BRITISH COLUMBIA
Ministry of Education

BIG IDEAS

DNA is the basis for the diversity of living things.	Energy change is required as atoms rearrange in **chemical processes**.	**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
Students are expected to be able to do the following:	*Students are expected to know the following:*
Questioning and predicting	• **DNA structure and function**
• Demonstrate a sustained intellectual curiosity about a scientific topic or problem of personal interest	• **patterns of inheritance**
• Make observations aimed at identifying their own questions, including increasingly complex ones, about the natural world	• mechanisms for the diversity of life:
• Formulate multiple hypotheses and predict multiple outcomes	– **mutation** and its impact on evolution
Planning and conducting	– **natural selection** and **artificial selection**
• Collaboratively and individually plan, select, and use appropriate investigation methods, including field work and lab experiments, to collect reliable data (qualitative and quantitative)	• **applied genetics** and **ethical considerations**
• Assess risks and address ethical, cultural, and/or environmental issues associated with their proposed methods and those of others	• rearrangement of atoms in **chemical reactions**
• Select and use appropriate equipment, including digital technologies, to systematically and accurately collect and record data	• acid-base chemistry
• Ensure that safety and ethical guidelines are followed in their investigations	• law of conservation of mass
Processing and analyzing data and information	• **energy change** during chemical reactions
• Experience and interpret the local environment	• **practical applications and implications of chemical processes**, including First Peoples knowledge
• Apply **First Peoples perspectives and knowledge**, other **ways of knowing**, and local knowledge as sources of information	• **nuclear energy** and **radiation**
• Seek and analyze patterns, trends, and connections in data, including describing relationships between variables (dependent and independent) and identifying inconsistencies	• law of conservation of energy
	• **potential** and **kinetic** energy
	• **transformation of energy**
	• local and global **impacts of energy transformations** from technologies
	• formation of the universe:
	– big bang theory
	– **components of the universe over time**
	• **astronomical data and collection methods**

Learning Standards (continued)

Curricular Competencies	Content
- 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 **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	

Learning Standards (continued)

Curricular Competencies	Content
- 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**	