

# Science overview

## Year 2 (Grade 7)

Unit title and teaching hours	Key concept & Related concepts	Global context & exploration	Statement of inquiry	Objectives	ATL skills	Content
Life processes (50 hrs)	Relationships and Patterns	Scientific and technical innovation. Exploration: Systems	The interconnectedness between organisms is related to their cell structure and their life processes.	A, B, C, D (all)	<p>Communication: Communication skills-giving and receiving information</p> <p>Social: collaboration skills/give and receive meaningful feedback</p> <p>Self management: reflection skills/Develop new skill techniques and strategies for effective learning.</p> <p>Research : information literacy skills/collect record and verify data/process data and report results</p> <p>Thinking: critical thinking skills/interpret data</p>	<p>Safety in a lab</p> <p>How to use microscopes</p> <p>Making and Interpreting graphs</p> <p>Characteristics of living things</p> <p>Cell structure</p> <p>Enzymes</p> <p>How the cell gets its energy</p> <p>Movement of materials in and out of a cell</p> <p>Cell tissues and organs</p>
<b>States of matter and Separating substances (45 hrs)</b>	Change, Models and Form	Scientific and technological innovation  methods	The particle model of matter can be used to explain the changes in the states of matter and different methods can be used in separating particles according	A, B, C, D (all)	<p>Communication: communication skills/read critically and for comprehension</p> <p>Social: Collaboration skills/give and receive feedback</p> <p>Self- management: reflection skills/develop new skills, techniques and strategies for effective learning</p>	<p>Everything is made up of particles</p> <p>Solid , liquids and gases</p> <p>The particles in solids liquids and gases</p> <p>Mixtures, solutions and solvents</p> <p>Separating methods</p>

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			to the physical properties of substances		Thinking: critical – thinking skills/interpret data	
<b>Measurement and units</b> <b>Thermal effects</b> <b>(40 hrs)</b>	relationships <b>and movement</b>	Scientific and technical innovation Models	Every measurement has a number that shows the magnitude and a unit.  Particles in solids liquids and gases have kinetic energy because they are moving.	A, B, C, D (all)	Communication: communication skills /take effective notes in class  Social : collaboration skills /give and receive meaningful feedback  Self management: affective skills/ practice focus and concentration  Research : information literacy skills/ collect and verify data.  Thinking: critical thinking skills/interpreting data.	Numbers and units Measuring volume and density Particles in solids liquids and gases Temperature and thermometers

### Year 3 (Grade 8)

Unit title and teaching hours	Key concept & Related concepts	Global context & exploration	Statement of inquiry	Objectives	ATL skills	Content
	Relationships and patterns	Scientific and technological innovation.	Organisms are classified into six major	A, D (all)	Communication: communicative skills/ Give and receive meaningful skills. Research: information literacy skills / Collect	The major groups of organisms: Plants, animals, fungi, protocista, bacteria and viruses.

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<b>The variety of living things (20 hrs)</b>		Systems	groups according to their structure and function.		record and verify data.	
<b>Plant physiology- Photosynthesis (40hrs)</b>	Change, energy, transformation	Scientific and technical innovation  Process	The process of photosynthesis by which plants can transform light energy into chemical energy in food.	A, B,C (all)	Communication: communication skills/ take effective notes in class  Social: Collaboration skills/ encourage others to contribute:  Thinking: Critical thinking skills/ practice observing carefully in order to recognize problems	Plants make starch  The structure of leaves  Photosynthesis and respiration  Factors affecting photosynthesis  Mineral nutrition
<b>Atoms and elements Atoms combining (45hrs)</b>	Change  Models, Balance  Transformations	Scientific and Technological Innovations  Models	The structure of atoms- (electron configurations), are related to their ability to combine with other atoms by forming bonds and new molecules.	A, D (all)	Communication: communication skills/Use and interpret a discipline specific terms and symbols  Research: Media literacy skills / seek a range of perspectives from multiple and varied sources.  Thinking: critical thinking skills/ use models and simulations to explore complex systems and issues  Thinking : creative thinking skills / use brainstorming and visual diagrams to generate	Atoms and elements  Isotopes and radioactivity  Electron arrangement  Models of atoms  Bonding of atoms  Covalent bond  Ionic bond  Metallic bond

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					new ideas and inquires.	
<b>Forces and motion</b>  <b>Forces and pressure (40 hrs)</b>	<b>Change</b> Interaction, movement	Scientific and technical innovation processes	Forces are everywhere. There are interactions, movements ,changes and processes which all have to do with force exertions.	A,B,C,D (all)	Communication: communication skills/take effective notes in class  Self- management: reflection skills/ develop new skills techniques and strategies for effective learning  Thinking critical: thinking skills/ interpret data  Thinking: transfer skills/apply skills and knowledge in unfamiliar situations.	Speed, velocity and acceleration  Free fall  Forces in balance,  Friction and breaking  Force, weight and gravity  Action and reaction  Forces and pressure

