## Science overview

### Year 2 (Grade 7)

<table>
<thead>
<tr>
<th>Unit title and teaching hours</th>
<th>Key concept &amp; Related concepts</th>
<th>Global context &amp; exploration</th>
<th>Statement of inquiry</th>
<th>Objectives</th>
<th>ATL skills</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>States of matter and Separating substances (45 hrs)</td>
<td>Change, Models and Form</td>
<td>Scientific and technological innovation methods</td>
<td>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</td>
<td>A, B, C, D (all)</td>
<td>Communication: communication skills/read critically and for comprehension Social: Collaboration skills/give and receive feedback Self- management: reflection skills/develop new skills, techniques and strategies for effective learning</td>
<td>Everything is made up of particles Solid, liquids and gases The particles in solids liquids and gases Mixtures, solutions and solvents Separating methods</td>
</tr>
</tbody>
</table>
## Science overview

<table>
<thead>
<tr>
<th>Measurement and units</th>
<th>Key concept &amp; Related concepts</th>
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</thead>
<tbody>
<tr>
<td>Thermal effects (40 hrs)</td>
<td>relationships and movement</td>
<td>Scientific and technical innovation</td>
<td>Models</td>
<td>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.</td>
<td>A, B, C, D (all)</td>
<td>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.</td>
</tr>
</tbody>
</table>

### Year 3 (Grade 8)

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<tr>
<th>Unit title and teaching hours</th>
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<tbody>
<tr>
<td>Relationships and patterns</td>
<td>Scientific and technological innovation.</td>
<td>Organisms are classified into six major</td>
<td>A, D (all)</td>
<td>Communication: communicative skills/ Give and receive meaningful skills. Research: information literacy skills / Collect</td>
<td>The major groups of organisms: Plants, animals, fungi, protoctista, bacteria and viruses.</td>
<td></td>
</tr>
</tbody>
</table>
## Science overview

<table>
<thead>
<tr>
<th>The variety of living things (20 hrs)</th>
<th>Systems</th>
<th>groups according to their structure and function.</th>
<th>record and verify data.</th>
<th></th>
</tr>
</thead>
</table>
| Plant physiology-Photosynthesis (40hrs) | Change, energy, transformation | Scientific and technical innovation Process | 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 |  |
| Atoms and elements Atoms combining (45hrs) | 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 |  |
Science overview

<table>
<thead>
<tr>
<th>Forces and motion</th>
<th>Change Interaction, movement</th>
<th>Scientific and technical innovation processes</th>
<th>Forces are everywhere. There are interactions, movements, changes and processes which all have to do with force exertions.</th>
<th>A, B, C, D (all)</th>
<th>Communication: communication skills/take effective notes in class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forces and pressure (40 hrs)</td>
<td>Speed, velocity and acceleration</td>
<td>Forces in balance, Friction and breaking</td>
<td>Force, weight and gravity</td>
<td>Action and reaction</td>
<td>Forces and pressure</td>
</tr>
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</table>

Year 4 (Grade 9) Biology - Ecology

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<tr>
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</thead>
<tbody>
<tr>
<td>Human physiology-</td>
<td>Systems, Function, movement</td>
<td>Scientific and technical innovation</td>
<td>The structure of the human respiratory system</td>
<td>A, B, C, D (all)</td>
<td>Communication: Communication skills/give and receive meaningful feedback</td>
<td>Lung structure, ventilation of the lungs, lung capacity and breathing rate, gaseous exchange, characteristics of</td>
</tr>
</tbody>
</table>
## Science overview

| **Breathing**  
<table>
<thead>
<tr>
<th><strong>(40 hrs)</strong></th>
</tr>
</thead>
</table>
| **Systems**  
| works efficiently to allow the exchange of oxygen and carbon dioxide.  
| **Research**  
| Information literacy skills/collect, record + verify data  
| Creative-thinking skills/ apply skills and knowledge in unfamiliar situations.  
| the respiratory surface and smoking.  
| **Food and Digestion**  
| **(40 hrs)** |
| **Change, Transformation**  
| **Scientific and technical innovation**  
| **Products and processes**  
| 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.  
| **Social**  
| collaboration skills/encourage others to contribute.  
| organization skills/plan short and long term assignments, meet deadlines.  
| Affective skills/ practice focus and concentration.  
| Critical thinking skills/practice observing carefully in order to recognise problems.  
| **Food and diet**  
| Balanced diet  
| The alimentary canal  
| Absorption  
| Use of digested food |
### Science overview

