Grade 6

# SCIENCE CURRICULUM at a Glance

*This is a support document only. Please refer to the curriculum to fully understand the intent and context.*

**Global Competencies**


**Enduring Understandings**

Explaining Phenomena · Collective Endeavour · Science & Technology · Implications · Empowering Agency

**Potential** Inquiry Questions

- *What causes events to happen?*
- *How are time and the motion of the Solar System related?*
- *How are living things similar and different from each other?*

## Strand A. Indigenous Peoples within the Natural World

*What contributions do Indigenous ways of knowing, being, and doing make to science?*

**SCI.6.A.1** Demonstrate an understanding of different First Nations, Métis, and Inuit ways of knowing, being, and doing in relationship with the land and the natural world by exploring Indigenous methods of observing and interpreting the world, applying scientific principles, and creating technologies within local traditional and contemporary cultural contexts (e.g., wholistic, reciprocal, interconnected, and sustainable ways; land-based learning; outdoor learning; intersections with Western science).

## Strand B. Science Identity

*How do I engage in science?*

**SCI.6.B.1** Develop a sense of agency, identity, and belonging in science by cultivating natural curiosity about the world, acquiring scientific skills and fostering scientific attitudes, building a personal connection to nature, establishing links between science concepts and personal experience, and recognizing that everyone can contribute to science.

## Strand C. Practical Science

### STSE CONTEXTS

*How do science and our world interact?*

**SCI.6.C.1**
Demonstrate an awareness of the dynamic interplay between science, technology, society, and the environment (STSE), thereby being empowered to critically evaluate the impacts of scientific and technological advancements on individuals, communities, and ecosystems, and to make informed decisions for a sustainable future.

Examples: playground physics; importance of water-based transport in Manitoba; submarine technology; uses of buoyancy and forces in Indigenous structures and tools; flight; significance of celestial bodies (Earth, Sun, Moon, stars) in various cultures; use of the Sun to mark time historically; ancient observatories; causes of solar and lunar eclipses; the importance of understanding tides; the importance of sustainable and renewable energy sources; wildlife-human interactions and coexistence; selective breeding for desired traits; genetic engineering (GMO, CRISPR, etc.); biodiversity in Manitoba and around the world; significance of plant names in Indigenous languages; conservation efforts

### SCIENTIFIC MEASUREMENT

*How do we measure scientifically?*

**SCI.6.C.2**
Demonstrate an understanding of units, measuring tools, and the nature of measurement in science. (**Bold** indicates items introduced for the first time at this grade level.)

Include the following:

- Tools: calendar, clock, ruler, pan balance, balance, volumetric vessels, spring scale, **voltmeter, ammeter (multimeter)**
- Attributes: length, mass, volume, time, temperature, speed, force, **electric potential, current (Note: DC low voltage only, i.e., battery power)**
- Units: length (km, m, cm, mm), mass (kg, g), volume (L, mL), time (h, min, s), temperature (°C), speed (km/h, m/s), force (N), **current (A), potential (V)**
- Skills: measure and estimate using standard SI tools and units; select measurement tools; display quantitative data (charts, line graphs, tables, etc.); recognize importance of standard units; convert between SI length, time, and volume units; **understand meaning of SI prefixes and their symbols (micro, milli, centi, deci, deka, hecto, kilo, mega)**

### ACTION AND PRACTICE

*How can we do science?*

**SCI.6.C.3**
Demonstrate practical scientific skills through safely and actively participating in a variety of scientific practices such as inquiry-based learning experiences, experimentation, scientific observation, data analysis, measurement, debate and scientific argumentation, communicating scientific information, and designing and building.

Examples:

- Participate in learning experiences that include an Indigenous community member (e.g., Elder, Knowledge Holder; Knowledge Keeper) to share knowledge, experience, or teachings related to the curriculum.
- Use the design process to construct a prototype that can fly and meet specific performance criteria.
- Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.
- Construct simple circuits to demonstrate how electrical energy can be controlled to produce light, heat, sound, motion, and magnetic effects.
- Compare closely related animals that live in different parts of the world, and propose explanations for any differences in their structures and behaviours.
- Demonstrate work habits that ensure personal safety, the safety of others, and consideration for the environment.

### SCIENTIFIC INSTRUMENTS

*How do we use tools in science?*

**SCI.6.C.4**
Demonstrate an understanding of the purpose and function of various scientific instruments and materials (considering availability and appropriateness), as well as competence in using them safely.

Examples: telescope, hand lenses, binoculars, electrical circuit components, fossils, glassware, craft and recycled materials, classroom materials, materials from nature, logbook, diagrams, charts, graphs, spreadsheets, safety procedures

### CAREERS, HOBBIES, AND ACTIVITIES

*Where is science found in our lives?*

**SCI.6.C.5**
Demonstrate an understanding of the connections between the scientific ideas studied and a range of careers, hobbies, and activities.

Examples: astronomer, teacher, geneticist, pilot, ship's captain, oceanographer, climate scientist, energy engineer, museum curator, rigger, balloonist, sailor, model rocketry, star gazing, Indigenous storytelling related to seasons and life, fossil hunting, swimming, basketball, lacrosse, snowshoeing, skiing, snowboarding

Manitoba

## Strand D. Nature of Science

### PURPOSE

Science is about finding the cause or causes of phenomena in the natural world.

