

Assessment Schedule – 2017

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

Evidence Statement

QUESTION ONE

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 ideas.	Explains at least THREE ideas.	Discusses one point.	Discusses both points.
<p>Examples of possible ideas include:</p> <ul style="list-style-type: none"> • Describes the process of pollination. Pollination is the transfer of pollen from the anther of a flower to the stigma of a flower • Describes insect / animal pollination. E.g. insect / animal consumes nectar and pollen is transferred to the body, they go to another flower and pollen is transferred. • Describes wind pollination. E.g. wind flowers release pollen into the air (environment) and rely on chance (wind) to transfer it. • Describes the features of an animal / insect pollinated flower. E.g. flower will have bright petals, nectar, scent / Has anthers / stigma inside petals / produces smaller quantities of pollen / produces pollen that has a rough / sticky surface / more accurate method of pollination • Describes the features of a wind- pollinated flower. • E.g. flowers are often dull, uncoloured, small, unscented flowers / has stigma and anthers that hang outside the petals (flower) / produces large amounts of pollen / produces pollen that is light-weight / small / aerodynamic / less accurate method of pollination • Describes the importance of pollination in the life-cycle of a plant. E.g. pollination of flowers can lead to fruit / seed formation. Pollination increases genetic variation. 				<p>Examples of possible ideas include:</p> <ul style="list-style-type: none"> • Explains similarities / differences between wind pollinators and animal (bird) / insect e.g.: <ul style="list-style-type: none"> - Bird-pollinated flowers have brightly coloured petals which the birds can see from a distance and are attracted to / Insects collecting food from the flower which also be attracted to certain colours / patterns / scents. Animal / insect consumes nectar, some of the pollen (will rub off the anther onto the bird which will then fly to another flower depositing pollen on its stigma as it goes) AND Wind-pollinated flowers do not need to attract pollinators so do not make brightly coloured petals / have no scent therefore there flowers tend to be small / white / dull / greenish / do not produce nectar because no one consumes. - Insect-pollinated flowers have the stamen / stigma inside and close to nectar glands so the insect brushes against AND wind pollinators have the stamen / stigma loosely attached / large surface area / outside the flower to release pollen / catch pollen from the wind. - Animals / insect plants put energy into attracting pollinators / producing nectar AND wind plants put energy into production of pollen / appearance of pollen. - Animal / insect pollinators produce pollen that is rough / spiky / sticky surface so it can attach AND wind pollinated flowers produce pollen that is small / light / aerodynamic so it can travel further / easily by the wind. 			<ul style="list-style-type: none"> • Discusses similarities / differences between wind and animal (bird) / insect pollination AND links to importance of pollination in the maximising fertilisation (occurring by bring male gamete close to female gamete) / fertilisation is essential to seed production and the continuation of the species. • Discusses similarities / differences between wind and animal (bird) / insect pollination AND links to importance of pollination increasing genetic variation, e.g. because genetic variation in the seeds produced occurs due to the mixing of the genetic material inside the pollen, with the genetic material inside the ovule, it results in offspring (seeds) that have genetic makeup different from each of the parents. 	

QUESTION TWO

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 at least THREE relevant ideas.	Discusses an advantage of reproduction method (sexual / asexual / both) and links to tubers / runners / bulbs / rhizomes OR Discusses a disadvantage of reproduction method (sexual / asexual / both) and links to tubers / runners / bulbs / rhizomes	Discusses an advantage of reproduction method (sexual / asexual / both) and links to tubers / runners / bulbs / rhizomes AND Discusses a disadvantage of reproduction method (sexual / asexual / both) and links to tubers / runners / bulbs / rhizomes
<p>Examples of possible ideas include:</p> <ul style="list-style-type: none"> • Reproduction is for the continuation of the species / create offspring pass on genetic information. • Plants have tubers / bulbs / rhizomes to store food so daughter plants can grow off / Plants have runners to enable them to spread away from their parent plant. • Sexual reproduction increases genetic variation / produces genetically different offspring). • Asexual reproduction produces no genetic variation / genetically identical. • Sexual reproduction needs male and female gametes to be available / asexual only requires one parent. 					<p>Examples of possible ideas include:</p> <ul style="list-style-type: none"> • A tuber / potato / bulb is a structure that forms in the roots of some plants (It forms because excess sugars that are produced by photosynthesis are moved to the roots to be stored as starch. This enables the plant to survive over the winter when the green part dies down.) The tuber uses the stored starch to start to grow shoots and more roots so that it can photosynthesise, absorb water and grow into a new potato plant. • A runner is a stem that grows across the surface of the soil away from the parent plant and forms a daughter plant. (It forms roots at certain points and then grows into a new plant separate from the parent plant.) • (Strawberry plants form runners which will then grow into young plants a short distance from the parent.) The purpose of these is to allow the plant to reproduce asexually which only requires one parent; even though it is genetically identical to the parent it still allows the continuation of the species. Etc. • Asexual plants produce identical offspring so if the environment (disease) changes the species has an increased chance of dying 		<ul style="list-style-type: none"> • One of the advantages to the plant of reproducing sexually is that it allows for increased genetic variation in the offspring. This is an advantage to the species because it increases the survival chances. For example, if members of a population are genetically different from each other, some are possibly able to survive a disease since some of them may be more resistant. On the other hand, plants that reproduce asexually produce offspring that are genetically identical to the parent plants. This means that if one of the population is adversely affected by disease, the probability of the other members being also affected is high. This can lead to many or all of the population dying. For example, potato plants can reproduce both sexually and asexually. The offspring that grow from the tubers form the previous season are genetically identical to the parents. However the offspring produced through seed formation would be genetically different and therefore the population will probably be more viable in the long run. 	

