Assessment Schedule – 2007

Biology: Describe the functioning of human digestive and skeletomuscular systems (90166)

Evidence Statement

Q	Achievement	Achievement with Merit	Achievement with Excellence
One (a)	Describes the digestion that occurs in the mouth as physical (teeth chewing) and chemical (enzyme added).		
(b)	Describes the role of blood in collecting / transporting digested food.	Identifies a reason why extra blood is required during and after a meal. Eg Extra blood flows to the stomach and intestine walls during and after a meal. More blood is required than when they are empty, to collect the products of digestion and transport them around the body for use. OR Extra blood flows to the stomach and intestine walls during and after a meal to take extra oxygen to meet the increased demand due to increased rate of respiration of muscle / digesting cells.	
(c)	Describes normal bowel function. Eg The first half of the colon absorbs fluids and recycles them into the blood stream. The second half compacts the wastes into faeces, secretes mucus which binds the substances, and lubricates it to protect the colon and ease its passage. OR Describes the effects on the bowel Eg Some of the symptoms of bowel cancer include a change in bowel habit (diarrhoea or constipation) blood in the stools, bowel obstruction etc OR Describes effect of bowel cancer on the general health. Eg The digestive system stops functioning efficiently, this can result in unexplained weight loss and anaemia, pain, weakness and tiredness, spread of cancer and ultimately lead to death.	Gives reasons for how normal bowel functioning OR general health is affected by bowel cancer. (must link the explanation) Eg Some or all of the normal bowel functions of water absorption, binding of solid waste, mucus secretion for lubrication of the passage of waste and protection of the bowel wall are interrupted with the development of cancerous polyps on the wall of the bowel. Polyp growth causes obstruction that prevents the smooth passage of solid waste through the bowel as they become bigger. This may cause pain. Blood in the stools due to bleeding from the bowel wall.	Provides links between how normal bowel functioning is affected by bowel cancer and the health of the person (links all 3). Eg Some or all of the normal bowel functions of water absorption, binding of solid waste, mucus secretion for lubrication of the passage of waste and protection of the bowel wall are interrupted with the development of cancerous polyps on the wall of the bowel. These prevent the smooth passage of solid waste through the bowel as they become bigger and cause changes to the rate of normal mucus secretion and water absorption. Subsequently the health of the person with bowel cancer is affected overall. They may experience change in bowel habit, blood in the stools due to bleeding from the bowel wall, pain due to bowel obstruction by the tumour, unexplained weight loss and anaemia.

Q	Achievement	Achievement with Merit	Achievement with Excellence
Two (a)	Describes the process of bone growth. Eg Regions near the **end of each bone** are made of cartilage, which become **ossified**. This results in the bone getting bigger.		
(b)	Describes an idea that calcium is required to make bones hard and strong.	Gives a reason for how calcium results in healthy bones. Eg Calcium is required to make calcium phosphate and calcium carbonate in the body. These substances are embedded into the collagen fibre matrix making it very hard and strong.	
(c)	Describes the causes or effects or prevention of osteoporosis. Eg Osteoporosis occurs when a person has low bone density, which allows their bones to break easily. OR Osteoporosis is caused by lack of calcium in the diet. OR A person can help prevent osteoporosis by not smoking, and by having lots of calcium in their diet when they are young.	Identifies reasons for TWO of the causes, effects, or prevention of osteoporosis. See Excellence column.	Provides links between reasons for the causes (C), effects (E) and prevention (P) of osteoporosis. (need all three, C,E, P) Eg Osteoporosis can be caused by a low peak bone mass at around 25–30 years of age. This is the result of inadequate calcium in the diet in younger years and inadequate vitamin D, which aids calcium absorption. It can also be caused by factors that affect bone matrix formation like cigarette smoking, lack of exercise or family history. Bone density reduces naturally with age in both men and women, but the hormonal changes that occur during menopause increase the rate at which bone density is lost in women. The effects of low peak bone mass and the loss of bone density with age are weak, fragile and brittle bones, which fracture and break very easily. A person can help prevent osteoporosis by avoiding the things that cause it and thus ensuring their bones are strong. For example they must ensure they have a diet rich in calcium, especially in their younger years and plenty of vitamin D to help build up their peak bone mass. They should not smoke as this can affect bone matrix formation, and they should get plenty of exercise because it helps build up the bone matrix, making the bones stronger.