<table>
<thead>
<tr>
<th>The circulatory system (30 hrs)</th>
<th>Scientific and technical innovation processes</th>
<th>The process by which blood is transported throughout the body and the structure and function of the circulatory system makes it efficient and necessary.</th>
<th>A, D (all)</th>
<th>Communication: Communication skills/ take effective notes in class. Social: Collaboration skills/ listen actively to other perspectives and ideas. Self- management: Organization skills/set goals that are challenging and realistic. Media: Literacy skills/ Seek a range of perspectives from multiple and various skills.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The interdependence of living organisms and the impact of human activity on the environment (40 hrs)</td>
<td>Systems, Interactions, balance</td>
<td>Globalization and sustainability Human impact on the environment</td>
<td>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.</td>
<td>A, D (all)</td>
</tr>
<tr>
<td>Composition of blood The heart The blood vessels Functions of blood Transplants and transfusions Heart diseases</td>
<td>Ecosystems Food chains and food webs The carbon, the hydrogen and the water cycle Energy flow in the ecosystem</td>
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### Science overview

#### Year 4 (Grade 9) Chemistry - Physics

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</table>
| Separation techniques (25)   | Change Movement Transformation | Scientific and Technological Innovation | Homogeneous and heterogeneous mixtures can be separated into their components through movement and transformation of matter. | A, B and C | - Propose and evaluate a variety of solutions  
- Use brainstorming and visual diagrams to generate new ideas and inquiries  
- Apply skills and knowledge in unfamiliar situations | The first twenty elements of the periodic table  
Mixtures, solutions and compounds.  
Separation methods filtering, chromatography, simple and fractional distillation, evaporation. |
| Giving and sharing - Forming bonds (15) | Relationships Interaction Form | Scientific and Technological Innovation | The periodic table of elements defines whether elements can give and take or share electrons in order to | A and B | - Collect, record and verify data  
- Gather and organize relevant information to formulate an argument | 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 |
### Science overview

| Light my way (20) | Systems Patterns Movement | Scientific and Technica l 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 | - Revise understanding based on new information and evidence  
- Design improvements to existing machines, media and technologies  
- Apply skills and knowledge in unfamiliar situations | Light and sight  
- Law of reflection and refraction. Total internal reflection  
- Plane mirrors  
- Pinhole camera/box  
- Periscope, telescope, prism, magnifying glass  
- Lenses, ray diagrams |
| Waves (20) | RelationshipsF orm Energy Movement | Scientific and Technica l Innovati on | Mechanical, sound or electromagnetic waves are energy that moves in different ways. | B and D | - Gather and organize relevant information to formulate an argument | Mechanical waves, refraction, diffraction and reflection  
- Electromagnetic radiation  
- Sound waves |
## Science overview

**Year 5 (Grade 10) Biology-Ecology**

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| **DNA and genetics (40)** | 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 | Communication: Use and interpret a range of discipline-specific terms and symbols / 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 / Consider ethical, cultural and environmental implications | structure of nucleic acids, replication, transcription and translation, mitosis and meiosis, autosomal and sex-linked inheritance patterns for monogenic traits, the environmental contribution to traits, mutations, screening and genetic disease |
| **“A brave new world”? Genetic engineering, natural selection and evolution. (50)** | 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 | Communication: Negotiate ideas and knowledge with peers and teachers  
Social: Make fair and equitable decisions  
Thinking: consider ideas from multiple perspectives  
Self-management: Consider ethical, cultural and environmental implications | Genetic variations (meiosis, mutation)  
Natural selection  
Artificial Selection  
Evolution  
Selective breeding  
Genetic Engineering  
Cloning |
### Science overview

| Ecosystems and their conservation, our lives depend on it. (40) | 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

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<tr>
<td>Titration, balancing acids and bases</td>
<td>Change Transformation Balance</td>
<td>Scientific and Technical Innovation</td>
<td>Balanced chemical reactions are a useful tool to determine chemical change</td>
<td>A, B and C</td>
<td>THINKING: Transfer skills</td>
<td>Names of ionic compounds (revision) Balancing chemical reactions, neutralization reactions. Solubility rules Titration theory and experiments</td>
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<td>Science overview</td>
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<tr>
<td><strong>Fossil fuels</strong></td>
<td>Relationships Patterns Environment</td>
<td>Scientific and Technical Innovation</td>
<td>How do compounds of carbon relate with human society and the environment.</td>
<td>A and D</td>
<td>RESEARCH: Information literacy skills</td>
<td>Oil refining</td>
</tr>
</tbody>
</table>
| **Keep moving** | 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 |
| **The Electric Civilization** | 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 |