

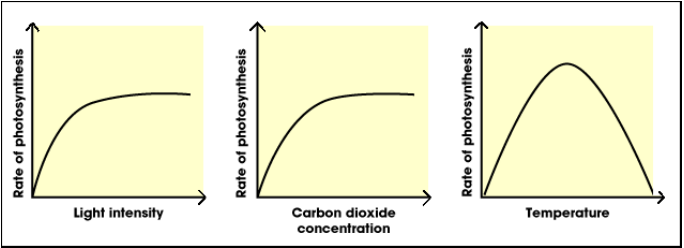
**Assessment Schedule – 2020****Biology: Demonstrate understanding of biological ideas relating to the life cycle of flowering plants (90928)****Evidence Statement**

Q	Achievement	Merit	Excellence
ONE	<p><b>Describes</b> (single, simple ideas):</p> <ul style="list-style-type: none"> <li>the function of seed parts</li> <li>ways that seeds can be dispersed</li> <li>benefits of seed dispersal.</li> <li>an importance for seed dispersal.</li> </ul> <p>Examples of <b>possible</b> described ideas:</p> <ul style="list-style-type: none"> <li>Cotyledon provides energy for the seedling.</li> <li>Testa protects the seed.</li> <li>Radicle provides early stability.</li> <li>Plumule develops into early leaves.</li> <li>Seeds can be dispersed through wind / water / animals / etc.</li> <li>Seed dispersal allows new areas to be colonised.</li> <li>Seed dispersal reduces competition.</li> <li>(Sexual) reproduction of seeds help to increase genetic diversity.</li> <li>Seed dispersal is necessary to continue on the life cycle of the plant species.</li> </ul>	<p><b>Explains</b> (gives reasons and / or examples):</p> <ul style="list-style-type: none"> <li>How environmental factors affect seed dispersal.</li> <li>How environmental factors affect seed germination.</li> <li>Why seed dispersal benefits the plant.</li> </ul> <p>Examples of <b>possible</b> explanations include:</p> <ul style="list-style-type: none"> <li>Some types of seed, e.g. dandelion seeds, require wind for dispersal. These types of seeds are usually light in weight, aerodynamic, or have structures designed to catch the wind. This means that if they grow in areas protected from wind, they are less likely to be dispersed very far from the parent plant.</li> <li>Seed germination requires specific environmental factors such as water. Water enters the seed via the micropyle, a small hole in the testa and activates enzymes in the cotyledon that starts the digestive process of the starch (also in cotyledon). This energy released is required for the process of germination.</li> <li>Dispersal of seeds away from their <b>parent plant</b> reduces the chance of competition for light space and other nutrients that could occur if the offspring grew close to the parent plant. This means that new seedlings will have access to more light and water and other resources allowing for better and faster growth.</li> </ul>	<p><b>Discusses</b> (makes links between explanations and includes an example):</p> <ul style="list-style-type: none"> <li>How different parts of the seed are required for germination and dispersal.</li> <li>How environmental factors affect seed germination and dispersal.</li> </ul> <p>Examples of <b>possible</b> discussions include:</p> <ul style="list-style-type: none"> <li>The testa provides protection for the seed until water (activating the enzymes) and oxygen enters. Oxygen is required for respiration to take place and this releases the energy required to support other life processes, such as growth / mitosis of the radicle and plumule (via mitosis). The radicle will grow into the soil and develop roots that collect water, while the plumule will grow to develop early leaves. These will in turn capture light energy and carry out photosynthesis.</li> <li>Seed dispersal is necessary as it allows plants to avoid <b>competition</b> between other offspring and parents, while also providing the opportunity to colonise new areas. By allowing seeds to germinate in areas distant away from the parent plants, competition for light, space, water etc. is avoided and allows the new plant to grow without these limiting factors. Examples include: <ul style="list-style-type: none"> <li>Dandelions that are dispersed by the wind have seeds that are light and have a light dry fruit with a parachute of fine hairs attached that allows the seed to float in the air and be blown away from the parent by the wind.</li> <li>Seeds that are dispersed by animals have a fleshy, juicy fruit that surrounds the seed(s). This encourages the animal to eat the fruit, after which the animal transports the seed inside its gut and deposits the seed in a different place. The testa of seeds dispersed in this way must be resistant to the digestive chemicals found in the gut of animals.</li> </ul> </li> </ul>

N0	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 ONE relevant idea.	Explains at least TWO relevant ideas.	Discusses ONE idea.	Discusses TWO ideas.

