BIG IDEAS

Multicellular organisms rely on internal systems to survive, reproduce, and interact with their environment.	Everyday materials are often mixtures.	Newton's three laws of motion describe the relationship between force and motion.	The solar system is part of the Milky Way, which is one of billions of galaxies.

Learning Standards

Curricular Competencies	Content
Students are expected to be able to do the following: **Questioning and predicting** • Demonstrate a sustained curiosity about a scientific topic or problem of personal interest • Make observations in familiar or unfamiliar contexts • Identify questions to answer or problems to solve through scientific inquiry • Make predictions about the findings of their inquiry **Planning and conducting** • With support, plan appropriate investigations to answer their questions or solve problems they have identified • Decide which variable should be changed and measured for a fair test • Choose appropriate data to collect to answer their questions • Observe, measure, and record data, using appropriate tools, including digital technologies • Use equipment and materials safely, identifying potential risks **Processing and analyzing data and information** • Experience and interpret the local environment • Identify First Peoples perspectives and knowledge as sources of information • Construct and use a variety of methods, including tables, graphs, and digital technologies, as appropriate, to represent patterns or relationships in data • Identify patterns and connections in data • Compare data with predictions and develop explanations for results • Demonstrate an openness to new ideas and consideration of alternatives	*Students are expected to know the following:* • the basic structures and functions of body **systems:** – **excretory** – **reproductive** – **hormonal** – **nervous** • **heterogeneous mixtures** • mixtures**:** – **separated using a difference in component properties** – **local First Peoples knowledge** of separation and extraction methods • **Newton's three laws of motion** • effects of **balanced and unbalanced forces** in **daily physical activities** • **force of gravity** • the overall scale, structure, and age of the universe • the position, motion, and **components of our solar system** in our galaxy

Learning Standards (continued)

Curricular Competencies	Content
Evaluating • Evaluate whether their investigations were fair tests • Identify possible sources of error • Suggest improvements to their investigation methods • Identify some of the assumptions in **secondary sources** • Demonstrate an understanding and appreciation of evidence • Identify some of the social, ethical, and environmental implications of the findings from their own and others' investigations **Applying and innovating** • Contribute to care for self, others, and community through personal or collaborative approaches • Co-operatively design projects • Transfer and apply learning to new situations • Generate and introduce new or refined ideas when problem solving **Communicating** • Communicate ideas, explanations, and processes in a variety of ways • Express and reflect on personal, shared, or others' experiences of **place**	

BIG IDEAS

Evolution by natural selection provides an explanation for the diversity and survival of living things.	Elements consist of one type of atom, and compounds consist of atoms of different elements chemically combined.	The electromagnetic force produces both electricity and magnetism.	Earth and its climate have changed over geological time.

Learning Standards

Curricular Competencies

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 interest
- Make observations aimed at identifying their own questions about the natural world
- Identify a question to answer or a problem to solve through scientific inquiry
- Formulate alternative "If…then…" hypotheses based on their questions
- Make predictions about the findings of their inquiry

Planning and conducting

- Collaboratively plan a range of investigation types, including field work and experiments, to answer their questions or solve problems they have identified
- Measure and control variables (dependent and independent) through fair tests
- Observe, measure, and record data (**qualitative and quantitative**), using equipment, including digital technologies, with **accuracy** and **precision**
- Use appropriate SI units and perform simple unit conversions
- Ensure that safety and ethical guidelines are followed in their investigations

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
- Construct and use a range of methods to represent patterns or relationships in data, including tables, graphs, keys, models, and digital technologies as appropriate
- Seek patterns and connections in data from their own investigations and secondary sources
- Use scientific understandings to identify relationships and draw conclusions

Content

Students are expected to know the following:

- **organisms have evolved over time**
- **survival needs**
- **natural selection**
- **elements** and **compounds** are **pure substances**
- **crystalline structure** of solids
- **chemical changes**
- electricity
  - **generated in different ways** with different environmental impacts
  - **electromagnetism**
- the fossil record provides evidence for changes in biodiversity over **geological time**
- First Peoples knowledge of changes in biodiversity over time
- evidence of **climate change** over geological time and the recent **impacts of humans:**
  - **physical records**
  - **local First Peoples knowledge of climate change**

Learning Standards (continued)

