

**BIOLOGY**  
**Investigative Skills Assessment**

**BIO3T/P09/TN**

**Teachers' Notes**

**CONFIDENTIAL**

**The effect of temperature on the rate of the reaction catalysed by trypsin**

Candidates are required to carry out an investigation on the effect of temperature on the rate of the reaction catalysed by trypsin.

**Materials**

In addition to access to general laboratory equipment, each candidate needs

- 30 cm<sup>3</sup> of 0.5 % trypsin solution (neutrase can be used as an alternative)
- 100 cm<sup>3</sup> of a 3 % solution of skimmed milk powder (fat-free)
- 30 cm<sup>3</sup> of pH 7 buffer solution. Any suitable buffer may be used.
- 18 dry test tubes to hold 15 cm<sup>3</sup> of solution
- test tube rack(s)
- stop watch (or suitable alternative)
- thermometer to cover the range 0 °C to 100 °C
- permanent marker pen
- graduated pipettes or syringes capable of measuring up to 10 cm<sup>3</sup>

Candidates should also have access to water baths or large beakers that they may use as water baths.

**Managing the investigation**

In this investigation, candidates will require data from five different temperatures—room temperature, 30 °C, 40 °C, 50 °C and 60 °C.

In Stage 1 they should individually collect data for three temperatures—room temperature, 60 °C and one other temperature between these two values. Teachers should tell candidates which additional temperature to investigate, so that data for five temperatures will be available to every candidate for Stage 2.

For Stage 2 teachers should provide candidates with raw data for two other temperatures.

**In this investigation, teachers must not give candidates the following information:**

- how often to record the temperature of the water bath
- whether to use a water bath at room temperature

**One week before sitting Stage 1 of the ISA, teachers may give their candidates the following information.**

You will be investigating the rate of the reaction catalysed by an enzyme.

There should be no further discussion of this topic.