<table>
<thead>
<tr>
<th>Unit Name</th>
<th>Key Concepts</th>
<th>Related Concept(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientific Method and Engineering Practices</td>
<td>RELATIONSHIPS allow students to identify and understand the connections and associations between properties, forces, objects, people and ideas, including the human community’s connection with the worlds in which we live. Any change in relationship brings consequences—some of which may occur on a small scale, while others may be far reaching, affecting large systems like human societies and the planet as a whole. CAUSE &amp; EFFECT Relationships in sciences indicate the connections found among variables through observation or experimentation. These relationships also can be tested through experimentation. Scientists often search for the connections between form and function. Modelling is also used to represent relationships where factors such as scale, volume of data, or time make other methods impractical. MODELS: Representations used for testing scientific theories or proposals that can be accurately repeated and validated; simulations used for explaining or predicting processes which may not be observable or to understand the dynamics of multiple underlying phenomena of a complex system. EVIDENCE: Support for a proposition derived from observation and interpretation of data.</td>
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<td>Changing Earth - Geology</td>
<td>CHANGE is a conversion/shift/movement from one state to another. Exploring change allows students to examine forces that shape the world: past, present and future. Inquiry into the concept of change invites students to consider causes, processes and consequences: natural and artificial, intentional and unintentional, positive and negative. In sciences, change is viewed as the difference in a system’s state when observed at different times. This change could be qualitative (such as differences in structure, behaviour, or level) or quantitative (such as a numerical variable or a rate). Change can be irreversible, reversible or self-perpetuating. SYSTEMS are sets of interacting or interdependent components. Everything in the known universe is a component of a system and generally also a part of multiple interacting and interdependent systems. Systems provide structure and order in both natural and human environments. Dynamic and complex in nature, systems rely on a state of equilibrium and are very vulnerable to change. Systems in sciences describe sets of components that function due to their interdependence or complementary nature. Common systems in science are closed systems, where resources are not removed or replaced, and open systems, where necessary resources are renewed regularly. Modelling often uses closed systems to simplify or limit variables.</td>
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### Global Context

Students will explore the natural world and its laws; the interaction between people and the natural world; how humans use their understanding of scientific principles; the impact of scientific and technological advances on communities and environments; the impact of environments on human activity; how humans adapt environments to their needs.

### Statement of Inquiry

Evidence of cause and effect relationships lead to advancement in understanding and the ability to solve complex problems.

### Objectives

<table>
<thead>
<tr>
<th>B. Inquiring and Designing</th>
<th>C. Processing and Evaluating</th>
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<td>At the end of year 1, students should be able to:</td>
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<td>i. outline an appropriate problem or research question to be tested by a scientific investigation</td>
<td>i. present collected and transformed data ii. interpret data and outline results using scientific reasoning iii. discuss the validity of a prediction based on the outcome of the scientific investigation iv. discuss the validity of the method v. describe improvements or extensions to the method</td>
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<td>ii. outline a testable prediction using scientific reasoning</td>
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<td>iii. outline how to manipulate the variables, and outline how data will be collected iv. design scientific investigations.</td>
<td>A. Knowing and Understanding i. summary the ways in which science is applied and used to address a specific problem or issue ii. describe and summarize the various implications of using science and its application in solving a specific problem or issue (global 3rd vs 1st world)</td>
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<td>C. Processing and Evaluating</td>
<td>D. Reflecting on the Impacts of Science</td>
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<td>A. Knowing and Understanding i. outline scientific knowledge ii. apply scientific knowledge and understanding to solve problems set in familiar situations and suggest solutions to problems set in unfamiliar situations iii. interpret information to make scientifically supported judgments.</td>
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### Scientific and Technical Innovations: How do we understand the worlds in which we live?

- **Global Context**
  - At the end of year 1, students should be able to:
    - i. outline an appropriate problem or research question to be tested by a scientific investigation
    - ii. outline a testable prediction using scientific reasoning
    - iii. outline how to manipulate the variables, and outline how data will be collected
    - iv. design scientific investigations.

- **Context**
  - Evidence of cause and effect relationships lead to advancement in understanding and the ability to solve complex problems.

- **Scientific and Technical Innovations: How do we understand the worlds in which we live?**
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- **Processing and Evaluating**
  - i. present collected and transformed data
  - ii. interpret data and outline results using scientific reasoning

### Scientific and Technical Innovations: How do we understand the outcomes of the scientific investigation?

- **Global Context**
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### Scientific and Technical Innovations: How do we understand the methods we use?

- **Global Context**
  - At the end of year 1, students should be able to:
    - i. outline scientific knowledge
    - ii. apply scientific knowledge and understanding to solve problems set in familiar situations and suggest solutions to problems set in unfamiliar situations
    - iii. interpret information to make scientifically supported judgments.

- **Context**
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- **Processing and Evaluating**
  - i. present collected and transformed data
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### Scientific and Technical Innovations: How do we understand the validity of predictions based on scientific reasoning?

- **Global Context**
  - At the end of year 1, students should be able to:
    - i. apply scientific knowledge and understanding to solve problems set in familiar situations and suggest solutions to problems set in unfamiliar situations
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- **Context**
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### Scientific and Technical Innovations: How do we understand the outcomes of the scientific method?

- **Global Context**
  - At the end of year 1, students should be able to:
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- **Processing and Evaluating**
  - i. present collected and transformed data
  - ii. interpret data and outline results using scientific reasoning

### Globalization and Sustainability: How is everything connected?

- **Global Context**
  - Students will explore the interconnectedness of human-made systems and communities; the relationship between local and global processes; how local experiences mediate the global; reflect on the opportunities and tensions provided by global interconnectivity; the impact of decision-making on humankind and the environment.

- **Context**
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- **Globalization and Sustainability: How is everything connected?**
  - Students will explore the interconnectedness of human-made systems and communities; the relationship between local and global processes; how local experiences mediate the global; reflect on the opportunities and tensions provided by global interconnectivity; the impact of decision-making on humankind and the environment.

- **Processing and Evaluating**
  - Possible explorations to develop
    - • Systems, models, methods
    - • Epochs, eras, turning points and “big history”
  - Possible explorations to develop:
    - • Models
  - Possible explorations to develop:
    - • Systems, models, methods; products, processes and solutions
  - Processes and solutions through the lens of ergonomics can lead to the retooling of systems to better use our resources.
<table>
<thead>
<tr>
<th>ATL skills</th>
<th>Communication Skills</th>
<th>Thinking Skills</th>
<th>Research Skills VI</th>
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</tr>
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<tbody>
<tr>
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**Content (Topics, Knowledge, and Skills)**

- **Scientific Method, experimental design, metric system, data tables and graphs**
- **Age of the Earth, composition of the Earth, geologic movement of the continents, natural disasters**
- **Relationships between the Sun, Earth, and moon. Size and scale of the solar system, formation of the solar system**
- **Atoms and Molecules, movement as heat, thermal energy transfer**

**Scientific write ups focussed on specific steps of the scientific method/design cycle.**

- **Renewable and nonrenewable energy sources. Human population and increase in energy demands worldwide. What is our human impacts using these different energies and what are possible solutions?**
- **Renewable and Nonrenewable Energy: Reading of 2 short articles, extracting evidence that supports a claim, short writing response using evidence.**

**Research Skills VI**

- Collect, record and verify data
- Collect and analyze data to identify solutions and make informed decisions
- Understand and implement intellectual property rights
- Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions
- Self Management Skills III
- Plan short and long-term assignments to meet deadlines
- Plan strategies and take action to achieve personal and academic goals
- Select and use technology effectively and productively