



General Certificate of Education
Advanced Level Examination
June 2014

Biology

BIO6X/TN

Unit 6X A2 Externally Marked Practical 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.

Estimated entries must be submitted to AQA in order for centres to receive hard copies of the materials to be used by candidates.

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Teachers' Notes**CONFIDENTIAL**

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

Investigating movement of maggots

Candidates are required to investigate the movement of maggots.

Materials**Task 1**

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

- a cardboard cover made as described in Managing the investigation
- 3 maggots
- 3 filter papers (minimum 125 mm diameter)
- plastic teaspoon
- access to a bowl of water at room temperature
- container for holding maggots after each trial.

Task 2

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

- a prepared cardboard cover
- 10 maggots
- 10 filter papers (minimum 125 mm diameter)
- plastic teaspoon
- timer
- access to a bowl of water at room temperature
- container for holding maggots after each trial.

Managing the investigation

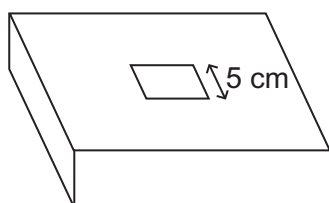
If you have any queries about the practical work for this EMPA, please contact your Assessment Adviser. Contact details can be obtained by emailing your centre name and number to science-gce@aqa.org.uk. Please do not contact suppliers for advice.

Making the cover

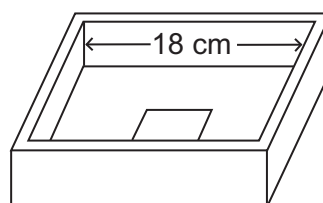
The cardboard cover is made from a box measuring a minimum of 20 cm × 20 cm × 4 cm. A cereal box is an ideal starting point.

1. Seal the ends of the box with sticky tape.
2. In the centre of one side of the box, cut a square hole that measures 18 cm × 18 cm.
3. In the centre of the opposite side of the box, cut a square hole that measures 5 cm × 5 cm.

The cover viewed as used



The cover viewed upside down



The cover can be prepared prior to Task 1 by staff or by candidates (**as long as no discussion of the investigation takes place**). A prepared set of covers can be used with different sets of candidates and reused in Task 2. Candidates do not need to use the same cover in Task 2 as in Task 1.

The investigation was successfully trialled with both 125 mm and 150 mm diameter filter paper.

Spare maggots and filter papers should be available in both Task 1 and Task 2.

In this investigation, 10 repeats will be considered sufficient for statistical analysis.

Technical information

Maggots can be purchased at most fishing supply stores (blowfly larvae are the most common but other fly larvae can also be used). Maggots should be used within a few days of purchase.

If maggots are stored in the fridge, they should be removed 1 hour before the tasks to allow them to reach room temperature.

Trialling

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

Turn over ►

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 the EMPA until one week before Task 1. One week before Task 1, teachers may give their candidates the following information.

You will investigate the movement of maggots. In addition, you will need to understand the following topics:

- nutrient cycles
- survival and response
- investigating populations.

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:

- how to determine the centre of the filter paper
- how to determine when a maggot changes direction.

Task 1

Introduction

You are going to investigate the movement of maggots.

In Task 1, you will investigate the number of times a maggot changes direction as it moves off a piece of filter paper in ordinary laboratory light and in reduced light.

Materials

You are provided with:

- 3 maggots
- cardboard cover
- 3 filter papers
- access to a bowl of water at room temperature
- plastic teaspoon
- container for holding maggots after each trial.

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

Method

Read these instructions carefully before you start your investigation.

1. Soak a piece of filter paper in the water. Remove it and shake it gently to remove excess water. Lay this paper flat on the workspace in front of you.
2. Place a maggot at the centre of the filter paper using a plastic teaspoon.
3. Count how many times the maggot changes direction before it moves off the filter paper. Record the result in **Table 1**.
4. Remove the maggot, turn the piece of filter paper over and replace the maggot at the centre of the filter paper.
5. Place the cardboard cover over the filter paper with the small observation hole uppermost. This reduces the intensity of light falling on the maggot.
6. Count how many times the maggot changes direction before it moves off the filter paper. Record your result in **Table 1**.
7. Remove the maggot and discard the filter paper.
8. Repeat steps 1 to 7 until you have results for 3 maggots.

If a maggot stops moving, remove it and repeat the trial with another maggot.

You will need to decide for yourself:

- how to determine the centre of the filter paper
- how to determine when a maggot changes direction.

Turn over ►

Task 2

Introduction

You are going to investigate the movement of maggots.

In Task 2, you will investigate the relationship between the number of times a maggot changes direction and the time it takes the maggot to move off a piece of filter paper.

Materials

You are provided with:

- cardboard cover
- 10 maggots
- plastic teaspoon
- 10 filter papers
- access to a bowl of water at room temperature
- timer
- container for holding maggots after each trial.

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

Method

Read these instructions carefully before you start your investigation.

You should record a change of direction when the maggot changes the direction of movement of its whole body.

1. Soak a piece of filter paper in the water. Remove it and shake it gently to remove excess water. Lay this paper flat on the workspace in front of you.
2. Place a maggot at the centre of the filter paper using a plastic teaspoon.
3. Place the cardboard cover over the filter paper with the small observation hole uppermost.
4. Start the timer.
5. Record how many times the maggot changes direction before it moves off the filter paper.
6. Stop the timer and record the time taken for the maggot to move off the filter paper.
7. Remove the maggot and discard the filter paper.
8. Repeat steps 1 to 7 with the remaining 9 maggots.

If a maggot stops moving, remove it and repeat the trial with another maggot.

You will need to decide for yourself:

- how to determine the centre of the filter paper.