Assessment Schedule – 2006

Biology: Describe plant processes (90167)

Evidence Statement

Q	Evidence contributing to Achievement	Evidence contributing to Achievement with Merit	Evidence contributing to Achievement with Excellence
1	CO_2 (carbon dioxide) H_2O (water) **BOTH** required		
2	Features of layers 1 and 2 include: Layer 1: • cells closely packed together • cells full of chloroplasts Layer 2: • cells contain some chloroplasts • cells loosely packed (air spaces). • cells round with gaps • phloem and xylem present to transport water and glucose (A correct description for only ONE of the two layers required.)		
3(a)	Guard cells are pairs of sausage-shaped or banana-shaped cells, with a thicker inner wall (facing each other). They have chloroplasts, and are generally smaller than the surrounding epidermal cells. Two features either described or drawn (clear labelling needed).		
(b)	Stomata open to allow carbon dioxide to enter.	As for Achievement **PLUS** the explanation linking an increase or decrease in carbon dioxide levels to an increase or decrease in photosynthesis rate.	
4	Several basic ideas are possible: • Only some wavelengths of light are used in the photosynthesis process • only red and blue wavelengths of light are used in photosynthesis • green light is not used in photosynthesis, it is reflected • in dim light there may be no photosynthesis • in high light intensity the photosynthesis rate may not increase further if the light intensity is increased. One feature relating to light colour **AND** one feature relating to light intensity need be mentioned / described.	As for Achievement **PLUS** an explanation of why ONE factor is important, eg: Chlorophyll is a green pigment absorbing strongly in the red and blue region of the visible spectrum. **OR** Light intensity is significant, as there will be a minimum level of light intensity required for photosynthesis, and at upper levels of light intensity the chlorophyll will not be able to absorb more light energy, so photosynthesis rate will not increase.	As for Merit **PLUS**: A discussion of how the rate of photosynthesis will vary, depending on the wavelength (colour) and intensity of the light. There may be wavelengths and intensities where photosynthesis rate is already at a maximum, due to other limiting factors (eg, temperature, CO_2 availability), and others where photosynthesis rate is minimal because the wavelength cannot be absorbed.

5(a)	Flower parts are **named AND** the function is **described** as follows: **A =** Anther or stamen produces pollen. **B =** Sepals protect flower bud or support petals. **C =** Ovary contains ovules or develop into fruit. **D =** Ovules (egg or seed) contain female gametes or develop into seeds. Any THREE flower parts correctly named and described.		
5(b)	Flower 1 is insect or animal or bird pollinated and Flower 2 is wind pollinated.	Explanation links one feature of one type of flower to its method of pollination, eg: • The stigma of flower 1 is enclosed in the petals so the insect has to brush past it to collect nectar and the pollen sticks to the insect. • The stigma of flower 2 is feathery and hanging to collect pollen from the air currents.	
5(c)	The pollen tube grows to the ovary / ovule / female gamete **OR** the pollen tube contains the male gamete.	Gives a reason for the growth of the pollen tube, eg the pollen tube contains the male gamete(s), which must travel down the tube to fuse with the female gamete for fertilisation. Must clearly explain how the pollen tube leads to fertilization.	
6(a)	For Achievement, the answer must contain the **name** of ONE flowering plant that can reproduce asexually, **AND** a **description or name** of the method used by that named plant, eg: • Potato plants reproduce asexually using stem tubers or tubers. • Strawberry plants reproduce asexually by producing horizontal stems called runners. • Garlic plants reproduce asexually by producing bulbs. • Ginger plants reproduce asexually by producing swollen horizontal underground stems called rhizomes. • Dahlia plants reproduce asexually by producing swollen root tubers. • *Gladiolus* plants reproduce asexually by producing stacks of stem bases called corms. • Lilac plants can reproduce asexually by producing adventitious shoots from lateral stems that touch the soil. This method is called layering.		

