**Area of Learning: SCIENCE — Physics Grade 11**

**BIG IDEAS**

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| An object’s **motion** can be predicted, analyzed, and described. |  | **Forces** influence the motion of an object. |  | **Energy** is found in different forms, is conserved, and has the ability to do work. |  | Mechanical **waves** transfer energy but not matter. |

**Learning Standards**

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| **Curricular Competencies** | **Content** |
| *Students are expected to be able to do the following:*  Questioning and predicting   * Demonstrate a sustained intellectual curiosity about a scientific topic or problem  of personal, local, or global interest * Make observations aimed at identifying their own questions, including increasingly abstract ones, about the natural world * Formulate multiple hypotheses and predict multiple outcomes   Planning and conducting   * Collaboratively and individually plan, select, and use appropriate investigation methods, including field work and lab experiments, to collect reliable data (qualitative and quantitative) * Assess risks and address ethical, cultural, and/or environmental issues  associated with their proposed methods * Use appropriate SI units and appropriate equipment, including digital technologies, to systematically and accurately collect and record data   Apply the concepts of accuracy and precision to experimental procedures  and data:   * + significant figures   + uncertainty   scientific notation | *Students are expected to know the following:*   * **vector and scalar quantities** * horizontal **uniform and accelerated motion** * **projectile motion** * **contact forces** and the factors that affect magnitude  and direction * mass, force of gravity, and apparent weight * **Newton’s laws of motion** and free-body diagrams * balanced and unbalanced **forces in systems** * conservation of energy; principle of work and energy * **power and efficiency** * **simple machines** and mechanical advantage * applications of simple machines by First Peoples * **electric circuits (DC), Ohm’s law, and Kirchhoff’s laws** * **thermal equilibrium** and specific heat capacity * generation and **propagation of waves** * **properties and behaviours** of waves * **characteristics** of sound * resonance and **frequency** of sound * **graphical methods** in physics |

**Area of Learning: SCIENCE — Physics Grade 11**

**Learning Standards (continued)**

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| **Curricular Competencies** | **Content** |
| Processing and analyzing data and information   * Experience and interpret the local environment * Apply First Peoples perspectives and knowledge, other ways of knowing, and local knowledge as sources of information * Seek and analyze patterns, trends, and connections in data, including describing relationships between variables, performing calculations, and identifying inconsistencies * Construct, analyze, and interpret graphs, models, and/or diagrams * Use knowledge of scientific concepts to draw conclusions that are consistent with evidence * Analyze cause-and-effect relationships   Evaluating   * Evaluate their methods and experimental conditions, including identifying sources of error  or uncertainty, confounding variables, and possible alternative explanations and conclusions * Describe specific ways to improve their investigation methods and the quality of their data * Evaluate the validity and limitations of a model or analogy in relation to the phenomenon modelled * Demonstrate an awareness of assumptions, question information given, and identify bias  in their own work and in primary and secondary sources * Consider the changes in knowledge over time as tools and technologies have developed * Connect scientific explorations to careers in science * Exercise a healthy, informed skepticism and use scientific knowledge and findings  to form their own investigations to evaluate claims in primary and secondary sources * Consider social, ethical, and environmental implications of the findings from their own  and others’ investigations * Critically analyze the validity of information in primary and secondary sources and evaluate the approaches used to solve problems * Assess risks in the context of personal safety and social responsibility |  |

**Area of Learning: SCIENCE — Physics Grade 11**

**Learning Standards (continued)**

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| **Curricular Competencies** | **Content** |
| Applying and innovating   * Contribute to care for self, others, community, and world through individual  or collaborative approaches * Co-operatively design projects with local and/or global connections and applications * Contribute to finding solutions to problems at a local and/or global level  through inquiry * Implement multiple strategies to solve problems in real-life, applied,  and conceptual situations * Consider the role of scientists in innovation   Communicating   * Formulate physical or mental theoretical models to describe a phenomenon * Communicate scientific ideas and 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 * Express and reflect on a variety of experiences, perspectives, and worldviews through **place** |  |