# Updated draft K-6 curriculum (May 2022)

Science

## Overview

Science aims to answer questions and make sense of the physical, living, and digital world. Science calls on students to use their curiosity, creativity, and perseverance to develop a deeper knowledge and understanding of the world. It includes the study of physics, chemistry, biology, Earth science, astronomy, and computer science.

Through science, students, both on their own and in teams, develop critical thinking, problem solving, confidence, and communication skills to make sense of complex information. They gain knowledge and skills by applying scientific methods. Exploring the environment through diverse perspectives and traditional knowledge allows students to connect with their surroundings and recognize the responsibility we share for our planet.

Studying science equips students with the skills needed to evaluate information they encounter every day and make evidence informed decisions. It can lead to careers in research, medicine, computer science, geology, engineering, astronomy, agriculture, and more.

## Draft curriculum content update summary

### What we heard

We listened to all feedback from classroom piloting and engagement activities and heard these common concerns across all draft Kindergarten to Grade 6 (K-6) subjects:

- Load
  - some content is too heavy within a subject, grade, or learning outcome
- Age-inappropriateness
  - some knowledge, understandings, and skills/procedures need to be better aligned with students' developmental level in a specific grade
  - more pre-requisite learning is needed in some grades to support the knowledge, understandings, and skills/procedures
- Wording clarity
  - clearer expectations and verb choice are needed in some content for students to achieve learning outcomes
  - clearer descriptions are needed for some knowledge, understandings, or skills/procedures
- First Nations, Métis, and Inuit content
  - additional content is needed to support First Nations, Métis, and Inuit perspectives
  - some content needs to represent First Nations, Métis, and Inuit perspectives and contributions more authentically

The feedback on the draft K-6 science curriculum from March 2021 offered suggestions related to neutral language, integrating scientific methods and hands-on activities, as well as digital literacy and ethics.

We heard the content needed updates to:

- ensure language is neutral, while emphasizing connections to nature and allowing for a variety of perspectives
- integrate scientific methods more effectively into all content
- increase opportunities for creativity, hands-on activities, and investigation
- increase emphasis on digital literacy and ethics

### What we updated

In May 2022, we updated the draft K-6 science curriculum from March 2021 to reflect the engagement and piloting feedback we heard. We also aligned the updated draft with top-performing jurisdictions, both within Canada and internationally, as well as those with knowledge-rich curriculums.

We made the following content updates:

- **Load:** Refined examples, removed redundancies, and redistributed content while considering age-appropriateness.
- **Age-appropriateness:** Reworded content, added definitions, examples, or details to develop foundational knowledge, and shifted content into grades 7-12.
- **Wording clarity:** Analyzed and aligned verbs to Bloom's Taxonomy to ensure higher-level verbs are used in all K-6 grades, and/or edited for cohesiveness and clear language use.
- **First Nations, Métis, and Inuit content:** Made updates based on feedback from stakeholder groups and jurisdictional scans.
- **Neutral language:** Revised and added content to reflect a variety of perspectives and ensured shared responsibility for environmental stewardship and sustainability is more evident, while emphasizing connections to nature.
- **Scientific methods and hands-on activities:** Revised and added content across all K-6 grades to integrate scientific methods and increase opportunities for active learning and creativity.
- **Digital literacy and ethics:** Revised and added content to ensure digital literacy and ethics are more evident.

## Current curriculum and updated draft comparison

The following list shows how elements in the current K-6 science curriculum, published in 1996, compare to the updated draft. The comparisons provide examples and do not represent all the changes that were made.

| | **Current curriculum (1996) Examples** | **Updated draft curriculum (May 2022) Examples** |
|---|---|---|
| **Specific units and topics** | • Content is organized by units and topics that limit connections between scientific ideas, methods, and thinking. | • Students build foundational knowledge across K-6 to deepen their understanding of scientific ideas, methods, and thinking. |
| **Computational thinking** | • There are no references to problem solving with coding. | • There are clear expectations for students to learn problem solving that includes coding and algorithms. |
| **Science components/scientific methods** | • Students learn to apply science inquiry skills at each grade but do not study scientific methods in a separate unit. | • Students will learn scientific methods, including investigation, objectivity, evidence, representation, ethics, and explanation in a separate content area and apply these learnings across all content and grades. |
| **Diverse perspectives** | • There are no references to diverse perspectives.<br>• There are no references to First Nations, Métis, and Inuit perspectives. | • There are opportunities for students to explore diverse perspectives and cultures.<br>• First Nations, Métis, and Inuit knowledge, practices, and perspectives are clearly and respectfully included. |

## Snapshot by grade

In updated draft K-6 science from May 2022, students will learn about matter, energy, Earth systems, living systems, space, computer science, and scientific methods.

