Assessment Schedule – 2008

Biology: Describe diversity in the structure and function of plants (90463)

Evidence Statement

NB Plant / plant groups must be included eg mosses, ferns, gymnosperms, angiosperms (monocotyledons, dicotyledons), hydrophytes, mesophytes, xerophytes, halophytes, algae have been accepted as well.

Q	Achievement	Achievement with Merit	Achievement with Excellence
ONE & TWO	A **description** of "what the structure is AND how it works (function)" to show diversity in THREE named plant groups. *Evidence may come from either Q1 or Q2 and may be in the form of a labelled diagram.*	Answers explain why the function of the structures allows each group to survive in the different environments. The answers must relate to the named process, for a minimum of TWO named plant groups. *Evidence may come from either Q1 or Q2 and may be in the form of a labelled diagram.*	A discussion of the **DIVERSITY,** in relation to a process, to enable plant groups to **live and survive in their environment**. Compares and contrasts the diversity across at least TWO plant groups. *Evidence may come from either Q1 or Q2.*
	Nutrition: • large SA / vol ratio • leaf arrangement around stem – whorls, alternate, etc • structures of insectivorous plants, sundew, pitcher plants. • numbers chloroplasts/amount of chlorophyll • leaf structure associated with type p/sis **Transport:** • mosses – no specialised cells for transport, rely on diffusion rhizoids and hydroids • ferns – transitional, have tracheids or simple conducting tissues • angiosperms – xylem vessels, more sophisticated etc phloem food movement • monocotyledons / dicotyledons – arrangement of vascular tissue, secondary thickening, etc • small plants, eg mosses have no specialised conducting tissue. **Transpiration:** • modified leaves; curled, reduced (stem also photosynthetic eg broom) • leaves absent, cacti • stomata; sunken, upper / lower leaf • deciduous plants / over-wintering. **Reproduction:** *Mosses* • main plant gametophyte • produce antheridia and archegonia (at tips of gametophyte) • produce sperm (gametes) • sporophyte attached to base of	**Nutrition:** Reasons for adaptation linked to survival eg • large SA / vol ratio – to absorb max light and gases for photosynthesis • larger air spaces in spongy mesophyll increase / provide flotation for : aquatic plants so. • insectivorous plants in low nutrient environments so... **Transport:** Reasons for adaptation linked to survival, eg: • capillary action / and evaporation / transpiration in xylem vessels have allowed transportation of water from the roots to the leaves of even the tallest of trees in a terrestrial environment, with minimal moisture available. • mosses need to live in wet environments. **Transpiration:** Reasons for adaptation linked to survival eg: • curled leaves prevent transpiration because the inside of the leaf develops a high humidity which reduces the concentration gradient, therefore less transpiration • similar for sunken stomata • link these to reduced water loss and dryer environments. **Reproduction:** Reasons for adaptation linked to survival eg *Mosses*	Discussion of diversity in structure and function to survive in different environments, habitats or niches. Eg a discussion of the reduction in competition due to occupation of different environments (accept habitats or niches if well described). Comparisons are made contrasting Structures / functions in two plant groups as to how they achieve the **chosen process** successfully. Describes the evolutionary/adaptive significance of features (increasing or decreasing diversity). **Nutrition:** eg • Significance of C3, C4 and CAM plants allowing occupation of different niches • Diversity linked to plant nutrition in environment • Shade plants vs light vs water • Insectivorous plants, nutrition linked to environment. **Transport:** Mosses remain as small plants – unable to conduct material over large areas, etc; large trees with efficient conducting tissue able to live in dry environments, etc. **Transpiration:** • adaptations linked to the environment • diversity in carrying out the same process in different environments.

	gametophyte produces spores, etc. *Ferns* • dominant phase – sporophyte • prothallus structure produces antheridia and archegonia • structure of sporangia – mechanism for release of spores. *Gymnosperms* • male / female cones • seed structure, etc. *Angiosperms* • wind-pollinated / small flowers/ colourless/lots small pollen/many together • insect-pollinated / colourful,scented,larger etc • specialisation of floral structure for fertilisation by specialised pollinator. • structures anther for pollen • carpel for ovules • stigma to receive pollen • pollen tube to transfer sperm.	• gametes flagellated in mosses, in **wet** environment. • spores light, produced in large numbers carried by wind • photosynthetic gametophyte **supports** the sporophyte. *Ferns* • mechanism for release of spores • prothallus – antheridia release sperm swim to archegonia, etc **still need for moisture.** *Gymnosperms* • location and function of cones • quantity of pollen produced . winged pollen so • seed structure for movement in air currents, etc. *Angiosperms* • endosperm to feed developing embryo/prolong survival also role of testa to protect seed • temporal and spatial separation of male and female (pollen / ovule) gamete production • details of mechanisms of pollen dispersal small light /rough / sticky • energy saved/used to produce nectar/pollen/floral structures • mechanism for sperm transfer through pollen tube reducing chance of desiccation • flower structures advantages to increase chances of pollination etc.	**Reproduction:** • significance of the increasing dominance of the sporophyte generation. • the significance of the mechanisms to increase genetic variability within the species • complexity of floral structures relevant to increasing specialisation of pollination / mutualistic relationships • sperm / flagellated gametes suitable in a wet environment. • wind-pollination suitable in windy environment when large numbers of the species are present, etc.

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
Description of structure AND function of THREE named plant groups.	Explains how adaptations in structure and function allow survival. Achievement plus TWO out of three plant groups explained sufficiently.	Discussion links the need for **diversity** to survive in a range of environments. (Must compare and contrast between at least TWO plant groups.) As for Merit plus E.