



Grades 10 – 12

The following are some of the examples of where the **Content** of the new curriculum lends itself to incorporating Agriculture into your classroom. These **Content** pieces can be paired with any number of **Curricular Competencies** to create engaging lessons/activities/projects to satisfy course requirements.

Course	Content Connections that are useful for Agriculture themes	Activity/Program Suggestions
<p><b>Science 10</b></p>	<ul style="list-style-type: none"> <li>• DNA structure and function</li> <li>• Genes and Chromosomes</li> <li>• Simple patterns of inheritance</li> <li>• Mechanisms for the diversity of life               <ul style="list-style-type: none"> <li>○ Mutation and its impact on evolution</li> <li>○ Natural and artificial selection                   <ul style="list-style-type: none"> <li>▪ Agricultural examples (eg. Monoculture, polyculture, food sustainability)</li> <li>▪ Breeding (plant and animal)</li> </ul> </li> </ul> </li> <li>• Applications of genetics and ethical considerations               <ul style="list-style-type: none"> <li>○ Genomics, GMOs,</li> </ul> </li> <li>• Practical applications and implications of chemical processes including First Peoples perspectives               <ul style="list-style-type: none"> <li>○ Food chemistry, phytochemistry</li> </ul> </li> </ul> <p><b>Sample Curricular Elaboration Questions:</b></p> <ul style="list-style-type: none"> <li>• How are plants used by First Peoples in your local area?</li> <li>• How would you design a garden for your school that features local plants and considers appropriate plant choices?</li> <li>• How does your garden filled with local plants contribute to your sense of place? (The connection between people and place is foundational to First Peoples perspectives.</li> </ul>	<p>BCAITC Programs</p> <ul style="list-style-type: none"> <li>• Spuds in Tubs               <ul style="list-style-type: none"> <li>○ Test the effects of mutagens (microwaves, ultraviolet light etc) on seed potatoes ability to sprout.</li> </ul> </li> <li>• Harvest Bin               <ul style="list-style-type: none"> <li>○ Start a school garden using raised planter beds and facilitate the lessons below</li> </ul> </li> <li>• Pencil Patch               <ul style="list-style-type: none"> <li>○ Self-guided stations help students understand various aspects of garden ecology</li> </ul> </li> </ul> <p>Lesson Ideas</p> <ul style="list-style-type: none"> <li>• Use examples from the garden to teach Mendelian genetics (pea plants would be a great hook)</li> <li>• Visit an ethnobotanical garden in your area</li> <li>• Have students read seed packets and research local plants. Use the information to plan and map a garden.</li> <li>• Use Brassica oleracea as an example of how artificial selection was used to create cole crops (cabbage, brussel sprouts, kale, broccoli etc)</li> <li>• Compare and contrast the effects of monocultures and polycultures.</li> <li>• Have student groups research and debate the use of GMO's</li> <li>• Learn about the traditional uses of plants and then have students make their own tea combination using the "tea pyramid"</li> <li>• Investigate the production cycle for a variety of local foods.</li> <li>• Field trip to locals farms</li> </ul>

