NAME: ……

SCHOOL: ……

WINCHESTER
COLLEGE

# WINCHESTER ENTRANCE

## Biology

MAY 2 2024

Time Allowed: 30 minutes

Total Marks: 30

The mark for each question is given in brackets [ ].

**Calculators may be used.**

*Write your answers in this booklet. If you need additional space, please write on sheets of A4 paper and attach them to this booklet. You should show all your working so that credit may be given for partly correct answers.*

**Candidates will be penalized for giving answers to too many significant figures.**

*Diagrams are not drawn to scale.*

*Do not be discouraged if you do not finish.*

**B1** Thaddeus and Araminta wanted to investigate how the colour of light affects the rate at which plants photosynthesise.
They set up the apparatus pictured below:

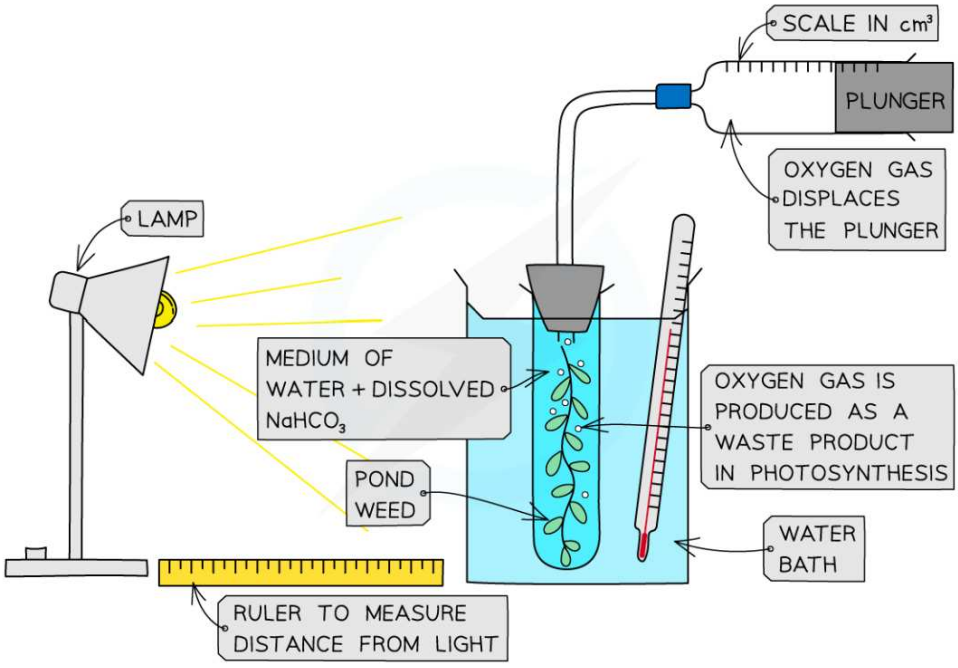



**Fig. 1**

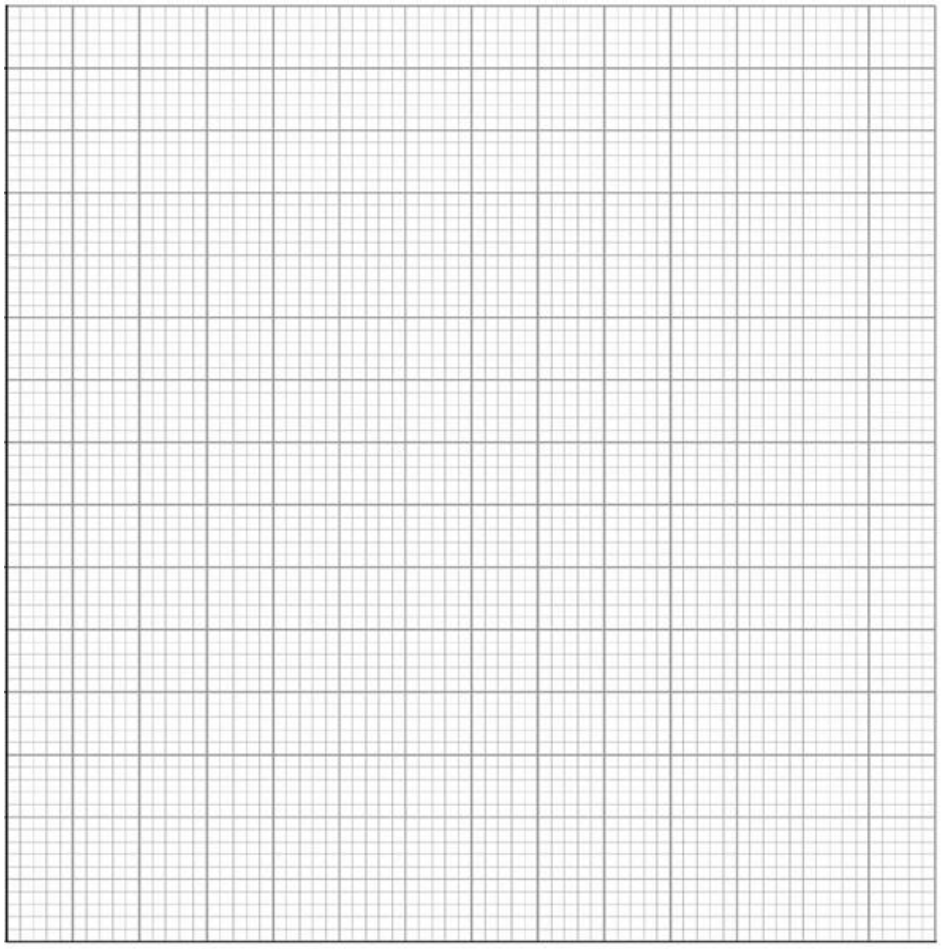
$NaHCO_3$ is a chemical powder called sodium bicarbonate. It provides carbon dioxide for the plant.

