

Science 7 and 8 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.

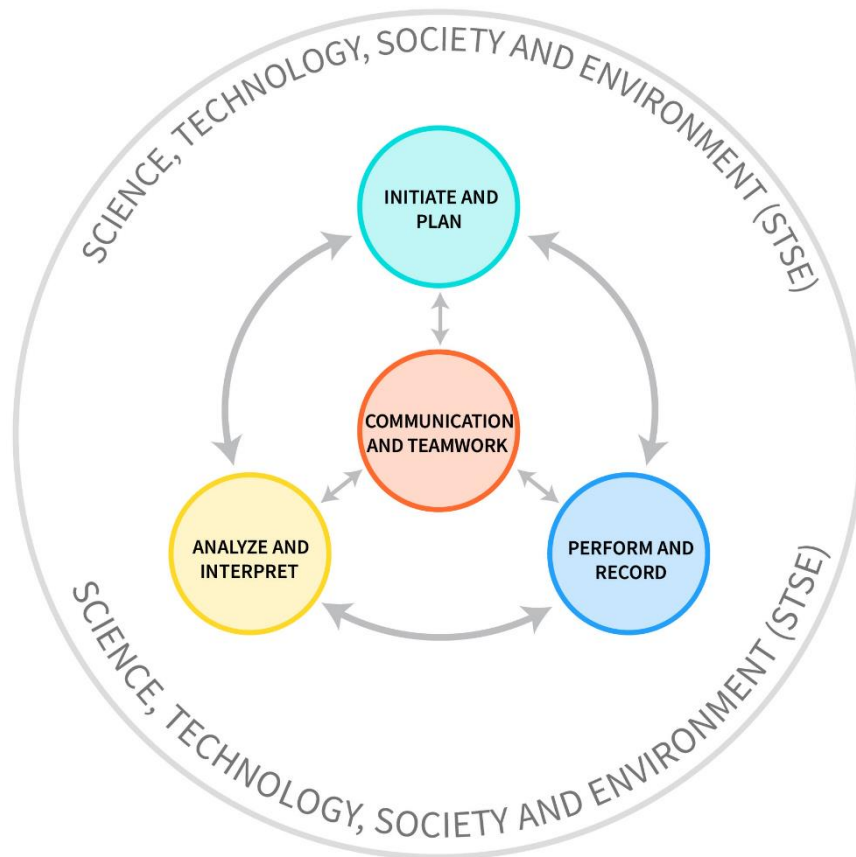


Figure 1 Science Inquiry Process Cycle

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.

	4 - Excelling	3 - Meeting	2 - Approaching	1 - Working Below
NBGCs	The science learner independently and consistently:	The science learner generally:	The science learner sometimes (or with support):	The science learner rarely:
CTPS Comm	<ul style="list-style-type: none"> asks questions that arise from careful observation of phenomena, models or unexpected results. 	<ul style="list-style-type: none"> asks questions that arise from careful observation of phenomena, models or unexpected results. 	<ul style="list-style-type: none"> asks questions that arise from careful observation of phenomena, models or unexpected results. 	<ul style="list-style-type: none"> asks questions that arise from careful lead to investigations.
CTPS ICE	<ul style="list-style-type: none"> determines variables (e.g. dependent, independent and control) to formulate a hypothesis or states a problem statement for a practical problem. 	<ul style="list-style-type: none"> determines variables (e.g. dependent, independent and control) to formulate a hypothesis or states a problem statement for a practical problem. 	<ul style="list-style-type: none"> determines variables (e.g. dependent, independent and control) to formulate a hypothesis or states the problem statement for a practical problem. 	<ul style="list-style-type: none"> determines variables to formulate a hypothesis or states a problem statement for a practical problem.
CTPS SASM	<ul style="list-style-type: none"> selects appropriate tools, materials and equipment to carry out a fair test or test a prototype. 	<ul style="list-style-type: none"> selects appropriate tools, materials and equipment to carry out a fair test or test a prototype. 	<ul style="list-style-type: none"> selects appropriate tools, materials and equipment to carry out a fair test or test a prototype. 	<ul style="list-style-type: none"> selects appropriate equipment to carry out a fair test or solve a technological problem.
CTPS Comm ICE SASM	<ul style="list-style-type: none"> develops (with guidance) investigation procedures for a fair test or designs a solution to a practical problem. 	<ul style="list-style-type: none"> develops (with guidance) investigation procedures for a fair test or designs a solution to a practical problem. 	<ul style="list-style-type: none"> develops (with guidance) investigation procedures for a fair test or designs a solution to a practical problem. 	<ul style="list-style-type: none"> develops scientific procedures or design plan for a technological solution.

