

Science Rubrics: Grades 3 and 4

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.

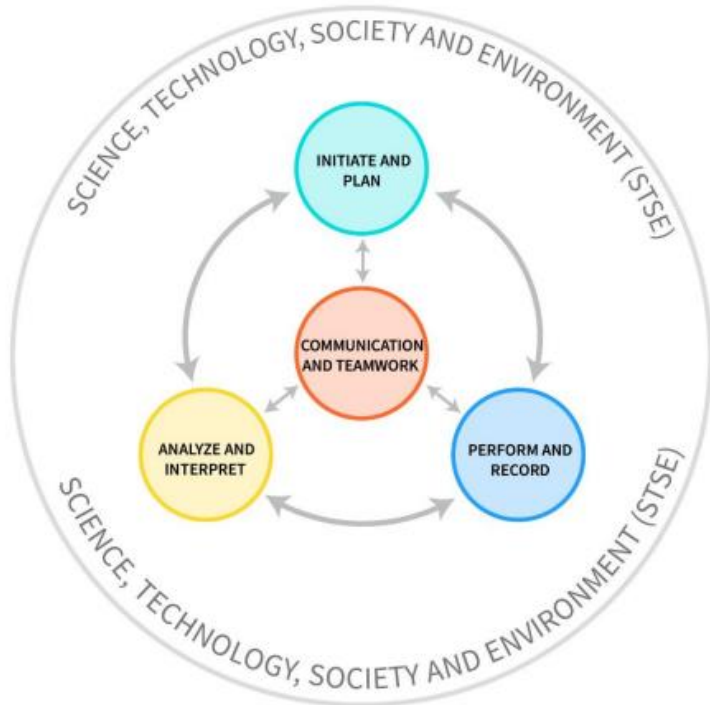


Figure 1 Science Inquiry Process Cycle

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 sets out the need for students to acquire science-related skills, knowledge, and attitudes, and emphasizes that this is best done through the study and analysis of the interrelationships 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 Sustainability (STSE).

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Strand: Scientific Literacy (GCO 1): 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).

Big Idea: Investigation (SCO 1.1: Initiate and Plan):

The skills of questioning, identifying problems and developing preliminary ideas and plans. Students ask and refine questions that they can investigate to understand how the natural and constructed (designed) world works.

NBGCs	Achievement Indicators			
	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"> asks questions about familiar phenomenon. 	<ul style="list-style-type: none"> asks questions about familiar phenomenon. 	<ul style="list-style-type: none"> asks questions about familiar phenomenon. 	<ul style="list-style-type: none"> asks questions about familiar phenomenon.
CTPS Comm	<ul style="list-style-type: none"> makes predictions related to the question posed. 	<ul style="list-style-type: none"> makes predictions related to the question posed. 	<ul style="list-style-type: none"> makes predictions related to the question posed. 	<ul style="list-style-type: none"> makes predictions related to the question.
CTPS Comm	<ul style="list-style-type: none"> explains the data that will need to be collected to answer the question. 	<ul style="list-style-type: none"> explains the data that will need to be collected to answer the question. 	<ul style="list-style-type: none"> explains the data that will need to be collected to answer the question. 	<ul style="list-style-type: none"> explains the data needed to answer the question.

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Big Idea: Investigation (SCO 1.2: Perform and Record):

The skills of carrying out a plan that include gathering data by observing and measuring and, in most cases, using and manipulating materials and equipment. This is the hands-on stage of investigations where students put their questions to the test.

NBGCs	Achievement Indicators			
	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 SASM	<ul style="list-style-type: none"> uses appropriate methods and tools to collect data. 	<ul style="list-style-type: none"> uses appropriate methods and tools to collect data. 	<ul style="list-style-type: none"> uses appropriate methods and tools to collect data. 	<ul style="list-style-type: none"> uses appropriate methods and tools for data collection.
CTPS Comm	<ul style="list-style-type: none"> records observations and/or measurements (data). 	<ul style="list-style-type: none"> records observations and/or measurements (data). 	<ul style="list-style-type: none"> records observations and/or measurements (data). 	<ul style="list-style-type: none"> records observations or measurements (data).
CTPS Comm ICE	<ul style="list-style-type: none"> creates a diagram or simple prototype (model) that includes important details. 	<ul style="list-style-type: none"> creates a diagram or simple prototype (model) that includes important details. 	<ul style="list-style-type: none"> creates a diagram or simple prototype (model) that includes important details. 	<ul style="list-style-type: none"> creates diagram or simple prototype (model) with details.

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Big Idea: Sensemaking (SCO 1.3: Analyse and Interpret):

Having conducted their inquiry, students analyze the data gathered and determine what the results mean. The process skills of examining information and evidence; of processing and presenting data; and of interpreting, analyzing, and applying the results. This stage is most directly related to numeracy.