Thaddeus and Araminta decided to collect the amount of oxygen produced by the pond weed over the course of 1 hour. They repeated this experiment but each time placing a different coloured filter in front of the light, to see whether the volume of oxygen produced changed with different colours of light available. Their results are below:

| Colour of light filter | Volume of oxygen collected in 1 hour ($cm^3$) | | | |
|---|---|---|---|---|
| | Repeat 1 | Repeat 2 | Repeat 3 | Mean average |
| Blue | 12.0 | 11.5 | 12.5 | 12.0 |
| Green | 6.0 | 6.0 | 3.0 | 5.0 |
| Yellow | 2.0 | 1.5 | 2.5 | |
| Orange | 3.0 | 2.5 | 3.5 | |
| Red | 6.0 | 8.5 | 9.5 | |

(a) Complete the table with the correct mean average figures for the data. [3]

(b) Plot a bar graph of Thaddeus and Araminta's data for the **mean average** volumes of oxygen against different colours on the grid below.



[5]

(c) Suggest **two** variables that Thaddeus and Araminta would need to keep constant during this experiment, to ensure their results are reliable.

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..... [2]

(d) Write a conclusion for Thaddeus and Araminta's results.

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..... [2]

(e) There is an urgent need internationally to limit deforestation in the tropical rainforests. State three reasons why forests are so important.

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..... [3]

**B2** Fig 2.1 shows a mammal sperm cell:

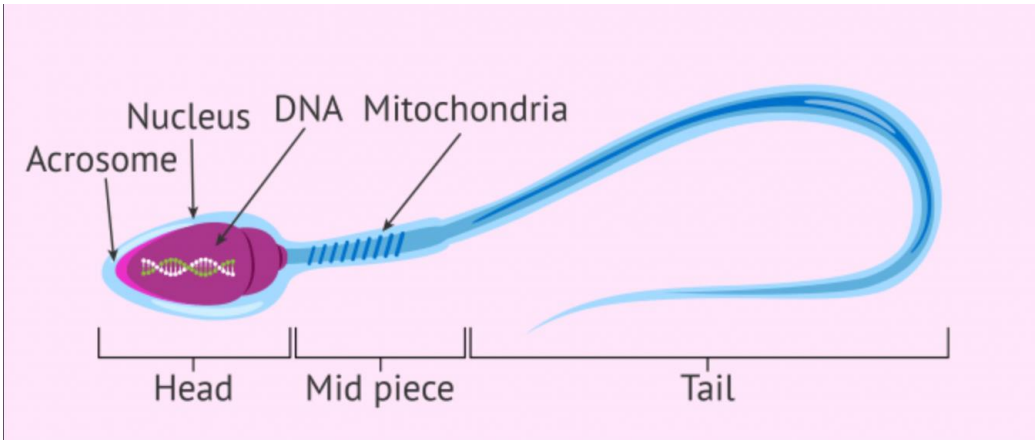


**Fig. 2**

(a) Describe how this cell is adapted for fertilising an egg cell.

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..... [3]

(b) Sperms are found in seminal fluid which contain glucose (sugar). State the name of the specific process in all living cells which requires sugar.

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..... [2]

(c) Write the word equation for this process.

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..... [4]

(d) Describe two differences between a sperm and an egg cell.

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..... [2]

(e) State the name of reproductive cells such as sperm and eggs.

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(f) Describe and explain how a woman expecting a baby can make choices to help ensure that her baby develops properly and is born healthy.

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……. [3]

**Total: 30 marks**

## End of this paper

## References:

**Figure 1** - photosynthesis required practicals Flashcards | Quizlet

**Figure 2** - Structure of a mature human sperm cell (invitra.com)