaning of your graph.
3. What happens to metabolism as the environmental temperature increases?
4. Define: metabolism.
5. What are the two general types of reactions that are part of metablolism?
6. List and describe at least two specific biochemical processes that are examples of metabolic processes.
7. Using the data, calculate how many times greater the metabolic rate is:
   a) at $20^{O}C$ than at $10^{O}C$, b) at 30 ^{O}C than at 20 ^{O}C, c) at 40 ^{O}C than at 30 ^{O}C.
8. What happens to metabolic rate with every $10^{O}C$ increase in temperature?
9. Extrapolate your graph and fill-in the O_2 Consumption $ml\ g^{-1}\ h^{-1}$ numbers that correspond with:
   a)$0^{O}C$ b)$60^{O}C$ c)$70^{O}C$
10. Write a short essay explaining, in detail, the effects of environmental temperature on some of the specific life processes you listed in question 6.
11. What should happen to the amount of food required by an organism if the environmental temperature
    (a) drops $10^{O}C$? (b) increases $10^{O}C$?
12. Why is temperature considered the most important environmental factor governing the distribution of life on earth?
13. Suppose we had a bowl full of goldfish. Design an experiment which would test the relationship between temperature and metabolic rate. List your materials and methods as in any typical lab. report

optional bonus outside research: (2 points)

14. Research Van't Hoffs Rule. Cite your source. Only one bonus winner per source.