

Assessment Schedule – 2007**Biology: Describe plant processes (90167)****Evidence Statement**

Q	Achievement	Achievement with Merit	Achievement with Excellence
One (a)	As the light intensity increases, so too does the rate of photosynthesis up to a maximum rate then it levels off or becomes constant		
(b)	Describes the function of chlorophyll in the leaf as being for the absorption / trap/ capture (sun)light (and use of light energy to make glucose).		
(c)	Describes the presence of starch in leaf 1 and the absence of starch in leaf 2 Eg: Leaf 1 contains starch and leaf 2 does not. OR Leaf 1 has been photosynthesising and leaf 2 has not.	<p>Identifies reasons for the difference in results for leaf 1 and leaf 2. Must include that leaf 1 made starch by photosynthesis as it had all the materials (light, CO₂, water) while leaf 2 did not make starch because carbon dioxide was absent therefore photosynthesis did not occur</p> <p>Eg: Leaf 1 went a blue/black colour because starch is present in the leaf and iodine goes a blue/black colour if starch is present. Starch is present in leaf 1 because leaf 1 was able to photosynthesise using carbon dioxide gas available to the plant. However leaf 2 remained a yellow/brown because there is no starch present. This is because Leaf 2 did not have any carbon dioxide available to it because the CO₂ was absorbed by the sodium hydroxide. Therefore leaf 2 could not photosynthesise or produce starch.</p>	

Two	<p>Describes the function of TWO or more features of a leaf.</p> <p>Eg:</p> <p>The stomata allow carbon dioxide gas to diffuse into the leaf.</p> <p>OR</p> <p>The vascular tissue (xylem) allows water to be transported to the leaf to be used in photosynthesis.</p> <p>OR</p> <p>The air space allows easy diffusion of CO₂</p> <p>OR</p> <p>Lots of chloroplasts in palisade cells to capture light</p>	<p>Gives reasons for ONE leaf features with respect to photosynthesis.</p> <p>Eg:</p> <p>There are numerous air spaces within the leaf. This allows carbon dioxide gas, which is required for photosynthesis, to diffuse from the stomata to the chloroplasts located in the mesophyll and palisade cells where PS occurs; oxygen gas (a waste product of PS) diffuses out of the palisade and mesophyll cells into the airspaces and then out through the stomata.</p> <p>Vascular tissue provides strength to leaf so it can be held upright and get maximum sunlight for photosynthesis. Palisade cells are packed with green chloroplasts which are the site of photosynthesis. These cells are closely packed on the upper side of leaf because this side receives most of the light therefore maximises photosynthesis.</p>	
Three	<p>Describes in general terms why plants need nitrogen for healthy growth.</p> <p>Eg:</p> <p>Plants need nitrogen for making chlorophyll (for photosynthesis)/ plant proteins (for plant structures).</p>	<p>Gives a reason why plants need nitrogen for healthy growth.</p> <p>Eg:</p> <p>Plants need nitrogen in the soil so that it can be absorbed through the root hairs with water and used in building essential plant molecules eg chlorophyll, plant proteins to build plant cells, nucleic acids. Without nitrogen the plant would not be able to make chlorophyll and therefore would not be able to photosynthesise. Etc.</p>	
Four (a)	<p>Describes how the stem grows thicker.</p> <p>Eg:</p> <p>The cambium divides/ produces to form new xylem and new phloem.</p> <p>The meristematic cells divide to form new xylem and new phloem.</p>	<p>Identifies reasons for how the stem grows thicker.</p> <p>Eg:</p> <p>A ring of cambium forms in the stem. Each growing season the cambial cells divide repeatedly forming rows of secondary xylem towards the centre and secondary phloem towards the outside of the stem. This results in the stem becoming thicker.</p>	

(b)	<p>Describes ONE similarity or difference</p> <p>Eg: The process in root tips and shoot tips is cell division, mitosis or primary growth.</p> <p>OR</p> <p>Roots grow downwards and shoots grow upwards or towards the light.</p>	<p>Explains why there are similarities or differences. Explains ONE ie why it grows up OR down</p> <p>Eg: At tips cell division/ mitosis/ primary growth occurs resulting in the roots growing down to receive water a raw material for photosynthesis OR At tips cell division/ mitosis/ primary growth occurs resulting in the shoots growing up to receive light a raw material for photosynthesis</p> <p>The process in root tips and shoot tips is cell division, mitosis or primary growth. This results in an increasing number of cells and the shoot or root becoming bigger causing it to grow upwards for light for photosynthesis OR downwards for water for photosynthesis</p> <p>OR</p> <p>In roots the division of cells results in the root growing downwards (positive geotropism) towards a source of water required for plant support and photosynthesis, while the shoot grows upwards (positive phototropism) towards the light necessary for photosynthesis.</p>	<p>Compares a similarity and a difference. Explains why it grow up and down</p> <p>Eg: The growing parts of plants are actively dividing by mitosis to make new cells and tissues. These tissues elongate and specialise. However in roots the division of cells results in the root growing downwards (positive geotropism) towards a source of water while the shoot grows upwards (positive phototropism) towards the light necessary for photosynthesis.</p> <p>OR</p> <p>Once the new cells are produced they elongate and become bigger, and then differentiate or change into specialised cells and tissues required by the plant. This process occurs in both root and shoot tips. In roots however, the cells may become, for example, root hair cells for water absorption or root cap cells that secrete a slime to ease the passage of the root through the soil as it grows. In shoots, the cells may differentiate into, for example leaf epidermal cells which develop a waxy cuticle for water conservation, or leaf palisade cells with many chloroplasts for photosynthesis.</p>
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Five (a)	<p>Describes an advantage of sexual reproduction to a plant.</p> <p>Eg: Sexual reproduction results in increased variation.</p> <p>OR</p> <p>Produces seeds for dispersal</p> <p>OR</p> <p>Produces large numbers of seeds for dispersal</p>		
(b)	<p>Names and describes TWO ways – Method and mechanism</p> <p>Eg: Seeds have wings so they can be dispersed by the wind. Seeds can be caught using hooks in an animal's fur and moved with it, Seeds have air sacs so they can float and be dispersed by water etc.</p>		
(c)	<p>Describes ONE way that seed dispersal increases plant survival.</p> <p>Eg: If seeds are dispersed there is a better chance that some seeds will land in a place with conditions favourable for germination. If seeds are dispersed there is less competition</p>	<p>Gives reasons for how seed dispersal will increase plant survival and why this helps it survive</p> <p>Eg: If seeds are dispersed there is a better chance that some seeds will land in a place with favourable conditions for germination. This means more offspring are likely to grow. Also, the plant's survival is increased by dispersal because there is increased chance of colonising new areas increasing its range. Dispersal results in reduced competition for light, water, space, minerals etc with the parent plant and other new plants, thus increasing the chances of offspring to grow and reproduce themselves. etc</p>	

