

NAME:

SCHOOL:



Shrewsbury School

SHREWSBURY SCHOOL

SCHOLARSHIP EXAMINATION 2018

BIOLOGY **(30 MINUTES)**

Instructions to candidates:

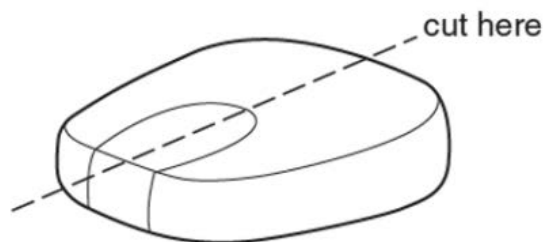
- Answer all questions in the spaces provided
- There are 20 marks available for this paper.

Apparatus per candidate

- Sweetcorn on the cob
- Banana
- Safety specs
- White tile
- Tissue paper
- Two razor blades – CARE!
- Mounted needle
- Iodine solution – CARE! Wear safety specs while handling.
- Pipette
- Blunt forceps
- Ruler
- Hand lens
- Three microscope slides and cover slips
- High power light microscope (with eyepiece graticule)

Sweetcorn part I

1. Take the piece of sweetcorn and use forceps to remove one single seed without crushing it.
2. Place the seed on the white tile and cut it as shown below using a clean razor blade.



3. Pick up one half of the seed with forceps and smear the cut surface onto a clean microscope slide.
4. Add one drop of iodine on top of the smear, then place a coverslip on top of the iodine drop, using tissue paper to blot off any excess;
5. Wait for one minute then observe the slide under the microscope at highest magnification.
6. There is a miniature ruler built in to the microscope lens. At highest magnification a single unit on this ruler is equal to 2.5µm (micrometres).

Use it to measure the range of dimensions of some of the many small, dark, rounded objects.

Range of object sizes = [2]

7. Take a new slide and use the same seed half as before to make another smear. Now (discretely!) add a small drop of your own saliva to the smear; use the mounted needle to mix the saliva and sweetcorn smear together.
Don't put a coverslip on yet.

Now leave this slide until later on point 18 - in Sweetcorn part 3

Sweetcorn part 2

8. Pick up the other half of the sweetcorn seed with forceps and add one drop of iodine directly to the cut surface;
9. Wait for one minute then observe the cut, stained surface of the sweetcorn seed; you may use a hand lens if you wish.

Draw what you see in the space below, labelling the differently stained regions; also add a scale bar to your drawing.

[4]

Banana part 1

10. Now place one drop of iodine solution directly on the white tile;
11. Peel the banana and use a razor blade to chop it in half;
12. Gently rub one cut end into the drop of iodine on the tile;
13. Wait for one minute then observe the cut, stained end of the banana; you may use a hand lens if you wish.

Draw what you see in the space below, labelling the differently stained regions; also add a scale bar to your drawing.

[4]

Banana part 2

- 14. Take a clean microscope slide and smear the other, unstained end of the banana onto it;
- 15. Add one drop of iodine on top of the smear of banana and place a coverslip on top of the iodine drop, using tissue paper to blot off any excess;
- 16. Wait for one minute then observe the slide under the microscope at highest magnification.

Locate a cell containing dark, rounded objects and draw the cell in the space below.

[2]

- 17. Use the microscope's ruler to measure the largest dimension of one of the dark, rounded objects in the banana cell.

Object size = [1]

Sweetcorn part 3

- 18. Now return to the slide you made earlier with a smear of sweetcorn and saliva. Add a drop of iodine and then a coverslip.

Use the microscope's ruler to measure the largest dimension of one of the dark, rounded objects.

Object size = [1]

Summary questions

19. What similarity between bananas and sweetcorn is shown by your observations?

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..... [1]

20. Describe and explain the effect of adding saliva to the smear of sweetcorn.

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..... [2]

21. What are the functions of bananas and sweetcorn in nature?

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..... [2]

22. Given what you have said about the function of a banana, what is odd about it?

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..... [1]

END OF QUESTION PAPER