

Assessment Schedule – 2018

Biology: Demonstrate understanding of biological ideas relating to the life cycle of flowering plants (90928)

Evidence Statement

Q	Achievement	Merit	Excellence
ONE	<p>Examples of possible ideas include:</p> <ul style="list-style-type: none"> • The purpose of photosynthesis (PS) is to produce glucose / food / chemical energy for the plant. • Correct word equation/unbalanced chemical equation/states reactants and products, OR PS is the process whereby plants transform light energy into chemical energy • As light intensity / CO₂ concentration increases, the rate of PS increases (to a point). • The rate of PS is highest at an optimal temperature. / The rate of PS slows down / stops when the temperature gets too cold and when it gets too hot. • States the function of ONE leaf structure = e.g. stomata let CO₂ in / O₂ out / PS occurs in the chloroplasts in the leaf, etc. 	<p>Examples of possible explanations of environmental factors include:</p> <ul style="list-style-type: none"> • The rate of PS is affected by environmental factors, for example, temperature. When the temperature is too cold, the rate slows down. This is because PS is a chemical reaction controlled by enzymes that work best at an optimal temperature and slow down in cooler temperatures. If the temperature is too hot the enzymes that control the rate of PS can become denatured and not work any longer causing PS to stop altogether eventually. • The rate of photosynthesis increases as carbon dioxide concentration/light increases up to a certain point. This is because CO₂ /light is needed for Photosynthesis but at some point other factors, such as water, will become limiting/other factors must be in adequate supply for the rate to keep increasing (limiting factors must be named). <p>Explains how two or more structures of the leaf work together to allow photosynthesis to occur (without reference to rate). For example:</p> <ul style="list-style-type: none"> • The spongy mesophyll layer in the leaf has air spaces to allow for movement of CO₂ gas to the cells where PS occurs. 	<p>Examples of possible discussions include:</p> <ul style="list-style-type: none"> • The spongy mesophyll layer in the leaf has air spaces in it. This allows for movement of CO₂ gas / to the cells where PS occurs, allowing PS to proceed using the required CO₂ raw material. The air spaces therefore allow the rate of PS to be maximised. • Clear epidermis allows light to pass through to the palisade layer/ mesophyll / chloroplasts in order to maximise the rate photosynthesis. • Palisade layer is near the top of the leaf and has more chloroplasts than other parts of the leaf. This allows maximum light capture in the organelle that carries out photosynthesis, which will maximise PS rate. • Xylem tubes bring water into the leaf, close to the palisade layer. This allows water to diffuse into the cells to maximise the rate of photosynthesis.

NØ	N1	N2	A3	A4	M5	M6	E7	E8
No response / no relevant evidence.	ONE relevant idea given.	TWO relevant ideas given.	THREE relevant ideas given.	FOUR relevant ideas given.	Explains TWO relevant ideas.	Explains THREE relevant ideas.	Links the interaction of TWO environmental factors and structure of the leaf to the way it maximises the rate of PS.	Links the interaction of THREE environmental factors and structure of the leaf to the way it maximises the rate of PS.

Q	Achievement	Merit	Excellence
TWO	<p>Examples of possible ideas include:</p> <ul style="list-style-type: none"> • Pollination is the transfer of pollen from anther to stigma. • Fertilisation is the fusing of male gamete (from pollen) with female gamete (ovule). • Describes ONE function of a structure related to pollination or fertilisation, e.g. anthers produce pollen / colourful flowers / nectar / scent attract pollinator, etc. • A pollen grain grows a pollen tube. • Pollination / fertilisation are important in the life cycle of the flowering plant because they ensure the species continues. 	<p>Examples of possible explanations include:</p> <ul style="list-style-type: none"> • Pollination is important to the life cycle of a flowering plant because it ensures that the male gamete is brought close to the female gamete so that fertilisation can occur. • Fertilisation / cross pollination is important to the life cycle of a flowering plant because it ensures the mixing of genetic information / variation in offspring / unique offspring. • After the pollen grain lands on the stigma it grows a pollen tube. This is because it needs to reach the ovule in the ovary (for fertilisation). • Explains structure wind pollinated OR animal pollinated flowers <p>E.g. Anthers of wind pollinated flowers protrude outside of flower in order for wind to catch the pollen, and the pollen is light so that it will easily travel on the wind OR nectar is located deep in flower so that animal must brush anther / stigma and collect / deposit pollen when searching for nectar.</p>	<p>Examples of possible discussions include:</p> <ul style="list-style-type: none"> • After the pollen grain lands on the stigma it grows a pollen tube. This is because it needs to reach the ovule in the ovary. The ovum produces a chemical that guides pollen tube to ovum. The liquid on the stigma pollen tube start to grow. The pollen tube ensures the delivery of the male gamete to the female gamete in the ovary, maximising successful fertilisation and seed development. • The anther of wind pollinated flowers produces lots of aerodynamic pollen that can travel long distances on the wind. This maximises the chances that pollen will actually land on a stigma, and therefore the success of pollination. • Colourful petals / nectar can attract insect pollinators. This ensures many pollinators will visit the flower in order to maximise pollination success. • The stigma is often sticky to effectively trap pollen grains ready for travel to the ovary. This ensure the pollen stays on the stigma long enough to grow the pollen tube to ensure fertilisation.

