

# **Appendices**



## General Learning Outcomes

The purpose of Manitoba science curricula is to impart to students a measure of scientific literacy that will assist them in becoming informed, productive, and fulfilled members of society. As a result of their Early, Middle, and Senior Years science education, Manitoba students will be able to:

### Nature of Science and Technology

- A1. recognize both the power and limitations of science as a way of answering questions about the world and explaining natural phenomena
- A2. recognize that scientific knowledge is based on evidence, models, and explanations, and evolves as new evidence appears and new conceptualizations develop
- A3. distinguish critically between science and technology in terms of their respective contexts, goals, methods, products, and values
- A4. identify and appreciate contributions made by women and men from many societies and cultural backgrounds towards increasing our understanding of the world and in bringing about technological innovations
- A5. recognize that science and technology interact with and advance one another

### Science, Technology, Society, and the Environment (STSE)

- B1. describe scientific and technological developments, past and present, and appreciate their impact on individuals, societies, and the environment, both locally and globally.
- B2. recognize that scientific and technological endeavours have been and continue to be influenced by human needs and the societal context of the time
- B3. identify the factors that affect health and explain the relationships among personal habits, lifestyle choices, and human health, both individual and social
- B4. demonstrate a knowledge of, and personal consideration for, a range of possible science- and technology-related interests, hobbies, and careers
- B5. identify and demonstrate actions that promote a sustainable environment, society, and economy, both locally and globally

**Scientific and Technological Skills and Attitudes**

- C1. recognize safety symbols and practices related to scientific and technological activities and to their daily lives, and apply this knowledge in appropriate situations
- C2. demonstrate appropriate scientific inquiry skills when seeking answers to questions
- C3. demonstrate appropriate problem-solving skills while seeking solutions to technological challenges
- C4. demonstrate appropriate critical thinking and decision-making skills when choosing a course of action based on scientific and technological information
- C5. demonstrate curiosity, skepticism, creativity, open-mindedness, accuracy, precision, honesty, and persistence, and appreciate their importance as scientific and technological habits of mind
- C6. employ effective communication skills and utilize information technology to gather and share scientific and technological ideas and data
- C7. work cooperatively and value the ideas and contributions of others while carrying out scientific and technological activities
- C8. evaluate, from a scientific perspective, information and ideas encountered during investigations and in daily life

**Essential Science Knowledge**

- D1. understand essential life structures and processes pertaining to a wide variety of organisms, including humans
- D2. understand various biotic and abiotic components of ecosystems, as well as their interaction and interdependence within ecosystems and within the biosphere as a whole
- D3. understand the properties and structures of matter as well as various common manifestations and applications of the actions and interactions of matter
- D4. understand how stability, motion, forces, and energy transfers and transformations play a role in a wide range of natural and constructed contexts
- D5. understand the composition of the Earth's atmosphere, hydrosphere, and lithosphere, as well as the processes involved within and among them
- D6. understand the composition of the universe, the interactions within it, and the impacts of humankind's continued attempts to understand and explore it

**Unifying Concepts**

- E1. describe and appreciate the similarity and diversity of forms, functions, and patterns within the natural and constructed world
- E2. describe and appreciate how the natural and constructed world is made up of systems and how interactions take place within and among these systems
- E3. recognize that characteristics of materials and systems can remain constant or change over time, and describe the conditions and processes involved
- E4. recognize that energy, whether transmitted or transformed, is the driving force of both movement and change, and is inherent within materials and in the interactions among them

## Notes

## Kindergarten to Grade 4, and Senior 1 Science Cluster Titles

Manitoba's *Science Frameworks (Kindergarten to Grade 4, Grades 5–8, Senior 1)* present specific learning outcomes (SLOs) that are arranged into groupings, referred to as clusters. The clusters are thematic and generally relate to the three science disciplines: life science, physical science, and Earth and space science.

Whereas the SLOs themselves are mandatory, the order in which they are addressed is not. Teachers are encouraged to plan their instruction based on student needs, individual contexts, learning resources, and other pertinent considerations.

The cluster titles for both Kindergarten to Grade 4 Science, and Senior 1 Science have been reproduced in the figure below.

Grades Clusters	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Senior 1
Cluster 0	Overall Skills and Attitudes (to be integrated into Clusters 1 to 4)					
Cluster 1	Trees	Characteristics and Needs of Living Things	Growth and Changes in Animals	Growth and Changes in Plants	Habitats and Communities	Reproduction
Cluster 2	Colours	The Senses	Properties of Solids, Liquids, and Gases	Materials and Structures	Light	Atoms and Elements
Cluster 3	Paper	Characteristics of Objects and Materials	Position and Motion	Forces that Attract or Repel	Sound	Nature of Electricity
Cluster 4		Daily and Seasonal Changes	Air and Water in the Environment	Soils in the Environment	Rocks, Minerals, and Erosion	Exploring the Universe

## Notes