



This *Grade 5 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 5 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 5 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 both knowledge and skills, 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 [Grades 5 to 8 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/or Testing the Prototype or Consumer Product  
Evaluating and Optimizing the Solution



**MAINTAINING A HEALTHY BODY**

- ▶ **Importance of healthy eating habits**  
01 02 03 04 05 13
- ▶ **Functions of body systems**  
01 06 07 08 09 10 11 12
- ▶ **Personal decision making related to health**  
01 13 14 15  
5-0-9f



**PROPERTIES OF AND CHANGES IN SUBSTANCES**

- ▶ **Characteristics and properties of matter**  
01 02 04 05 06 07
- ▶ **Physical and chemical changes**  
01 03 08 09 10 11
- ▶ **Properties of substances that determine their use or application**  
01 12 13 14  
5-0-8c 8g 9e



**FORCES AND SIMPLE MACHINES**

- ▶ **Effects of forces on objects**  
01 02 14
- ▶ **Use of simple machines to accomplish tasks**  
01 03 04 05 06 07 08 09  
10 11 12 13 14  
5-0-8d



**WEATHER**

- ▶ **Daily weather conditions**  
01 03 04 08 13 14 15
- ▶ **Role of technology in our understanding of weather and climate**  
01 02 05 06 07 09 10  
11 12  
5-0-8b 8c 8d 8e 8g 9a 9b
- ▶ **Weather and climate**  
01 16 17 18  
5-0-8b 8g 9e



### Cluster 1 MAINTAINING A HEALTHY BODY

- ▶ A balanced diet is necessary to maintain a healthy body.  
01 02 03 04 05 13
- ▶ Humans have body systems that serve various functions and work together to ensure a healthy functioning of the body.  
01 06 07 08 09 10 11 12
- ▶ The choices we make and the environments in which we live affect our health.  
01 13 14 15  
5-0-9f



### Cluster 2 PROPERTIES OF AND CHANGES IN SUBSTANCES

- ▶ Matter is defined as anything that takes up space and has mass; it can exist in three states (solid, liquid, and gas), each having specific properties.  
01 02 04 05 06 07
- ▶ Chemical reactions involve substances reacting to form new substances, while physical reactions do not involve the formation of a new substance; both types of reactions can be reversible or non-reversible.  
01 03 08 09 10 11
- ▶ Substances have different properties and behave in different ways, which can allow them to be distinguished from one another and can determine their uses as well as their potential effects on society and the environment.  
01 12 13 14  
5-0-8c 8g 9e



### Cluster 3 FORCES AND SIMPLE MACHINES

- ▶ Forces act on objects and can change their motion.  
01 02 14
- ▶ Simple machines can change the intensity and direction of the force exerted on objects to help us accomplish various tasks.  
01 03 04 05 06 07 08 09 10 11 12 13 14  
5-0-8d



### Cluster 4 WEATHER

- ▶ Weather conditions change daily and are caused by complex interactions between energy from the Sun and the atmosphere, water systems, and landforms.  
01 03 04 08 13 14 15
- ▶ Weather conditions affect us every day, and the development of technologies has enabled us to better understand and predict weather.  
01 02 05 06 07 09 10 11 12  
5-0-8b 8c 8d 8e 8g 9a 9b
- ▶ Climate refers to long-term weather patterns of a region and can change through both natural and human-made processes.  
01 16 17 18  
5-0-8b 8g 9e

KNOWLEDGE AND UNDERSTANDING

REPORT CARD CATEGORIES

SCIENTIFIC INQUIRY

DESIGN PROCESS

#### Asking Questions and Making Predictions 1a 3a 9c

- Ask specific questions that lead to investigations.
- Make a prediction or hypothesis that can be investigated scientifically.

#### Planning and Carrying Out Investigations 1b 3b 3c 4a 4c 4d 4e 5a 5c 5d 5e 5f 9c

- Create a plan to answer a specific question.
- Identify variables that could affect an investigation and variables that should be held constant to ensure a fair test.
- Select and safely use tools to observe and measure.
- Make observations that are relevant, and record them in a variety of ways.

#### Analyzing and Interpreting Data 6a 6c 6f 7a 7b 7c 7h 9c 9d

- Represent data in a variety of ways and interpret it.
- Interpret patterns and discrepancies in data.
- Draw a conclusion based on data that explains the results of the investigation and supports or rejects the hypothesis.
- Evaluate the methods used to answer a question, and identify potential applications of investigation results.

#### Obtaining, Evaluating, and Communicating Information 2a 2b 2c 7f 7g 8a 8b 9c

- Communicate results and conclusions in a variety of ways.
- Recognize that science is a way of answering questions about the world and that there are questions that science cannot answer.
- Access and review information from a variety of sources.

#### Identifying and Defining Practical Problems 1c 3d 9c

- Identify and describe a practical problem that can be solved.
- Define the problem by developing criteria for evaluating a prototype or a consumer product based on function, reliability, and aesthetics, and by identifying constraints such as available materials, time, or cost.

#### Researching, Planning, and Choosing a Solution 1d 2a 3b 3c 3e 4d 9c

- Identify various ways to solve a practical problem, and select and justify one to implement.
- Create a plan for the chosen solution, including materials, safety considerations, labelled diagrams, and steps to follow.

#### Constructing and/or Testing the Prototype or Consumer Product 4b 4c 4d 4e 5a 5b 5c 5d 9c 9d

- Construct a prototype.
- Test a prototype or consumer product with respect to the criteria.

#### Evaluating and Optimizing the Solution 6d 6e 7d 7e 8c 9c

- Identify and make improvements to the prototype, and explain the rationale for changes.
- Evaluate the strengths and weaknesses of a consumer product with respect to criteria.
- Propose and justify a solution to the initial problem.

### 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 [Grades 5 to 8 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, cost, environmental impact, etc.).

At the Middle Years level, a second facet of the design process is introduced to students. The evaluation of consumer products does not involve the construction of a model or prototype, but rather simulates the decision-making process of a consumer when purchasing a product.

#### RESEARCH, PLANNING, AND CHOOSING A SOLUTION

Research can be necessary to better understand a problem and to identify possible solutions or to make the best choice. 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/OR TESTING THE PROTOTYPE OR CONSUMER PRODUCT

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 consumer product 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 or decision 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 [Grades 5 to 8 Science: A Foundation for Implementation](#).