DRAFT: Agriculture 110

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Department of Education and Early Childhood Development
Curriculum Branch

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Table of Contents

1. Introduction

1.1 Mission and Vision of Educational System

The New Brunswick Department of Education and Early Childhood Development is dedicated to providing the best public education system possible, wherein all learners have a chance to achieve their academic best. The mission statement for New Brunswick schools is:

Each student will develop the attributes needed to be a lifelong learner, to achieve personal fulfillment and to contribute to a productive, just, and democratic society.

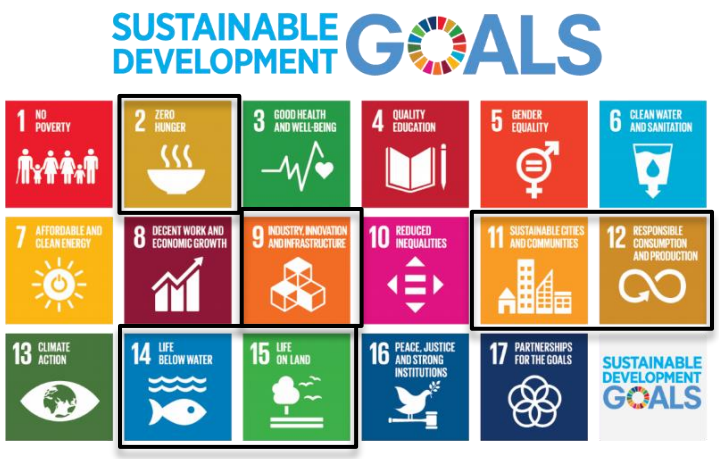
1.2 New Brunswick Global Competencies

New Brunswick Global Competencies provide a consistent vision for the development of a coherent and relevant curriculum. The statements offer learners clear goals and a powerful rationale for schoolwork. They help ensure that provincial education systems' missions are met by design and intention. The New Brunswick Global Competencies statements are supported by curriculum outcomes.

New Brunswick Global Competencies are statements describing the knowledge, skills and attitudes expected of all learners who graduate high school. Achievement of the New Brunswick Global Competencies prepares learners to continue to learn throughout their lives. These Competencies describe expectations not in terms of individual school subjects but in terms of knowledge, skills and attitudes developed throughout the curriculum. They confirm that learners need to make connections and develop abilities across subject boundaries if they are to be ready to meet the shifting and ongoing demands of life, work, and study today and in the future**. See: Appendix 6.1.**

1.3 Sustainable Development Goals (aka SDGs and the Global Goals)

Science, Technology, and Innovation (STI) are recognized as the key drivers behind economic growth and prosperity. In the context of the SDGs for achieving, the Global Goals, STI plays a central role. The aim of the 17 Global Goals is to secure a sustainable, peaceful, prosperous, and equitable life on Earth for everyone now and in the future. To create a more sustainable world, and to engage with sustainability issues, learners must become sustainability change-makers. Education, therefore is vital for the achievement of sustainable development. By intentionally connecting classroom learning to these goals, educators create real-world (relevant) context for learners to help them become global citizens and critical thinkers. The concepts and content in this document are aligned with specific goals.



The SDGs address the need to activate at multiple levels and across disciplines to gather and create the necessary knowledge to lay the foundations for practices, innovations, and technologies that address global challenges today, and in the future.

In *Agriculture 110* learners may explore and investigate topics related to goals:

- 2 - Zero Hunger
- 9 - Industry, Innovation, and Infrastructure
- 11 - Sustainable Cities and Communities
- 12 - Responsible Consumption and Production
- 14 - Life on Land
- 15 - Life Below Water

2. Pedagogical Components

2.1 Pedagogical Guidelines

Diverse Cultural Perspectives

It is important for educators to recognize and honour the variety of cultures and experiences from which learners are approaching their education and the world. It is also important for educators to recognize their own biases and be careful not to assume levels of physical, social or academic competencies based on gender, culture, or socio-economic status.

Each learner's culture will be unique, influenced by their community and family values, beliefs, and ways of viewing the world. Indigenous cultures view the world in a much more holistic way than the dominant culture. Disciplines are taught as connected to one another in a practical context, and learning takes place through active participation, oral communication and experiences. Immigrant learners may also be a source of alternate world views and cultural understandings. Cultural variation may arise from the differences between urban, rural and isolated communities. It may also arise from the different value that families may place on academics or athletics, books or media, theoretical or practical skills, or on community. Providing a variety of teaching and assessment strategies to build on this diversity will provide an opportunity to enrich learning experiences for all learners.

Universal Design for Learning

Universal Design for Learning is a "framework for guiding educational practice that provides flexibility in the ways information is presented, in the ways learners respond or demonstrate knowledge and skills, and in the ways, learners are engaged. It also "...reduces barriers in instruction, provides appropriate accommodations, supports, and challenges, and maintains high achievement expectations for all students, including students with disabilities and students who are limited English proficient." (CAST, 2011).

To build on the established practice of differentiation in education, the Department of Education and Early Childhood Development supports Universal Design for Learning for all learners. New Brunswick curricula are created with universal design for learning principles in mind. Outcomes are written so that learners may access and represent their learning in a variety of ways, through a variety of modes. Three tenets of universal design inform the design of this curriculum. Educators are encouraged to follow these principles as they plan and evaluate learning experiences for their learners:

- Multiple means of representation: provide diverse learners options for acquiring information and knowledge
- Multiple means of action and expression: provide learners options for demonstrating what they know
- Multiple means of engagement: tap into learners' interests, offer appropriate challenges, and increase motivation

For further information on Universal Design for Learning, view online information at the CAST website, download the UDL reference handout.

The curriculum has been created to support the design of learning environments and lesson plans that meet the needs of all learners. Specific examples to support Universal Design for Learning for this curriculum can be found in the appendices. The **Planning for All Learners Framework** will guide and inspire daily planning. **See: Appendix 6.2**

Cross Curricular Literacy and Multilingual Language Learners

Literacy occurs across learning contexts and within all subject areas. Opportunities to speak and listen, read and view, and write and represent are present every day - in and out of school. All subject-area teachers support all learners' language development with content-area vocabulary development, academic language structures, and structured classroom conversations.

