GRADE 3 SCIENCE at a glance

This ***Grade 3 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 3 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 3 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 PLANTS

- **Needs of plants to grow and develop**
  01 04 06 10 11 12
- **Sun as the source of energy for plants**
  01 05 06
- **Characteristics and adaptations of plants**
  01 02 07 08 09 11 16 17
- **Interactions of plants with their environment**
  01 03 13 14 15 16 18

MATERIALS AND STRUCTURES

- **Properties of materials**
  01 02 03 04 08 09 12 13
- **Strength and stability of structures**
  01 05 06 07 08 09 12 13
- **Effects of forces on structures**
  01 10 11

FORCES THAT ATTRACT OR REPEL

- **Force as a push or a pull**
  01 02 03 19
- **Forces that act at a distance**
  01 03 14 16 17 19
- **Interactions of forces with objects and living things**
  01 04 05 06 07 08 09 10 11 12 13 14 15 18 19

SOILS IN THE ENVIRONMENT

- **Components of soil**
  01 02 03 04 05 06
- **Effects of soil characteristics on plants**
  01 04 07 08 10 11 12
- **Interactions between animals/humans and soil**
  01 08 09 10 11 12

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Curriculum Overview

REPORT CARD CATEGORIES

KNOWLEDGE AND UNDERSTANDING

Cluster 1 GROWTH AND CHANGES IN PLANTS

- Plants are living things and, like all living things, they have certain needs so that they can stay alive, grow, and develop.
  01 04 06 10 11 12
- Plants get their energy from the Sun to produce food.
  01 05 06
- Plants have adaptations that help them survive in their environment, and these adaptations can be harmful or helpful to humans.
  01 02 07 08 09 11 16 17
- Plants are a vital component of the environment and help to sustain the well-being of all other living things.
  01 03 13 14 15 16 18

Cluster 2 MATERIALS AND STRUCTURES

- Materials have different properties that are suited to different purposes. Many objects and structures can be built up from different materials that are joined together.
  01 02 03 04 08 09 12 13
- The characteristics of materials as well as shapes of structures provide strength and stability to natural and human-built structures from various cultures and communities around the world.
  01 05 06 07 08 09 12 13
- Different forces can have an effect on the strength and stability of structures.
  01 10 11

Cluster 3 FORCES THAT ATTRACT OR REPEL

- A force is a push or a pull that can attract or repel objects.
  01 02 03 19
- Some forces can act at a distance (e.g., gravitational, magnetic, electrostatic) and move certain objects without touching them directly.
  01 03 14 16 17 19
- Gravitational, magnetic, and electrostatic forces interact with objects and living things in predictable ways.
  01 04 05 06 07 08 09 10 11 12 13 14 15 18 19

Cluster 4 SOILS IN THE ENVIRONMENT

- Soils are made of various components, and different types of soils are made of different components and different amounts of these components.
  01 02 03 04 05 06
- The composition of soil determines its characteristics. These characteristics affect plant growth and can determine how humans use the soil to grow plants or make objects.
  01 04 07 08 10 11 12
- Animals are important to maintaining the quality of soil and the actions of humans can have positive or negative effects on soil quality.
  01 08 09 10 11 12

SCIENTIFIC INQUIRY

Asking Questions and Making Predictions
1a 1b

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

Planning and Carrying Out Investigations
3a 3b 3c 4a 4e 4f 4g 4h 5a 5b 5c 5d 5e 6a 9a 9b 9c

- With the class, create a plan to answer a question.
- With the class, identify variables that could affect an investigation.
- Safely use tools to make observations and collect data.
- Record observations in a variety of ways.

Analyzing and Interpreting Data
6a 6b 6c 7a 7b 8a

- Represent data using concrete-object graphs, pictographs, and bar graphs, and interpret them.
- Discuss data and ask questions based on data.
- Draw a conclusion based on the data gathered.

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

- Communicate results and conclusions in a variety of ways.
- Recognize that explanations have to be supported by the available evidence and by knowledge considered scientific.
- Access and review, with support, information from a variety of reliable sources.

DESIGN PROCESS

Identifying and Defining Practical Problems
1c 2a 2b 3f

- Use prior knowledge to describe potential problems that can be solved through a simple design.
- In small groups, define the problem by developing criteria for measuring success based on function and aesthetics.

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

- In small groups, brainstorm possible solutions to a practical problem, and reach consensus on a solution to implement.
- In small groups, create a plan to solve the problem or meet the need, including steps to follow and a diagram.

Constructing and Testing the Model or Prototype
4b 4c 4e 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
4d 7c 8c

- Identify and make improvements to an object or device with a rationale for making the changes.
- Recognize that designing a solution to a simple problem may have considerations, such as cost, materials, time, and space.

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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*.