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: 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

	4 - Excelling	3 - Meeting	2 - Approaching	1 - Working Below
NBGCs	The science learner independently and consistently:	The science learner generally:	The science learner sometimes (or with support):	The science learner rarely:
CTPS Collab ICE	<ul style="list-style-type: none"> performs a systematic experimental procedure to test a hypothesis or executes plan to build a prototype. 	<ul style="list-style-type: none"> performs a systematic experimental procedure to test a hypothesis or executes plan to build a prototype. 	<ul style="list-style-type: none"> performs a systematic experimental procedure to test a hypothesis or executes plan to build a prototype. 	<ul style="list-style-type: none"> performs a logical procedure to test a hypothesis or build a prototype.
CTPS Comm ICE	<ul style="list-style-type: none"> applies scientific ideas or principles to test a design (e.g., object, tool, process, system). 	<ul style="list-style-type: none"> applies scientific ideas or principles to test a design (e.g., object, tool, process, system). 	<ul style="list-style-type: none"> applies scientific ideas or principles to test a design (e.g., object, tool, process, system). 	<ul style="list-style-type: none"> applies scientific ideas or principles to the design process.
CTPS SGC	<ul style="list-style-type: none"> uses tools and equipment appropriately (proper handling, transport, etc.) in an investigation. 	<ul style="list-style-type: none"> uses tools and equipment appropriately (proper handling, transport, etc.) in an investigation. 	<ul style="list-style-type: none"> uses tools and equipment appropriately (proper handling, transport, etc.) in an investigation. 	<ul style="list-style-type: none"> uses tools and equipment appropriately in an investigation.
CTPS Comm	<ul style="list-style-type: none"> records qualitative and quantitative data using tools as appropriate. 	<ul style="list-style-type: none"> records qualitative and quantitative data using tools as appropriate. 	<ul style="list-style-type: none"> records qualitative and quantitative data using tools as appropriate. 	<ul style="list-style-type: none"> records appropriate data.
CTPS Comm ICE	<ul style="list-style-type: none"> develops a model to show the relationships amongst variables. 	<ul style="list-style-type: none"> develops a model to show the relationships amongst variables. 	<ul style="list-style-type: none"> develops a model to show the relationships amongst variables. 	<ul style="list-style-type: none"> develops a model to demonstrating relationship.

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Science Skills: Analyse and Explain

Scientific investigations produce data that must be analyzed to determine meaning. The process skills of examining information and evidence, and of processing data uses a range of tools. Graphical and pictorial representations and statistical analysis are relevant at this stage. 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	<ul style="list-style-type: none"> evaluates the accuracy of various methods for collecting data. 	<ul style="list-style-type: none"> evaluates the accuracy of various methods for collecting data. 	<ul style="list-style-type: none"> evaluates the accuracy of various methods for collecting data. 	<ul style="list-style-type: none"> evaluates the accuracy of various methods for collecting data.
CTPS Comm	<ul style="list-style-type: none"> constructs graphical displays (e.g., drawings, charts, maps, tables, and graphs). 	<ul style="list-style-type: none"> constructs graphical displays (e.g., drawings, charts, maps, tables, and graphs). 	<ul style="list-style-type: none"> constructs graphical displays (e.g., drawings, charts, maps, tables, and graphs). 	<ul style="list-style-type: none"> constructs graphical representations.
CTPS Comm	<ul style="list-style-type: none"> applies concepts of probability and statistics (e.g., mean, median, mode, and variability). 	<ul style="list-style-type: none"> applies concepts of probability and statistics (e.g., mean, median, mode, and variability). 	<ul style="list-style-type: none"> applies concepts of probability and statistics (e.g., mean, median, mode, and variability). 	<ul style="list-style-type: none"> applies concepts of statistical thinking.
CTPS Comm	<ul style="list-style-type: none"> identifies possible sources of error. 	<ul style="list-style-type: none"> identifies possible sources of error. 	<ul style="list-style-type: none"> identifies possible sources of error. 	<ul style="list-style-type: none"> Identifies sources of error.
CTPS Comm	<ul style="list-style-type: none"> draws a conclusion based on evidence gathered from scientific experiment or testing of the designed solution. 	<ul style="list-style-type: none"> draws a conclusion based on evidence gathered from scientific experiment or testing of the designed solution. 	<ul style="list-style-type: none"> draws a conclusion based on evidence gathered from scientific experiment or testing of the designed solution. 	<ul style="list-style-type: none"> draws a conclusion based on evidence collected.

