



General Certificate of Education  
Advanced Subsidiary Examination  
June 2014

**Biology**

**BIO3T/P14/TN**

**Unit 3T AS Investigative Skills Assignment**

**Teachers' Notes**

**Confidential**

The Exams Officer should make two copies of these Teachers' Notes; one copy for the Head of A-level Biology and one for the technician.

These copies can be released to the Head of A-level Biology and the technician at any point following publication but must be kept under secure conditions at all times.

Teachers can have sight of the Teachers' Notes but no further copies should be made.

All teacher-assessed marks to be submitted by 15 May

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**Confidential**

These notes must be read in conjunction with **Instructions for the Administration of the ISA: A-level Biology** published on the AQA Website. Please note that these have been revised for 2014.

**The effect of concentration of blackcurrant squash on osmosis in potato cylinders****Introduction**

In this investigation, candidates will measure the change in mass of potato cylinders when placed in different concentrations of blackcurrant squash. They will be provided with five concentrations of blackcurrant squash and potato cylinders. The candidates will prepare the cylinders, weigh them and place them in different concentrations of squash. They will leave the cylinders to allow osmosis to occur. After 30 minutes, they will remove the cylinders, blot them dry and reweigh them.

**Materials**

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

- blackcurrant squash of concentrations 100%, 80%, 60%, 40% and 20%.  
Allow 30 cm<sup>3</sup> per candidate
- water for 0% concentration
- potato cylinders in water
- 6 boiling tubes
- boiling-tube rack
- measuring cylinder, syringe or pipette to measure 20 cm<sup>3</sup>
- white tile
- scalpel or small knife to cut the potato cylinders
- paper towels
- access to a sieve
- ruler
- timer
- glass rod
- access to a balance (at least 2 decimal places preferable).

## 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 science-gce@aqa.org.uk

Candidates will be provided with pre-cut cylinders of potato, from which the skin has been removed. The cylinders should be of different lengths but of sufficient size to allow the candidates to trim them to a suitable length for their investigation. Several potatoes may be used, but all must be of the same variety.

The potato cylinders can be prepared using a cork borer of diameter 1 cm or a potato chipper could be used. Although a chipper does not give cylinders, this word will be used to describe the potato sample throughout. The cylinders should be prepared at least an hour before the lesson and kept in water to allow the cells to be turgid at the beginning of the experiment.

## Trialling

The task(s) **must** be trialled before use.

This investigation has been trialled successfully using Ribena and Sainsbury's own brand blackcurrant cordial, which was about half the cost of Ribena. If other brands of cordial are to be used, it is important to check that the concentration of sugar is similar to that of Ribena. 'No added sugar' or 'diet' cordials should **not** be used. Trials must use the same cordial that the candidates will use.

## Additional Information

AQA might publish Additional Information about an ISA/EMPA practical. This will be placed on e-AQA in Secure Key Materials. We will email Exams Officers who have downloaded the particular Teachers' Notes so they can print a copy for the Head of Biology. Additional Information will cover issues such as suitable suppliers or tips on getting a practical to work.

## Information to be given to candidates

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 concentration of blackcurrant squash on osmosis in potato cylinders. In addition, you will need to understand the following topics:

- osmosis
- the passage of water through a plant
- cell wall structure
- protein structure
- haemoglobin.

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

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

- the length of the potato cylinders to use
- what to do if a potato cylinder floats to the surface.

Turn over ►

## Task Sheet

### The effect of concentration of blackcurrant squash on osmosis in potato cylinders

#### Introduction

In this investigation, you will measure the change in mass of potato cylinders in different concentrations of blackcurrant squash. You will be provided with different concentrations of blackcurrant squash. The blackcurrant squash contains sugar. You will trim the pieces of potato provided to a suitable length, weigh them and place one cylinder in each concentration of squash. After a period of time, you will reweigh the cylinders.

#### Materials

You are provided with the following:

- blackcurrant squash of concentrations 100%, 80%, 60%, 40% and 20%
- water for 0% concentration
- water containing potato cylinders
- 6 boiling tubes
- boiling-tube rack
- measuring cylinder, syringe or pipette
- white tile
- scalpel or small knife to cut the potato cylinders
- paper towels
- ruler
- access to a sieve
- timer
- glass rod
- access to a balance.

You may ask your teacher for any other apparatus you require.

## Method

**Read these instructions carefully before you start your investigation.**

To assist your planning, you should be aware that you will leave your potato cylinders in blackcurrant squash for 30 minutes.

1. Label a boiling tube '100%'. Add 20 cm<sup>3</sup> of 100% blackcurrant squash to this tube.
2. Trim a potato cylinder to a length that will be covered by the squash when placed in the boiling tube. Blot it dry with a paper towel, use the balance to weigh it and record its mass. **Do not** add it to the boiling tube yet but keep it with this tube.
3. Repeat steps 1 and 2 with blackcurrant squash at concentrations of 80%, 60%, 40%, 20% and 0% (water).
4. Place each potato cylinder into the appropriate boiling tube and start the timer.
5. After each cylinder has been in its boiling tube for 30 minutes, remove it, blot it dry with a paper towel, reweigh it and record its mass.
6. For each concentration of blackcurrant squash, calculate the percentage change in mass of the potato cylinder. Record these calculated values in your results table.

**You will need to decide for yourself:**

- the length of the potato cylinder to cut
- what to do if a potato cylinder floats to the surface.