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90167

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

Level 1 Biology, 2005

90167 Describe plant processes

Credits: Four
9.30 am Tuesday 15 November 2005

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should answer ALL the questions in this booklet.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

For Assessor's use only	**Achievement Criteria**	
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Describe biological ideas relating to the functioning of plant processes.	Explain biological ideas relating to the functioning of a plant process.	Discuss biological ideas relating to the functioning of a plant process.
Overall Level of Performance		

You are advised to spend 50 minutes answering the questions in this booklet.

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PART A: PHOTOSYNTHESIS

QUESTION ONE

The diagram below shows a cross section of a typical leaf.

Adapted from: George Knox (ed), *Biological Science: Processes and Patterns of Life*, Department of Education, 1969, p 295.

Arrows **A** and **B** show the movement of substances **required for** photosynthesis.
Arrows **C** and **D** show the movement of substances **produced during** photosynthesis.

Name each of the substances **A**, **B**, **C** and **D.**

A _____

B _____

C _____

D _____

QUESTION TWO

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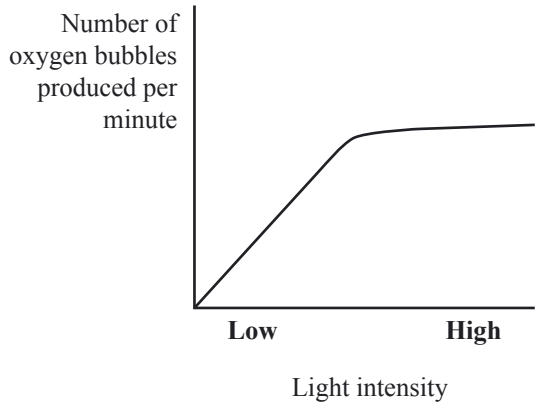
Canadian pond weed (*Elodea canadiensis)* is a common water plant that produces tiny bubbles of oxygen during photosynthesis. The number of bubbles produced per minute indicates the rate of photosynthesis.

The graph shows how the rate of photosynthesis in Canadian pond weed relates to light intensity.

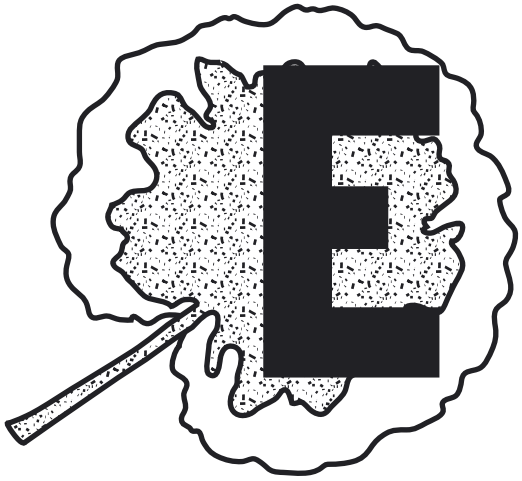


(a) **Describe** the effect of changing from low **to** high light intensity on the rate of photosynthesis.

(b) **Give a reason** why the photosynthesis rate does not increase any further at high light intensity.

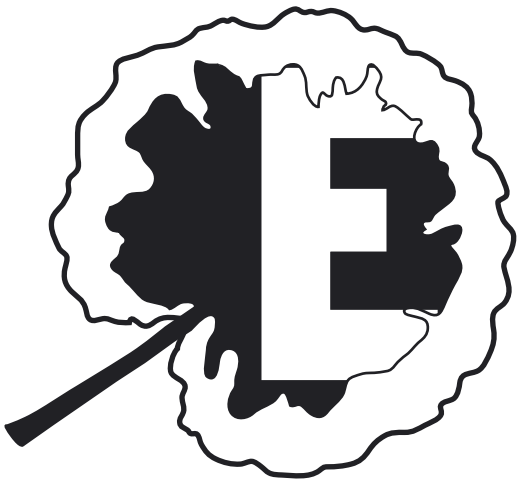
QUESTION THREE

A student carried out an investigation to see where starch was produced in a variegated (white and green) geranium leaf that had a black cardboard letter E attached to it (as in the first diagram below). The geranium plant had previously been kept in the dark for 12 hours.



The leaf was exposed to normal light conditions for 4 hours. It was then removed from the plant and tested for the presence of starch.

The second diagram (below) shows the leaf after it had been tested for the presence of starch. The darkly shaded portions of the leaf contain starch.



Use this experiment to **discuss** the importance of TWO factors necessary for starch production in a leaf.

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PART B: REPRODUCTION

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QUESTION FOUR

(a) Give **three** characteristics of flowers that would **attract** insects for pollination.

1. _____

_____

2. _____

_____

3. _____

_____

The photograph shows the male flowers of a deciduous tree. These are produced on the ends of the branches in early spring, before the new leaves appear.

D. G. Mackean, *Introduction to Biology*, John Murray, London, 1973, p 83.

(b) **Explain** how the position of the male flowers **and** the timing of flowering help pollination.

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QUESTION FIVE

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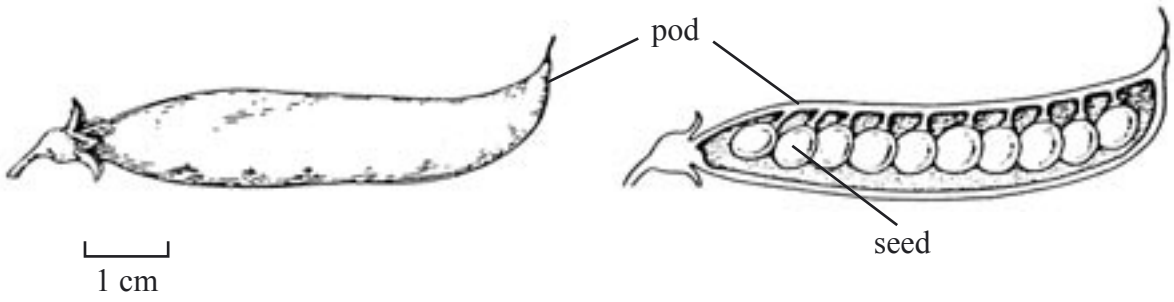
The pea pod is the fruit of the pea plant. When mature the pod contains 8 – 10 seeds.



(a) **Name** and **describe** how the **parts** of a pea flower develop into:

(i) the pea pod.

(ii) the pea seeds.

(b) **Explain** how the production of fruit provides an advantage to the survival of flowering plants.

QUESTION SIX

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Many flowering plants can reproduce sexually **and** asexually (or vegetatively).

(a) **Describe** TWO ways a flowering plant can naturally reproduce **asexually**.
(You may refer to named plants in your answer.)

(b) Compare asexual and sexual reproduction in flowering plants and **discuss** how these two processes differ **genetically**.

PART C: GROWTH

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QUESTION SEVEN

A child carved their initials deeply into the trunk of a tree, 1 metre above the ground, in 2005.

Describe the probable **position** and **appearance** of the carved initials in 10 years time.

QUESTION EIGHT

The following series of diagrams shows a typical example of germination and early seedling growth.

**[FOR COPYRIGHT REASONS,
THIS RESOURCE CANNOT BE REPRODUCED HERE.
SEE BELOW.]**

D. G. Mackean, *Life Study: A Textbook of Biology*, John Murray, London, 1981, p 83.

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(a) **Describe** how early seedling growth is **affected** by:

(i) gravity

(ii) light

(b) **Explain** why the seed has a store of carbohydrate.

(c) **Discuss** how **gravity** and **light** are important for successful early seedling growth.

Extra paper for continuation of answers if required.
Clearly number the question.

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Question number