June 2016 — DRAFT CURRICULUM

Area of Learning: SCIENCE

Grade 10

BIG IDEAS

- Genes are the foundation for the diversity of living things.
- Chemical processes require energy change as atoms are rearranged.
- Energy is conserved and its transformation can affect living things and the environment.
- The formation of the universe can be explained by the big bang theory.

Learning Standards

Curricular Competencies | Content
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**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:**

- DNA structure and function
- genes and chromosomes
- simple patterns of inheritance
- mechanisms for the diversity of life: mutation and its impact on evolution
- natural and artificial selection
- applications of genetics and ethical considerations
- rearrangement of atoms in chemical reactions
- acid-base chemistry
- law of conservation of mass
- energy change during chemical reactions
- practical applications and implications of chemical processes, including First Peoples perspectives
- law of conservation of energy
- transformation of potential and kinetic energy
- local and global impacts of energy transformations from technologies
### Curricular Competencies

#### 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**

#### Content
- First Peoples perspectives on energy
- Nuclear energy and **radiation**:
  - Fission versus fusion
  - **Technologies and applications**, and implications
- Formation of the universe:
  - Big bang theory
  - Components of the universe over time
  - Astronomical data and collection methods