Website References

Website references contained within this document are provided solely as a convenience and do not constitute an endorsement by the Department of Education and Early Childhood Development of the content, policies, or products of the referenced website. The EECD does not control the referenced websites and is not responsible for the accuracy, legality, or content of the referenced websites or for that of subsequent links.

Referenced website content may change without notice. School districts and educators are encouraged to preview and evaluate sites before recommending them for learner use. If an outdated or inappropriate site is found, please report it to Department of Education and Early Childhood Development, email: edcommunication@gnb.ca or phone: at (506) 453-3678.

Copyright Matters

Educators must ensure that they respect the fair dealing provision when accessing and using course resources and materials for instructional purposes. The works of others should not be used without their permission unless the use is permitted by the *Copyright Act*. Educators are expected to be aware of the copyright status of instructional materials in their possession. The *Copyright Act* permits use of a copyright-protected work without permission from the copyright owner or the payment of copyright royalties under specific conditions.

Consumable materials intended for one-time use in the classroom (i.e. workbooks and exercise sheets) are created with the understanding that each learner is to have their own copy. Unless educators have permission to copy a consumable, copying, scanning, or printing materials intended for one-time use is strictly prohibited. Copying from instructional materials intended for one-time use without permission exposes the educator, the school, and the school board to liability for copyright infringement

To learn more about the fair dealing guidelines and the *Copyright Act* visit, the Council of Ministers of Education Canada website here.

2.2 Assessment Guidelines

Assessment Practices

Assessment is the systematic gathering of information about what learners know and are able to do. Learner performance is assessed using the information collected during the evaluation process. Educators use their professional skills, insight, knowledge, and specific criteria that they establish to make judgments about learner performance in relation to learning outcomes. Learners are also encouraged to monitor their own progress through self-assessment strategies, such as goal setting and rubrics.

Research indicates that learners benefit most when assessment is regular and ongoing and is used in the promotion of learning (Stiggins, 2008). This is often referred to as formative assessment. Evaluation is less effective if it is simply used at the end of a period of learning to determine a mark (summative evaluation).

Summative evaluation is usually required in the form of an overall mark for a course of study, and rubrics are recommended for this task.

Some examples of current assessment practices include:

• Questioning	• Projects and Investigations
• Observation	• Checklists/Rubrics
• Conferences	• Responses to texts/activities
• Demonstrations	• Reflective Journals
• Presentations	• Self and peer assessment
• Role plays	• Career Portfolios
• Technology Applications	• Projects and Investigations

Formative Assessment

Research indicates that learners benefit most when assessment is ongoing and is used in the promotion of learning (Stiggins, 2008). Formative assessment is a teaching and learning process that is frequent and interactive. A key component of formative assessment is providing ongoing feedback to learners on their understanding and progress. Throughout the process adjustments are made to teaching and learning.

Learners should be encouraged to monitor their own progress through goal setting, co-constructing criteria and other self-and peer-assessment strategies. As learners become more involved in the assessment process, they are more engaged and motivated in their learning.

Additional details can be found in the Formative Assessment foldout.

Summative Assessment

Summative evaluation is used to inform the overall achievement for a reporting period for a course of study. Rubrics are recommended to assist in this process.

For further reading in assessment and evaluation, visit the Department of Education and Early Childhood Development's Assessment and Evaluation site here.

3. Subject Specific Guidelines

3.1 Rationale

Agriculture 110 is a New Brunswick high school course intended to formalize course knowledge that was previously offered in some school locations as a local option course. The curriculum provides introductory Agriculture knowledge and skills, experiential learning opportunities, and culminates in a learner-led project proposal or business plan. The careers and technologies referenced in the course include New Brunswick practices over time as well as present contexts.

3.2 Course Description

Agriculture 110 includes the history and evolution of Agriculture in New Brunswick which recognizes Indigenous and settler contributions, everyday impacts on life in New Brunswick, and specific types of Agriculture predominant in New Brunswick. Learners will apply knowledge of plants and animals to local contexts, to introductory plant growing and animal care research skills, this leads to creating quality Agriculture products and/or operations. Learners will apply skills during Agriculture experiences and/or work placements and will have build knowledge in Agricultural careers. *Agriculture 110* allows the opportunity for a learner-led personal choice project or development of a business proposal and plan to summarize and demonstrate learning.

3.3 Curriculum Organizers and Outcomes

Outcomes

The New Brunswick Curriculum is stated in terms of general curriculum outcomes, specific curriculum outcomes and achievement indicators.

General Curriculum Outcomes (**GCO**) are overarching statements about what learners are expected to learn in each strand/sub-strand. The general curriculum outcome for each strand/sub-strand is the same throughout the grades.

Specific Curriculum Outcomes (**SCO**) are statements that identify specific concepts and related skills underpinned by the understanding and knowledge attained by leareners as required for a given grade.

I Can – Exemplars (Achievement Indicators) are one example of a representative list of the depth, breadth and expectations for the outcome.

Learning Outcomes Summary Chart

GCO 1	**Learners will examine the history and evolution of Agriculture in New Brunswick.**
SCO 1.1	Learners will value how agricultural practices in New Brunswick have changed over time, recognizing Indigenous and settler contributions as well as environmental influences.
SCO 1.2	Learners will compare how Agriculture impacts everyday life in New Brunswick.
SCO 1.3	Learners will distinguish the specific types of farming, agriculture, aquaculture, fisheries, and the geographic predominance in New Brunswick of each.

GCO 2	**Learners will investigate plant production in New Brunswick.**
SCO 2.1	Learners will apply scientific knowledge to plant production in their local context.
SCO 2.2	Learners will experiment with crop propagation and production in their local contexts.
SCO 2.3	Learners will apply industry principles to harvesting, processing, and transporting quality products.

GCO 3	**Learners will investigate animal agriculture in New Brunswick.**
SCO 3.1	Learners will compare the variety of animal farming opportunities in New Brunswick.

