General Certificate of Education
Advanced Level Examination
June 2011

Biology BIO6T/Q11/TN

Unit 6T A2 Investigative Skills Assignment

Teachers' Notes Confidential

A copy should be given immediately to the teacher(s) responsible for GCE Biology

Teachers' Notes

CONFIDENTIAL

These notes must be read in conjunction with the *Instructions for the Administration of Investigative Skills Assignment: GCE Biology* published on the AQA Website.

An investigation into the effect of competition for oxygen on the growth of yeast

Candidates will investigate the effect of oxygen availability on the growth of yeast using the method outlined on the task sheet.

Before the investigation

Approximately 48 hours before the investigation is to be carried out by candidates the two yeast cultures should be set up as follows.

- Make a suspension of 0.1 g of dried yeast in 100 cm^3 of sterile nutrient broth.
- Nutrient broth – in trials 13 g of nutrient broth powder was dispersed in 1 dm^3 of deionised water. This was autoclaved at 121°C for 15 minutes.
- Add 30 cm^3 of the suspension to two separate sterile conical flasks, one 250 cm^3 and one 25 cm^3 (30 cm^3 will fill the smaller conical flask).
- Loosely stopper the conical flasks with **non-absorbent sterile** cotton wool.
- The yeast suspensions should be cultured in these flasks for approximately 48 hours at 25°C before being used by candidates. (The actual time varied with freshness of yeast and needs to be trialled before being used for the task).

Setting up the investigation for candidates

Materials

In addition to general laboratory equipment each candidate will need:

- access to samples of cultures from the two different-sized flasks
- 200 cm^3 sterile water
- 250 cm^3 sterile beaker
- sterile measuring cylinder to measure 200 cm^3
- sterile glass rod for stirring
- sterile 1 cm^3 graduated pipette or syringe
- spreader in sterilising solution – this can be made by bending a length of glass rod
- sufficient metabisulphite solution to sterilise spreaders
- 2 sterile agar plates made up with nutrient agar in standard 11 cm diameter Petri dishes
- marker pen
- acetate grid
- sticky tape such as sellotape and scissors

Technical Information

All glassware must be sterilised. Sodium metabisulphite (10% solution), Milton or Camden solution will give an adequate level of sterilisation.

The agar plates need to be incubated somewhere warm after spreading with yeast culture, 25°C is ideal. They should be cultured base uppermost.

In trials the best results were achieved when the agar plates were cultured for between 18 and 24 hours. If candidates cannot examine them after 24 hours, the plates can be stored temporarily in a refrigerator.

In Stage 1 of the investigation each candidate will require an acetate grid. Grids should be prepared by photocopying the template provided on page 4 and cutting it to provide a square that will completely cover an 11 cm Petri dish.

A dark background used with the acetate grid enables easier counting of colonies.

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 of the ISA, teachers should give their candidates the following information.

You will investigate the effect of oxygen on the growth of yeast cells. In addition you will also need to understand the following topics.

- populations
- competition.

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

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

- how to select the squares to be counted at random.