



DEPARTMENT OF EDUCATION

National Pacing Guide: Combined Science

Grades: 10-12

2023-2024

Ministry of Education
NATIONAL COMBINED SCIENCE PACING GUIDE
Standard Version – 3 Years

GRADE 10 COMBINED SCIENCE

TERM I: CHRISTMAS TERM: SEPTEMBER – DECEMBER

WEEK	TOPIC/FOCUS
3 weeks	Characteristics of Living Things: organisms nutrition excretion respiration irritability growth reproduction and movement Classification of living things Plants and Animals: Kingdoms to species
3 weeks	Cell Structure and Organization The structure of an animal and plant cell The differences in structure between plant and animal cells The relation of the structures seen under the light microscope to their functions Additional organelles in animal and plant cell as seen under the electron microscope Ribosomes mitochondria endoplasmic reticulum Golgi bodies lysosomes chromosomes Levels of Organization Tissues as a group of similar cells. Structure of tissues in relation to their function: root hair cell red blood cell xylem cells. Types of tissue in animals and plants: epithelial, nerve, connective, blood, muscle, epidermal, vascular photosynthetic Organs and Organ Systems
2 weeks	Diffusion. Define and make observations of diffusion. Use coloured substances to demonstrate diffusion. Illustrate examples of diffusion in the human body. Factors affecting the rate of diffusion. The importance of gaseous and solute diffusion and of water as a solvent. Design and conduct experiments
3 weeks	Osmosis. Define and make observations of osmosis. Plan and perform an experiment to show osmosis. The importance of osmosis in the uptake of water by plants The effect of osmosis on plant and animal tissues: changes resulting in turgidity, flaccidity and plasmolysis Effects of isotonic, hypotonic and hypertonic solutions on plant and animal cells

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GRADE 11 COMBINED SCIENCE

TERM I: CHRISTMAS TERM: SEPTEMBER – DECEMBER

WEEK	TOPIC/FOCUS
3 weeks	<p>Diet and Balanced Diet. Balanced diet as it relates to age, sex and activity. The effects of malnutrition. Deficiency Diseases (Vitamins and Minerals) The Human alimentary Canal Mechanical and Physical Digestion Teeth : types, causes of dental decay and the proper care of the teeth Peristalsis</p>
2 weeks	<p>Chemical Digestion Enzymes as proteins and biological catalysts. The importance of enzymes and their functions in the digestion of food. The name of enzymes which help to break down starches, proteins and fats. The end products of digestion. Absorption – Small Intestine, significance of villi Assimilation</p>
2 weeks	<p>Transport The Heart- Gross structure and function and the effects of exercise on heartbeat. Likely causes of heart attacks and preventative measures Blood Vessels – The structure and function of arteries, veins and capillaries, the double circulatory system.</p>
2 weeks	<p>Blood – The composition of the blood of a mammal The functions of blood including clotting. The transfer of materials between capillaries and tissue fluid. Phagocytosis Respiration – Definition</p>
2 weeks	<p>Aerobic and Anaerobic Respiration State word equations Balanced chemical equation Role of anaerobic respiration in baking and brewing</p>
1 week	<p>Gas Exchange and Breathing. Features of gas exchange. Differences in composition of inspired and expired air. Effects of physical activity on rate and depth of breathing. The role of ribs, intercostals muscles and diaphragm in ventilation of the lungs. The effects of cigarette smoke</p>

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GRADE 12 COMBINED SCIENCE

TERM I: CHRISTMAS TERM: SEPTEMBER – DECEMBER

WEEK	TOPIC/FOCUS
3 weeks	Heat and temperature. Measurement of temperature – Celsius, Fahrenheit and Kelvin. Conversion from C to F and vice versa. Difference between heat and temperature. Heat transfer by conduction, convection and radiation Effect of heat on matter. Thermal Expansion of solids, liquids and gases.
2 weeks	Forces and Motion. Define the term force. Types and Effects of forces. The relation between force, mass and acceleration $F = ma$ Unit of force N. Ways in which a force may change the motion of a body.
2 weeks	Energy Work and Power. Energy in different forms, its transfer and conversion or application of the principle of energy conversion. Energy transfer in terms of work done and make calculations involving $W = fd$ Potential and Kinetic Energy - $K.E. = 1/2mv^2$ Major sources of energy and alternative energy sources. Various energy forms, hydroelectric, geothermal, nuclear as alternative sources of energy.
2 weeks	Power _ the relation of power to energy transferred and time taken. Calculate energy using equations $E = Pt$ $P=W/t$
2 weeks	General Wave Properties: Wave motions shown by vibrations in ropes and springs and experiments using ripple tanks. The meaning of speed of waves, vibration, amplitude, wavelength and frequency Sound Waves: longitudinal waves. Simple model to show transmission of sound. The qualitative effects of thickness, tension and length on frequency of a vibrating string
1 week	Light. Laws of Reflection from a plane mirror. Effects of concave and convex mirrors. Refraction of light.