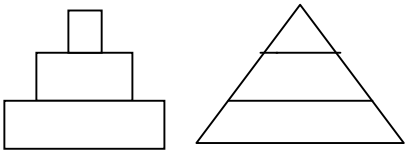
Assessment Schedule – 2006

Biology: Describe concepts and processes relating to ecology (90461)

Evidence Statement

Question	Achievement	Achievement with Merit	Achievement with Excellence
1(a)	**Description of at least 2 stages in the growth rate of species A.** Growth rate fast (during first 5 weeks) then slower (for last 3 weeks/ as approaches carrying capacity). Not • S-shaped/sigmoid curve • Exponential growth.		
1(b)	**Description of relationship** (Inter-specific) Competition **OR** description of species competing **OR** Ammensalism **OR** Antibiosis.		
1(c)	**Description of ONE adaptation of *Lemna.*** **(**way of life of the organism) • has air sac to float • roots grow in water.	**Reason for how ONE adaptation helps survival.** • air sacs enable the plant to float on the surface, therefore able to trap light for photosynthesis • air sacs enable the plant to float in slow moving water so that the mineral supply in one area is not exhausted • roots grow in water and enable the plant to absorb minerals (not nutrients).	
2(a)	**Pattern named** Zonation (horizontal, not vertical).		

2(b)	**Description of zonation** The change in species composition (along an environmental gradient/ drainage). Ie, different species in different areas.	**Explanation of how drainage affects distribution or diversity.** • Different species more / less tolerant to poor drainage. • In good drainage, there is more species variety **AND** tall trees can grow, creating more environments, and hence more diversity. Ie, a preference (more suited/ optimal conditions) for an area to explain the distribution. NOT grows well – this is the result of tolerance. *Candidate exemplars* • *trees are unable to tolerate poor drainage so will only grow in the good drainage areas.* • *Optimum conditions for trees are found in the good drainage area but shrub plants prefer damp soil and only grow in the poor drainage area.*	
2(c)	**Description of stratification** The vertical layering (of vegetation in a forest).		
2(d)	**Describes how canopy trees affect any ONE of:** • light (intensity) • humidity • temperature • wind. The direction of change must be stated (increase or decrease) • Light: high light intensity at the top of the forest, decreases as move to lower levels. • Humidity: low humidity at the top of the forest, increases as move to lower levels. • Temperature: greater range at higher layers /smaller range at lower layers. • Wind: air movement is high at the top of the forest, decreases as move to lower levels.	**Gives reason for HOW the canopy trees affect ONE abiotic factor** *Candidate exemplars* • *The canopy trees are so big that they block some light from the species below.* • *Because the canopy trees cover the trees and plants below them, they protect these plants from strong winds which could damage them.* • *The cover provided by the canopy trees restricts the air movement below and this increases the humidity below the canopy.* • *Canopy trees filter out the light so that the plants below live in a darker environment.* • *Shelter is given to plants below the canopy by the big trees so they don't get exposed to heavy rain and strong winds.*	**Discussion links the type of vegetation to the changing conditions caused by ONE abiotic factor** Links include reference to a narrow tolerance range for species below the canopy and/or examples of adaptations. • Species lower in forest adapted to lower light intensity (leaves larger / greener), unable to survive in higher light intensity • Humidity higher at lower levels and plants tolerate only small changes in humidity levels. • Temperature range less extreme in lower layers, plants have a narrower tolerance. • Air movement is reduced at lower levels so plants do not have seeds dispersed by wind/high humidity is maintained/plants more fragile.

3(a)	**Definition of population complete** Group of individuals of the same species living in a (defined) area.		
3(b)	**Diagram of age structure of an introduced bird species** **or**  Diagram must have wide base and base wider than layers above. If labelled, labels must be correct • bottom layer = pre-reproductive/young • middle = reproductive/middle-age • top = post-reproductive/old.		
3(c)	**ONE aspect of the ecological niche of the fantail described** Aspect relates to the habitat or feeding level or an adaptation of the fantail • (primary) carnivore/ secondary consumer/insectivore/eats(flying) insects • aerial feeder/ hawking/ catches food on the wing/catches flying insects • lives in the pine tree. *Candidate exemplars* • *fantail is able to fly fast to catch flying insects* • *fantail is a small, agile bird capable of quick turns while flying to catch insects* • *fantail feeds during the day.*		

3(d)	**Description includes ONE of the following:** • birds feeding in different areas • feeding on different insects/diets • adaptation of feeding method. **OR** Gause's Principle is described *Candidate Exemplars* • *The birds can co-exist because they have different ecological niches* • *No two organisms can continue to occupy the same ecological niche and survive. The fact that these birds can co-exist proves that they do not have the same ecological niche.* • *The fantail flies to catch its food but the blackbird has to dig out insects that live in the leaf litter.*	**Situation 1** **Gives reasons for how TWO of the following affect competition** • birds feeding in different areas • feeding on different insects/diets • adaptation of feeding method **AND** these are linked to no/ reduced direct competition. *Candidate Exemplars* • *Birds feed in different areas of the forest and eat different insects so there is no inter-specific competition.* • *Blackbirds feed on ground-dwelling insects in the leaf litter but fantails catch flying insects in the air. They do not occupy the same niche.* **Situation 2** **Gives a reason for how ONE of the following affect competition:** • birds feeding in different areas • feeding on different insects/diets • adaptation of feeding method **AND** This is linked to no/reduced competition and supported by Gause's Principle.	**Explains HOW and WHY birds can co-exist in a discussion that links feeding to position / type of insects the birds feed on** • all seven species feed in different areas • niche / position / level of feeding reduces significant overlap • insects living in areas of feeding different **AND** • recognises this as example of (Gause's) Competitive Exclusion Principle because of niche differentiation. **ie** **Describes TWO ways that the niche of the birds is different:** • birds feeding in different areas • feeding on different insects/diets • adaptation of feeding method **AND** **Links this to no/reduced competition** **AND** **Supports this with Gause's Principle.**
4	**Description refers to movement of both energy and nutrients.** Energy flow is linear/one-way. **AND** Nutrient flow is a cycle/ circular flow. *Candidate Exemplars* • *Energy flow is from one trophic level to another but nutrient flow is a cycle* • *Energy flow is from one organism to another in steps along the food chain but nutrient flow is circular.*	**Gives a reason for HOW or WHY energy flow is one-way and recycling of nutrients.** Light (solar) energy is converted by plants into chemical energy, passes through the food chain. At each step energy is lost as heat – one way. **AND** HOW nutrients are recycled. (May describe a specific nutrient cycle eg. Carbon or Nitrogen but a clear link to explain how nutrients are recycled must be shown.) **OR** WHY nutrients are recycled - limited supply /finite supply of nutrients (and if not recycled, then nutrients not available for plant growth, and there is accumulation of dead matter).	**Discussion includes a comparison / contrast of energy flow and nutrient cycle.s** HOW and WHY energy flow is one-way and recycling of nutrients is compared/contrasted Movement of energy one-way. Steps in energy flow limited because energy lost at each step through respiration (heat) and decomposers. Energy must be continually replaced. However, nutrient resources are finite so must continually be recycled.

Judgement Statement

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Achievement	Achievement with Merit	Achievement with Excellence
SIX questions answered correctly. Minimum 6 × A	SEVEN questions answered correctly, including at least TWO at Merit level. Minimum 2 × M + 5 × A	EIGHT questions answered correctly, including at least TWO at Merit level and at least ONE at Excellence level. Minimum 1 × E + 2 × M + 5 × A