### BIG IDEAS

- **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

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

#### 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
## Curricular Competencies

### 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