

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use Total Task 1



General Certificate of Education
Advanced Subsidiary Examination
June 2014

Biology

BIO3X/PM1

Unit 3X AS Externally Marked Practical Assignment Task Sheet 1

To be completed before Task Sheet 2.

For submission by 15 May 2014

For this paper you must have:

- a ruler with millimetre measurements
- a calculator.

Task 1

Introduction

Capillary action causes some of the movement of water up plant stems. Capillary action is the movement of water through narrow spaces.

In this task, you will stain the plant tissue where capillary action occurs and demonstrate capillary action in paper.

Materials

You are provided with:

- piece of celery stem
- coloured water
- scalpel/knife
- cutting board
- shallow dish
- timer
- magnifying lens
- microscope slide
- 3 different types of absorbent paper **A**, **B** and **C**
- ruler with millimetre measurements
- scissors.

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

Method

Read these instructions carefully before you start your investigation.

Staining the tissue that transports water in a plant stem

1. Add coloured water to the shallow dish to a depth of 3–4 mm.
2. Take a 2 cm piece of celery stem.
3. Place one cut end of the celery in the coloured water in the dish. Start the timer.
4. After 5 minutes, remove the celery stem and rinse with water to remove the coloured water on the outside of the stem.
5. Cut as thin a slice as you can from the end of the celery stem that has been in the coloured water. Lay this section flat onto the microscope slide. Look at the section using the magnifying lens, making note of where the coloured dye is.

Figure 1 (page 4) shows a section through a celery stem.

Use a label line and the letter **X** to show **one** area that corresponds to where you can see the most intense colour in your section.

Observing capillary action in paper

6. Cut a strip of absorbent paper **A** 2 cm wide and at least 10 cm long.
7. Hold one end of the strip and lower the other end into the coloured water in the dish until the end is just under the surface. Keep the strip upright in this position for 30 seconds.
8. Remove the strip of paper and, immediately, measure how far the coloured water has moved up the paper. Record your result in **Table 1** on page 4.
9. Repeat steps 6 to 8 with paper types **B** and **C**.

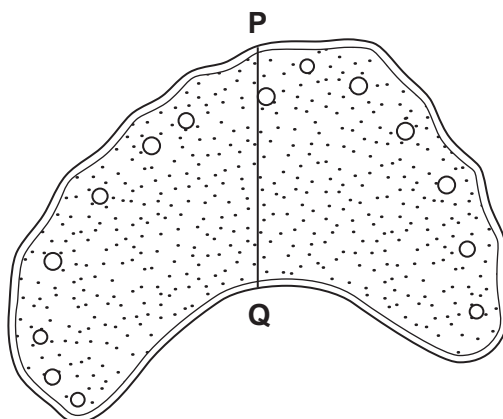
You will need to decide for yourself:

- the position of the most intense colour in your section of celery stem.

Turn over ►

Recording your results

Use a label line and the letter **X** to show **one** area in **Figure 1** that corresponds to where you can see the most intense colour in your section.

[1 mark]**Figure 1**

Complete **Table 1**.

Table 1

Type of absorbent paper	Distance coloured water moved in 30 seconds / mm
A	
B	
C	

Questions on Task 1

Answer **all** questions in the spaces provided.

1 Other than capillary action, name **two** processes that cause water to move up a plant stem. **[2 marks]**

1

2

2 In step 5, you were told to cut as thin a slice as possible from the celery. Explain why it was important that the slice was thin. **[1 mark]**

.....

.....

.....

3 The coloured dye moves with water as it moves through the stem. What is the name of the tissue that water moves through? **[1 mark]**

.....

4 In **Figure 1**, the actual distance shown by line **P–Q** is 9 mm. Describe how you could calculate the magnification of this diagram. **[2 marks]**

.....

.....

.....

.....

.....

Turn over for the next question

Turn over ►

5 Describe how you would adapt the method you used to find the rate of movement of coloured water up a celery stem.

[3 marks]

.....

.....

.....

.....

.....

.....

[Extra space]

.....

.....

6 In step 8, you were told to measure the distance moved by the water immediately. Explain why the distance had to be measured immediately.

[1 mark]

.....

.....

.....

END OF TASK 1

There are no questions printed on this page

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**

There are no questions printed on this page

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**