Curricular Competencies	Content
Evaluating • Reflect on their investigation methods, including the adequacy of controls on variables (dependent and independent) and the quality of the data collected • Identify possible sources of error and suggest improvements to their investigation methods • Demonstrate an awareness of assumptions and bias in their own work and secondary sources • Demonstrate an understanding and appreciation of evidence (qualitative and quantitative) • Exercise a healthy, informed skepticism and use scientific knowledge and findings from their own investigations to evaluate claims in secondary sources • Consider social, ethical, and environmental implications of the findings from their own and others' investigations **Applying and innovating** • Contribute to care for self, others, community, and world through personal or collaborative approaches • Co-operatively design projects • Transfer and apply learning to new situations • Generate and introduce new or refined ideas when problem solving **Communicating** • Communicate ideas, findings, and solutions to problems, using scientific language, representations, and digital technologies as appropriate • Express and reflect on a variety of experiences and perspectives of **place**	

BIG IDEAS

Life processes are performed at the cellular level.	The behaviour of matter can be explained by the kinetic molecular theory and atomic theory.	Energy can be transferred as both a particle and a wave.	The theory of plate tectonics is the unifying theory that explains Earth's geological processes.

Learning Standards

Curricular Competencies

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 interest
- Make observations aimed at identifying their own questions about the natural world
- Identify a question to answer or a problem to solve through scientific inquiry
- Formulate alternative "If…then…" hypotheses based on their questions
- Make predictions about the findings of their inquiry

Planning and conducting

- Collaboratively plan a range of investigation types, including field work and experiments, to answer their questions or solve problems they have identified
- Measure and control variables (dependent and independent) through fair tests
- Observe, measure, and record data (**qualitative and quantitative**), using equipment, including digital technologies, with **accuracy** and **precision**
- Use appropriate SI units and perform simple unit conversions
- Ensure that safety and ethical guidelines are followed in their investigations

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
- Construct and use a range of methods to represent patterns or relationships in data, including tables, graphs, keys, models, and digital technologies as appropriate
- Seek patterns and connections in data from their own investigations and secondary sources
- Use scientific understandings to identify relationships and draw conclusions

Content

Students are expected to know the following:

- **characteristics of life**
- **cell theory** and **types of cells**
- photosynthesis and cellular respiration
- the relationship of **micro-organisms** with living things:
  - basic functions of the **immune system**
  - **vaccination** and **antibiotics**
  - impacts of **epidemics** and **pandemics** on human populations
- **kinetic molecular theory (KMT)**
- **atomic theory** and **models**
- **protons, neutrons, and quarks**
- **electrons and leptons**
- **types** and **effects** of electromagnetic radiation
- light:
  - **properties**
  - **behaviours**
  - **ways of sensing**
- **plate tectonic movement**
- major geological events of local significance
- First Peoples knowledge of:
  - local geological formations
  - significant local geological events
- layers of Earth

Learning Standards (continued)

Curricular Competencies	Content
Evaluating • Reflect on their investigation methods, including the adequacy of controls on variables (dependent and independent) and the quality of the data collected • Identify possible sources of error and suggest improvements to their investigation methods • Demonstrate an awareness of assumptions and bias in their own work and secondary sources • Demonstrate an understanding and appreciation of evidence (qualitative and quantitative) • Exercise a healthy, informed skepticism and use scientific knowledge and findings from their own investigations to evaluate claims in secondary sources • Consider social, ethical, and environmental implications of the findings from their own and others' investigations **Applying and innovating** • Contribute to care for self, others, community, and world through personal or collaborative approaches • Co-operatively design projects • Transfer and apply learning to new situations • Generate and introduce new or refined ideas when problem solving **Communicating** • Communicate ideas, findings, and solutions to problems, using scientific language, representations, and digital technologies as appropriate • Express and reflect on a variety of experiences and perspectives of **place**	

BIG IDEAS

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

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 interest • Make observations aimed at identifying their own questions, including increasingly complex 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 and those of others • Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and record data • Ensure that safety and ethical guidelines are followed in their investigations **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 (dependent and independent) and identifying inconsistencies • Construct, analyze and interpret graphs (including interpolation and extrapolation), models and/or diagrams • Use knowledge of scientific concepts to draw conclusions that are consistent with evidence • 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**

Learning Standards (continued)

Curricular Competencies	Content
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 the 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 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 and to evaluate claims in secondary sources • Consider social, ethical, and environmental implications of the findings from their own and others' investigations • Critically analyze the validity of information in secondary sources and evaluate the approaches used to solve problems **Applying and innovating** • Contribute to care for self, others, community, and world through individual or collaborative approaches • Transfer and apply learning to new situations • Generate and introduce new or refined ideas when problem solving • Contribute to finding solutions to problems at a local and/or global level through inquiry • Consider the role of scientists in innovation **Communicating** • Formulate physical or mental theoretical models to describe a phenomenon • 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 • Express and reflect on a variety of experiences, perspectives, and worldviews through **place**	