SCO 3.2	Learners will research care for animals, reproduction, new technologies, products and by-products in animal farming in New Brunswick.
SCO 3.3	Learners will examine practices related to and the potential for producing and marketing animal by-products.

GCO 4	**Learners will explore careers in Agriculture.**
SCO 4.1	Learners will apply learning through practical activities and/or work placements.
SCO 4.2	Learners will research innovations in Agriculture.
SCO 4.3	Learners will construct a personal choice project or develop a business proposal and plan.

4. Curriculum Outcomes

GCO 1	**Learners will examine the history and evolution of Agriculture in New Brunswick.**
SCO 1.1	**Learners will value how agricultural practices in New Brunswick have changed over time, recognizing Indigenous and settler contributions as well as environmental influences.**
Concepts and Content	

• History of Agriculture in New Brunswick
  ○ Settlement in the 19th century
  ○ Second Settlement during the Depression – "Return to the Land"
  ○ Cottage farming
  ○ Commercial farming
 	
• First Nations Ways of Knowing
  ○ The connection of Wabanaki Peoples to the natural environment
  ○ The organization of Wabanaki Societies historically and today
  ○ Ancestral teachings and oral traditions
  ○ Worldviews
  ○ Our First Treaty is with Mother Earth
 	
• Farms
  ○ Hobby
  ○ Commercial
  ▪ Small scale
  ▪ Large scale
 	
• Self sufficiency
 	
• Transformation of agrarian to current society
  ○ Rural and urban influences
	• Appreciate various worldviews, including those of Indigenous Peoples.
	• Compare cottage farming and commercial farming in New Brunswick.
	• Compare Indigenous and Western views of the natural environment.
	• Describe how agriculture has evolved over time.
	• Discover pre-contact trade relationships, alliances and sharing of resources between Indigenous Nations.
	• Examine the role of innovation and precision agriculture in farming practices.
	• Examine how social relationships and identity are shaped by the natural environment.
	• Identify how biotechnologies have affected food production.
	• Identify the impact of market needs and economics of agriculture as a commercial business.
	• Identify when the second settlement took place and its impact on agriculture in New Brunswick.
	• Investigate what economic systems would look like if everyone adopted the concept of Netukulimk (e.g. How would it impact the environment?)
	• Learn about the role of oral tradition in passing on knowledge.
	• Recognize the history of agriculture in New Brunswick since the 19th century.

○ Technological influences • Innovations in farming practices ○ Large and small operations ○ Crop and livestock changes ○ Agricultural Biotechnology ○ Industry influence ○ Precision agriculture • Supply and demand	• Recognize how Wabanaki Nations were self-sustaining and carried out all the functions of nations (healthcare, education, trade, resource management, self protection, defence, diplomacy, *etc.*). • Research how the degradation of the natural environment impacts Indigenous Peoples around the world and research an action to mitigate it. • Research the impact land access and use has had on Wabanaki and other Indigenous societies over time (e.g., food scarcity, loss of water access, forced agrarianism).

Resources

Video	Website	Document
Agriculture is Art – thinkAG (2020) Agriculture is Business - thinkAG (2020) Agriculture is Engineering - thinkAG (2020) Agriculture is Math - thinkAG (2020) Agriculture in the Classroom (video list)	Agriculture in the Classroom: Great Canadian Farm Tour Agriculture in the Classroom: Bioplastics Provincial Archives of New Brunswick: Agriculture of the Past	Agriculture Pesticides and Plant Technology: Benefiting Canadians Great Canadian Farm Tour Activity Book Great Canadian Farm Tour Activity Book Answer Key Innovation, Creativity, and Entrepreneurship New Brunswick Agriculture at the End of the Colonial Era: A Reassessment Sustainability and Global Citizenship Regenerating Agriculture in New Brunswick

SCO 1.2	Learners will compare how Agriculture impacts everyday life in New Brunswick.
Concepts and Content	**I Can – exemplars:**

• Types of Agriculture production
  ○ Clothes
  ○ Local food
  ○ Major crops and commodities
  ○ Products
 	
• Agriculture and Economy
  ○ Production
  ○ Employment
  ○ Exports
  ○ Value-added goods
  ▪ Feed
	• Define local food.
	• Describe how to identify local food.
	• Discuss how climate change impacts local, national, and global food supplies.
	• Examine economic benefits and challenges of local food.
	• Examine environmental benefits and challenges to local food.
	• Examine health benefits and challenges to local food.
	• Examine social benefits and challenges to local food.
	• Identify export markets for New Brunswick's agri-food products.
	• Identify the impact that agriculture has on food production and employment.
	• Identify the impact of agricultural products on local, national, and international export markets.
	• Identify major crops and commodities produced in New Brunswick.
	• Identify the role of the agricultural industry in meeting human needs.
	• Identify value-added goods made from agricultural products and by-products.

Resources		
Video	**Website**	**Document**
Before the Plate (2018)	Agriculture in the Classroom: Eating Local Buy Local NB New Brunswick: Deliciously Canadian The Real Dirt on Farming SDG 2: Zero Hunger SDG 9: Industry, Innovation, and Infrastructure SDG 11: Sustainable Cities and Communities SDG 12: Responsible Consumption and Production	Agriculture and Agri-Food 2020 Agriculture in the Classroom: #MyFoodChoice Agriculture in the Classroom: What's Growing Around Us? Before the Plate: Student Guide Before the Plate: Teacher Guide Critical Thinking and Problem Solving Innovation, Creativity, and Entrepreneurship Sustainability and Global Citizenship

SCO 1.3	Learners will distinguish the specific types of farming, agriculture, aquaculture, fisheries, and the geographic predominance in New Brunswick of each.
Concepts and Content	**I Can – exemplars:**

• Agriculture
  ○ Crops
  ▪ Vegetables
  ▪ Grains
  ▪ Fruits/Orchards
  ▪ Forages
  ▪ Others
  ○ Livestock
  ▪ Milking cows
  ▪ Beef cows
  ▪ Poultry (chicken, turkey, eggs)
  ▪ Swine
  ▪ Sheep
  ▪ Goats
  ▪ Fur (mink, fox)
  ○ Products (dairy, beef, pork, lamb, wool, fur, eggs, chicken, turkey; pollination revenue from renting honeybees)
 	
• Aquaculture
  ○ Salmon
  ○ Oysters
  ○ Alternate Species Production.
  ○ Products (vitamins, medications).
 	
