AQA
General Certificate of Education
Advanced Level Examination
June 2012

Biology

Unit 6T  A2 Investigative Skills Assignment

Teachers’ Notes

Confidential

A copy should be given immediately to the teacher responsible for GCE Biology
An investigation of the effect of temperature on respiration in yeast

Candidates will investigate the effect of temperature on the rate of respiration in yeast.

The candidates will be provided with a yeast and glucose mixture. The rate of respiration will be measured by the time taken for methylene blue to decolourise.

Candidates will carry out the practical five times at 35 °C. They may assume this is enough data for a statistical test. Candidates will be provided with data for 25 °C for use in Stage 2.

The investigation needs to be trialled to ensure that the yeast is active and the methylene blue decolourises in 5 minutes or less.

Materials

In addition to general laboratory equipment each candidate needs

- approximately 12 cm³ yeast and glucose mixture
- approximately 12 cm³ methylene blue
- 5 test tubes
- test tube rack
- 250 cm³ glass beaker to act as a water bath
- a way of changing the temperature of the water bath eg Bunsen burner or supplies of hot and cold water. Electronic water baths must not be used.
- graduated pipettes or syringes
- marker pen
- thermometer to measure temperature of water bath.
- timer.
Technical Information

In trials, the best results were achieved with the following.

Yeast and glucose mixture

Make up a solution of 1 g glucose in 100 cm$^3$ water. Just before use, raise the temperature of this solution to 30°C and add 5 g dried yeast. Shake to suspend the yeast in the glucose solution. Use an open-topped flask or beaker as bubbling will occur.

Methylene blue solution

If you purchase methylene blue in powder form, a suitable solution may be made by dissolving 1 g methylene blue and 0.6 g sodium chloride in 100 cm$^3$ distilled water. Then dilute this solution 0.1 cm$^3$ in 100 cm$^3$ water.

If you already have methylene blue stain this can be used by diluting 0.1 cm$^3$ in 100 cm$^3$ water.

When trialled, these concentrations led to decolourisation of the methylene blue in approximately 5 minutes. Should decolourisation take longer, you may further dilute the methylene blue.

Managing the investigation

If you have any queries about the practical work for the ISA please contact your Assessment Adviser. Contact details can be obtained by emailing your centre name and number to biology-gce@aqa.org.uk. Please do not contact suppliers for advice.

The task must be trialled before use.

Candidates must not be given information about an ISA assessment until one week before Stage 1. One week before sitting Stage 1, teachers may give their candidates the following information.

You will investigate a factor affecting the rate of respiration. In addition you will also need to understand the topic

- enzymes.

There must be no further discussion of this topic and candidates must not be provided with any further resources to prepare for the assessment.

Candidates should be reminded before they start Stage 2 that they should use the data supplied for 25°C as well as the data they have collected.

Teachers must not give candidates the following information.

- how to monitor and maintain the temperature of the water bath.