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.

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

<table>
<thead>
<tr>
<th>Grades Clusters</th>
<th>Kindergarten</th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
<th>Grade 4</th>
<th>Senior 1</th>
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</thead>
<tbody>
<tr>
<td>Cluster 0</td>
<td></td>
<td>Overall Skills and Attitudes (to be integrated into Clusters 1 to 4)</td>
<td></td>
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<tr>
<td>Cluster 1</td>
<td>Trees</td>
<td>Characteristics and Needs of Living Things</td>
<td>Growth and Changes in Animals</td>
<td>Growth and Changes in Plants</td>
<td>Habitats and Communities</td>
<td>Reproduction</td>
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<tr>
<td>Cluster 2</td>
<td>Colours</td>
<td>The Senses</td>
<td>Properties of Solids, Liquids, and Gases</td>
<td>Materials and Structures</td>
<td>Light</td>
<td>Atoms and Elements</td>
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<tr>
<td>Cluster 3</td>
<td>Paper</td>
<td>Characteristics of Objects and Materials</td>
<td>Position and Motion</td>
<td>Forces that Attract or Repel</td>
<td>Sound</td>
<td>Nature of Electricity</td>
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</tbody>
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Notes