CURRICULUM

Grade-9- Cycle:Intermediate

Biology Textbook: Life and Earth Science (National Textbook)

UNITS	Learning Outcomes
I- Transformation of Food into nutrients: Digestion - Our Food	
- Kinds of food	-Recall the different kinds of food: energy food, functional food, and energy food
- Food tests	- Know the food tests: test for starch, reducing sugar, proteins, lipids, water and salts containing Chloride ions
- Chemical transformation of food	- Know that digestion is a chemical transformation -Know that digestion is molecular simplification - Know the meaning of hydrolysis - Specify the role of an enzyme - Know the meaning of in-vitro digestion - Understand the importance of a control tube
- Enzymes: Agents of Digestion	- Define a substrate - Define a biocatalyst - Define Ph (chemical medium) - Understand that enzymes act on specific substrate, at specific temperature, and in a specific chemical medium - List the properties of enzymes
-From Food to Nutrients	- Draw and label the parts of digestive system
- Bile	- Know that complete digestion of food leads to formation of nutrients - Understand the role of bile
- Peristalsis	- Know that peristalsis is a muscular contraction pushing the food down the digestive system - Know that mechanical digestion speeds up chemical digestion
The Route of Nutrients	-Know that absorption is the passage of nutrients from small intestine into blood and lymph - Specify the two routes of absorption
Villi	-Know that villi are the microscopic structures in the small intestine responsible for absorption - List the properties of villi that favor absorption

II- From Nutrients to Energy: Respiration	
-Organization of the Respiratory System	-Draw and label the parts of the digestive system - List the properties of alveoli that favor gas exchange
-Respiratory Gas Exchange	--Define diffusion -Know that respiratory gas exchange takes place in - alveoli -tissues - Explain how does gas exchange takes place in alveoli and in tissues -Specify the factors that facilitate gas exchange at the level of tissues
- Transport of Respiratory Gases	-Know that two blood components: Hemoglobin and plasma transport respiratory gases -Know that oxygen is transported by hemoglobin in the form of oxyhemoglobin -Know that carbon dioxide is transported by hemoglobin in the form of carbohemoglobin -Know that oxygen gas is slightly soluble in plasma
- Transport and Distribution of Nutrients and Oxygen Gas to Organs	
-Heart and Cardiac Activity	-Draw and label the parts of the heart - Define an artery, a vein and a blood capillary -Define valves - Specify the different kinds of valves - Describe the three phases of cardiac cycle - Define an electrocardiogram and specify its importance
- Blood Vessels and the Dynamics of Circulation	- List the types of blood vessels - Differentiate between arteries and veins - List the properties of capillaries that facilitate exchange of materials
-Double Circulation	- Know that blood circulation is made up of 2 circulations: pulmonary and systemic circulation - Specify the importance of small and big circulation
-Cardiovascular Accidents	-Define an infarction - Specify the causes of infarction - List the factors that lead to an infarction
-Usage of Nutrients and Oxygen gas by the Cells	-Know that metabolism is the sum of all chemical reactions in the cell - Know that cellular oxidation is the reaction that uses

	oxygen gas and supplies energy - Know that assimilation is the synthesis of new organic matter by cells using the energy supplied by oxidation - Know that protein synthesis requires amino acids and energy -Know that proteins differ according to number of amino acids and their sequence
IV- Regulation of the Internal Medium and Renal Function	
-Kidneys, Site of Urine Formation	-Draw and label the parts of the Urinary System -Specify the role of each part of the urinary system -Know the pathway of urine from the site of its formation until its elimination to the outside -Differentiate between a renal artery and a renal vein -Know that nephrons are the microscopic structures in kidneys in which urine formation takes place -Know that nephrons are well-adapted to their job due to the intensive supply of blood vessels -Know that water, mineral salts and nitrogenous wastes are the normal constituents of urine -Know that glucose and proteins are the abnormal constituents of urine -Know the tests for urea, salt containing chloride ions, and glucose
-Renal Functions	- Know the two roles of kidneys: -Purifying role - Regulating role - Know that the kidneys purify the body from toxic wastes as urea, uric acid…resulting from the metabolism of proteins -Know that the kidneys regulate the concentration of different components of the plasma . Know that kidneys keep constant the composition of the internal medium by eliminating excess salts and water.
V- Nutrition and Health	
-Food Ration	- Know that food ration is the quantity of food that an individual must consume per day to cover the needs in matter and energy - Food ration varies according to age, sex, physiological state, activity and climate
- Balanced diet	- Know that a balanced diet must cover the energy needs and should supply the body with all the indispensable substances needed for the proper functioning of the body.

Unbalanced diet	- The absence of one or more nutritive elements in the diet may cause more or less disturbances. -Differentiate between Kwashiorkor, Marasmus, Rickets and Obesity
VI- Chromosomes, Carriers of Genetic Information -Transmission of Hereditary Characteristics	- Recall the terms: gene, dominant, recessive, pure, hybrid. genotype and phenotype - Define the term allele - Explain how to solve factorial analysis and find the first filial generation
- The laws of HEREDITY	-List the laws of heredity - Indicate the importance of a testcross -Know the difference between complete and incomplete dominance -Know how to solve exercises dealing with intermediary heredity and codominance
- The carriers of Genetic Information	-Know that chromatin material condenses into chromosomes which are visible only during cell division -Define a karyotype - Specify the importance of using a karyotype to determine the gender of an individual and any possible abnormality - Know that the chromosomal formula of a man is 44 +XY (or 44, XY) and that of a woman is 44 + XY (or 44, XY)
- Chromosomes and Traits of the Individual	- A chromosomal abnormality is an abnormal number or (shape) of a chromosome - The abnormality can be on an autosome or on a sex chromosome. - Know that trisomy 21 is due to the presence of an extra copy of chromosome 21
- The Genes, Units of Genetic Information	- Know that genes occupy specific locii on chromosomes - Know the meaning of a gene map - know how are dominant genes and recessive genes expressed - Know the different blood types
VIII- Conformed Reproduction of Genetic Information -Transmission of Genetic Information	- Know that mitosis is a conformed reproduction - List the phases of mitosis in order - Draw the phases and label each -Describe the events in the phases of mitosis -Differentiate between a plant cell and an animal cell undergoing mitosis -Describe the evolution of a chromosome during mitosis

-Conformed Reproduction of Chromosomes	- Describe the importance of interphase -Emphasize that the duplication of chromosomes ensures the transmission of the genetic information to the daughter cells - Emphasize the conservation of the genetic information from one cellular generation to the other
IX- Sexual Reproduction and Genetic Diversity	
-Gametes, Specialized Cells with 23 Chromosomes	- Compare the karyotype of a somatic cell to that of a gamete -List the phase of meiosis -Draw and label the different phases -Explain the events in the phases of meiosis
- Fertilization, A new Genetic Combination	- Define fertilization - Understand that during fertilization the chromosomal number of the species is restored - Understand that fertilization unites, at random, two sets of chromosomes carrying different alleles -Understand that each newborn possesses an original genetic program that makes of him/her a unique person - Understand that the gender of the baby is determined by the sex chromosome carried by the sperm
