EXEMPLAR

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NZQA
NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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For Supervisor's use only

Level 1 Biology, 2007

90167 Describe plant processes

Credits: Four
9.30 am Tuesday 27 November 2007

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 2–10 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 A			

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

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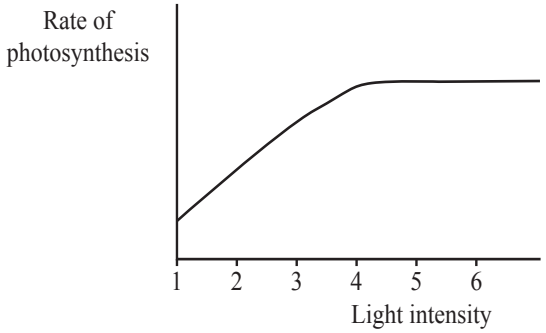
QUESTION ONE

(a) **Describe** the relationship between light intensity and the rate of photosynthesis as shown in the graph below.



increase then levels off

As light Intensity increases the rate of photosynthesis increases only up to a point. After this point the Rate of photosynthesis will remain the same because ① Chloroplast are absorbs max sunlight ② Co2 or temp acting as a limiting factor

A

(b) The leaves of plants normally have a green colour due to the presence of chlorophyll.

Describe the function of chlorophyll in the leaf.

The function of chlorophlly in the leaf is to provide the green colour to the plants. It is also one of the raw materials that is needed for the process of photosynthesis

N

- green colour of leaf
- no light absorption

In an investigation of photosynthesis, leaves of a destarched plant were treated as shown below, and the plant left in a sunny place for 2 days.

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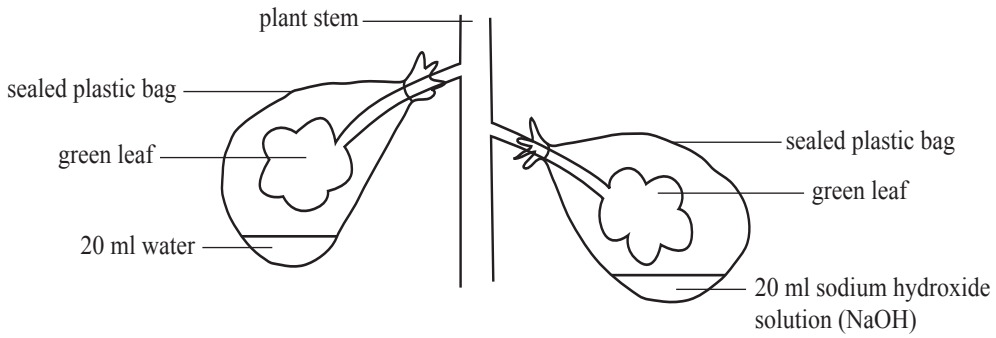

Leaf 1 **Leaf 2**

After two days an iodine test on both leaves gave the following results:

Leaf 1 **Leaf 2**

(c) **Explain** these results in terms of photosynthesis.

Leaf 1 photosynthesis produced starch.

These results shows that Leaf 1 ~~was~~ went through the process of photosynthesis and produces starch. This shown ~~by~~ by the iodine test. ~~The~~ Leaf 1 ~~was~~ made starch because it had all the raw materials for photosynthesis ~~The~~ Leaf 2 went brown because no starch was produced because it did not have all the raw material for the process of photosynthesis

Leaf 2 no starch

A

no NaOH absorbs CO_2,
so no photosynthesis therefore no starch
so no **M**

QUESTION TWO

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The diagram below shows the internal structure of a leaf.

Adapted from V. Slaughter, *Living Things* (London: Hodder & Stoughton, 1980), p 30.

Explain how TWO features of a leaf allow it to carry out photosynthesis.

In the palisade mesophill layer, palisade cells are tightly packed with each other. Thus the chloroplast can absorb max sunlight as possible. The Stoma cells control the intake of water, CO_2, O_2. [water + CO_2 needed for photosynthesis] Stoma cells can become turgid and flaccid depending on the intake of water.