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 to practice appropriate scientific language, conventions and representations. Communicating information to a variety of audiences can take many forms: tables, diagrams, graphs, and models, as well as orally, in writing and discussions. This stage is most directly related to English Language Arts.

	4 - Excelling	3 - Meeting	2 - Approaching	1 - Working Below
NBGCs	The science learner independently and consistently:	The science learner generally:	The science learner sometimes (or with support):	The science learner rarely:
Collab Comm SASM	<ul style="list-style-type: none"> works cooperatively to examine own knowledge or knowledge of peers. 	<ul style="list-style-type: none"> works cooperatively to examine own knowledge or knowledge of peers. 	<ul style="list-style-type: none"> works cooperatively to examine own knowledge or knowledge of peers. 	<ul style="list-style-type: none"> works cooperatively to examine own knowledge.
CTPS Comm ICE	<ul style="list-style-type: none"> chooses a format of communication appropriate to purpose (e.g., reports, data tables, scientific models, etc.). 	<ul style="list-style-type: none"> chooses a format of communication appropriate to purpose (e.g., reports, data tables, scientific models, etc.). 	<ul style="list-style-type: none"> chooses a format of communication appropriate to purpose (e.g., reports, data tables, scientific models, etc.). 	<ul style="list-style-type: none"> chooses appropriate communication method.
CTPS Collab Comm	<ul style="list-style-type: none"> discusses procedures, results and conclusions of investigations using appropriate scientific terminology. 	<ul style="list-style-type: none"> discusses procedures, results and conclusions of investigations using appropriate scientific terminology. 	<ul style="list-style-type: none"> discusses procedures, results and conclusions of investigations using appropriate scientific terminology. 	<ul style="list-style-type: none"> discusses investigations using appropriate scientific terminology.
CTPS Collab Comm	<ul style="list-style-type: none"> discusses the design process leading to the solution using appropriate technological terminology. 	<ul style="list-style-type: none"> discusses the design process leading to the solution using appropriate technological terminology. 	<ul style="list-style-type: none"> discusses the design process leading to the solution using appropriate technological terminology. 	<ul style="list-style-type: none"> discusses the designed solution using technological terminology.
CTPS Comm	<ul style="list-style-type: none"> communicates answers to questions or solutions to problems based on evidence. 	<ul style="list-style-type: none"> communicates answers to questions or solutions to problems based on evidence. 	<ul style="list-style-type: none"> communicates answers to questions or solutions to problems based on evidence. 	<ul style="list-style-type: none"> communicates understandings based on evidence.

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-based (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.

	4 - Excelling	3 - Meeting	2 - Approaching	1 - Working Below
NBGCs	The science learner independently and consistently:	The science learner generally:	The science learner sometimes (or with support):	The science learner rarely:
CTPS SASM SGC	<ul style="list-style-type: none"> follows guidelines for safe use of equipment to conduct a scientific experiment. 	<ul style="list-style-type: none"> follows guidelines for safe use of equipment to conduct a scientific experiment. 	<ul style="list-style-type: none"> follows guidelines for safe use of equipment to conduct a scientific experiment. 	<ul style="list-style-type: none"> follows science safety guidelines.
CTPS SASM SGC	<ul style="list-style-type: none"> follows guidelines for safe use of tools to build a prototype of a solution. 	<ul style="list-style-type: none"> follows guidelines for safe use of tools to build a prototype of a solution. 	<ul style="list-style-type: none"> follows guidelines for safe use of tools to build a prototype of a solution. 	<ul style="list-style-type: none"> follows technology safety guidelines.
CTPS SGC ICE SGC	<ul style="list-style-type: none"> uses science and technological knowledge when considering issues of concern to them. 	<ul style="list-style-type: none"> uses science and technological knowledge when considering issues of concern to them. 	<ul style="list-style-type: none"> uses science and technological knowledge when considering issues of concern to them. 	<ul style="list-style-type: none"> uses science and technological knowledge to consider issues.
CTPS Comm ICE SGC	<ul style="list-style-type: none"> reflects on various aspects of an issue to make decisions about possible actions. 	<ul style="list-style-type: none"> reflects on various aspects of an issue to make decisions about possible actions. 	<ul style="list-style-type: none"> reflects on various aspects of an issue to make decisions about possible actions. 	<ul style="list-style-type: none"> 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>.