### Kindergarten

- Properties of natural and constructed objects can be explored through five senses.
- Movement of objects and animals, including reasons why humans and animals move.
- Surrounding environment and its elements, including connection to and respect for the environment.
- Ways to protect the environment, like caring for nature, reducing waste, recycling, reusing, and not littering.
- The purpose of instructions, contexts in which they can be experienced, and how they can be presented.

### Grade 1

- Properties of natural and constructed objects and how they can be physically changed.
- Characteristics of movement, including direction, pathway, and speed.
- Changes in the environment, including seasonal changes and sudden weather events.
- Responsibility to care for the natural world, and personal and community actions that illustrate that responsibility from a variety of perspectives.
- Creating and ordering instructions, and how instructions can support safety during science investigations.
- Investigation and its purpose, including to satisfy curiosity, solve a problem, or meet a need.

### Grade 2

- Properties of materials and how materials can be used to make various objects.
- The source, pathway, and behaviour of light and sound.
- Earth, its landforms, its bodies of water, and its relationship to the Sun.
- Growth and development of plants and animals, and various ways individuals or groups can relate to nature.
- How creativity can be used to ensure that instructions lead to the desired outcome.
- Methods and processes used in scientific investigation.

### Grade 3

- Natural and processed materials and their potential to be changed, including states of matter and the water cycle.
- Contact forces and how they can affect the movement of objects, including an introduction to simple machines.
- Changes in Earth's surface, including the glaciers melting due to Earth warming up.
- How layers of the landscape hold information about the past, including fossilized dinosaur bones in Alberta landscapes.
- First Nations, Métis, and Inuit relationships to land and intergenerational knowledge of landscapes.
- Interactions between plants, animals (including humans), and the environment.
- Creativity and its relationship to computational thinking.
- Ways to approach investigation and how investigation develops knowledge of the natural world and can be used to support decision making.

### Grade 4

- Waste management methods, including reducing waste production and applying knowledge of hazardous materials, recycling, reusing, reducing, repurposing, and repairing.
- Non-contact forces, including gravity and magnetism.
- Interconnections between systems of Earth (land, air, water, and organisms), including conservation.
- Functions of external structures of organisms.
- Astronomical phenomena and technologies used to observe them.
- Design processes and their creative application in solving problems.
- The nature of evidence and its role in science.

### Grade 5

- The particle model of matter and its relationship to the physical properties of solids, liquids, and gases.
- Forces in water and air, including buoyancy and the principles of flight.
- Renewable and non-renewable energy resources and the relationship between environmental conditions in Alberta and available energy resources.
- The relationship between climate and weather, and agricultural practices, including conservation agriculture.
- Functions of internal systems of organisms.
- Observable processes that happen among stars, planets, the Sun, and the Moon.
- Creating physical and computational artifacts, coding, and translating algorithms into code.
- Controlled experiments, ways to gather evidence, and the importance of handling data and evidence responsibly, including scientific ethics.

### Grade 6

- Effect of heating and cooling on particles of matter, including changes of state and thermal expansion.
- Interactions between objects and the resulting forces.
- Scientific, environmental, and economic considerations around energy distribution and use, including in Alberta.
- Factors affecting climate and climate change, including greenhouse gases, and personal actions that can be taken to address climate change.
- Characteristics and components of ecosystems, including the importance of plants.
- Components of the solar system, their characteristics, and the technologies used to understand them.
- Design, abstraction, and coding, and the impact computers and technology have on people and the environment.
- Explanation and hypothesis and their role in science.