(b)	There is a good description of **EITHER** asexual reproduction **OR** sexual reproduction. Requires any **TWO** correct statements, eg: • Asexual reproduction only requires one parent plant. • Asexual reproduction only involves mitosis. • Sexual reproduction always involves gamete production. • Sexual reproduction produces offspring that are all different from each other and their parents.	Answer describes both, **AND** compares at least **ONE** aspect, eg: • Asexual reproduction does not involve the production of gametes; sexual reproduction requires gamete production. • Asexual reproduction involves only mitosis, whereas meiosis is required for gamete production in sexual reproduction. • Asexual reproduction produces genetically identical offspring; sexual reproduction produces genetically unique offspring. It is important that in a question requiring the **difference** to be pointed out, **BOTH** methods must be mentioned in a comparison.	
(c)	At least TWO advantages and / or disadvantages of asexual reproduction, where the advantages or disadvantages are related to asexual reproduction, but the specific advantage and / or disadvantages are not clearly communicated.	At least ONE advantage or disadvantage that is specifically related to either reproduction success or dispersal, eg: Asexual reproduction produces offspring with no genetic variation, identical to the parent plant. Their lack of diversity could be a problem if the environmental conditions changed. All offspring would be similarly affected.	Both reproduction AND dispersal. Advantages and disadvantages of asexual reproduction include: **Advantages**: • no need for wasteful gamete production • quick and reliable reproduction in a favourable habitat • one parent plant required, no need for cross pollination • no variation, offspring identical to the successful parent plant. • no need to waste time waiting for pollen to be transferred. • offspring still attached to parent so is able to gain nutrients, higher chance of survival • offspring growing in an environment they are adapted to because they have the same genetic make up as their parents. • useful for farmer as he can reproduce wanted traits **Disadvantages**: • offspring plants are genetically identical to each other and the parent plant, so no long-term diversity on which natural selection could act, ie long-term vulnerability to environmental change • there is no production of fruit, so there is no significant dispersal away from the parent plant and the other asexual offspring plants. • offspring are not dispersed far from parents so they compete for space etc. • offspring can't colonies new areas.

7	Any correct statement about fruit structure in general, eg: • fruit is for the dispersal of seeds • a fruit always contains seeds • the fruit develops from the flower.	The explanation outlines that a true fruit develops from the ovary of a flower, and contains seeds. Both pumpkin and lemon flowers have ovaries that enlarge (swell) and mature into structures that disperse seeds (= fruit).	
8(a)	Store starch / food in the seed.		
(b)	The two main environmental conditions are: • water or moisture (to rehydrate the seed) • warm temperatures (to increase metabolic activity). • oxygen NOT hot or cold A change in day length also can trigger germination, providing the other two conditions are present. Two environmental factors are needed for Achievement.		
(c)	**One** structure of seeds must be listed or described, without a correct explanation of its function prior to germination, eg: • tough testa • endosperm or cotyledons • lack of water, state of dehydration • micropyle.	As for Achievement, **plus** the explanation includes the function of the component, eg: • The testa is the tough impermeable layer around the seed. This protects it while it is dormant and stops germination unless enough water is present. • The endosperm and cotyledons have enough starch stored so that the seeds can metabolise it slowly during dormancy for several years and not lose viability. • As a seed ripens it dehydrates itself and the metabolic activity slows right down. The enzyme necessary for germination requires water. • Oxygen can enter through the micropyle for cell respiration (metabolism). **ONE** of the above (or the equivalent explanation)	

9	The description should state that cambium cells are **dividing cells** that produce new tissue during g**rowth** of young green stems **OR** Cambium cells form new xylem and phloem cells (transport or conducting cells) **OR** Cambium cells divide to increase the girth or diameter of a young stem. **OR** Cambium cells are involved with secondary growth or thickening		

Judgement Statement

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Achievement	Achievement with Merit	Achievement with Excellence
EIGHT questions answered correctly. Minimum 8 × A	TWELVE questions answered correctly, including at least FOUR at Merit level. Minimum 4 × M + 8 × A	TWELVE questions answered correctly, including at least FOUR at Merit level and at least ONE at Excellence level. Minimum 1 × E + 4 × M + 7 × A