NØ	N1	N2	A3	A4	M5	M6	E7	E8
No response / no relevant evidence.	ONE relevant idea given.	TWO relevant ideas given.	THREE relevant ideas given.	FOUR relevant ideas given.	Explains TWO relevant ideas.	Explains THREE relevant ideas.	Links TWO flower structures and functions to the success of pollination OR fertilisation.	Links THREE flower structures and functions to the success of pollination AND fertilisation.

Q	Achievement	Merit	Excellence
THREE	<p>Examples of possible ideas include:</p> <ul style="list-style-type: none"> Plants need raw materials to grow, e.g. water, sugars, proteins. Primary growth makes plants taller / increase in height / length OR creates differentiated cells. Primary growth occurs from meristems / tips. Secondary growth is when the stem grows wider. Secondary growth results in (secondary) xylem / phloem. Secondary growth occurs from the cambium / lateral meristem cells. Secondary growth gives stability / support / transport / anchorage Primary growth is important to allow the plant to access light / roots to access water. 	<p>Examples of possible explanations include:</p> <p>Explains importance of Primary growth:</p> <ul style="list-style-type: none"> Eg Primary growth involves the creation of differentiated cells which is important because the plant requires different types of cells for different jobs. / Primary growth allows plants to grow tall enough to access light for photosynthesis / roots to access water for photosynthesis, etc. <p>Explains importance of secondary growth:</p> <ul style="list-style-type: none"> E.g. Secondary growth is important for stability so the plant does not blow over in a storm/wind/ etc. /Bark provides protection against insects/bacteria etc/transport water for photosynthesis. Explains how TWO environmental factors affect primary growth e.g. <p>The amount of water affects the rate of primary and secondary growth. This is because water is required for photosynthesis / cell elongation / mitosis / which are needed for growth / water creates larger xylem and growth rings. AND Light is needed to maximise photosynthesis which provides glucose / energy and building supplies for growth.</p>	<p>Examples of possible discussions include:</p> <ul style="list-style-type: none"> Primary growth is important to the flowering plant because it allows the plant to grow taller and rise above its competition to gain access to sunlight, which is needed for photosynthesis. Primary growth is important because it provides the plant with the many different types of specialised cells it needs to carry out its life processes. This provides the plant with different types of cells for different jobs, eg leaf cells involved in photosynthesis and flowers for reproduction. Primary growth of roots allows the roots to grow deeper / cover more area for increased absorption of water / Mg for chloroplasts which is needed for photosynthesis. Secondary growth is important to give the plant strength and support to allow it to survive for several years. These stronger stems will also support branches with many leaves and flowers, thus continuing to photosynthesise and reproduce respectively. Secondary growth is important because it provides the xylem and / or phloem to transport glucose (phloem)/water (xylem) around the plant for further growth of leaves for photosynthesis / flowers for reproduction / support respiration for further growth / reproduction.

NØ	N1	N2	A3	A4	M5	M6	E7	E8
No response / no relevant evidence.	ONE relevant idea given.	TWO relevant ideas given.	THREE relevant ideas given.	FOUR relevant ideas given.	Explains TWO relevant ideas.	Explains THREE relevant ideas.	Discusses TWO ways that ONE type of growth is important to the plant by increasing photosynthesis / reproduction / respiration or reducing competition.	Discusses TWO ways that BOTH types of growth are important to the plant by increasing photosynthesis / reproduction / respiration / reducing competition.

Cut Scores

Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
0 – 7	8 – 13	14 – 19	20 – 24