Name _____ Date _____ Block _____

Outbreak! (An Enzyme Graphing Activity)

Background

Imagine you're a World Health Organization (WHO) scientist who's been sent to investigate an outbreak of a mysterious illness in the Dominican Republic. People who are ill have stomach cramps, diarrhea, and vomiting. A small number of young children have died from the illness due to severe dehydration.

After running a series of tests on a local well, the you find three different types of bacteria in the water (labeled A, B, and C). In order to learn more about each type of bacteria, the enzymes from each strain were analyzed for their optimum environmental conditions.

Procedure

1. Clearly label your graphs with proper titles.
2. Using the following data tables, plot the graphs of each enzyme.
   - Make one graph for pH and another for temperature.
   - Plot all three enzymes (A, B, and C) on the same graph. Use different colors, and include a key.
   - Use smooth, flowing lines to connect the points on your graphs.
   - When you have finished your graphs, answer the questions in the analysis section.

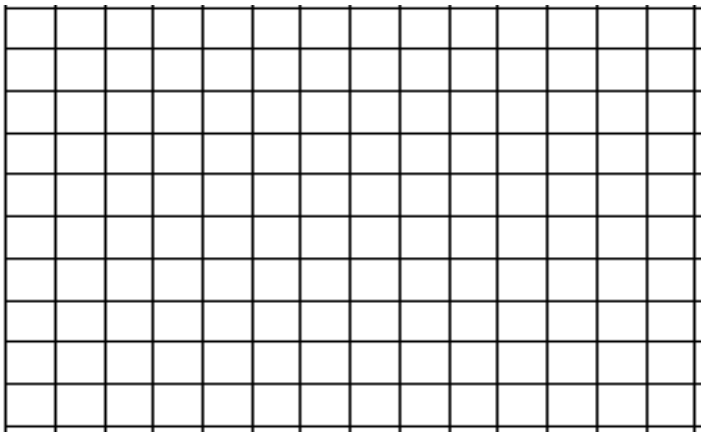
pH vs. % Enzyme Activity

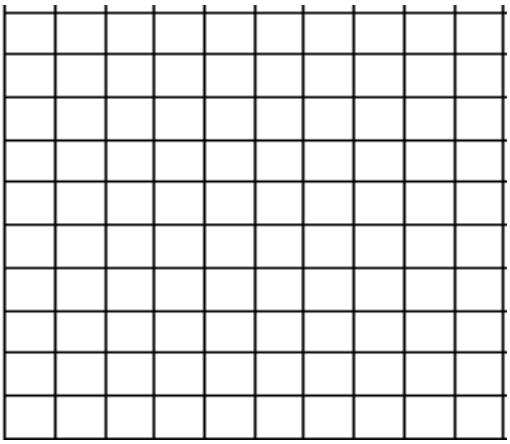
pH	Enzyme A	Enzyme B	Enzyme C
1	0	0	0
2	100	0	0
3	75	0	0
4	50	8	0
5	23	22	0
6	7	70	0
7	0	95	0
8	0	100	0
9	0	97	8
10	0	76	18
11	0	20	35
12	0	8	60
13	0	0	90
14	0	0	0

Temperature vs % Enzyme Activity

Temperature (Celsius)	Enzyme A	Enzyme B	Enzyme C
0	5	0	0
10	26	10	0
20	50	38	0
30	84	79	0
40	100	100	12
50	0	20	37
60	0	0	80
70	0	0	100
80	0	0	22
90	0	0	0
100	0	0	0

Title _____ **Title** _____





Analysis

1. Identify the optimum pH and temperature for all three enzymes.

_____

_____

_____

2. Complete the Claim-Evidence-Reasoning Framework below to write a conclusion to the following question:

Of the three studied, which bacteria are most likely causing the outbreak?*

Claim (Answer the research question.)	
Evidence (List at least 2 pieces of data or observations)	Reasoning (Why does the data described at left matter?)

*A few key facts to keep in mind when interpreting the data:

1. Most of the digestive tract (mouth, esophagus, intestines) has a neutral or slightly basic pH. The exception is the stomach, which is highly acidic.
2. The human body maintains an average temperature of about 37°C.