OPHS Biology Name: _____

Unit 2 Topic 4: Enzymes

Graphing Activity- Solving the Digestive Enzyme mix up!

Materials: graph paper
colored pencils

Background

You are the head of a biological research team that has been gathering data about the various life forms living in or near an alkaline* hot spring in Arkansas. You have just returned from having been at the alkaline hot spring site for many weeks. It is now time to get down to some serious research and analyze the data you've collected.

Things seem to be going well when suddenly you discover the labels on three of your collection bottles have come off during shipment. You remember that you collected three different digestive enzymes in these bottles. You also remember collecting one of the enzymes from a group of bacteria that live right in the middle of the alkaline hot spring. The other two enzymes came from the digestive tract of a strange little mammal called a Mondoni, which lives at the edge of the spring.

You realize that if you go ahead and analyze the enzymes, you may find out which enzymes belong to what creature. You re-label the bottles A, B and C and begin your analysis.

Procedure

1. Clearly label your graphs **with proper titles** and **correct/specific x- and y-axis labels**.
2. Using graph paper and the data table provided, plot the graphs of each enzyme.
    - **Plot all three enzymes on the same graph, using a different colored pencil for each enzyme (include a KEY)**
    - There should be two graphs for each enzyme.
    - Use smooth, flowing lines to connect the points on your graphs.
    - When you have finished your graphs, answer the questions in the analysis section.

pH vs. % Enzyme Activity

pH	Enzyme A	Enzyme B	Enzyme C
1	0	0	0
2	100	0	0
3	75	0	0
4	50	8	0
5	23	22	0
6	7	70	0
7	0	95	0
8	0	100	0
9	0	97	8
10	0	76	18
11	0	20	35
12	0	8	60
13	0	0	90
14	0	0	0

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Temperature vs % Enzyme Activity

Temperature (Degrees Celsius)	Enzyme A	Enzyme B	Enzyme C
0	5	0	0
5	13	0	0
10	26	10	0
15	38	22	0
20	50	38	0
25	65	54	0
30	84	79	0
35	97	97	5
40	100	100	12
45	30	80	23
50	0	20	37
55	0	0	58
60	0	0	80
65	0	0	98
70	0	0	100
75	0	0	90
80	0	0	22
85	0	0	3
90	0	0	0
95	0	0	0
100	0	0	0

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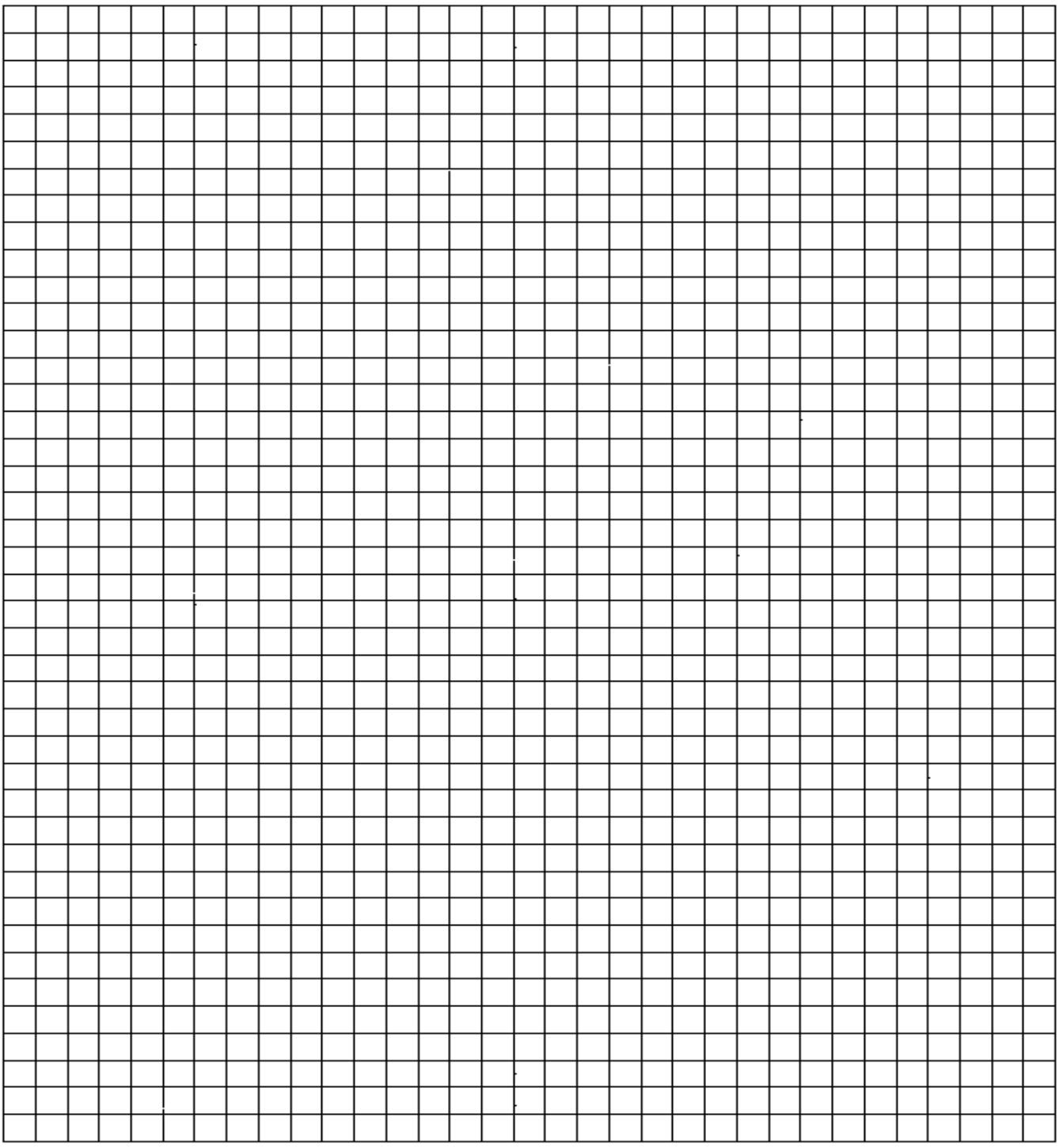
Graph #1 Title: _____



