GRADE 2 SCIENCE at a glance

This ***Grade 2 Science at a Glance*** can be used in designing, planning, and assessing student learning for the year. It can be used as a planning tool to preview the content of the Grade 2 Science curriculum.

It is organized by **clusters** and sorts learning outcomes into **big ideas**. The clusters are the context in which students develop knowledge and understanding of important ideas in science while actively engaging in science and technology practices, deepening their understanding of concepts as they experience how science is actually done.

This document can be used with the ***Grade 2 Science Curriculum Overview*** to plan clear and concise expectations for student learning. It can also be used to connect learning by making links to other subject areas.

Science PRACTICES CLUSTER 0 OUTCOMES

The **practices** of science and technological design support students in acquiring a better understanding of how scientific knowledge is produced and how solutions to practical problems are designed. Students engaging in scientific inquiry and design activities simultaneously use knowledge, skills, and attitudes, which deepens their understanding of concepts and provides exposure to the many approaches that are used in science and technology.

These practices are outlined in detail in *Kindergarten to Grade 4 Science: Manitoba Curriculum Framework of Outcomes*.

SCIENTIFIC INQUIRY

- Asking Questions and Making Predictions
- Planning and Carrying Out Investigations
- Analyzing and Interpreting Data
- Obtaining, Evaluating, and Communicating Information

DESIGN PROCESS

- Identifying and Defining Practical Problems
- Researching, Planning, and Choosing a Solution
- Constructing and Testing the Model or Prototype
- Evaluating and Optimizing the Solution

GROWTH AND CHANGES IN ANIMALS

- **Needs of animals to grow and develop**
  01 04 12 15 16
- **Plants or other animals as a source of food**
  01 04 05 06 07
- **Characteristics, growth, and changes in animals**
  01 02 03 08 09 10 11 12 14 15
- **Importance of reproduction**
  01 08 13

PROPERTIES OF SOLIDS, LIQUIDS, AND GASES

- **States of matter**
  01 02 03 04 05 11 12 13
- **Changes of state**
  01 14 15
- **Properties of matter**
  01 06 07 08 09 10 16 17 18 19

POSITION AND MOTION

- **The position of objects**
  01 02 03 04 05
- **Effects of pushes or pulls on the position or motion of an object**
  01 03 06 07 08
- **Technologies used to change the position of objects**
  01 09 10 11 12 13 14

AIR AND WATER IN THE ENVIRONMENT

- **Air and its effects on us and the environment**
  01 02 03 04 05 08
- **Importance of water and the water cycle**
  01 06 07 08
- **Importance of clean air and water**
  01 09 10 11 13
- **Impacts of humans on the quality of air and water**
  01 12 13 14

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Curriculum Overview

REPORT CARD CATEGORIES

KNOWLEDGE AND UNDERSTANDING

Cluster 1 GROWTH AND CHANGES IN ANIMALS

- Animals, including humans, are living things and, like all living things, they have certain needs so they can stay alive, grow, and develop.
  01 04 12 15 16
- Animals, including humans, obtain food, which is essential for growth and development, from plants or other animals.
  01 04 05 06 07
- Animals, including humans, grow, change, have specific characteristics and behaviours, and have offspring similar to themselves.
  01 02 03 08 09 10 11 12 14 15
- Reproduction is essential to every kind of living thing. Parents often engage in behaviours that help their offspring survive, but the offspring of some animals are independent at birth.
  01 08 13

Cluster 2 PROPERTIES OF SOLIDS, LIQUIDS, AND GASES

- Matter can exist in different states (solid, liquid, or gas), each state having specific properties.
  01 02 03 04 05 11 12 13
- Matter can change from one state to another (e.g., by melting, freezing, boiling) by heating or cooling.
  01 14 15
- Different types of solids, liquids, and gases can be described and classified by their observable properties and interactions with other solids, liquids, and gases (e.g., absorption of water, floatability, ability to dissolve), which can determine their uses.
  01 06 07 08 09 10 16 17 18 19

Cluster 3 POSITION AND MOTION

- The position of an object can be described using a variety of reference points.
  01 02 03 04 05
- The position or motion of an object can be changed by a push or a pull, and the size of the change depends on the strength of the push or pull.
  01 03 06 07 08
- Certain technologies can facilitate the motion of objects (e.g., inclined planes, wheels and axles).
  01 09 10 11 12 13 14

Cluster 4 AIR AND WATER IN THE ENVIRONMENT

- Air is a major part of the environment; it can move and affect us and the environment.
  01 02 03 04 05 08
- Water is a major part of our environment and can change states as part of the water cycle.
  01 06 07 08
- Clean air and water are necessary for humans, plants, and animals to survive.
  01 09 10 11 13
- Our actions can have an impact on the quality of air and water, and on its ability to sustain life.
  01 12 13 14

SCIENTIFIC INQUIRY

Asking Questions and Making Predictions
1a 1b

- Ask questions that can be investigated.
- Make predictions based on prior experiences and observations.