## Year 4 (Grade 9) Biology -Ecology

Unit title and teaching hours	Key concept & Related concepts	Global context & exploration	Statement of inquiry	Objectives	ATL skills	Content
<b>Human physiology-</b>	Systems, Function, movement	Scientific and technical innovation	The structure of the human respiratory system	A,B,C,D (all)	Communication: Communication skills/give and receive meaningful feedback  Social: Collaboration skills/give and receive meaningful feedback	Lung structure, ventilation of the lungs ,lung capacity and breathing rate, gaseous exchange, characteristics of

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<p><b>Breathing</b> (40 hrs)</p>		<p>Systems</p>	<p>works efficiently to allow the exchange of oxygen and carbon dioxide.</p>		<p>Research: Information literacy skills skills/collect, record +verify data  Thinking: Creative-thinking skills/ apply skills and knowledge in unfamiliar situations.</p>	<p>the respiratory surface and smoking.</p>
<p><b>Food and Digestion</b>  (40 hrs)</p>	<p>Change, Transformation</p>	<p>Scientific and technical innovation  Products and processes</p>	<p>Digestion is an efficient process by which food is transformed to smaller nutrient particles, in order to be absorbed by the circulatory system and to be transferred to cells.</p>	<p>A,B,C (all)</p>	<p>Social: collaboration skills/encourage others to contribute.  Self-management: organization skills/plan short-and long term assignments, meet deadlines.  Self –management: Affective skills/ practice focus and concentration.  Thinking: Critical thinking skills/practice observing carefully in order to recognise problems.</p>	<p>Food and diet  Balanced diet  The alimentary canal  Absorption  Use of digested food</p>

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<p><b>The circulatory system (30 hrs)</b></p>	<p>Systems, Function, form</p>	<p>Scientific and technical innovation processes</p>	<p>The process by which blood is transported throughout the body and the structure and function of the circulatory system makes it efficient and necessary.</p>	<p>A, D (all)</p>	<p>Communication: Communication skills/ take effective notes in class.</p> <p>Social: Collaboration skills/ listen actively to other perspectives and ideas.</p> <p>Self- management: Organization skills/set goals that are challenging and realistic.</p> <p>Media: Literacy skills/ Seek a range of perspectives from multiple and various skills.</p>	<p>Composition of blood</p> <p>The heart</p> <p>The blood vessels</p> <p>Functions of blood</p> <p>Transplants and transfusions</p> <p>Heart diseases</p>
<p><b>The interdependence of living organisms and the impact of human activity on the environment (40 hrs)</b></p>	<p>Systems, Interactions, balance</p>	<p>Globalization and sustainability</p> <p>Human impact on the environment</p>	<p>All living things are interrelated in an ecosystem. Humans as part of ecosystems have the greatest impact on the community of living things and their environment.</p>	<p>A, D (all)</p>	<p>Communication: Communication skills/organise and depict information logically</p> <p>Social: Collaboration skills/give and receive meaningful information</p> <p>Self- management: Activity skills/practice focus and concentration</p> <p>Self- management: Reflection skills/consider ethical, cultural and environment implication</p>	<p>Ecosystems</p> <p>Food chains and food webs</p> <p>The carbon , the hydrogen and the water cycle</p> <p>Energy flow in the ecosystem</p>

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## Year 4 (Grade 9) Chemistry - Physics

Unit title and teaching hours	Key concept & Related concepts	Global context & exploration	Statement of inquiry	Objectives	ATL skills	Content
<b>Separation techniques (25)</b>	Change Movement Transformation	Scientific and Technical Innovation	Homogeneous and heterogeneous mixtures can be separated into their components through movement and transformation of matter.	A, B and C	<ul style="list-style-type: none"> <li>- Propose and evaluate a variety of solutions</li> <li>- Use brainstorming and visual diagrams to generate new ideas and inquiries</li> <li>- Apply skills and knowledge in unfamiliar situations</li> </ul>	<p>The first twenty elements of the periodic table</p> <p>Mixtures, solutions and compounds.</p> <p>Separation methods filtering, chromatography, simple and fractional distillation, evaporation.</p>
<b>Giving and sharing - Forming bonds (15)</b>	Relationships Interaction Form	Scientific and Technical Innovation	The periodic table of elements defines whether elements can give and take or share electrons in order to	A and B	<ul style="list-style-type: none"> <li>- Collect, record and verify data</li> <li>- Gather and organize relevant information to formulate an argument</li> </ul>	<p>Atomic structure, proton and nucleon number, isotopes and ions. Electronic configuration. Ionic bonding and properties of ionic compounds. Covalent bonding and covalent compounds. Metallic bond and metals</p>

