Science 6 Rubrics

The New Brunswick science curriculum is guided by the vision that all students, regardless of gender or cultural background, will have an opportunity to develop scientific literacy. Scientific literacy is an evolving combination of the science-related attitudes, skills, and knowledge that students need to develop inquiry, problem-solving, and decision-making abilities, to become lifelong learners, and to maintain a sense of wonder about the world around them.

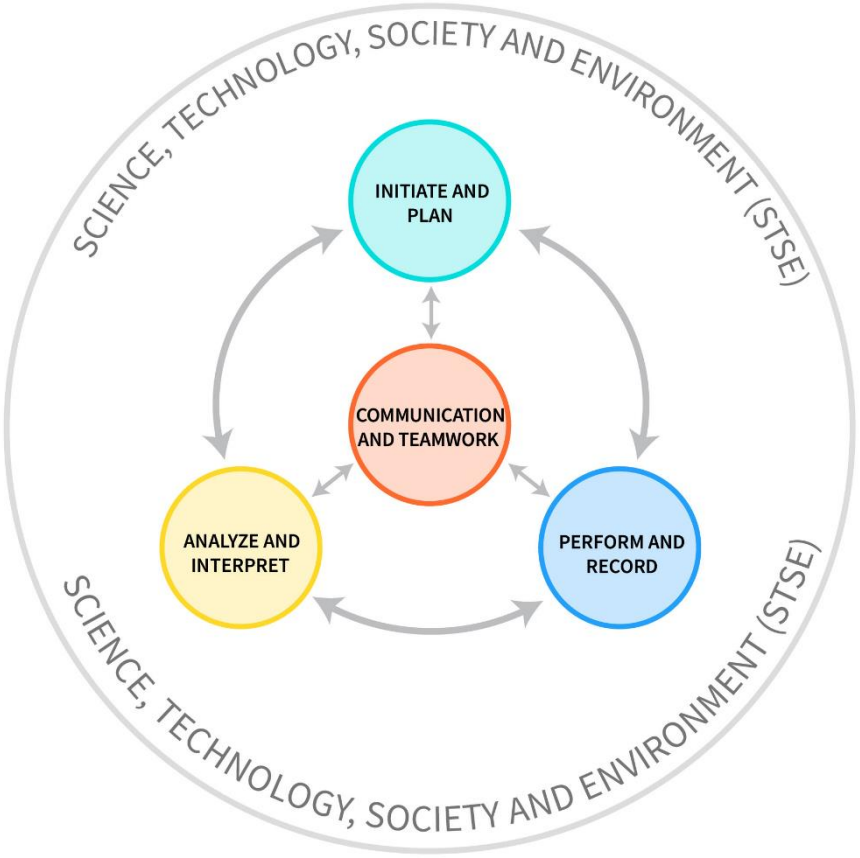

Figure 1 Science Inquiry Process Cycle

A science education which strives for scientific literacy must engage students in asking and answering meaningful questions. Some of these questions will be posed by the teacher, while others will be generated by the students. These questions are of three basic types: “Why …?”; “How…?”; and “Should …?”. Scientific inquiry addresses "why" questions. "How" questions are answered by engaging in the problem-solving process, and "should" questions are answered by engaging in decision making (Atlantic Province Education Foundation, 1998).

The vision of scientific literacy requires for students to gain science-related skills, knowledge, and attitudes, and emphasizes that this is best done through the study and analysis of the inter-relationships among science, technology, society, and the environment (STSE). The general curriculum outcomes (included in the headers of subsequent pages) form the basis for assessment. The science rubrics are designed to systematically gather information on how well students are learning science skills and processes in the following areas: Initiate and Plan; Perform and Record; Analyze and Interpret; Communicate and Teamwork; and Living Sustainably (STSE).

GCO 1.0: Students will develop the skills required for scientific and technological inquiries, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions (scientific literacy).

Science Skills: Initiate and Plan

The skills of questioning, defining problems, and developing and specifying relationships between variables. Students ask and refine questions or problem statements that can be empirically tested through scientific experiments or by designing a solution for a practical problem.

NBGCs	4 - Excelling	3 - Meeting	2 - Approaching	1 - Working Below
	The science learner independently and consistently:	The science learner generally:	The science learner sometimes (or with support):	The science learner rarely:
CTPS Comm ICE	• asks questions about phenomenon that lead to a fair test or brainstorm a practical technological problem.	• asks questions about phenomenon that lead to a fair test or brainstorm a practical technological problem.	• asks questions about phenomenon that lead to a fair test or brainstorm a practical technological problem.	• asks questions that lead to an investigation.
CTPS ICE	• considers appropriate variables; *dependent, independent and control* to formulate a hypothesis.	• considers appropriate variables; *dependent, independent and control* to formulate a hypothesis.	• considers appropriate variables; *dependent, independent and control* to formulate a hypothesis.	• considers appropriate variables to formulate a hypothesis.
CTPS SASM	• chooses appropriate materials and equipment for an investigation.	• chooses appropriate materials and equipment for an investigation.	• chooses appropriate materials and equipment for an investigation.	• chooses appropriate equipment for an investigation.
CTPS Comm	• describes the investigation procedures for a *fair test* or a solution to a practical problem.	• describes the investigation procedures for a *fair test* or a solution to a practical problem.	• describes the investigation procedures for a *fair test* or a solution to a practical problem.	• describes the investigation procedures for a *fair test* or a solution to a practical problem.