(d)	<p>FOUR features described</p> <p><u>Wind</u></p> <p>Flowers that are pollinated by the wind have dull coloured, small petals and no scent or nectar.</p> <p>OR</p> <p>The anthers and stigma hang outside the flower.</p> <p>OR</p> <p>The anthers and stigma are large in wind-pollinated flowers.</p> <p>OR</p> <p>The anthers produce a large amount of pollen etc</p> <p><u>Insect</u></p> <p>Flowers that are pollinated by insects are bright coloured, sweet smelling, produce nectar.</p> <p>OR</p> <p>The anthers and stigma are located within the flower.</p> <p>etc</p>	<p>Lists FOUR features and gives a reason for the difference in the structure related to the difference in functions for wind OR insect-pollinated flowers for TWO features.</p> <p>These features must be explained</p> <p>Eg:</p> <p><u>Insect</u></p> <p>Insect-pollinated flowers need to attract insects to transport their pollen from their anther to the stigma of another flower (if cross-pollination). In order to attract insects, insect-pollinated flowers are often brightly coloured, have scent and nectar so the insect comes into the flower and collects or receives the pollen</p> <p>OR</p> <p>The anthers of insect-pollinated flowers produce large pollen grains with a rough surface. This helps them stick to the insect's body as it brushes against the anther and remain there until it is brushed off on a stigma.</p> <p>OR</p> <p>The anthers and stigmas of insect-pollinated flowers are usually found inside the petals. This helps to ensure that as the insect enters the flower in search of nectar or enticed by the scent it will brush against the anther and collect pollen.</p> <p>OR</p> <p><u>Wind</u></p> <p>The pollen produced by wind-pollinated flowers is usually small, light and smooth, and many grains are produced. This is so they are more easily carried on the wind and are more likely to land on a stigma.</p> <p>OR</p> <p>In wind-pollinated flowers the anther and stigma tend to be large and hang outside the small petals. This ensures that both are more exposed to the wind to ensure pollen is collected from the anther and will land on the stigma of another flower. etc</p>	<p>Compares and contrasts at least TWO reasons for the differences in structures related to the differences in functions for wind-pollinated AND insect-pollinated flowers.</p> <p>Eg:</p> <p>Insect-pollinated flowers need to attract insects to transport their pollen from their anther to the stigma of another flower (if cross-pollination). In order to attract insects, insect-pollinated flowers are often brightly coloured, have scent and nectar so that the insect comes into the flower and collects or leaves pollen. However flowers that use the wind to transport their pollen have no need to attract pollinators and therefore do not generally have brightly coloured petals, scent or nectar, but rather, are small and often green.</p> <p>OR</p> <p>The anther of insect-pollinated flowers produces large pollen grains with a rough surface. This helps them stick to the insect's body as it brushes against the anther and remain there until it is brushed off on a stigma. The pollen produced by wind-pollinated flowers is different. The grains are usually small, light and smooth and many are produced. This is so they are more easily carried on the wind and are more likely to land on a stigma.</p> <p>OR</p> <p>The anthers and stigmas of insect-pollinated flowers are usually found inside the petals. This helps to ensure that as the insect enters the flower in search of nectar, or enticed by the scent, it will brush against the anther and collect pollen and likewise brush against the stigma and deposit pollen. However, in wind-pollinated flowers the anther and stigma tend to be large and hang outside the small petals. This ensures that both are more exposed to the wind to ensure pollen is collected from the anther, and will land on the stigma of another flower. etc</p>
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Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
Total of SIX opportunities answered at Achievement level or higher. $6 \times A$	Total of at least SIX opportunities answered with FOUR at Merit level or higher. $4 \times M + 2 \times A$	Total of at least SIX opportunities answered with ONE at Excellence level and FOUR at Merit level. $1 \times E + 4 \times M + 1 \times A$