• Fisheries
  ○ Inshore, Mid-shore, Offshore
  ○ Mythbusting
	• Determine the benefits and importance of plant species.
	• Examine the benefits and importance of animals.
	• Identify animal species.
	• Identify aquaculture species in New Brunswick.
	• Identify aquatic species.
	• Identify key areas of agriculture.
	• Identify safeguards to the environment used in agriculture, aquaculture, and fisheries.
	• Identify types of farming in New Brunswick.
	• Recognize that animals need care.

Resources		
Video	**Website**	**Document**
	Agriculture in the Classroom: Aquaculture in Briggs and Little Dairy Farmers of Canada: Dairy in Canada SDG 2: Zero Hunger SDG 12: Responsible Consumption and Production SDG 14: Life Below Water SDG 15: Life on Land	Agriculture and Agri-Food 2020 Agriculture in the Classroom: Agriculture and Related Issues A Year on a Mink Farm Critical Thinking and Problem Solving Dive into Aquaculture! Agriculture in the Classroom: Where Beef Comes From Teacher Guide Where Beef Comes From

GCO 2 Learners will investigate plant production in New Brunswick.

SCO 2.1	Learners will apply scientific knowledge to plant production in their local context.
Concepts and Content	**I Can – exemplars:**

• Carbon Cycle
  ○ Carbon Sequestering
• Land reclamation
• Nature-based Agriculture solutions
• New Brunswick plant species
• New Brunswick ecosystems
• Permaculture
• Photosynthesis
  ○ Light Cycles
  ○ Light Intensity and Growing Regions
	• Associate local plant species grown in the different ecosystems of New Brunswick.
	• List the different ecosystems of New Brunswick.
	• Analyze the impact of invasive crops to native ecosystems.
	• Identify Permaculture.
	• Apply understanding of photosynthesis to local plant production and local ecosystems.
	• Apply understanding of the carbon cycle to local plant production and local ecosystems.

Resources		
Video	**Website**	**Document**
	Agriculture in the Classroom: Agriculture and Land Use SDG 14: Life Below Water SDG 15: Life on Land	The Adventures of Michael and Mia: Stewards of the Land Critical Thinking and Problem Solving The Earth on Turtle's Back

SCO 2.2	Learners will experiment with crop propagation and production in their local contexts.
Concepts and Content	**I Can – exemplars:**

• Identifying crops
  ○ Grains
  ○ Forages
  ○ Fruit/orchards
  ○ Other resources:
  ▪ Fibres
  ○ Vegetables
 	
• Small- and large-scale crop production processes
  ○ Hydroponics
  ○ Propagation
  ▪ Irrigation
  ▪ Planting
  ▪ Pollination
  ▪ Seeding
  ▪ Soil
  ▪ Transplanting
  ○ Protected agriculture (e.g. greenhouse)
  ○ Raised beds
 	
• Regional Food
  ○ Fruits
  ○ Grains
  ○ Greens
 	
• Value Added plant products
  ○ Animal feed by-products
  ○ Straw from crops
	• Describe the role of insects in pollination.
	• Discover appropriate amounts of water and fertilizer to maintain good plant health.
	• Experiment with harvesting seeds from mature plants.
	• Identify the benefits and/or limitations of raised beds.
	• Identify the benefits and/or limitations of protected agriculture in sustainable production.
	• Identify fruits commonly produced in New Brunswick.
	• Identify methods to access honeybees for plant production. (e.g. renting bees, beekeeping, growing pollinator plants)
	• Identify plant parts.
	• Identify the role of using hydroponics.
	• Identify types and characteristics of soil suitable for agriculture.
	• Identify vegetables commonly produced in New Brunswick.
	• Propagate plants.
	• Start a plant from seed.
	• Understand the importance of honeybees for pollinating crops.

Resources		
Video	**Website**	**Document**
University of Guelph Honey Bee Research Centre (channel) Nova Scotia Government: All Kinds of Apples (playlist)	Agriculture in the Classroom: Bees Agriculture in the Classroom: Fertilizer Agriculture in the Classroom: Irrigation Agriculture in the Classroom: Soil Agriculture in the Classroom: Water Management Dairy Farmers of Canada: Dairy in Canada Food and Agriculture Organization: Soil Biodiversity Perennia: Honey Bees SDG 2: Zero Hunger SDG 12: Responsible Consumption and Production	The Adventures of Michael and Mia: Stewards of the Land Agriculture in the Classroom: Technology in Agriculture At Home Guide Agriculture in the Classroom: Alex's First Seed Guiding Reading Lesson Alex's First Seed Agriculture in the Classroom: Blossom's Big Job Guided Reading Lesson Blossom's Big Job Collaboration Critical Thinking and Problem Solving Cultural Agriculture Partnership: All Kinds of Apples Fall Classroom Learning Experience Fields of Home Innovation, Creativity, and Entrepreneurship Reggie's Technology Adventure Reggie's Technology Adventure Lesson Plan

SCO 2.3	Learners will apply industry principles to harvesting, processing, and transporting quality products.
Concepts and Content	**I Can – exemplars:**

• Food Science
  ○ Food safety
  ○ Processing and preservation
  ○ Stages of production
  ○ Transportation
 	
• Environment and Soil Health
  ○ Composting
  ○ Cycle of nutrients
  ○ Environmental impact and mitigation practices
  ○ Regenerative organic
 	
• Plant Health
  ○ Biosecurity
  ○ Genetically Modified Organisms (GMO)
  ○ Integrated pest management
  ○ Organic agriculture
  ○ Sustainable practices in agriculture
 	
• Technology
  ○ Artificial Intelligence
  ○ Automation
  ○ Biotechnology
  ○ Genetics
  ○ Robotics
	• Classify chemical and physical soil properties.
	• Compare methods used to keep food safe.
	• Describe how organic matter is formed.
	• Determine the potential of genetically modified organisms on agricultural production.
	• Determine the potential of organic agriculture for agricultural production.
	• Examine the role of product transportation.
	• Explain soil erosion.
	• Examine soil nutrient content.
	• Examine soil profiles.
	• Identify the benefits involved in plant genetic technology.
	• Identify the ethical issues involved in plant genetic technology.
	• Identify how plant-based products are processed and preserved.
	• Identify the impact of environment and soil health on crop quality and yield.
	• Identify the importance of plant health to the sustainability of Agriculture.
	• Identify the risks involved in plant technology.
	• Identify soil types.
	• Practice reading soil test result reports.
	• Show the importance of food safety.