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Science Skills: Perform and Record

Carrying out of investigations progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions. This is the hands-on stage of investigations where students conduct experiments, field work, and/or design and build solution to a practical problem

NBGCs	4 - Excelling	3 - Meeting	2 - Approaching	1 - Working Below
	The science learner independently and consistently:	The science learner generally:	The science learner sometimes (or with support):	The science learner rarely:
CTPS Collab ICE SASM	• conducts appropriate investigation to test hypothesis or problem statement.	• conducts appropriate investigation to test hypothesis or problem statement.	• conducts appropriate investigation to test hypothesis or problem statement.	• conducts appropriate investigations.
CTPS Collab SASM SGC	• uses tools and equipment appropriately (e.g., proper handling, transport) in an investigation.	• uses tools and equipment appropriately (e.g., proper handling, transport) in an investigation.	• uses tools and equipment appropriately (e.g., proper handling, transport) in an investigation.	• uses tools and equipment appropriately in an investigation.
CTPS Comm	• records observations (*qualitative data*) and/or measurements (*quantitative data*).	• records observations (*qualitative data*) and/or measurements (*quantitative data*).	• records observations (*qualitative data*) and/or measurements (*quantitative data*).	• record observations and/or measurements.
CTPS Comm ICE	• develops a model to predict and/or describe a phenomenon.	• develops a model to predict and/or describe a phenomenon.	• develop a model to predict and/or describe a phenomenon.	• develops a model of a phenomenon.

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Science Skills: Analyse and Explain

Having conducted their investigations, students analyze the data to make sense of the findings and progress to distinguishing between correlation and causation. The process skills of examining information and evidence; of processing and presenting data; and of interpreting, analyzing and applying the results are relevant at this stage. Where feasible, the use to digital tools should be introduced. This stage is most directly related to numeracy.

NBGCs	4 - Excelling	3 - Meeting	2 - Approaching	1 - Working Below
	The science learner independently and consistently:	The science learner generally:	The science learner sometimes (or with support):	The science learner rarely:
CTPS Comm	• organizes tables and graphical displays.	• organizes tables and graphical displays.	• organizes tables and graphical displays.	• organizes data collected.
CTPS Comm ICE	• constructs graphical displays of data (e.g., drawings, charts, maps, graphs).	• constructs graphical displays of data (e.g., drawings, charts, maps, graphs).	• constructs graphical displays of data (e.g., drawings, charts, maps, graphs).	• constructs graphical displays of the data.
CTPS Comm ICE	• classifies objects and events.	• classifies objects and events.	• classifies objects and events.	• classifies objects and events.
CTPS Comm	• obtains information from sources and/or other reliable media to support results.	• obtains information from sources and/or other reliable media to support results.	• obtains information from sources and/or other reliable media to support results.	• obtains information to support results.
CTPS Comm	• uses data (*evidence*) to confirm or refute the hypothesis or initial problem.	• uses data (*evidence*) to confirm or refute the hypothesis or initial problem.	• uses data (*evidence*) to confirm or refute the hypothesis or initial problem.	• uses data to support findings.

GCO 1.0: Students will develop the skills required for scientific and technological inquiries, for solving problems, for communicating scientific ideas and results, for working collaboratively, and for making informed decisions (scientific literacy).

Science Skills: Communication and Teamwork

The skills of working collaboratively to communicate scientific ideas and information for a purpose, using appropriate scientific language, conventions and representations. Students progress to evaluating the merit and validity of ideas and methods. This stage involves the gradual expansion of the sphere of communication – audiences and media. Students discuss and explain their investigations to a variety of audiences using a variety of formats, including digital technologies. This stage is most directly related to English Language Arts.

NBGCs	4 - Excelling	3 - Meeting	2 - Approaching	1 - Working Below
	The science learner independently and consistently:	The science learner generally:	The science learner sometimes (or with support):	The science learner rarely:
CTPS Collab Comm SASM	• uses appropriate science vocabulary, numeric and symbol systems to share understandings.	• uses appropriate science vocabulary, numeric and symbol systems to share understandings.	• uses appropriate science vocabulary numeric and symbol systems to share understanding.	• uses subject specific vocabulary.
Collab Comm SASM	• discusses ideas and contributions of peers, teacher and/or guests.	• discusses ideas and contributions of peers, teacher and/or guests.	• discusses ideas and contributions of peers, teacher, and/or guests.	• discusses ideas contributions of others.
CTPS Collab Comm ICE	• communicates ideas using a variety of modes (e.g., digital technologies, models, simple reports).	• communicates ideas using a variety of modes (e.g., digital technologies, models, simple reports).	• communicates ideas using a variety of modes (e.g., digital technologies, models, simple reports).	• communicates ideas using novel methods.
CTPS Comm	• presents idea in a clear and logical order.	• presents ideas in a clear and logical order.	• presents idea in a clear and logical order.	• presents ideas in a logical manner.