Planning and Carrying Out Investigations
4a 4e 4f 4h 4i 5a 5b 5c 5d 5e 9a 9b 9c

- Follow directions during explorations and understand their purpose.
- Safely use tools and equipment to make observations that are relevant to a question.
- Record observations in writing, by drawing, and/or with charts.

Analyzing and Interpreting Data
6a 6b 6c 7a

- Visually represent data using concrete-object graphs, pictographs, and bar graphs (1:1 correspondence).
- Discuss data and ask questions based on data.
- Propose an answer to the question based on observations.

Obtaining, Evaluating, and Communicating Information
2a 2b 4g 7d 7e 8a 9a

- Describe what was done and what was observed orally, in pictures, or with materials.
- Recognize that learning can come from careful observations.
- Access information from a variety of sources and recognize when it meets research needs.

DESIGN PROCESS

Identifying and Defining Practical Problems
1c 3c

- Use prior knowledge to describe potential problems that can be solved through a simple design.
- With the class, define the problem by specifying limited criteria based on function and aesthetics.

Researching, Planning, and Choosing a Solution
2a 2b 3a 3b 3d 4e 4f 4g 9a

- With the class, brainstorm possible solutions to a practical problem and reach consensus on a solution to implement.
- With the class, create a plan to solve the problem or meet the need, including steps to follow and/or a drawing of the object to be constructed.

Constructing and Testing the Model or Prototype
4b 4c 4f 4g 4h 5b

- Construct an object or device to solve the problem or meet the need.
- Test the object or device with respect to the criteria.

Evaluating and Optimizing the Solution
7b 7c 8b

- Identify and make improvements to the object or device with respect to the criteria.
- Propose and evaluate the solution to the initial problem.

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Science Practices

Scientific Inquiry

ASKING QUESTIONS AND MAKING PREDICTIONS

Science inquiry begins with a child's sense of wonder about the world. Asking questions stimulates curiosity, promotes the development of ideas, promotes discussion, helps clarify concepts, and can lead to a deeper understanding of a concept. As students progress across the grades, their questions should become more relevant, focused, and sophisticated, which requires teaching effective questioning strategies and giving students opportunities to ask and refine their questions. Making predictions is also an important part of science inquiry. Using prior knowledge, observations, and reasoning, students develop ideas to predict possible answers to questions, rather than simply making random guesses.

PLANNING AND CARRYING OUT INVESTIGATIONS

Throughout their schooling, students are expected to plan and carry out, with appropriate levels of support, investigations in the field or laboratory, working collaboratively as well as individually; investigations gradually become more systematic and require clarifying what counts as data and identifying variables that could affect an investigation. The data and observations that are collected are used to test existing understandings, revise them, or develop new understandings.

ANALYZING AND INTERPRETING DATA

Student investigations produce data that must be displayed and analyzed in order to derive meaning. Because patterns and trends in data are not always obvious, a range of tools including tables, graphical representations, and visualizations are used to identify significant features and patterns in the data and to interpret the results of the investigation.

OBTAINING, EVALUATING, AND COMMUNICATING INFORMATION

Students engage with multiple sources to obtain information that is used to evaluate the merit and validity of their claims, methods, and investigation designs. They develop facility with communicating clearly and persuasively the method(s) used and the ideas generated. Critiquing and communicating ideas individually and in groups is a critical activity. Communicating information and ideas can be done in multiple ways: using tables, diagrams, graphs, models, and equations, as well as orally, in writing, and through extended discussions.

For more information about scientific inquiry and student expectations across the grades, consult *Kindergarten to Grade 4 Science: A Foundation for Implementation*.

Design Process

IDENTIFYING AND DEFINING PRACTICAL PROBLEMS

Technological problem solving involves identifying and defining problems that need to be solved. In order to define a problem, students identify the goals or criteria (what the solution needs to have) as well as constraints (limitations such as available tools and materials, time, dimensions, etc.).

RESEARCH, PLANNING, AND CHOOSING A SOLUTION

Research can be necessary to better understand a problem and to identify possible solutions. Students conduct their own research and consider multiple possible solutions to a given problem. They can then choose the best solution by comparing each possible solution against the criteria and constraints that have been identified.

CONSTRUCTING AND TESTING THE MODEL OR PROTOTYPE

Engineering uses models and simulations to analyze and test solutions to a problem. Students develop a plan to construct and/or test a prototype or model against the criteria and constraints that were identified.

EVALUATING AND OPTIMIZING THE SOLUTION

Optimizing the design solution involves a process in which solutions are systematically tested and refined and the final design is improved by trading off less important features for those that are more important.

For more information about the design process and student expectations across the grades, consult *Kindergarten to Grade 4 Science: A Foundation for Implementation*.