

## Curriculum Content Biology

### FORM TWO

<b>LEARNING OUTCOMES</b>	<b>CONTENT SCOPE</b>	<b>SUGGESTED TEACHING AND LEARNING STRATEGIES</b>	<b>SUGGESTED ASSESSMENT STRATEGIES</b>
<b>2.1</b> <b>Diet and Health</b>			
2.1.1 Recognize the importance of a balanced diet.	<ul style="list-style-type: none"> <li>• Diet includes everything that a person eats or drinks.</li> <li>• Food contains nutrients that are needed by all body cells.</li> <li>• A balanced diet contains the different nutrients (carbohydrates, proteins, fats, water, vitamins, minerals, and fiber) in the correct proportions.</li> <li>• Daily activities and physiological conditions can be influenced by ones diet.</li> </ul>	<ul style="list-style-type: none"> <li>• Students view video clip of balanced diets after completing "KWL".</li> <li>• Role play: students set up a restaurant that serves meals to persons of varying needs – babies, pregnant women, elderly persons, athletes. Students advise customers on suitable meal choices and alternatives.</li> </ul>	<ul style="list-style-type: none"> <li>• In groups, students prepare a brochure using Publisher of common foods and their nutrient content to be displayed in the school cafeteria.</li> <li>• Conduct research of food offerings of school cafeteria or school meals to assess whether students are offered a balance option.</li> </ul>

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2.1.2 Outline the basic structure of the digestive system and functions of each part.	<ul style="list-style-type: none"> <li>• Basic structure of the human digestive system listing all the parts and basic functions of the parts.</li> </ul>	<ul style="list-style-type: none"> <li>• Students label diagrams, charts or assemble models of the digestive system.</li> </ul>	<ul style="list-style-type: none"> <li>• Students prepare power point presentation showing the different parts of the alimentary canal and their functions.</li> </ul>
2.1.3 Explain how humans obtain nutrients from food.	<ul style="list-style-type: none"> <li>• Digestion entails physical and chemical changes in the food.</li> <li>• Physical changes are brought about by chewing and churning of the stomach.</li> <li>• Chemical changes release simpler substances from the food:               <ul style="list-style-type: none"> <li>○ Carbohydrates- simple sugars (e.g. glucose)</li> <li>○ Proteins - amino acids.</li> <li>○ Fats - fatty acids and glycerol.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Teachers use a video depicting digestion in humans.</li> <li>• Teachers display charts showing the parts of the digestive system in the classroom.</li> <li>• Teacher guides students as they conduct food tests on common food items to identify main nutrient, e.g.,</li> </ul>	<ul style="list-style-type: none"> <li>• Conduct food tests on samples of food, students brought for lunch and deduce the most popular food group consumed.</li> <li>• Students plan or design investigations to test hypotheses on relating food particle size and</li> </ul>

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	<p>These simple substances enter the blood stream and are taken to the body cells.</p> <ul style="list-style-type: none"> <li>• Enzymes are also involved in the breakdown of food materials (Students are only required to know general categories of enzymes involved e.g. carbohydrases, proteases and lipases.</li> <li>• The main nutrient components of foods can be identified using simple food tests.</li> </ul>	<p>protein, starch, and glucose, fat/oils.</p>	<p>responses to food tests etc:</p> <ul style="list-style-type: none"> <li>○ Formulate hypothesis.</li> <li>○ Outline the procedure to conduct experiment: <ul style="list-style-type: none"> <li>▪ Identify applicable variables (manipulated, responding and control).</li> <li>▪ Perform and record activity</li> <li>▪ Describe findings and identify limitations</li> <li>▪ State conclusions.</li> </ul> </li> <li>• Students compose a monologue/ write a story to narrate the</li> </ul>

