**Area of Learning: SCIENCE Grade 9**

**BIG IDEAS**

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| Cells are derived from cells. |  | The electron arrangement of atoms impacts their chemical nature. |  | Electric current is the flow of electric charge. |  | The biosphere, geosphere, hydrosphere, and atmosphere are interconnected, as matter cycles and energy flows through them. |

**Learning Standards**

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| **Curricular Competencies** | **Content** |
| *Students are expected to be able to do the following:*Questioning and predicting* **Q&P9** Demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal interest
* **Q&P17** Make observations aimed at identifying their own questions, including increasingly complex ones, about the natural world
* **Q&P16** Formulate multiple hypotheses and predict multiple outcomes

Planning and conducting* **P&C23** Collaboratively and individually plan, select, and use appropriate investigation methods, including field work and lab experiments, to collect reliable data (qualitative and quantitative)
* **P&C22** Assess risks and address ethical, cultural and/or environmental issues associated with their proposed methods and those of others
* **P&C24** Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and record data
* **P&C18** Ensure that safety and ethical guidelines are followed in their investigations

Processing and analyzing data and information* **P&A2** Experience and interpret the local environment
* **P&A16** Apply First Peoples perspectives and knowledge, other **ways of knowing**, and local knowledge as sources of information
* **P&A22** Seek and analyze patterns, trends, and connections in data, including describing relationships between variables (dependent and independent) and identifying inconsistencies
* **P&A21** Construct, analyze and interpret graphs (including interpolation and extrapolation), models and/or diagrams
* **P&A23** Use knowledge of scientific concepts to draw conclusions that are consistent with evidence
* **P&A20** Analyze cause-and-effect relationships
 | *Students are expected to know the following:** asexual reproduction:
	+ **mitosis**
	+ **different forms**
* sexual reproduction:
	+ **meiosis**
	+ **human sexual reproduction**
* element properties as organized in the **periodic table**
* The arrangement of electrons determines the **compounds** formed by elements
* **circuits** —must be complete for electrons to flow
* **voltage**, **current**, **and resistance**
* **effects of solar radiation** on the cycling of matter and energy
* **matter** **cycles** within **biotic and abiotic** components of ecosystems
* **sustainability** **of systems**
* First Peoples knowledge of **interconnectedness** and **sustainability**
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**Area of Learning: SCIENCE Grade 9**

**Learning Standards (continued)**

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| **Curricular Competencies** | **Content** |
| Evaluating* **EVAL24** Evaluate their methods and experimental conditions, including identifying sources of error or uncertainty, confounding variables, and possible alternative explanations and conclusions
* **EVAL22** Describe specific ways to improve their investigation methods and the quality of the data
* **EVAL23** Evaluate the validity and limitations of a model or analogy in relation to the phenomenon modelled
* **EVAL21** Demonstrate an awareness of assumptions, question information given, and identify bias in their own work and secondary sources
* **EVAL19** Consider the changes in knowledge over time as tools and technologies have developed
* **EVAL18** Connect scientific explorations to careers in science
* **EVAL15** Exercise a healthy, informed skepticism, and use scientific knowledge and findings to form their own investigations and to evaluate claims in secondary sources
* **EVAL12** Consider social, ethical, and environmental implications of the findings from their own and others’ investigations
* **EVAL20** Critically analyze the validity of information in secondary sources and evaluate the approaches used to solve problems

Applying and innovating* **A&I8** Contribute to care for self, others, community, and world through individual or collaborative approaches
* **A&I3** Transfer and apply learning to new situations
* **A&I1** Generate and introduce new or refined ideas when problem solving
* **A&I9** Contribute to finding solutions to problems at a local and/or global level through inquiry
* **A&I7** Consider the role of scientists in innovation

Communicating* **COMM12** Formulate physical or mental theoretical models to describe a phenomenon
* **COMM10** Communicate scientific ideas, claims, information, and perhaps a suggested course of action, for a specific purpose and audience, constructing evidence-based arguments and using appropriate scientific language, conventions, and representations
* **COMM11** Express and reflect on a variety of experiences, perspectives, and worldviews through **place**
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