

Assessment Schedule – 2013**Biology: Demonstrate understanding of biological ideas relating to a mammal as a consumer (90929)****Evidence Statement**

| ONE | NØ | N1 | N2 | A3 | A4 | M5 | M6 | E7 | E8 |
|-----|---|-----------------|------------------|---|--|--|--|--|--|
| | No response /no relevant evidence. | ONE idea given. | TWO ideas given. | THREE ideas given. At least ONE from small intestines and ONE from large intestines. | FOUR ideas given. At least ONE from small intestines and ONE from large intestines. | Explains aspects of at least ONE of the intestine's structure AND at least ONE digestive process. | Explains aspects of at least TWO of the intestine's structure – at least ONE aspect from small intestines and ONE aspect from the large intestines AND at least ONE digestive process. | Compares and contrasts at least ONE of the roles /processes and structures of the small intestine AND large intestine during digestion. OR Discusses fully the processes and structures of either the small or large intestine. | Compares and contrasts at least TWO of the roles / processes and structures of the small intestine AND large intestine during digestion. |
| | <ul style="list-style-type: none"> Small intestine has villi /is longer and thinner /small intestine has rich blood supply. Large intestine is shorter and wider /has appendix /caecum attached /no villi /includes colon and rectum, and finishes at the anus. Digestion in small intestine takes 5 – 6 hours /completes digestion /is where enzymes secreted – amylase, lipase, protease /secretions of pancreatic juice from pancreas /secretion of bile from gall bladder /absorbs digested molecules. The large intestine has bacteria present / is where undigested material becomes firmer /is where faeces are stored (rectum) /absorbs water /takes 12 – 24 hours for food to pass through. <p>NB: Answer does not require specific times, but they should be correct relative to each other (ie longer in large intestine).</p> | | | | | <ul style="list-style-type: none"> The small intestine has small fingerlike projections called villi. These increase the surface area for absorption. The large intestine contains bacteria. These bacteria in the colon convert undigested material to faeces. Enzymes in the small intestine, such as amylase, lipase and protease, digest food from large insoluble molecules to smaller soluble molecules. In the large intestine, undigested material becomes firmer because water has been absorbed, largely consisting of cellulose and fibre, forming faeces. In the large intestines, there are crypts which are inward folds that provide housing for the bacteria and produce the mucus. The large intestine is the tube where faeces or stool is found. It contains the undigested food and some fluids. | | <p>The small intestine is split into the duodenum and ileum. The duodenum is the first part and secretes enzymes such as amylase, lipase and protease, which digests food from large insoluble molecules to smaller soluble molecules that can be absorbed in the ileum, while no enzymes are secreted in the large intestines. In the second part of the small intestines /ileum, the small digested molecules are absorbed into the blood. To aid this the ileum has finger-like projections called villi and microvilli, which increase the surface area for absorption.</p> <p>The large intestines are where water is absorbed and bacteria, housed in the crypts / inward folds, in the colon convert the undigested material into faeces. The faeces are then temporarily stored in the anus before being egested out the anus.</p> | |

