



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 cm<sup>3</sup> 100 % alcohol (ethanol or methanol work equally well)
- 5 cm<sup>3</sup> of each of concentrations 80 %, 60 %, 40 % and 20 % of same alcohol (this can be provided in bulk stock bottles)
- 20 cm<sup>3</sup> 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 cm<sup>3</sup>
- bungs to fit 10 of the test tubes
- 2 × 100 cm<sup>3</sup> beakers
- 10 cm<sup>3</sup> 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 cm<sup>3</sup> 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.