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| | <ul style="list-style-type: none">• Sexual production produces more (genetic) variation so if the environment (disease) changes the species (offspring) has less chances of dying out.• Disadvantage of sexual is larger energy to produce few / less offspring / any valid reason / advantage of asexual is less energy to produce more offspring or any valid reason.• Sexual reproduction decreases competition for resources because the seed / offspring is dispersed away from the parent and are not in competition for the same resources therefore increases survival.• Asexual reproduction increases competition because the offspring and parent plant are in close proximity and compete for the same resources therefore decreases survival. | |
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QUESTION THREE

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 ONE relevant idea.	Explains at least TWO relevant ideas.	Links environmental factors and the parts of the seed to the process of germination OR Links environmental factors and parts of the seedling to the process of seedling growth.	Links environmental factors and the parts of the seed to the process of germination OR Links environmental factors and parts of the seedling to the process of seedling growth. AND Correct factors work together with the structures of the seeds / seedling in order to allow germination / growth to occur.	
<p>Examples of possible ideas include:</p> <ul style="list-style-type: none"> Describe environmental factors required for seed germination Seeds need water, oxygen AND specific temperature (usually warmth) to germinate. Temperature / warmth affects enzyme action. Some seeds require scarification to germinate. Some seeds require vernalisation to germination. Describe how different volume of water affects the growth of the seedling. Seeds with 6 mL of water per day grew the most / optimal / tallest / seeds in 2ml / 8ml grow the smallest / slowest. Water is required for photosynthesis / word equation (or unbalanced chemical) to produce glucose. Oxygen is important as it needed for (aerobic) respiration. Describes the purpose of the different parts of a seed in germination. The cotyledon in the seed acts as a food store which is used in germination / contains enzymes. The radicle forms the first root / The plumule forms the first shoot / The cotyledon produces first leaves for photosynthesis. The micropyle in the seed coat allows water to enter the seed. 					<p>Examples of possible explanations (gives reasons for how or why) include:</p> <ul style="list-style-type: none"> The cotyledon contains starch / nutrients / energy that the seed can use before photosynthesis (before first leaves develop). Enzyme activation is also dependent on temperature. So when the seeds are at an appropriate temperature (e.g. warm) the enzymes are activated to begin the process of germination. (2mls of water) not enough water is a limiting factor in photosynthesis therefore seedling growth / glucose production is decreased. (8mls of water) too much water drowns the seed preventing oxygen to access the seed. Seedlings leaves absorb light for photosynthesis. Nutrients absorbed through root hairs (and air) and required for growth / required for enzymes. 		<p>Examples of possible discussions include: <i>(1 environmental factor and 2-3 parts of seed / seedling)</i></p> <ul style="list-style-type: none"> Water enters the seed through the micropyle. This helps to activate the enzymes in the foodstore / cotyledon to begin converting the starch stored into glucose, so that the energy needed for germination to occur is available. Water – the radicle grows out of the seed and becomes the first root. This is so the young plant can absorb more water from the environment which is used to continue to support the process of germination / eventually to be used in photosynthesis when the young shoot is exposed to light. Oxygen is absorbed through the micropyle and required for seeds to germinate. Oxygen is required to for (aerobic) cell respiration within the foodstore / cotyledon to (allow) energy to be released for (seedling) growth. Temperature: high temperatures denature enzymes in the food store / cotyledon / leaves decreasing growth / photosynthesis Water enters the seedling via root hairs and is transported (xylem) to the seedling first leaves 		

		<p>where it is used for photosynthesis.</p> <ul style="list-style-type: none"> • Carbon dioxide enters the first leaves (stomata) and is transported to cells for photosynthesis . (Both are needed to make glucose so it can be used for the growth / photosynthesis). • Correct factors work together with the structures of the seeds / seedling in order to allow germination / growth to occur.
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Cut Scores

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