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			interact and form ionic or covalent bonds.			
<b>Light my way (20)</b>	Systems Patterns Movement	Scientific and Technica   Innovati on	Using a light ray with lenses, reflective surfaces or through different medium we can create a system with a pattern of movement that can be explained and predicted.	A, B and C	<ul style="list-style-type: none"> <li>- Revise understanding based on new information and evidence</li> <li>- Design improvements to existing machines, media and technologies</li> <li>- Apply skills and knowledge in unfamiliar situations</li> </ul>	<p>Light and sight</p> <p>Law of reflection and refraction. Total internal reflection</p> <p>Plane mirrors</p> <p>Pinhole camera/box</p> <p>Periscope, telescope, prism, magnifying glass</p> <p>Lenses, ray diagrams</p>
<b>Waves (20)</b>	Relationships Form Energy Movement	Scientific and Technica   Innovati on	Mechanical, sound or electromagnetic waves are energy that moves in different ways.	B and D	<ul style="list-style-type: none"> <li>- Gather and organize relevant information to formulate an argument</li> </ul>	<p>Mechanical waves, refraction, diffraction and reflection</p> <p>Electromagnetic radiation</p> <p>Sound waves</p>

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## Year 5 (Grade 10) Biology-Ecology

Unit title and teaching hours	Key concept & Related concepts	Global context & exploration	Statement of inquiry	Objectives	ATL skills	Content
<b>DNA and genetics (40)</b>	Relationships Form, Function	Scientific and technical innovation	Understanding how the form of the DNA dictates its functions, and how DNA is responsible for maintaining stability through heredity but also as a cause for disease	A, C, D	<p>Communication: Use and interpret a range of discipline-specific terms and symbols / Make inferences and draw conclusions</p> <p>Social: Listen actively to other perspectives and ideas / Built consensus</p> <p>Research: Information literacy skills / Collect, record and verify data</p> <p>Thinking: Interpret data gained from scientific investigations / Apply skills and knowledge in unfamiliar situations.</p> <p>Self-management skills: Structure information appropriately in laboratory investigation reports / Consider ethical, cultural and environmental implications</p>	<p>structure of nucleic acids, replication, transcription and translation,</p> <p>mitosis and meiosis,</p> <p>autosomal and sex-linked inheritance patterns for monogenic traits,</p> <p>the environmental contribution to traits,</p> <p>mutations, screening and genetic disease</p>
<b>“A brave new world”? Genetic engineering, natural selection and evolution. (50)</b>	Change Patterns, transformation	Scientific and technical innovation	Identifying the mechanisms for evolution as influenced by our technology: natural & artificial selection through mutation, cross breeding and genetic engineering	A, D	<p>Communication: Negotiate ideas and knowledge with peers and teachers</p> <p>Social: Make fair and equitable decisions</p> <p>Thinking: consider ideas from multiple perspectives</p> <p>Self-management: Consider ethical, cultural and environmental implications</p>	<p>Genetic variations (meiosis, mutation)</p> <p>Natural selection</p> <p>Artificial Selection</p> <p>Evolution</p> <p>Selective breeding</p> <p>Genetic Engineering</p> <p>Cloning</p>

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						Genetic fingerprinting Human genome project
<b>Ecosystems and their conservation, our lives depend on it. (40)</b>	Systems Environment, balance	Globalization and sustainability	Understanding the interconnections within and between ecosystems and the growing human populations may be decisive to our society's sustainability and development	A, B, C, D	Communication: Make inferences and draw conclusions Social: Listen actively to other perspectives and ideas / Built consensus Research: Information literacy skills / Collect, record and verify data Thinking: Interpret data gained from scientific investigations / Apply skills and knowledge in unfamiliar situations. Self-management skills: Structure information appropriately in laboratory investigation reports	Conservation Natural and artificial ecosystems Populations

### Year 5 (Grade 10) Chemistry- Physics

Unit title and teaching hours	Key concept & Related concepts	Global context & exploration	Statement of inquiry	Objectives	ATL skills	Content
<b>Titration, balancing acids and bases</b>	Change Transformation Balance	Scientific and Technical Innovation	Balanced chemical reactions are a useful tool to determine chemical change	A, B and C	THINKING: Transfer skills	Names of ionic compounds (revision) Balancing chemical reactions, neutralization reactions. Solubility rules Titration theory and experiments

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						Calculation of concentration using titration data Reading the Nitrogen cycle (not related to the topic)
<b>Fossil fuels</b>	Relationships Patterns Environment	Scientific and Technical Innovation	How do compounds of carbon relate with human society and the environment.	A and D	RESEARCH: Information literacy skills	Oil refining Structure and nomenclature of organic molecules
<b>Keep moving</b>	Systems Energy Balance	Scientific and Technical Innovation	In moving systems every energy increase in one part of the system is balanced with a corresponding decrease somewhere else.	A, B, C and D	- Collect, record and verify data - Process data and report results	Perform calculations involving vector displacement, velocity and acceleration. Calculate potential and kinetic energy changes Calculate power requirements and work done
<b>The Electric Civilization</b>	Systems Interaction, Function	Scientific and Technical Innovation	Electricity allows the construction of interacting systems to support most functions of modern civilization.	B, C and D	- Process data and report results - Make unexpected or unusual connections between objects and/or ideas	Electrostatic forces, Coulomb's law Electric potential Direct current, circuits and resistance, Ohm's law Electrochemistry: Electrolysis and batteries (voltaic cells) Electromagnetism: Electric generators and electric motors