Assessment Schedule – 2010

Biology: Describe cell structure and function (90464)

Evidence Statement

Q	Achievement	Achievement with Merit	Achievement with Excellence
	Describes cell structure and function by: recognising, naming, drawing, giving characteristics of, or an account of.	Explains cell structure and function by: providing a reason as to how or why something occurs.	Discusses cell structure and function by: showing understanding by linking biological ideas.
ONE	Names the process of **photosynthesis** or describes it. Eg, process used to convert light energy into chemical energy / glucose / food. OR Eg, word equation for photosynthesis with sunlight over the arrow, or indicated somewhere in the answer. OR Description of photosynthesis. AND Describes the **role** of the **two** organelles. Eg, the eye spot detects / senses light, the flagellum moves the Euglena, the chloroplast absorbs light / carries out photosynthesis.	**Gives reasons** for the 3 organelles presence in the Euglena Eg, the **eye spot** detects the (direction) light and the flagellum moves the Euglena towards it. Eg, the **flagellum** moves the Euglena towards the light so that the chloroplast can absorb light to carry out **photosynthesis.** Eg, the **chloroplast** contains **chlorophyll** which absorbs light for the process of **photosynthesis** to make glucose. Eg, the **flagellum** moves Euglena around until eye spot detects light.	**Links** the roles of the organelles working together **and** links them to photosynthesis. Eg, the eye spot detects the (direction of) light and the flagellum moves the Euglena towards it. This means that the chloroplast is fully exposed to the available light. **Chlorophyll** in the chloroplast is then used in **photosynthesis** to produce glucose.

TWO	**Gives** TWO of: • Describes an enzyme's structure and function Eg. Enzymes are **biological catalysts** made mainly of protein / amino acids that **increase / control / decrease activation energy** the rate of reactions in organisms • Name BOTH enzyme models and describe ONE. • Eg. The induced fit and lock and key models. In the lock and key model, the enzyme has an active site which matches the substrate shape / In the induced fit model, the enzyme has an active site that changes shape to accommodate the substrate. • Describe TWO factors and how each alters the function of the enzyme. Eg: • Enzymes have an optimum pH that they work in, outside that range they denature. • At high temperatures enzymes lose their shape and denature. • At high substrate concentration there are more opportunities to bind to the enzyme. • Inhibitor blocks / changes the shape of the enzyme. • Co-enzymes assists the enzyme to function properly. • At high enzyme concentration more opportunities to bind the the enzyme .	**Explanation** of the difference between both models with respect to the **active site.** Eg. Active site of enzyme matches the substrate shape in lock and key model *(diagram or description)* Then chemical reaction can occur. In the induced fit model, the active site changes slightly when combined with substrate. The enzyme **returns** to its 'normal' shape once the substrate / product is released. OR **Explanation** of **how and why** factors affect **enzyme activity / active site**: (2 needed). Eg: • Substrate – As the are more substrate molecules, more can combine with the enzyme and this will increase the rate of reaction. Until the available enzyme molecules become 'saturated' and the rate of reaction levels off. (May use a diagram to show this). • Co-enzyme – these organic molecules alter the shape of the active site in such a way that it can effectively combine with the substrate(s). Without them the enzymes will not work, or do so at a very low rate of activity. • Enzyme – more availability of enzyme allows a greater number of reactions to take place so the overall rate of reaction increases. The actual enzyme activity does not increase (ie no change in product per unit time per unit mass of enzyme). • Inhibitors are usually considered poisons because they alter or block the active site to prevent the substrate from binding to the active site. • pH – which falls outside of the specific **range / optimum pH** of an enzyme can cause the active site to denature and change the shape of the active site. • Temperature – as the temperature increases the enzyme activity also increases as more substrate bind to enzyme. Temperatures above the optimum temperature cause the enzyme to denature and change the shape of the active site.	**Discussion** that links structure and function to enzyme activity models and factors that affect enzyme activity. Eg, enzymes are biological catalysts which control the rate of reactions in organisms. They have an active site that can work in 2 ways. The lock and key model where the substrate attaches to the enzyme at the active site. The reaction happens and the product(s) are releases. However in the induced fit model, the active site changes slightly when combined with substrate. The enzyme **returns** to its 'normal' shape once the substrate / product is released. Links the shape of the **active site** to the factors.

THREE (a)	Accept a reasonable **description** of the structure OR function of the cell membrane. Eg, an appropriately annotated diagram is acceptable – must be a bilayer with phospholipids / lipids labelled. OR Eg, the cell membrane is a **semi-permeable** barrier, controlling the movement of substances **in and out** of cells OR Eg, it is a bilayer of phospolipids / phosphate heads and fatty acid tails / phosphates with lipids. Semi permeable – also acceptable are: selectively permeable partially permeable differentiall permeable. (Some candidates may refer to the structure as a fluid-mosaic model, but without a description of the model, this is an inappropriate answer in its own right.)		
(b)	**Describes** the function of the membrane for the organelle Eg, the membrane controls the passage of molecules into and out of the organelle for its **specific functioning.** Eg, photosynthesis / respiration**.** OR The membrane allows the organelle to remain separate / intact from the rest of the cell so that it can perform its **specific function.** Eg, photosynthesis / respiration. DO NOT accept controls shape or for protection	**Explains** that organelles require different substances to carry out their role. The membrane controls the passage of molecules into and out of the organelle for its specific functioning. The membrane also allows the organelle to remain separate / intact from the rest of the cell so that it can perform its specific function / e.g.carbon dioxide / water enters chloroplast for photosynthesis / oxygen / pyruvic acid enters mitochondrion for respiration.	

(c)	**Describes** BOTH active transport and osmosis. Eg, **active transport** is the transportation of materials / substances against a concentration gradient AND Eg, **osmosis** is the movement of water across a **semi-permeable** membrane with a concentration gradient	**Gives a reason** for the difference between the two modes of transport. Eg, energy is required for active transport **because** the movement is against the concentration gradient / of large molecules. Osmosis is the movement of water across a **semi-permeable** membrane with a concentration gradient **OR** Eg, energy is not required for osmosis **because** the movement is through a **semi-permeable membrane** with the concentration gradient. **Active transport** is the transportation of materials / substances against a concentration gradient / large molecules, eg glucose.	Actually **compares and contrasts** the processes in key areas and **relates / links** them to the examples. At least two features addressed Eg, energy requirements, direction or mode of transport(transporter proteins) Note : Must indicate semi-permeable NOT just permeable. Eg, osmosis is the net movement of water molecules across a semi permeable membrane from high to low concentration. Active transport is the movement of molecules against the concentration gradient (low to high concentration) therefore requiring ATP energy. Osmosis occurs in living organisms such as paramecium living in fresh water environments where water comes inside the cells because of the concentration gradient. To get rid of the excess water, and to avoid bursting of the cell the contractile vacuole collects and expels this water through the radiating channels. This requires energy as it is going against the concentration gradient.
	2A	1A + 1M	1A + 1E

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
2 A	**2** M	**2** E