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			digestion of a sandwich.
2.1.4 Relate diet to weight gain and loss.	<ul style="list-style-type: none"> <li>• The regulation of body weight and body fat may be linked to diet, physical activity, lifestyle, and behavior.</li> <li>• Weight gain and loss can also be due to genetic predisposition.</li> <li>• Diet can be used to regulate health problems such as such as diabetes, heart disease and the health risks associated with weight gain and loss.</li> <li>• Health problems can also be caused by disturbed eating patterns.</li> </ul>	<ul style="list-style-type: none"> <li>• Teacher and student discussion on the effects of diet on weight gain, loss and one’s health.</li> <li>• Guided by the teacher, students research, summarize and analyze information from magazines/newspaper articles and internet as it relates to diet and health.</li> <li>• Teacher invites community health workers for discussion and information sharing with students.</li> </ul>	<ul style="list-style-type: none"> <li>• Student project: <ul style="list-style-type: none"> <li>○ Compile a journal/blog/wiki space/google docs. to monitor individual diet for a week to determine the components of foods consumed. Students use date collected to make informed choices.</li> <li>○ The class makes a list of specific steps that can be taken to</li> </ul> </li> </ul>

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	<ul style="list-style-type: none"> <li>• Eating a balanced diet and exercising regularly is necessary for maintaining a healthy body.</li> <li>• Achieving and maintaining a healthy body weight is important.</li> </ul>	<ul style="list-style-type: none"> <li>• Use height - weight chart to determine body mass index (BMI) and discuss the significance of maintaining a healthy weight.</li> </ul>	<p>maintain a healthy body weight.</p> <ul style="list-style-type: none"> <li>○ Interview people who have successfully lost weight and kept it off and discuss their strategies.</li> <li>• Students use the information from above activities and prepare a power point presentation on the relationship between diet and heart disease to be delivered to the student body.</li> </ul>

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<b>2.2</b> <b>Human Body Systems: The Circulatory System</b>			
2.2.1 Outline the basic structure of the circulatory system.	<ul style="list-style-type: none"> <li>• Components of the circulatory system: pump (heart), arteries, veins, capillaries, and blood</li> </ul>	<ul style="list-style-type: none"> <li>• Teachers use a video showing the circulatory system in humans.</li> <li>• Teachers display charts showing the circulatory system in the classroom.</li> </ul>	<ul style="list-style-type: none"> <li>• Students prepare graphic organizer showing the components of the circulatory system.</li> </ul>
2.2.2 Relate the main parts of the circulatory system to its functions in the human body	<ul style="list-style-type: none"> <li>• The circulatory system transports substances throughout the body.</li> <li>• Basic structure and functions of the heart, blood vessels (no details of the specific blood vessels are required)..</li> <li>• Components of the blood</li> </ul>	<ul style="list-style-type: none"> <li>• Guided by teacher students view prepared slides of relevant specimens.</li> </ul>	<ul style="list-style-type: none"> <li>• Students prepare a table listing the structures in the circulatory system and their individual functions</li> </ul>

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<p>2.2.3</p> <p>Investigate the relationship between exercise and pulse rate</p>	<ul style="list-style-type: none"> <li>• Pulse rate is directly related to heart rate. It can be measured at certain points on the body, e.g. wrist, neck, temple, ankle.</li> <li>• Pulse rate is related to the level of activity.</li> </ul>	<ul style="list-style-type: none"> <li>• Teacher leads discussion of relevant statistical data.</li> <li>• Teacher coordinates students' participation in practical activity to show the relationship between pulse rate and exercise.</li> </ul>	<ul style="list-style-type: none"> <li>• Students plan or design investigations to test hypotheses on relating height, age, gender and pulse rate etc: <ul style="list-style-type: none"> <li>○ Formulate hypothesis.</li> <li>○ Outline the procedure to conduct experiment: <ul style="list-style-type: none"> <li>▪ Identify applicable variables (manipulated, responding and control).</li> <li>▪ Perform and record activity</li> <li>▪ Describe findings and identify limitations</li> <li>▪ State conclusions.</li> </ul> </li> </ul> </li> </ul>