Q	Achievement	Merit	Excellence
TWO	<p>Describes the environmental factors that plants need to grow, and processes of primary and secondary growth.</p> <p>Examples of possible ideas include:</p> <ul style="list-style-type: none"> <li>Plants need raw materials to grow, e.g. water, sugars, proteins.</li> <li>Primary growth makes plants taller / increase in height / length OR creates differentiated cells.</li> <li>Primary growth occurs from meristems / tips.</li> <li>Secondary growth is when the stem grows wider.</li> <li>Secondary growth results in (secondary) xylem / phloem.</li> <li>Secondary growth occurs from the cambium / lateral meristem cells.</li> <li>Secondary growth gives stability / support / transport / anchorage.</li> <li>Primary growth is important to allow the plant to access light / roots to access water.</li> <li>Describes requirement and products of primary growth.</li> </ul>	<p>Explains:</p> <ul style="list-style-type: none"> <li>the function of different cells / tissues in primary growth</li> <li>the function of different cells / tissues in secondary growth</li> <li>the importance of primary growth</li> <li>the importance of secondary growth.</li> </ul> <p>Examples of possible explanations of the importance of primary growth include:</p> <ul style="list-style-type: none"> <li>Primary growth involves the creation of differentiated cells, which is important because the plant requires different types of cells for different jobs.</li> <li>Primary growth allows plants to grow tall enough to access light for photosynthesis / roots to access water for photosynthesis, etc.</li> </ul> <p>Examples of possible explanations of the importance of secondary growth include:</p> <ul style="list-style-type: none"> <li>Secondary growth is important for stability, so the plant does not blow over in a storm / wind / etc.</li> <li>Bark provides protection against insects / bacteria etc / transport water for photosynthesis.</li> </ul> <p>Examples of possible explanations of the different types of cells / tissues include:</p> <ul style="list-style-type: none"> <li>Root hair cells that grow downwards absorb water via osmosis to help with the plant's photosynthesis during primary growth.</li> <li>Xylem tissue is made up of xylem tubes that are hollow throughout the plant that can transport water.</li> <li>Phloem cells transport dissolved minerals and nutrients throughout the plant.</li> </ul>	<p>Discusses primary and secondary growth with examples of cell types:</p> <ul style="list-style-type: none"> <li>Primary growth is important to the flowering plant because it allows the plant to grow taller, providing it access to more sunlight exposure, increasing its rate of photosynthesis, therefore allowing it to grow faster and rise above its competition.</li> </ul> <p>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, e.g. leaf cells involved in photosynthesis and flowers for reproduction.</p> <p>Primary growth of roots allows the roots to grow deeper / cover more area for increased absorption of water / Mg for chloroplasts which are needed to increase the efficiency of photosynthesis.</p> <ul style="list-style-type: none"> <li>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.</li> </ul> <p>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.</p>

N0	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 ideas.	Explains THREE ideas.	Discusses ONE point.	Discusses TWO points.

Q	Achievement	Merit	Excellence
THREE	<p>Describes (single, simple ideas):</p> <ul style="list-style-type: none"> <li>the process of photosynthesis</li> <li>how photosynthesis provides energy for plant life processes</li> <li>how environmental factors will affect the rate of photosynthesis.</li> </ul> <p>Examples of possible ideas include:</p> <ul style="list-style-type: none"> <li>photosynthesis supports growth / seed production / flowering / provides glucose for respiration</li> <li>photosynthesis requires carbon dioxide and water and produces oxygen and glucose</li> <li>effect of an environmental factor described (eg, as light intensity / carbon dioxide increases, so does the rate of photosynthesis).</li> </ul> 	<p>Explains:</p> <ul style="list-style-type: none"> <li>Why photosynthesis is important to the life cycle of a plant.</li> <li>How an environmental factor influences the rate of photosynthesis.</li> </ul> <p>Examples of possible explanations include:</p> <ul style="list-style-type: none"> <li>Photosynthesis produces glucose, which can be used as an energy source to support further growth of new leaves, flowers, fruit and / or seeds. Energy available for this growth allows for successful fruit production, seed development (and germination) and increases the likelihood of successful seed dispersal.</li> <li>As the light intensity increases, the rate of photosynthesis also increases, until it reaches a maximum rate and no further increases in the rate of photosynthesis can occur.</li> <li>As the temperature increases, the rate of photosynthesis also increases, until an optimum temperature, where the rate will eventually drop.</li> </ul>	<p>Discusses the connection between environmental factors and the impact on the rate of photosynthesis:</p> <p>Examples of possible discussions include:</p> <ul style="list-style-type: none"> <li>Carbon dioxide enters the leaf through the stomata. As the carbon dioxide concentration increases, the rate of photosynthesis also increases until it reaches a maximum rate of photosynthesis. At this point, other factors such as water / light / chloroplast availability becomes a limiting factor, so even if the concentration continues to increase, there will be no further increase in the rate of photosynthesis.</li> <li>Similarly, as the light intensity increases, the rate of photosynthesis also increases until it reaches a maximum rate. At this point, all the chloroplasts inside the leaf are (saturated) absorbing as much light as possible, so even if the intensity increases, no further increases in the rate of photosynthesis can occur.</li> <li>As the temperature increases, the rate of photosynthesis also increases, until an optimum temperature, where the enzymes involved in the reaction eventually denature and are unable to catalyse the reaction any further. After this point, the rate of photosynthesis will gradually decrease and eventually stop.</li> </ul>

N0	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 ONE relevant idea.	Explains at least TWO relevant ideas.	Discuss the impact of ONE environmental factor on photosynthesis.	Discuss the impact of TWO or more environmental factors on photosynthesis.

**Cut Scores**

Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
0 – 8	9 – 14	15 – 19	21 – 24