N

- palisade tightly packed but needed to say contains lots of chloroplasts
- stoma cells control intake of water
- CO_2 yes.
- O_2 no (photosynthesis not respiration)

QUESTION THREE

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Plants need enough nitrogen for healthy growth. The diagram shows a plant that has grown in soil that did not have enough nitrogen in it.

For copyright reasons, this resource cannot be reproduced here.

Rogers and Poletti, *Year 11 Biology Workbook* (Hamilton: ABA Books, 2004), p 20.

Explain how plants use nitrogen for healthy growth.

Plants use nitrogen for the plants health. Meaning without nitrogen the plant will not survive at its best.

N

no mention of nitrogen needed to make proteins / chlorophyll

QUESTION FOUR

Assessor's use only

Different plant structures are built from specialised groups of plant cells called tissues. Each plant structure is made up of tissues designed to carry out specialised functions or processes.

The diagram shows the arrangement of plant tissues in a dicotyledon stem.

Don Bramley, *Yates Guide to Horticulture* (Auckland: Heinemann, 1987), p 22.

(a) Each year the stem will grow thicker by secondary thickening.

Explain how the stem grows thicker.

A set of cells grow between the vascular bundles called Cambium. This layer produces secondary xylem and secondary phloem that increases the thickness of the stem

N

no mention of cambium dividing to produce new xylem and phloem

(b) Plant growth at the shoot tips and the root tips shows some similarities and some differences.

Discuss reasons for the similarities and the differences in the way plants grow at the shoot tips compared with the root tips.

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Rogers and Poletti, *Year 11 Biology Workbook* (Hamilton: ABA Books, 2004), p 14.

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The main similiarity between the shoot tip and root tip is that they both contain a layer of meristem. A place were ~~number~~ mass of cell division occurs to increase the number of cells that increases ~~size~~ length of stem / root
where ever the cells grow they go through these process division → enlargement and specialization. ~~That is why~~.
The reason for the similarties and differences in way plants grow at the shoot tip compared with the root tips are
(i) The root have different function ~~comp~~ compared to the shoot

A

- has cell division for growth
- doesn't go on to talk about why: roots toward water, shoots toward light, etc

QUESTION FIVE

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Some plants can reproduce both sexually and asexually.

(a) **Describe** an advantage **to a plant** of sexual reproduction.

~~The~~ An advantage is that the new plant causes variation. Thus if the environmental condition goes for the worst. The new plant has a chance of survival.

A

(b) **Describe** THREE ways that seeds are dispersed.

The seed can be dispersed – mechanism

(1) Fleashy fruit make animal eat ~~eat~~ it thus transfer to a different place via the animal anus.

(2) By wind no mechanism

(3) By water no mechanism

N

(c) **Explain** how the dispersal of seeds can increase plant survival.

The dispersal of seed increases the plant survival by spreading them over the ~~p~~place and not all plant at the same place competing for resources.

~~The~~ By spreading they have a chance to reach a better habitat than before.

A

In sexual reproduction in flowering plants, some flowers are pollinated by insects and some are pollinated by the wind. Below are diagrams of an insect-pollinated flower and a wind-pollinated flower.

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insect-pollinated flower	wind-pollinated flower

V. Slaughter, *Living Things* (London: Hodder & Stoughton, 1980), p 150.

Annotation Key
I = Insect
W = Wind
see assessment schedule

(d) **Discuss** how the features of the flower allow pollination to occur in wind-pollinated flowers compared to insect-pollinated flowers.

The flower are not colourfull. In the ~~inserted~~ wind pollinated flowers the Stigamas is feathery and hang loose ~~thus~~ thus increases the surface area the ~~of~~ pollen ~~reaching~~ can attach to it. The Anthers hang loose as well, thus can be pushed by wind and releasing the pollen. The pollen are not that sticky as it would be in insert pollinated flowers they are dry so that they do not attach to obstacles when flying. Inserted pollinated flowers are big and conspicuous thus to attract insects ~~for~~ for pollination [prope of pollen]. They are scented to attract insects as well. These pollen are sticky ~~too~~ so that th attach to the insects body for pollination occurs.

feature why **W**

feature why **W**

feature why **I**

M