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2.2.4 Identify health conditions associated with the circulatory system.	<ul style="list-style-type: none"> <li>Atherosclerosis, high blood pressure, varicose veins.</li> </ul>	<ul style="list-style-type: none"> <li>Teacher presents relevant statistical data, article or video clip and leads discussion with students</li> </ul>	<ul style="list-style-type: none"> <li>Students research specific conditions and prepare power point or video presentation of health conditions and causative factors.</li> </ul>
<b>2.3</b> <b>Human Body Systems: Respiratory System</b>			
2.3.1 Outline basic structure of respiratory system.	<ul style="list-style-type: none"> <li>Basic structure of the human respiratory system listing all the parts and basic functions of the parts.</li> </ul>	<ul style="list-style-type: none"> <li>Teacher refers to video, animation or simulation of respiratory system.</li> </ul>	<ul style="list-style-type: none"> <li>Students prepare labelled diagrams and/or models of the respiratory system.</li> </ul>
2.3.2	<ul style="list-style-type: none"> <li>Breathing is the process by which air moves in and out of</li> </ul>	<ul style="list-style-type: none"> <li>Students observe the changes in the body (the</li> </ul>	<ul style="list-style-type: none"> <li>Students prepare a table of comparison</li> </ul>

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Distinguish between breathing and respiration in humans.	<p>the lungs (inhalation and exhalation).</p> <ul style="list-style-type: none"> <li>• Breathing involves the movement of muscles (intercostal muscles and diaphragm), which brings about changes in volume and pressure in the chest cavity.</li> <li>• Inhaled and exhaled air differs in composition.</li> <li>• Inhaled air contains more oxygen than exhaled air, which contains more carbon dioxide.</li> <li>• Respiration - the chemical breakdown of complex food substances, such as carbohydrates, fats and proteins, during which energy</li> </ul>	<p>thorax) as students inhale and exhale.</p> <ul style="list-style-type: none"> <li>• Students demonstrate inhalation and exhalation using balloon and plastic bottle models.</li> <li>• Conduct interviews with visiting experts (e. SWMCOL, fire officers, EMA etc.) on local incidences of domestic and industrial smoke emissions and hazards associated with each.</li> </ul>	<p>of composition of inhaled and exhaled air in various environments.</p> <ul style="list-style-type: none"> <li>• Conduct experiments to demonstrate the presence of carbon dioxide (limewater) and water vapor (mirror) in exhaled air and prepare lab report.</li> <li>• Student project: Students conduct research on the effects of smoking and prepare pamphlet (MS</li> </ul>

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	<p>and Carbon dioxide are released.</p> <ul style="list-style-type: none"> <li>• Word equation to represent respiration: Oxygen + Food <math>\longrightarrow</math> Energy + Carbon dioxide + Water.</li> <li>• Respiration takes place in the mitochondria of the cell. Respiration is the process that releases energy from food.</li> <li>• Health risks associated with smoke inhalation.</li> </ul>		<p>publisher) advising student body of the health risks of smoking.</p> <ul style="list-style-type: none"> <li>• Students write letters that may be submitted via email to a newspaper editor, mayor or local government representative explaining their concerns about uncontrolled fires (landfill, backyard, agricultural lands and</li> </ul>

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			hills) with recommendations.
2.3.3 Relate increase in physical activity to increase in breathing rate.	<ul style="list-style-type: none"> <li>• Respiratory/Breathing rate - number of breaths taken by a person within 60 seconds.</li> <li>• The more physical activity done, the faster the respiratory/breathing rate.</li> <li>• Relate breathing rate to levels of physical fitness.</li> </ul>	<ul style="list-style-type: none"> <li>• Teacher and students analyse relevant data</li> <li>• Presentations of experts (Sporting personal, medical practionner, health officers)</li> </ul>	<p>Student Project:</p> <ul style="list-style-type: none"> <li>• Students investigate the relationship between breathing rates and physical fitness: <ul style="list-style-type: none"> <li>○ Working in groups, students measure breathing rates by using a watch to time 60 seconds and count the number of breaths taken within the 60 seconds.</li> </ul> </li> </ul>

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			<ul style="list-style-type: none"><li>○ Compare breathing rates for different scenarios (before and after physical activity, age groups, gender)</li><li>○ Students compile data collected using Excel and prepare reports.</li><li>○ Students present findings during the school assembly.</li></ul>