Resources		
Video	**Website**	**Document**
Soil Defenders	Agriculture in the Classroom: Agriculture and Renewable Energy Curriculum Connections Agriculture in the Classroom: Biosecurity Agriculture in the Classroom: Crop Rotation Agriculture in the Classroom: Environmental Farm Plans Agriculture in the Classroom: Fertilizer Agriculture in the Classroom: Food Additives Agriculture in the Classroom: Food Processing Agriculture in the Classroom: Food Safety Agriculture in the Classroom: Food Security Agriculture in the Classroom: GMOs Around the World Agriculture in the Classroom: GMOs and the Environment Agriculture in the Classroom: GMO Foods Agriculture in the Classroom: Organic Farming Agriculture in the Classroom: Organic Food Agriculture in the Classroom: Organic Pest Management Agriculture in the Classroom: Organic Soil Management Agriculture in the Classroom: Organic and Synthetic Pesticides Agriculture in the Classroom: Pesticides – What and Why? Agriculture in the Classroom: Regenerative Agriculture Agriculture in the Classroom: snapAG Agriculture in the Classroom: What are GMOs SDG 2: Zero Hunger SDG 9: Industry, Innovation, and Infrastructure SDG 11: Sustainable Cities and Communities SDG 12: Responsible Consumption and Production	Agrobiodiversity and Agricultural Ecosystems The Adventures of Michael and Mia: Stewards of the Land AgScape: All About Soil Critical Thinking and Problem Solving Digging Deeper: Inquiry Into Soil Teacher Resource Guide Innovation, Creativity, and Entrepreneurship

GCO 3 Learners will investigate animal agriculture in New Brunswick.

SCO 3.1	Learners will compare the variety of animal farming opportunities in New Brunswick.
Concepts and Content	**I Can – exemplars:**

• Livestock
  ○ Large scale
  ○ Small scale
  ○ Specific traits
  ○ Terminology for livestock in local agriculture
 	
• Common types
  ○ Beef
  ○ Dairy
  ○ Fur (fox, mink, etc.)
  ○ Goats
  ○ Poultry (chicken, turkey)
  ○ Sheep
  ○ Swine
 	
• Non-traditional species and game farms
  ○ Alpaca
  ○ Bees
  ○ Emu
  ○ Llama
	• Classify major animal species raised in New Brunswick.
	• Describe how honeybees can be reared to make colonies.
	• Describe how llamas are used for the protection of sheep flocks.
	• Describe how queen honeybees can be sold to other beekeepers. Identify how alpaca/llama are raised.
	• Identify animal species.
	• Identify the segments of the poultry industry.
	• Survey different animal industries/commodities in New Brunswick.

Resources		
Video	**Website**	**Document**
	Agriculture in the Classroom: Beef Protein and the Environment Agriculture in the Classroom: Chicken Housing Agriculture in the Classroom: Curriculum Linked Resources Agriculture in the Classroom: Dairy Cows Agriculture in the Classroom: Dairy in Your Diet Agriculture in the Classroom: Farm Animals Agriculture in the Classroom: Grass-Fed and Grain-Finished Beef Agriculture in the Classroom: The Myth of Factory Farms Agriculture in the Classroom: Pig Housing Agriculture in the Classroom: snapAG SDG 2: Zero Hunger SDG 12: Responsible Consumption and Production	Bread in a Bag and Butter in a Jar

SCO 3.2	Learners will research care for animals, reproduction, new technologies, products and by-products in animal farming in New Brunswick.

Concepts and Content	I Can – exemplars:

• Animal Science
 	
• Technology
  ○ Artificial Intelligence
  ○ Automation
  ○ Biotechnology
  ○ Genetics
  ○ Robotics
 	
• Value-added products
  ○ Butter
  ○ Cheese
  ○ Eggs
  ○ Fur
  ○ Honey
  ○ Ice Cream
  ○ Meat (beef, chicken, goat, lamb, pork, turkey, etc.)
  ○ Wool
	• Describe milking a cow.
	• Explain collecting honey.
	• Explain obtaining fiber from goat, llama, and sheep.
	• Explain uses of goat, llama, and sheep fiber.
	• Identify benefits of animal genetic technology.
	• Identify ethical issues in animal genetic technology.
	• Identify how to meet animals' needs.
	• Identify technological advancements in the livestock industry.
	• Identify the processes of artificial insemination.
	• Identify risks in animal technology.
	• Identify sources of and uses for straw.
	• Identify the stages of egg development.
	• Identify the importance of good nutrition for livestock.
	• List major diseases and parasites of livestock.

Resources		
Video	**Website**	**Document**
	Agriculture in the Classroom: Animal Breeding Agriculture in the Classroom: Animal Welfare and Rights Agriculture in the Classroom: Eggs SDG 2: Zero Hunger	Critical Thinking and Problem Solving Innovation, Creativity, and Entrepreneurship

SCO 3.3	Learners will examine practices related to and the potential for producing and marketing animal by-products.

