GRADE 1 SCIENCE at a glance

This ***Grade 1 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 1 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 1 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

CHARACTERISTICS AND NEEDS OF LIVING THINGS

- **Needs of living things**
  01 07 08 09 10 11 12
- **Characteristics and behaviours of living things**
  01 02 03 04 05 06 15
- **Protection of the environment and of living things**
  01 10 11 12 13 14

THE SENSES

- **Role of the senses**
  01 03 07 11 12 14 15
- **Parts of the body involved with senses**
  01 02 05 06 08 09
- **Protection for our senses**
  01 04 07 10 13 15

CHARACTERISTICS OF OBJECTS AND MATERIALS

- **Objects and materials**
  01 02 03 05 08
- **Characteristics of materials**
  01 05 06 07
- **Construction of objects by combining, joining, and shaping materials**
  01 03 04 06 09 10 11

DAILY AND SEASONAL CHANGES

- **The Sun as a source of light and heat**
  01 02 03 05 06 07
- **Cycles and changes in our environment**
  01 03 06 07 09
- **Effects of daily and seasonal changes on living things**
  01 04 08 10 11 12 13 14 15 16 17

Manitoba

GRADE 1 SCIENCE

Curriculum Overview

REPORT CARD CATEGORIES

KNOWLEDGE AND UNDERSTANDING

Cluster 1 CHARACTERISTICS AND NEEDS OF LIVING THINGS

- Living things have basic needs and depend on their environment to meet those needs.
  01 07 08 09 10 11 12
- Living things have characteristics and behaviours that can be similar or different, and that help them survive in their environment.
  01 02 03 04 05 06 15
- The environment and living things are important and should be protected.
  01 10 11 12 13 14

Cluster 2 THE SENSES

- Senses help us gather information about the world around us to meet our needs and protect us.
  01 03 07 11 12 14 15
- Different parts of our body are involved in the gathering of information.
  01 02 05 06 08 09
- Senses are important, and the parts of the body that are associated with senses need to be protected.
  01 04 07 10 13 15

Cluster 3 CHARACTERISTICS OF OBJECTS AND MATERIALS

- Objects are made of materials that have observable characteristics.
  01 02 03 05 08
- Characteristics of materials determine their particular uses in objects.
  01 05 06 07
- A great variety of objects can be made by combining, joining, and shaping materials.
  01 03 04 06 09 10 11

Cluster 4 DAILY AND SEASONAL CHANGES

- The Sun is Earth's source of light and heat.
  01 02 03 05 06 07
- Observable changes in our environment (e.g., day and night, seasons, weather, position of the Sun) often occur in cycles.
  01 03 06 07 09
- Daily and seasonal changes in our environment affect all living things, including humans.
  01 04 08 10 11 12 13 14 15 16 17

SCIENTIFIC INQUIRY

Asking Questions and Making Predictions
1a 1b 9b

- Ask questions that can be investigated.
- Make predictions based on classroom experiences.

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

- Follow directions during explorations.
- Safely use tools and equipment.
- Make observations using senses, and record them using drawings and/or tally charts.

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

- Visually represent data using concrete-object graphs and pictographs (1:1 correspondence).
- Compare data and ask questions about 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 answers the questions asked.

DESIGN PROCESS

Identifying and Defining Practical Problems
1c 3c

- Recognize a practical problem that can be solved through a simple design.
- With the class, specify limited criteria based on function that a possible solution must meet.

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

- Brainstorm, with the class, possible solutions to a practical problem and reach consensus on a possible solution.
- With the class, create a plan to solve the problem or meet the need, including steps to follow.

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.
- With guidance, test the object or device with respect to the criteria.

Evaluating and Optimizing the Solution
4d 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.

GRADE 1 SCIENCE

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*.