Q	Achievement	Achievement with Merit	Achievement with Excellence
Three (a)	Describes the difference in the control of voluntary and involuntary muscle. Eg Voluntary muscle is under conscious control while involuntary muscle works automatically.		
(b)	Describes the freedom of movement of the hip joint. Eg It is a **ball and socket joint**, and the **shape** of the bones allows a wide range of movement. (ball and socket joint alone is insufficient)	Identifies a reason for the freedom of movement of the hip joint. (Indicates relationship to shape) Eg The hip joint is an example of a **ball and socket joint**. The ball at the top of the femur fits into the socket of the hip bone. This allows the ball to swivel and turn in any direction allowing movement in 3 planes. Etc	
(c)	Describes TWO aspects of the elbow joint that allow for movement. Eg The elbow is a hinge joint. The muscles work in antagonistic pairs. To move the arm up the biceps contracts. Ligaments link the bones together. Ligaments provide strength, support and stability. Tendons join the muscles to the bones. Cartilage helps stop rubbing or friction between the bones as they move.	Identifies reasons for how movement is brought about in the elbow joint. Eg The triceps and biceps muscles work antagonistically because muscles can only pull and not push. Tendons join the muscles to the bones so that when the muscle contracts or shortens, the bone is pulled, resulting in movement. Ligaments provide strength and support to the joint by forming a link between the bones of the joint, holding them together in a stable position while movement occurs. The cartilage provides a slippery surface on the ends of the articulating bones, reducing friction as movement occurs. (Any THREE explanations.)	Provides links between explanations of the components working together to bend the arm upwards. Eg To bend the arm upwards the biceps muscle contracts and the triceps muscle relaxes working antagonistically. Because the biceps muscle is attached to the bone in the lower arm, the radius, by a tendon, as it contracts it pulls the radius upwards resulting in the arm bending upwards at the elbow joint. The ligaments are flexible enough to allow this movement to occur while providing a link between the bones of the elbow joint, holding them in a stable position while movement occurs. Meanwhile the cartilage allows the bones to slide easily over each other reducing friction due to its slippery surface. Mention of ALL components is necessary.

Q	Achievement	Achievement with Merit	Achievement with Excellence
Four (a)	Describes function of TWO out of THREE of the following, eg Stomach: acid and gastric juice added or secreted / proteins digested / food mixed with gastric juice / bacteria killed by acid. Large intestine: absorbs water. Rectum: solid waste / faeces stored.		
(b)	Describes that food is moved through the digestive system by peristalsis/ muscular contraction.	Gives reasons for how peristalsis results in food being moved through the digestive system. Eg The organs and the intestine of the digestive system contain longitudinal and circular muscle that enable their walls to move through rhythmic contraction. The movement of the organs and intestines walls propel food and liquid through the digestive system. The muscles produce a narrowing or squeezing of the intestinal and organ walls, which push food in front of it in a wave-like action called peristalsis.	
(c)	Describes the function of TWO or more parts or features of the villi OR describes function of one part and describes overall function (to increase surface area for absorption). Eg microvilli – further increased surface area • capillaries absorb amino acids and glucose and water • lacteals absorb fatty acids.	Gives reasons for how TWO or more parts or features of the system work together, to contribute to overall function of increased surface area for absorption of digested food. Eg The finger-like projection shape of the villi increases the surface area available for absorption of digested food. Inside the finger-like projection is the long, thin lymph capillary or lacteal. This shape allows maximum absorption to occur. The job of the lymph capillary is to absorb fatty acids from the small intestine, which have come from the digestion of fats. etc	Provides links between the explanations of THREE or more parts of the villi and how they contribute to the overall function of increased surface area for absorption of digested food. Eg The finger-like projection shape of the villi increases the surface area available for absorption of digested food. Inside the finger-like projection is the long, thin lymph capillary or lacteal. This shape allows maximum absorption to occur. The job of the lymph capillary is to absorb fatty acids from the small intestine, which have come from the digestion of fats. The microvilli further increase the surface area available for absorption of digested food by the capillaries and lacteal. The blood capillaries form a fine network around the lacteal just below the surface of the villi. Because the capillaries are close to the surface of the villi, diffusion and active transport of digested food molecules from the small intestine into the blood is very quick. etc

Judgement Statement

Note: this standard requires evidence from both the human digestive system and the skeletomuscular system; this is noted by reference to specific questions as below.

Achievement	Achievement with Merit	Achievement with Excellence
Total of SEVEN opportunities answered at Achievement or higher: At least THREE must be from Questions One and / or Four AND at least THREE must come from Questions Two and / or Three. $7 \times A$	Total of EIGHT opportunities answered correctly: EITHER Any THREE at Merit level or higher from Questions One and / or Four *plus* FIVE at Achievement level. (Including 3 from Q2 & Q3) OR Any THREE at Merit level or higher from Questions Three and / or Two. *plus* FIVE at Achievement level. (Including 3 from Q1 & Q4) $3 \times M + 5 \times A$	Total of EIGHT opportunities answered correctly: EITHER TWO at Excellence from Questions One and Four AND ONE at Merit level from Questions One and / or Four AND FIVE at Achievement level. (Including 3 from Q2 & Q3) OR TWO at Excellence level from Questions Three and / or Two. AND ONE at Merit level from Questions Two and / or Three. AND FIVE at Achievement level. (Including 3 from Q1 & Q4) $2 \times E + 1 \times M + 5 \times A$