Concepts and Content	I Can – exemplars:
• Health and safety product and by-product checks/tests • Local product and by-product manufacturing • Marketing and scaling product and by-product production • Product and by-product processing and transportation • Quality assurance product and by-product checks/tests	• Describe cheese and milk grading. • Describe cheese and milk processing and production. • Describe how honeybees can be kept for the purpose of making and selling wax. • Describe how honeybees can be kept for the purpose of producing and selling honey. • Explain the steps milk undergoes when it leaves the dairy farm. • Identify plant by-products and their uses as value-added products. • Locate the animal products and animal by-products that come from each of the animal industries in New Brunswick.

Resources		
Video	**Website**	**Document**
	Agriculture in the Classroom: Food Additives Agriculture in the Classroom: Food Processing Agriculture in the Classroom: Food Safety Agriculture in the Classroom: Food Security Agriculture in the Classroom: Transporting Farm Animals Agriculture in the Classroom: Milk Pasteurization SDG 12: Responsible Consumption and Production	Critical Thinking and Problem Solving Innovation, Creativity, and Entrepreneurship

GCO 4 Learners will explore careers in Agriculture.

SCO 4.1 Learners will apply learning through practical activities and/or work placements.

Concepts and Content	I Can – exemplars:

• Practical activities
  ○ Composting
  ○ Farm tours
  ○ Greenhouse
  ○ Grow towers
  ○ School gardens
  ○ Windowsill gardens
  ○ Work placements
 	
• Careers in Agriculture
  ○ Agriculture training and education
  ○ Agri-businesses
  ○ Other services
  ▪ Electrician
  ▪ NB Power
  ▪ Refrigerator repair
	• Connect other services required by agriculture or on a farm.
	• Draw or layout a farm plan (e.g. barns, lagoon, wells etc.) including environmental and emergency management.
	• Identify careers in Agriculture.
	• Identify careers that specialize in technology used to assist the Agriculture industry.
	• Identify farm problems that require a proactive plan.

Resources

Video	Website	Document
Your Life | Your Agriculture	AGCareers: Career Profiles Agriculture in the Classroom: Curriculum Linked Resources Agriculture for Life: Career Labs Agriculture for Life: Learning Labs Green Careers Canada: Education Pathways Journey 2050: Career in Agriculture Videos The Explore Project: Career Case Explore Digital thinkAG thinkAG: Classroom and At-Home Educators	Can a Single Apple Slice Feed the World? Critical Thinking and Problem Solving Innovation, Creativity, and Entrepreneurship

SDG 9: Industry, Innovation, and Infrastructure SDG 11: Sustainable Cities and Communities

SCO 4.2	Learners will research innovations in Agriculture.
Concepts and Content	**I Can – exemplars:**

• Climate-smart Agriculture
  ○ Climate change adaptation
 	
• Mechanization
 	
• Local habitats
  ○ Land reclamation
  ○ Nature based solutions
 	
• Pest resistance
 	
• Precision Agriculture
 	
• Technologies
  ○ Automation
  ○ Biotechnology
  ○ Genetics
  ○ Robotics
	• Define Precision Agriculture including the importance and major focus/objectives.
	• Describe how Precision Agriculture can help the environment.
	• Describe technologies involving animals, food preservation, machines, pests, and/or plants.
	• Identify benefits and risks of genetic technologies.
	• Identify biological alternatives and technologies used in food production.
	• Identify disadvantages of precision farming.
	• Identify effects of climate change on Agriculture operations.
	• Identify the *5 R's* of Precision Agriculture.
	• Identify how Precision Agriculture helps farmers.
	• Identify how the knowledge of molecules, genes and DNA have led and lead to new biotechnologies.
	• Identify important techniques in precision farming.
	• Identify management tools used to prevent or delay pests' resistance to pesticides.
	• Identify technology applications to meet human needs.
	• List important inventions in Agriculture sectors.

Resources

Video	Website	Document
Agriculture in the Classroom: Farm Tour Videos Modern Agriculture Machines That Are At Another Level 1 Modern Agriculture Machines That Are At Another Level 2 Modern Agriculture Machines That Are At Another Level 3 Modern Agriculture Machines That Are At Another Level 4 Modern Agriculture Machines That Are At Another Level 5	Agriculture in the Classroom: Agriculture and Greenhouse Gases Agriculture in the Classroom: Agriculture and Land Use Agriculture in the Classroom: Bioplastics Agriculture in the Classroom: Carbon Sequestration Agriculture in the Classroom: GMOs Around the World Agriculture in the Classroom: GMOs and the Environment Agriculture in the Classroom: GMO Foods	Agrobiodiversity and Agricultural Ecosystems Agriculture Pesticides and Plant Technology: Benefiting Canadians Critical Thinking and Problem Solving Innovation, Creativity, and Entrepreneurship

Modern Agriculture Machines That Are At Another Level 6 Modern Agriculture Machines That Are At Another Level 7 Modern Agriculture Machines That Are At Another Level 8 Modern Agriculture Machines That Are At Another Level 9 Modern Agriculture Machines That Are At Another Level 10 Modern Agriculture Machines That Are At Another Level 11 Modern Agriculture Machines That Are At Another Level 12	Agriculture in the Classroom: Pesticides – What and Why? Agriculture in the Classroom: Regenerative Agriculture Agriculture in the Classroom: snapAG Agriculture in the Classroom: What are GMOs SDG 9: Industry, Innovation, and Infrastructure SDG 11: Sustainable Cities and Communities

SCO 4.3	Learners will construct a personal choice project or develop a business proposal and plan.
Concepts and Content	**I Can – exemplars:**
Learners will focus a project or develop a business proposal and plan around an area of interest in Agriculture, Aquaculture or Fisheries. The project or business proposal and plan develops an innovation, creates a business opportunity, meets a human need, or solves a problem in the school, community or industry.	• Adapt successful practices to New Brunswick Agriculture. • Chart the businesses that are impacted by my project or business proposal and plan. • Explain how my project shows Innovation, Creativity, and Entrepreneurship, or meets human need. • Identify areas of growth in New Brunswick Agriculture, Aquaculture, and Fisheries. • Prepare a summary report from experimental learning.

