



General Certificate of Education
Advanced Subsidiary Examination
June 2010

Biology

BIO3T/Q10/TN

Unit 3T AS 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 *Instructions for the Administration of the Investigative Skills Assignment: GCE Biology* published on the ISA disk and on the AQA website.

The effect of alcohol concentration on the leakage of pigment from beetroot cells

Materials

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

- approximately 30 cm³ 100 % alcohol (ethanol or methanol work equally well)
- 5 cm³ of each of concentrations 80 %, 60 %, 40 % and 20 % of same alcohol (this can be provided in bulk stock bottles)
- 20 cm³ stock solution of beetroot extract
- approximately 25 evenly sized discs of fresh beetroot tissue, rinsed in several changes of water and left in water. Cork borer 6 mm works well, discs approximately 2 mm thick
- 20 test tubes of approximately equal size to hold at least 5 cm³
- bungs to fit 10 of the test tubes
- 2 × 100 cm³ beakers
- 10 cm³ syringes or graduated pipettes
- thermometer to cover range 10 – 30 °C
- stop watch or timer
- test tube racks or beakers in which to stand test tubes
- paper towels to blot the discs
- large beaker that could be used as a water bath
- permanent marker pen
- water

Managing the investigation

Candidates should be prompted to read all the instructions carefully before they start the investigation. There are two parts to the investigation, **Part 1** and **Part 2**. Both parts need to be carried out in the same practical session. Candidates should work on their own.

Technical Information

Fresh beetroot are more readily available in late Autumn. Centres may wish to consider buying the beetroot then and storing them in damp sand in a cool place.

A stock solution of beetroot extract should be prepared in the following way (quantities per candidate). Measure 20 cm³ of the 100 % alcohol into a beaker and add 20 discs of beetroot tissue. Leave the discs for 10 minutes, shaking the beaker every minute. Remove the beetroot discs leaving a concentrated solution of betalin.

The task must be trialled before use.

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

You will be carrying out an investigation into the movement of substances through plasma membranes.

There should be no further discussion of this topic.