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NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

SUPERVISOR'S USE ONLY

Level 1 Biology, 2013

90928 Demonstrate understanding of biological ideas relating to the life cycle of flowering plants

9.30 am Thursday 14 November 2013

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of biological ideas relating to the life cycle of flowering plants.	Demonstrate in-depth understanding of biological ideas relating to the life cycle of flowering plants.	Demonstrate comprehensive understanding of biological ideas relating to the life cycle of flowering plants.

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 attempt 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 2–8 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.

TOTAL

ASSESSOR'S USE ONLY

You are advised to spend 60 minutes answering the questions in this booklet.

QUESTION ONE: POLLINATION

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Microscopic view of pollen transferred by wind.

www.flickr.com/photos/zeissmicro/7138583767/sizes/o/in/photostream/

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Pollen being blown from a flower.

www.naturalvisions.co.uk/ImageDetail.aspx?imdet=43015

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Microscopic view of pollen transferred by insect.

www.profimedia.si/photo/electron-micrograph-of-groundsel-pollen/profimedia-0094794016.jpg

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Flower being pollinated by a bee.

<http://adamnoosa.redbubble.com/sets/80081/works/4480088-honey-bee-in-flight>

Compare and contrast the process of pollination in wind-pollinated and in insect-pollinated plants.

In your answer you should:

- describe pollination
- explain the differences between the pollen from wind-pollinated plants and from insect-pollinated plants
- explain how the pollen structures of wind-pollinated plants and of insect-pollinated plants are suited to their method of dispersal
- discuss the differences between wind-pollinated and insect-pollinated flowers by comparing how they are suited to their methods of pollination.

QUESTION TWO: FERTILISATION

Fertilisation occurs after pollination.

(a) Describe what fertilisation is.

(b) Explain how fertilisation occurs in plants.

You may include a labelled diagram.

(c) Discuss how fertilisation changes the structure of the flower, and why this is important to at least TWO different types of seed dispersal.

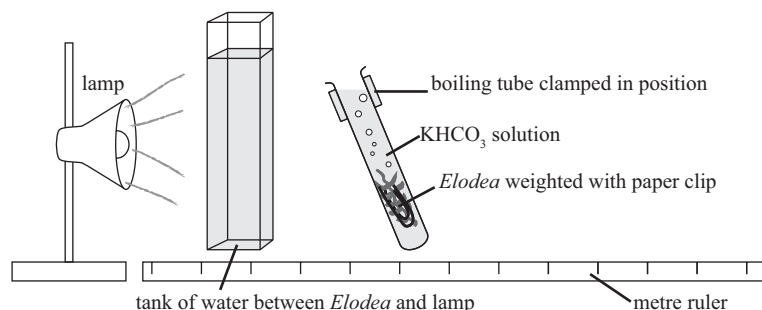
In your answer you should:

- explain what happens to the flower **after** fertilisation, and why this is important to seed dispersal
- explain the importance of seed dispersal to the plant.

QUESTION THREE: PHOTOSYNTHESIS

Two Year 11 students were investigating the effect of light intensity on photosynthesis. *Elodea* (oxygen weed) was added to a solution of potassium hydrogen carbonate (KHCO_3) using the experimental set-up shown below. The results from the experiment are shown in the table below.

Diagram to show the experiment set-up



Views of *Elodea* leaf cells

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adapted from www.nuffieldfoundation.org/practicalbiology/investigating-factors-affecting-rate-photosynthesis

http://botit.botany.wisc.edu/botany_130/Plant_cell/Elodea.html

Results:

Distance from lamp (cm)	Light intensity (lux)	Number of gas bubbles per minute			
		Trial 1	Trial 2	Trial 3	Average
5	2400	47	46	48	47
10	2200	46	48	47	47
15	2000	44	46	45	45
20	1800	44	42	43	43
25	1600	41	42	39	41
30	1400	40	34	37	37
35	1200	35	36	34	35
40	1000	33	34	32	33
45	800	27	25	26	26
50	600	18	16	17	17
60	400	12	10	11	11

- (a) Analyse the results of the experiment and the impact that changing the light intensity has had on photosynthesis of the *Elodea* plant.

In your answer you should:

- describe the process of photosynthesis
- explain why photosynthesis is important for *Elodea*
- explain how changing light intensity affects gas bubble production in *Elodea*
- discuss the significance of bubbles in this experiment and relate it to photosynthesis.

- (b) Explain why a solution of potassium hydrogen carbonate (KHCO_3) was used in this experiment.

