



General Certificate of Education
Advanced Subsidiary Examination
June 2013

Biology

BIO3T/Q13/task

Unit 3T AS Investigative Skills Assignment Task Sheet

Estimating the density of stomata in the lower epidermis of leaves

Introduction

The lower epidermis of a leaf is made up of a single layer of epidermal cells with stomata. Each stoma has two guard cells.

The density of stomata is the number of stomata in a given area of leaf epidermis. In this investigation, you will count the number of stomata in different fields of view of a microscope.

Materials

You are provided with:

- optical microscope
- microscope slides
- cover slips
- forceps
- mounted needle
- dropping pipette
- small beaker
- 3 leaves from the same plant.

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

Method

Read these instructions carefully before you start your investigation.

1. Obtain a small piece of the lower epidermis tissue by folding a leaf with the upper epidermis to the outside of the fold. The fold should be made at least 5 mm from a major vein. Then tear the leaf, at an angle, where the fold has broken all the tissues other than the lower epidermis. Your teacher will demonstrate this technique.
2. Use forceps to peel off a small piece of the lower epidermis of the leaf.
3. Place this small piece of epidermis in the centre of a microscope slide and add a drop of water.
4. Use a mounted needle to lower a cover slip in place.
5. Put your slide onto the stage of the microscope and focus on the stomata.
6. Count the number of stomata in one field of view using the highest power magnification of your microscope.
7. Repeat step 6 with different fields of view taken at random until you have sufficient data.
8. Repeat steps 1-7 using the two other leaves.

You must decide for yourself how many fields of view to use to count the number of stomata.

ISA BIO3T/Q13 Candidate Results Sheet: Stage 1

Estimating the density of stomata in the lower epidermis of leaves

Centre Number

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Candidate Number

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Candidate Name

Record your data in a table in the space below. (2 marks)

Hand in this sheet at the end of each practical session.

ISA BIO3T/Q13 Candidate Results Sheet: Stage 2

Estimating the density of stomata in the lower epidermis of leaves

Centre Number Candidate Number

Candidate Name.....

For each leaf, calculate:

- the mean number of stomata in the field of view
- the standard deviation of each of your mean values.

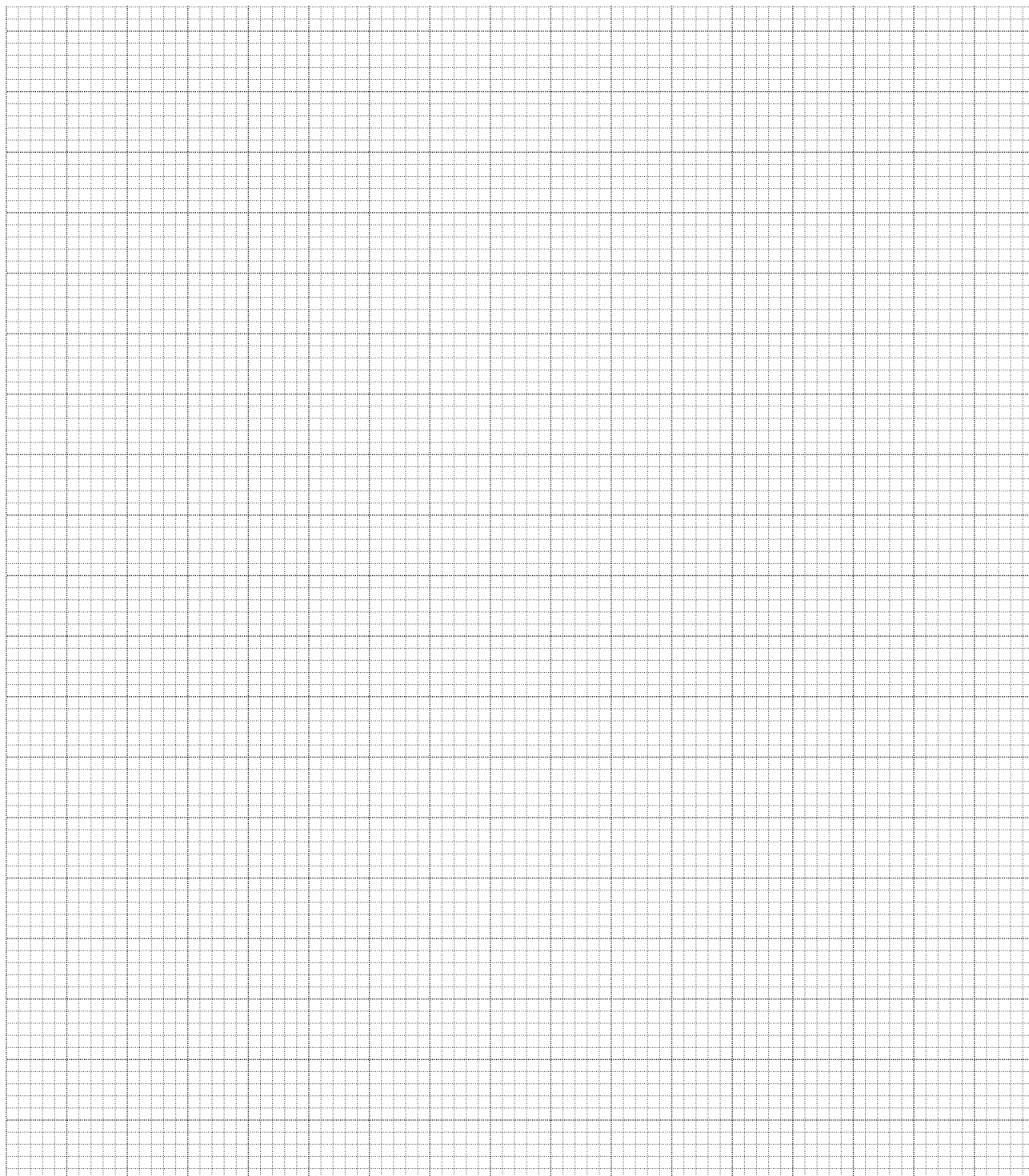
Complete the table.

Leaf number	Mean number of stomata per field of view	Standard deviation
1		
2		
3		

(2 marks)

Use the graph paper to plot a bar chart of your processed data. Include the standard deviation on your bar chart. (6 marks)

Hand in this sheet at the end of each practical session.



END OF TASK