*What is science for?*

**SCI.6.D.1** Demonstrate the understanding that science attempts to develop explanations for phenomena in nature.

### METHOD

Scientific explanations, theories, and models are those that best fit the evidence available at a particular time.

*How is science done?*

**SCI.6.D.2** Demonstrate the understanding that developing scientific explanations involves systematically collecting data through observations and measurements or using data from other sources.

**SCI.6.D.3** Demonstrate the understanding that a hypothesis is a prediction about what is happening, or what might happen, based upon theory, research, past experience, observations, or other evidence.

**SCI.6.D.4** Demonstrate the understanding that the data that scientists look for is guided by a theory or a hypothesis, and the evidence they find supports or refutes their predictions.

### APPLICATION

The knowledge produced by science is used in engineering and technologies to create products and processes.

*How is science used?*

**SCI.6.D.5** Demonstrate the understanding that engineering is the application of scientific principles and approaches to solving problems, often resulting in new technology that furthers scientific discovery.

**SCI.6.D.6** Demonstrate the understanding that when solving problems, there may be many possible solutions, each with associated implications, requiring both critical and creative thinking in choosing the best solution.
Examples: functionality, sustainability, economic considerations, ethics, impacts on all living things and all parts of the ecosystems

### IMPLICATION

Applications of science often have ethical, environmental, social, economic, and political implications.

*What are the impacts of using science?*

**SCI.6.D.7** Demonstrate the understanding that technologies may have both beneficial and detrimental social and environmental consequences.

## Strand E. Scientific Knowledge

### FORCE

Changing the movement of an object requires a net force to be acting on it.

*What role do forces play in events?*

**SCI.6.E.1** Demonstrate the understanding that the gravitational force of Earth pulls objects (near Earth's surface) toward the planet's centre.

**SCI.6.E.2** Demonstrate an understanding of forces that oppose gravitational force.
Examples: lift, normal force, buoyancy, tension

**SCI.6.E.3** Demonstrate a conceptual understanding of the principles of buoyancy.
Include the following: opposing forces, Archimedes Principle, volume, density, mass.

### ENERGY

The total amount of energy in the universe is always the same but can be transferred from one energy store to another during an event.

*What role does energy play in causing events?*

**SCI.6.E.4** Demonstrate the understanding that objects can have stored energy.
Examples: chemical, food, kinetic, thermal, gravitational, solar, electrical, elastic

**SCI.6.E.5** Demonstrate the understanding that stored energy can be transferred, and this causes events to happen.
Examples: create or transfer heat, illuminate a bulb, run a motor, grow and repair living tissue

**SCI.6.E.6** Demonstrate the understanding that in battery-powered circuits, as electricity flows, energy is transferred from the battery to components in the circuit and ultimately to the environment.
Include the following: chemical energy (batteries), charge, conductor, circuits, energy change from one form to another.

**SCI.6.E.7** Demonstrate an understanding of safety precautions associated with electricity.
Examples: household appliances, batteries, circuits

### SPACE SCIENCE

Our Solar System is a very small part of one of billions of galaxies in the universe.

*What are the astronomical reasons for observed phenomena related to marking time?*

**SCI.6.E.8** Demonstrate an understanding of the rotational motion of Earth, and its role in defining the length of a day.
Include the following: day and night, sunrise, sunset, rotation.

**SCI.6.E.9** Demonstrate the understanding that the meaning of human time systems is tied to the motions of Earth around the Sun and the Moon around Earth.
Include the following: month, year, seasons (solstice, equinox), revolution, orbit.

**SCI.6.E.10** Demonstrate an understanding of the relationship among the tilt of Earth's axis, revolution around the Sun, number of daylight hours, and seasonal change.

**SCI.6.E.11** Demonstrate an understanding of the nature of the Sun as a star like billions of others, and as the central source of energy, light, and gravity in the Solar System.
Include the following: heat, moon phases.

### GENETICS

Genetic information is passed down from one generation of organisms to another.

*What can be inherited?*

**SCI.6.E.12** Demonstrate the understanding that living things resemble their parents in both plants and animals because genetic information is passed from one generation to the next.
Examples: plant and animal offspring

**SCI.6.E.13** Demonstrate the understanding that the traits, skills, and behaviours exhibited by living things result from some combination of genetic, environmental, social, and learned components.
Examples: bird songs, migrations, web building, nest building

### EVOLUTION

The diversity of organisms, living and extinct, is the result of evolution.

*What kinds of living things are there and how do they come to be?*

**SCI.6.E.14** Demonstrate the understanding that there is a wide variety of living things in the world, which are systematically categorized by scientists.
Include the following: physical traits, taxonomy, dichotomous key.

**SCI.6.E.15** Demonstrate the understanding that fossils provide evidence of how living things have changed over time.
Examples: animal fossils, plant fossils, micro fossils

**SCI.6.E.16** Demonstrate an understanding of the nature of plant and animal species.
Include the following: viable offspring, hybrids (e.g., grolar/pizzly bear, mule, coy-dog, coy-wolf, liger, hybrid crops).

**SCI.6.E.17** Demonstrate the understanding that sexual reproduction produces offspring that are similar to but not identical to their parents.