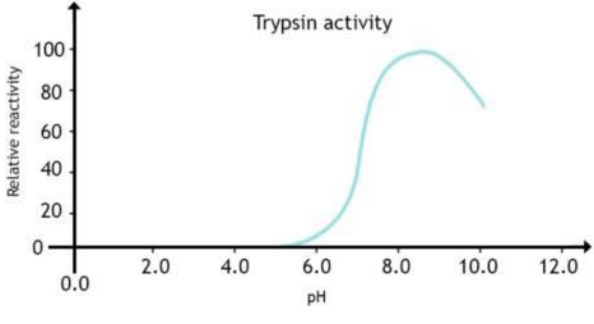
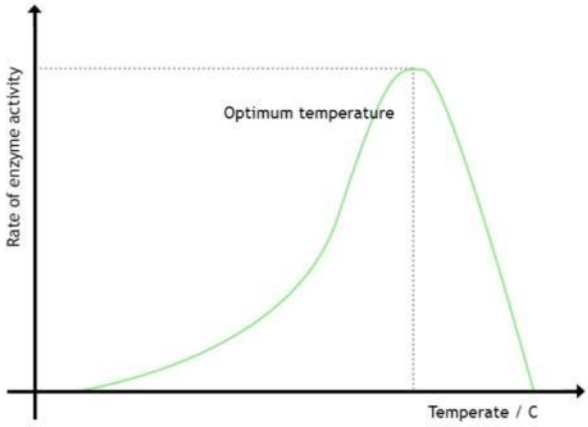
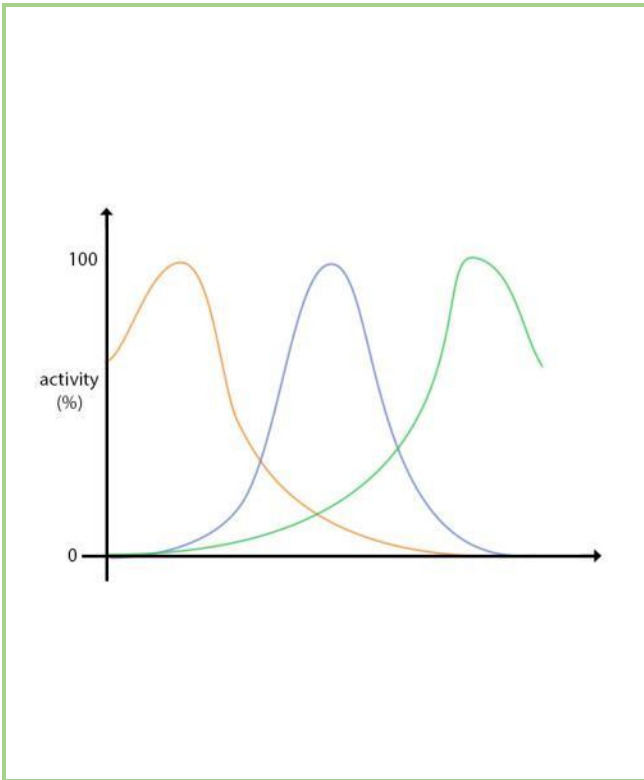


Task

The graphs all show how enzymes are affected by changing certain factors. Look at the graphs and then answer the questions.

 <p>Trypsin activity</p>	<p>1. Describe the trend shown (3 marks)</p>
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	<p>2. Explain the trend shown (4 marks)</p>
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3. Suggest an explanation for the trends on this graph. *Hint: First decide what the x axis label is.* (2 marks)

4. Sketch two more graphs of enzyme activity to show the effect of

- a. enzyme concentration
- b. substrate concentration.

Explain the trends in each.

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Teaching notes and suggested answers

A tiered activity to enable students to see the level they are working at when analysing enzyme graphs.

This is a useful activity to teach the skills involved with graph analysis, reminding students that the questions can be applied to a graph in any context of the specification. This could be used at the beginning of a lesson following the teaching of enzyme content in order to consolidate their understanding and to apply their knowledge.

1. Describe the trend shown (3 marks)

Between pH 0.0 and 5.0, the relative rate of reactivity remains at 0. The relative reactivity then rapidly increases to 100 at a pH of 8.0. Above pH 8.0, relative reactivity decreases.

2. Explain the trend shown (4 marks)

The rate of enzyme activity increases as temperature increases because the substrate and enzymes have more kinetic energy, move quicker and therefore have more successful collisions. Above a certain temperature however, enzymes denature, changing the shape of their active site resulting in less enzyme-substrate complexes forming. The rate of activity hits 0 when all enzymes have denatured.

3. Suggest an explanation for the trends on this graph.

Hint: First decide what the x axis label is. (2 marks)

This graph represents the activity of 3 different enzymes. Each enzyme has a different optimum pH / temperature.

4. As enzyme concentration increases, there is increased chance of successful collisions with the substrate. More enzyme-substrate complexes are formed. After a certain point however, the substrate is limiting the rate of reaction as there are more enzymes than substrate molecules and therefore maximum rate of reaction is reached. Vice versa if substrate concentration increases.