| TWO | NØ | N1 | N2 | A3 | A4 | M5 | M6 | E7 | E8 |
|-----|--|-----------------|------------------|--------------------|------------------|--|--|--|--|
| | No response/no relevant evidence. | ONE idea given. | TWO ideas given. | THREE ideas given. | FOUR ideas given | Gives a reason why physical OR chemical digestion is necessary for efficiency. | Gives a reason why physical AND chemical digestion are necessary for efficiency. | Compares and contrasts physical and chemical digestion. | Compares and contrasts physical and chemical digestion AND reasons why both are necessary for digestion to be efficient. |
| | <ul style="list-style-type: none"> Physical digestion occurs when food is broken down into smaller pieces. Physical digestion happens in the mouth/by the teeth or the muscle action of the intestine wall. Chemical digestion is when food is broken down into smaller pieces by the action of enzymes. Chemical digestion happens in the mouth/stomach/small intestine/duodenum. | | | | | <p>Physical digestion occurs when food is broken down into smaller pieces by the teeth or the muscle action of the intestine wall. This is necessary for efficient digestion because it increases the surface area available for the enzymes to act on.</p> <p>Chemical digestion occurs when enzymes break the bonds holding food particles / molecules together. It is necessary so that the molecules are small enough to be able to be absorbed.</p> | | <p>Physical digestion occurs when food is broken down into smaller pieces by the teeth or the muscle action of the intestine wall. These smaller pieces are then able to undergo chemical digestion. Chemical digestion is similar in that it results in food being broken down into smaller pieces, but is different in that it involves the use of enzymes, eg amylase in mouth. These break the chemical bonds holding the food molecules together so that they are small enough to be absorbed. Both types of digestion are required because physical digestion breaks up the larger pieces of food first, thus increasing the surface area available for the enzymes in chemical digestion to work on and therefore increasing the efficiency of the digestive process.</p> | |

| THREE | N0 | N1 | N2 | A3 | A4 | M5 | M6 | E7 | E8 |
|-------|---|-----------------|------------------|--------------------|-------------------|--|--|---|---|
| | No response/no relevant evidence. | ONE idea given. | TWO ideas given. | THREE ideas given. | FOUR ideas given. | Explains how either temperature OR pH affect the action of enzymes. | Explains how both temperature AND pH affect the action of enzymes. | Discusses the impact of temperature OR pH on the action of enzymes with reference to the idea of collision theory / active site. | Discusses the impact of temperature AND pH on the action of salivary amylase with reference to the idea of collision theory / active site AND the mammalian digestive system. |
| | <ul style="list-style-type: none"> Function of enzymes described, eg: make reactions go quicker/breaks down large molecules (NOT digests food). As the temperature increased, the rate increased. The rate decreased at the highest temperature/highest temp produced least maltose. More maltose in each of the 37°C results. Salivary amylase breaks down the starch to maltose/ glucose in the weakly alkaline/basic solution. Salivary amylase does not work if the conditions are acidic. Salivary amylase is active in the mouth. The mouth of mammals is slightly alkaline/basic. Mammalian body temperature is about 37°C. High temperatures denature the enzyme. | | | | | <ul style="list-style-type: none"> At increased temperature, the enzymes work faster, but only to a certain point. Beyond that, the enzyme is denatured (NOT enzymes killed). The enzyme worked best at either a neutral or slightly alkaline pH. In an acidic pH, the enzyme does not work as well as it is denatured/has its shape altered (NOT enzymes killed). | | <p>Salivary amylase / enzymes works best at 37°C. When the temperature was low, the particles moved more slowly so the enzyme took longer to work. At high temperatures the enzyme was denatured by the heat, and its active site changes shape. The temperature of a mammalian body is 37°C. As the enzyme is active in the body, the enzyme is therefore most active at body temperature.</p> <p>Salivary amylase worked best in slightly alkaline or neutral solutions. At low pH/in acidic solutions the enzyme is denatured, and its active site changes shape. This means it can no longer carry out the role it is specific for. The enzyme salivary amylase is active in the saliva/mouth, which is a slightly alkaline environment. Therefore it works most efficiently here. When food is swallowed and goes to the stomach, the acidic environment denatures the enzyme so it is no longer active.</p> <p>OR</p> <p>Enzymes work best at specific pHs, eg pepsin works best an acidic pH if it is in a different pH, the enzyme is denatured and its active site changes shape. This means it can no longer carry out the role it is specific for.</p> | |

Judgement Statement

| | Not Achieved | Achievement | Achievement with Merit | Achievement with Excellence |
|--------------------|---------------------|--------------------|-------------------------------|------------------------------------|
| Score range | 0 – 7 | 8 – 13 | 14 – 18 | 19 – 24 |