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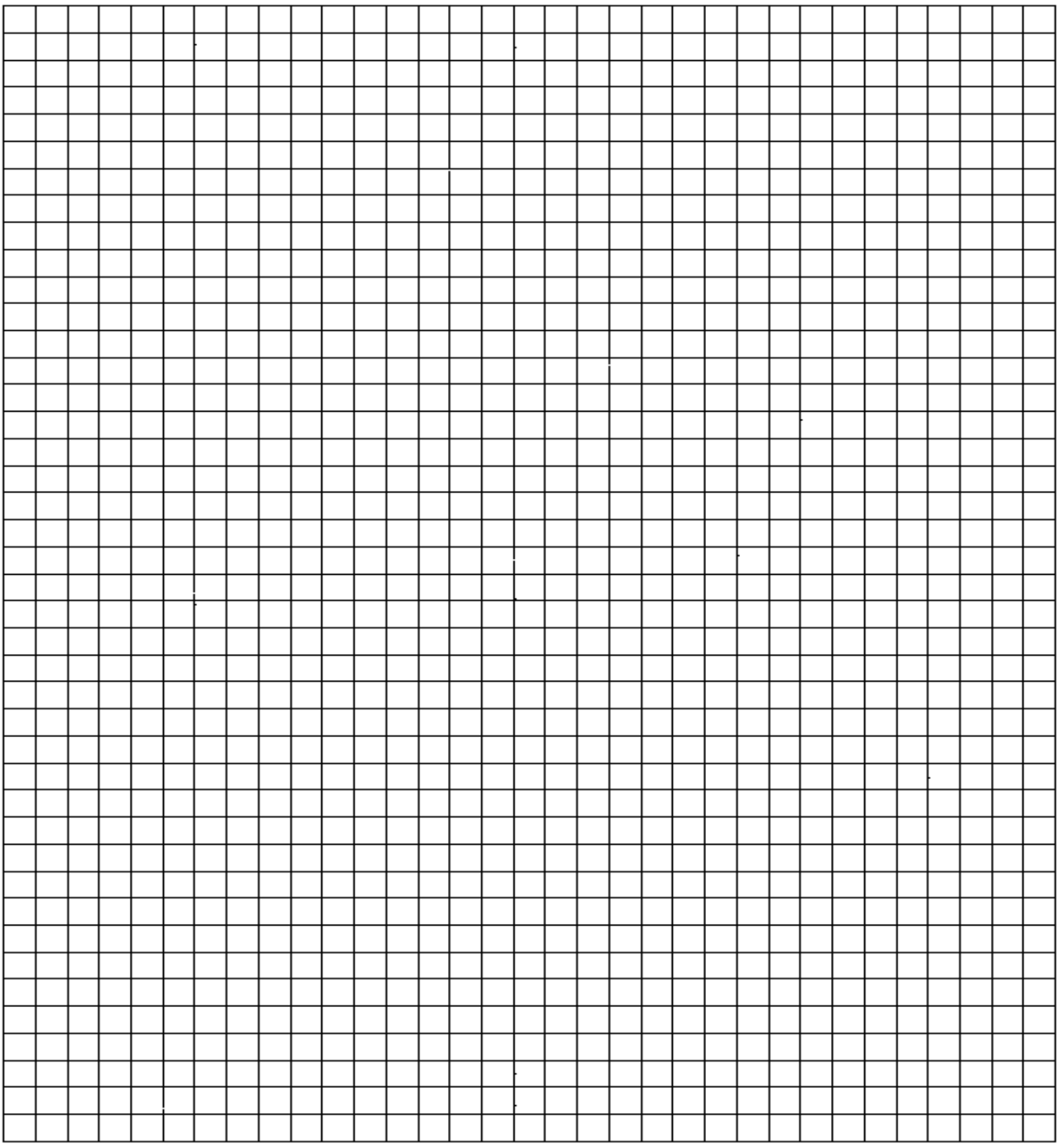
Graph #2 Title _____



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Analysis

1. What is the percent (%) activity of enzyme A at pH 3.5?

2. At what temperature do Enzymes B and C have the same % activity?

3. Which enzyme(s) work best in an acidic environment?

4. At what pH would Enzyme C probably have 100% activity?

5. Which enzymes probably came from the digestive tract of the Mondoni?

6. State two reasons why you think this.

    a.

    b.

7. Which enzymes probably came from the bacterial living in the alkaline hot spring?

8. State two reasons why you think this.

    a.

    b.

9. State which enzyme probably came from the stomach of the Mondoni and why you think this.

10. State which enzyme probably came from the intestine of the Mondoni and why you think this.