Resources		
Video	**Website**	**Document**
G3 Grow Beyond: 2022 Winners	Agriculture for Life: Learning Labs Sustainable Development Goals	Collaboration Communication Critical Thinking and Problem Solving Innovation, Creativity, and Entrepreneurship Self-Awareness and Self-Management Sustainability and Global Citizenship

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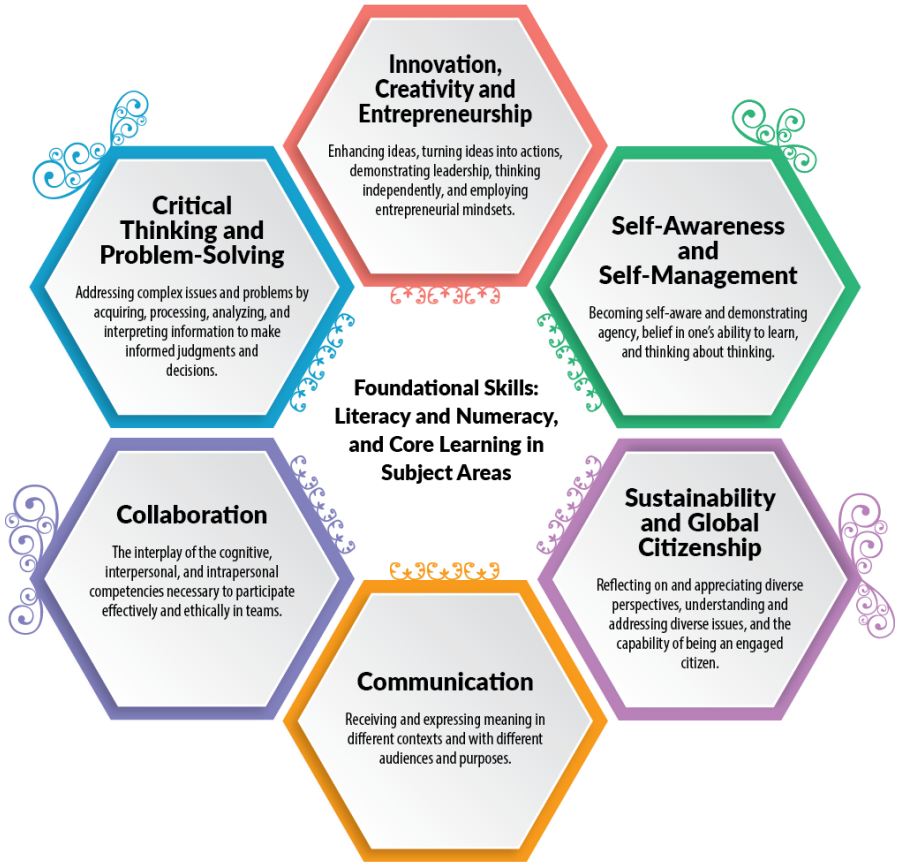
6. Appendices

6.1 New Brunswick Global Competencies

The individual and collective New Brunswick Global Competencies posters can be downloaded here.



6.2 Universal Design for Learning (UDL)

UDL helps meet the challenge of diversity by suggesting flexible instructional materials, techniques, and strategies that empower educators to meet these varied needs. UDL research demonstrates that the challenge of diversity can and must be met by making curriculum flexible and responsive to learner differences. UDL provides guidelines to minimize barriers and maximize learning for all.

Is there a form of **assistive technology** that could be used to enhance/facilitate this lesson?	Screen readers, screen magnifiers, speech-to-text, text-to-speech, alt. tags, image descriptors, etc.
Are there **materials which can appropriately challenge** readers to enhance this learning?	Increasing complexity of agriculture and growing equipment and tools, and techniques. Case studies, research, and existing data sets. Post-secondary level resources.
Are there learners in this group who cannot **access this learning (PLP background)** and whose needs I must revisit before teaching?	Consider and honour the needs of all learners. For example, select accessible agriculture visitation and growing sites, select alternative sites and allow learner choice, provide accommodations to allow site accessibility, consider the sensory experience and provide safe spaces or breaks for neurodiverse learners, etc.
Are there other **choices** that can be provided in this learning opportunity?	Digital tours or videos, online modules, NBVLC blended learning, etc. Alternative forms of project or proposal.
Is there another/a **variety of media** available? Only paper-based? Can it be listening? Can I add a visual component?	Textbooks, online textbooks, computer modelling software, videos, audio lessons (through text-to-speech), etc.

Can **movement** be involved?	Content instruction can be accomplished outdoors. Agriculture and growing equipment, tools, and techniques require various types of manipulation or movement. Guided tours. Software can be accessed on different devices and in different locations.
Grouping and regrouping?	General learning can be team-based or cooperative.
Educator versus non-educator centered? **Instructional design strategies** –…	Guests and experts allow for different instructional methods. It is expected that the project or proposal is learner generated and led.
Opportunities for learners to **propose variations** to the assignments/projects?	Alternatives to paper-based field reports. Art, music, and technology can facilitate variations to assignments/project and assessment.
Use of **art /music / technology**?	It is expected that learners will interact with agriculture equipment and tools, and software. Art and music are elements that can be considered when exploring agricultural history. Art, music, and technology can facilitate variations to assignments/projects and assessment.
Can I use **drama**? Art….	Drama is an element that can be considered when exploring agricultural history.
Is there a plan to support the learner/s who might already know this subject matter? **Enrichment**	Learners can prove prior learning and have opportunities to advance and enrich their own learning, this can be through self-initiated project proposals at various degrees of independence. Learners may explore post-secondary resources, post-secondary level techniques, or generate additional inquiries, etc.