NBGCs	Achievement Indicators			
	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"> represents data (e.g. tables and/or graphical displays) that is correctly titled and labelled. 	<ul style="list-style-type: none"> represents data (e.g. tables and/or graphical displays) that is correctly titled and labelled. 	<ul style="list-style-type: none"> represents data (e.g. tables and/or graphical displays) that is correctly titled and labelled. 	<ul style="list-style-type: none"> represents data correctly.
CTPS Comm ICE	<ul style="list-style-type: none"> develops sorting rules for grouping objects or concepts. 	<ul style="list-style-type: none"> develops sorting rules for grouping objects or concepts. 	<ul style="list-style-type: none"> develops sorting rules for grouping objects or concepts. 	<ul style="list-style-type: none"> develops suitable sorting rules.
CTPS Comm	<ul style="list-style-type: none"> uses data to answer initial question or prediction. 	<ul style="list-style-type: none"> uses data to answer initial question or prediction. 	<ul style="list-style-type: none"> uses data to answer initial question or prediction. 	<ul style="list-style-type: none"> uses data to answer initial question or prediction.

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Strand: Scientific Literacy (GCO 1): 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).

Big Idea: Communication (SCO 1.4: Communication and Teamwork):

The skills of working collaboratively to communicate scientific ideas and information for a purpose using appropriate scientific language, conventions, and representations. This stage introduces evaluating the merits and accuracy of ideas and methods. Students continue to discuss and explain their investigations to peers and present their results to a variety of audiences. This stage is most directly related to English Language Arts.

NBGCs	Achievement Indicators			
	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	<ul style="list-style-type: none"> uses appropriate science vocabulary, numeric and symbol systems to share understandings. 	<ul style="list-style-type: none"> uses appropriate science vocabulary, numeric and symbol systems to share understandings. 	<ul style="list-style-type: none"> uses appropriate science vocabulary, numeric and symbol systems to share understandings. 	<ul style="list-style-type: none"> uses appropriate science vocabulary, numeric and symbol systems.
Collab Comm SASM	<ul style="list-style-type: none"> responds to ideas and contributions of others to investigate phenomenon. 	<ul style="list-style-type: none"> responds to ideas and contributions of others to investigate phenomenon. 	<ul style="list-style-type: none"> responds to ideas and contributions of others to investigate phenomenon. 	<ul style="list-style-type: none"> responds contributions and ideas of others.
CTPS Comm	<ul style="list-style-type: none"> uses evidence from data analysis to support claim or draw conclusions. 	<ul style="list-style-type: none"> uses evidence from data analysis to support claim or draw conclusions. 	<ul style="list-style-type: none"> uses evidence from data analysis to support claim or draw conclusions. 	<ul style="list-style-type: none"> uses evidence from data analysis to support claim or draw conclusions.
CTPS Comm	<ul style="list-style-type: none"> presents ideas in a clear and logical order. 	<ul style="list-style-type: none"> presents ideas in a clear and logical order. 	<ul style="list-style-type: none"> presents ideas in a clear and logical order. 	<ul style="list-style-type: none"> presents ideas in a logical way.

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Strand: Learning & Living Sustainably (STSE: GCO 2): 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).

Big Idea: Responsible & Sustainable Application (SCO 2.1: STSE/Living Sustainability):

Living sustainably (connecting STSE) creates opportunities for students to put knowledge into action. Through investigations students' progress to understand that the world is interconnected, and that with purposeful and intentional action, they can make a difference.

NBGCs	Achievement Indicators			
	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	<ul style="list-style-type: none"> follows guidelines for safe use of equipment to conduct an experiment. 	<ul style="list-style-type: none"> follows guidelines for safe use of equipment to conduct an experiment. 	<ul style="list-style-type: none"> follows guidelines for safe use of equipment to conduct an experiment. 	<ul style="list-style-type: none"> follows science safety guidelines.
CTPS SASM SGC	<ul style="list-style-type: none"> follows safety guidelines for safe use of tools to build a prototype of a solution. 	<ul style="list-style-type: none"> follows safety guidelines for safe use of tools to build a prototype of a solution. 	<ul style="list-style-type: none"> follows safety guidelines for safe use of tools to build a prototype of a solution. 	<ul style="list-style-type: none"> follows technology safety guidelines.
CTPS ICE SGC	<ul style="list-style-type: none"> applies scientific knowledge when considering issues of concern to them. 	<ul style="list-style-type: none"> applies scientific knowledge when considering issues of concern to them. 	<ul style="list-style-type: none"> applies scientific knowledge when considering issues of concern to them. 	<ul style="list-style-type: none"> applies scientific knowledge to issues.
CTPS ICE SGC	<ul style="list-style-type: none"> reflects on various aspects of an issue and make decisions about possible actions. 	<ul style="list-style-type: none"> reflects on various aspects of an issue and make decisions about possible actions. 	<ul style="list-style-type: none"> reflects on various aspects of an issue and make decisions about possible actions. 	<ul style="list-style-type: none"> makes decisions about actions to take.

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Online Resources to Support Inquiry

Learning in Science How Science Works Interactive: <https://undsci.berkeley.edu/interactive/#/intro/2>
Understanding How Science Works - 3-4 Teachers' Lounge: <https://undsci.berkeley.edu/teaching/35.php>
Smarter Science Framework: [ENGLISH](#) | [FRENCH](#)

New Brunswick Global Competencies

NB Global Competencies	Description
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 about one's digital identity.
Critical Thinking and Problem Solving (CTPS)	Critical Thinking 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
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.
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>