GCO 2.0: Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology (STSE).

Society and Environment: Living Sustainably (STSE)

Living sustainably (connecting STSE) creates opportunities for students to put knowledge into action to preserve the following resources –human capital, community (social), and environment. Through active investigations students progress to understand that the world is interconnected, and that with purposeful and intentional action, they can change things.

NBGCs	4 - Excelling	3 - Meeting	2 - Approaching	1 - Working Below
	The science learner independently and consistently:	The science learner generally:	The science learner sometimes (or with support):	The science learner rarely:
CTPS SASM SGC	• follows guidelines for safe use of equipment to conduct a scientific experiment.	• follows guidelines for safe use of equipment to conduct a scientific experiment.	• follows guidelines for safe use of equipment to conduct a scientific experiment.	• follows science safety guidelines.
CTPS SASM SGC	• follows guidelines for safe use of tools to build a prototype of a solution.	• follows guidelines for safe use of tools to build a prototype of a solution.	• follows guidelines for safe use of tools to build a prototype of a solution.	• follows technology safety guidelines.
CTPS ICE SGC	• uses science knowledge when considering issues of concern to them.	• uses science knowledge when considering issues of concern to them.	• uses science knowledge when considering issues of concern to them.	• uses science knowledge to consider issues.
CTPS ICE SGC	• reflects on various aspects of an issue to make decisions about possible actions.	• reflects on various aspects of an issue to make decisions about possible actions.	• reflects on various aspects of an issue to make decisions about possible actions.	• makes decisions about action to take.

Online Resources to Support Inquiry Learning in Science

How Science Works Interactive: https://undsci.berkeley.edu/interactive/#/intro/2
Understanding How Science Works – 6, 7 & 8 Teachers' Lounge: https://undsci.berkeley.edu/teaching/68.php
Smarter Science Framework: ENGLISH | FRENCH

Global Competencies

NB Global Competencies	Description
Critical Thinking and Problem Solving (CTPS)	Critical Thinking and Problem Solving refer to addressing complex issues and problems by acquiring, processing, analyzing, and interpreting information to make informed judgments and decisions. The capacity to engage in cognitive processes to understand and resolve problems includes the willingness to achieve one's potential as a constructive and reflective citizen.
Collaboration (Collab)	Collaboration involves the interplay of the cognitive (including thinking and reasoning), interpersonal, and intrapersonal competencies necessary to participate effectively and ethically in teams. Ever-increasing versatility and depth of skill are applied across diverse situations, roles, groups, and perspectives to co-construct knowledge, meaning, and content, and learn from and with others in physical and virtual environments
Communication (Comm)	Communication involves receiving and expressing meaning (e.g., reading and writing, viewing and creating, listening and speaking) in different contexts and with different audiences and purposes. Effective communication increasingly involves understanding both local and global perspectives, societal and cultural contexts, and adapting and changing using a variety of media appropriately, responsibly, safely, and regarding one's digital identity.
Innovation, Creativity and Entrepreneurship (ICE)	Innovation, Creativity and Entrepreneurship involve the ability to turn ideas into action to meet the needs of a community. The capacity to enhance concepts, ideas, or products to contribute new-to-the-world solutions to complex economic, social, and environmental problems involves leadership, taking risks, independent/unconventional thinking, and experimenting with new strategies, techniques, or perspectives through inquiry research. Entrepreneurial mindsets and skills involve a focus on building and scaling an idea sustainably.
Self-Awareness and Self-Management (SASM)	Self-Awareness and Self-Management means becoming aware of and demonstrating agency in one's process of learning, including the development of dispositions that support motivation, perseverance, resilience, and self-regulation. Belief in one's ability to learn (growth mindset) is crucial, combined with strategies for planning, monitoring, and reflecting on one's past, present, and future goals, potential actions, strategies, and results. Self-reflection and thinking about thinking (metacognition) promote lifelong learning, adaptive capacity, well-being, and transfer of learning in an ever-changing world.
Sustainability and Global Citizenship (SGC)	Sustainability and Global Citizenship involve reflecting on diverse world views and perspectives and understanding and addressing ecological, social, and economic issues that are crucial to living in a contemporary, connected, interdependent, and sustainable world. They also include the acquisition of knowledge, motivation, dispositions, and skills required to be an engaged citizen with an appreciation for the diversity of people, perspectives, and the ability to envision and work toward a better and more sustainable future for all.

Council of Ministers of Education Canada (CMEC). 2020. Global Competencies Pan Canadian System Framework. Retrieved March 24, 2020 from https://www.globalcompetencies.cmec.ca/reviewed-jurisdiction-transformations.