Does the **language level** need to be adjusted for the learner to access this learning?	This course is highly dependent on the use of the English language and industry/scientific vocabulary. While learners can use online translators for context, the demonstrations of learning are usually done in English. Educators should prepare glossaries and provide universal accommodations for language to all learners. (Microsoft Word can determine the reading level of text.) In some cases, working with a translator may be appropriate (e.g. a translator to accompany guided site tours)
Is there an **independent or collaborative activity-project** that would be better meet the needs of one or more learners?	Part of this course is taught using project-based learning. Course work can be done independently or collaboratively, based on the needs of the learner, however it is recommended that pairing with a mentor, expert, or community member will enhance an independent approach.
Are there any **experts** that I could bring into the classroom electronically or as a guest speaker?	First Nation Elders (contact local First Nation subject coordinator), industry people, post-secondary professors, site tour guide, etc.
Have I linked the goal to as current event or a cultural event in the learner's lives? Can I make the learning more **relevant**?	The learning should be applied to local community contexts, and can consider the Sustainable Development Goals.
Is there a **hands-on experience** that we could do to launch this lesson or this learning?	Learning should include use of agriculture and growing equipment and tools, and be based in a local community context.

7. Resources

AGCareers: The AgCareers.com mission is to provide global talent solutions in agriculture and food. We strive to "Feed the World with Talent" in the industries we serve. Our passion is agriculture, demonstrated by our investment in time and resources engaging with candidates and employers in the industry. AgCareers.com works to build the pipeline of talent to the industry by expanding knowledge about the breadth of career opportunities in agriculture. <https://www.agcareers.com/>

Agriculture in the Classroom: Agriculture in the Classroom Canada (AITC-C) is a Canadian charitable organization with a vision to bring agriculture to every classroom, inspiring every student … Collectively, we are guided by passion, transparency, empowerment, innovation, inclusion and collaboration to ensure that every Canadian student is inspired to consider the role they play in our country's agriculture and food story. <https://aitc-canada.ca/en-ca/>

Agriculture for Life: Our programs and resources are designed for teachers by teachers with the goal of engaging, inspiring and empowering students and helping them understand and celebrate the integral role the industry plays in society, the environment and the economy. <https://www.agricultureforlife.ca/>

Briggs and Little: In 2014, John Thompson retired and Mike Little purchased 50% of Briggs & Littles shares. John Little and Mike Little, father and son, were the sole owners of Briggs and Little Woolen Mills Ltd. until 2019, when John retired from working in the office after 50 years. Currently, Mike is running the mill and his wife, Leah has taken over Johns responsibilities in the office. To date, the woolen mill has been operating for 165 years. <https://briggsandlittle.com/>

Buy Local NB: Buy Local NB is a project by the Conservation Council of New Brunswick aimed at offering a sensible solution toward the improvement of human and environmental health, social justice and community development. Buying Locally is a venture that has

many facets; it directly affects farmers, consumers, and the economy in a number of ways. Employing approximately 46,300 people in 2012, the agri-food sector plays an important economic and social role New Brunswick. <https://buylocalnb.ca/>

Dairy Farmers of Canada: Simply put, we're fellow Canadians doing what all Canadians do best: looking after one another. Driven by teamwork, integrity, and passion, we work hard each day to play our part in ensuring all Canadians have a chance to share a healthy, sustainable future …We're a farmer-funded and farmer-run organization (not a government body), and we represent the interests of the hard-working men and women on almost 10,000 Canadian dairy farms, day in and day out. Indirectly, we also stand with the over 178,000 extended members of the dairy farmer community and workforce from coast to coast. <https://dairyfarmersofcanada.ca/en>

Food and Agriculture Organization: The Food and Agriculture Organization (FAO) is a specialized agency of the United Nations that leads international efforts to defeat hunger. Our goal is to achieve food security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives. With 195 members - 194 countries and the European Union, FAO works in over 130 countries worldwide. <https://www.fao.org/home/en/>

Green Careers Canada: To help you introduce Green Careers to your students, we can help you find professionals in the landscape industry to attend a career fair or set up a job shadowing opportunity to teach students first-hand what the industry is all about. <https://greencareerscanada.ca/>

Journey 2050: Journey 2050 is a FREE agriculture education program that challenges participants to answer the question, "How will we sustainably feed nearly 10 billion people by the year 2050?" Using an inquiry-based approach, this gamified, virtual program encourages students to make decisions and adjust them as they see their impact on society, the environment, and the economy at a local and global scale. Students will hear from farmers across the globe, learning about their experiences to understand how agriculture differs across the globe. <https://www.journey2050.com/>

New Brunswick: Deliciously Canadian: The New Brunswick: Deliciously Canadian brand is managed by the New Brunswick Department of Agriculture, Aquaculture and Fisheries. It promotes New Brunswick's top seafood, agri-food and beverage products in international

markets, driving awareness of our wildly delicious food and beverage exports through retail and foodservice promotions, marketing collateral, overseas trade and press missions and advertising. <https://nbdeliciouslycanadian.com/>

Perrenia: Perennia Food and Agriculture Inc. is a provincial development agency with the mission to support growth, transformation and economic development in Nova Scotia's agriculture, seafood, and food and beverage sectors. We are Nova Scotia's only technical development agency focused solely on our food sector and maximizing its value. <https://www.perennia.ca/>

Provincial Archives of New Brunswick: Established in 1967, the Provincial Archives of New Brunswick collects and preserves the documents of the people, institutions and government of the province. Most of the holdings are for the period from 1784, when New Brunswick was made a separate province of British North America. However, some materials relating to the earlier exploration, Acadian and pre-Loyalist periods have also been acquired. <https://archives.gnb.ca/archives/Default.aspx?culture=en-CA>

The Real Dirt on Farming: Your Guide to Food and Farming in Canada … Food is connected to many of the big issues facing our society, from the cost of living and energy, to climate change, and health care. The Real Dirt on Farming is tackling those issues head-on to answer your questions, and to show you what we are doing to feed you safely, nutritiously, and sustainably. <https://www.realdirtonfarming.ca/>

thinkAG: Like a teacher in the classroom, Agriculture in the Classroom Canada (AITC-C) is committed to encouraging students to develop a passion for lifelong learning through collaboration, creativity, critical thinking, and communication. AITC-C works with our provincial members and partners to ensure students and teachers are equipped with curriculum-linked resources, programs, and experiences to have a balanced understanding of agriculture and food. <https://thinkag.ca/en-ca/>

United Nations Sustainable Development Goals: The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve

health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests. <https://sdgs.un.org/goals>