<p><b>Life Sciences 11 (Biology)</b></p>	<ul style="list-style-type: none"> <li>• Sexual and Asexual Reproduction</li> <li>• Effects of viruses on organisms</li> <li>• Evolution – coevolution: flowers and pollinators evolving together</li> <li>• Artificial selection and genetic modifications <ul style="list-style-type: none"> <li>○ Explore the social, ethical and environmental implications of humans on evolution through artificial selection and genetic modifications</li> </ul> </li> <li>• First Peoples understanding of animal body plans</li> <li>• First Peoples uses of local plants</li> <li>• Unifying characteristics of the evolutionary continuum across the kingdoms</li> </ul> <p><b>Sample Curricular Elaboration</b></p> <p><b>Questions:</b></p> <ul style="list-style-type: none"> <li>• In First Peoples cultures, there are often concurrent environmental events, such as salmon berries ripening when the sockeye salmon run starts. Can you find similar concurrent events in your local environment?</li> <li>• How do traditional First Nations clam gardens increase biodiversity of species and density of clams in the garden area?</li> <li>• Prepare biological diagrams of plants and animals</li> </ul>	<p>BCAITC Programs</p> <ul style="list-style-type: none"> <li>• Spuds in Tubs <ul style="list-style-type: none"> <li>○ Test the effects of mutagens (microwaves, ultraviolet light etc) on seed potatoes ability to sprout.</li> <li>○ Label the various anatomical terms (anterior, posterior, lateral, etc) on a “potato animal” and have students practice their dissection techniques. Ex. Incision along the lateral line</li> </ul> </li> <li>• Harvest Bin <ul style="list-style-type: none"> <li>○ Use the raised planter beds to start a school garden and facilitate the lessons below</li> </ul> </li> <li>• Pencil Patch <ul style="list-style-type: none"> <li>○ Self-guided stations help students understand various aspects of garden ecology</li> </ul> </li> <li>• Planting a Promise <ul style="list-style-type: none"> <li>○ Dissect a daffodil bulb and flower</li> </ul> </li> </ul> <p>Lesson/Activity Ideas</p> <ul style="list-style-type: none"> <li>• Use the plants in your garden to demonstrate various forms of sexual and asexual reproduction</li> <li>• Have students research the impacts (positive and negative) of viruses on plants</li> <li>• Use flowers and pollinators as examples of co-evolution</li> <li>• Bee Case study/unit plan</li> <li>• Use Brassica oleracea as an example of artificial selection to create cole crops (cabbage, brussel sprouts, kale, broccoli etc)</li> <li>• Have students compare and contrast artificial selection and genetic modifications.</li> <li>• Visit an ethnobotanical garden.</li> <li>• Learn about the traditional uses of plants and then have students make their own tea combination using the “tea pyramid”</li> <li>• Introduce bacteria by having students investigate foods that make use of bacteria in their production cycle (yogurt, sauerkraut, pickles, sourdough bread etc.) and then have students make those foods.</li> <li>• Investigate First Nations clam gardens</li> </ul>
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<p><b>Chemistry 11</b></p>	<ul style="list-style-type: none"> <li>• Physical and chemical change.</li> <li>• Features and common applications of organic chemistry</li> </ul>	<p>BCAITC Programs</p> <ul style="list-style-type: none"> <li>• Harvest Bin <ul style="list-style-type: none"> <li>○ Use potatoes planted in tubs to facilitate the lessons below</li> </ul> </li> </ul> <p>Lesson Ideas</p> <ul style="list-style-type: none"> <li>• Research organic compounds that are used in the production of fertilizers and pesticides.</li> <li>• Debate the benefits of organic vs. inorganic fertilizers.</li> <li>• Research the effects of certain organic compounds on crop pollinators (eg. Bees)</li> <li>• Introduce fermentation by having students make sauerkraut (or any other fermented food) and then describe the chemical reactions taking place.</li> <li>• Investigate how nutrient availability for plants changes based on the pH of the soil</li> </ul>
<p><b>Science for Citizens 11</b></p>	<ul style="list-style-type: none"> <li>• Health Science <ul style="list-style-type: none"> <li>○ Nutrition and lifestyle</li> <li>○ Allergies and sensitivities</li> <li>○ Medications and supplements</li> <li>○ Non-Western health practices including First Peoples Health and healing practices</li> </ul> </li> <li>• Agriculture practices and processes <ul style="list-style-type: none"> <li>○ Chemicals used in agriculture</li> <li>○ Environmental impact</li> <li>○ Impacts of personal choices <ul style="list-style-type: none"> <li>▪ Hydroponics, food crops, feed crops, fuel crops, animal husbandry, new technology</li> </ul> </li> </ul> </li> <li>• First Peoples worldview and sustainability</li> </ul> <p><b>Sample Curricular Elaboration Questions:</b></p> <ul style="list-style-type: none"> <li>• How do your actions affect the world around you?</li> <li>• Is it safe to eat GMO foods?</li> </ul>	<p>BCAITC Programs</p> <ul style="list-style-type: none"> <li>• Spuds in Tubs <ul style="list-style-type: none"> <li>○ Investigate the nutritional benefits of potatoes and various cultural ways of preparing them.</li> </ul> </li> <li>• Harvest Bin <ul style="list-style-type: none"> <li>○ Start a school garden using raised planter beds to facilitate the lessons below</li> </ul> </li> <li>• Pencil Patch <ul style="list-style-type: none"> <li>○ Self-guided stations help students understand various aspects of gardens</li> </ul> </li> </ul> <p>Lesson Ideas</p> <ul style="list-style-type: none"> <li>• Use Canada Food Guide recommendations to design a locally based menu</li> <li>• Investigations of food safety: eg. use agar plates to test for presence of bacteria after using various cleaning products</li> <li>• Learn about the traditional uses of plants and then have students make their own tea combination using the “tea pyramid”</li> <li>• Research, design and plant an ethnobotanical garden</li> <li>• Test various soil samples for N, P, K and make suggestions for remediation</li> <li>• Unit: Chemistry, Fertilizer and Environment</li> <li>• Have students design and construct a classroom aquaponics system</li> <li>• Field trip to locals farms</li> </ul>

<p><b>Environmental Science 11</b></p>	<ul style="list-style-type: none"> <li>• Diversity of local ecosystems <ul style="list-style-type: none"> <li>○ Abiotic and biotic factors</li> <li>○ Biodiversity: <ul style="list-style-type: none"> <li>▪ Species and their ecological roles</li> <li>▪ Relationships and interactions in ecosystems</li> </ul> </li> </ul> </li> <li>• Sustainability in local Ecosystems <ul style="list-style-type: none"> <li>○ Benefits of healthy ecosystems</li> <li>○ Humans as agents of change <ul style="list-style-type: none"> <li>▪ First People and other traditional ecological knowledge <ul style="list-style-type: none"> <li>• Local historical practices and ways of knowing (eg agriculture, ethnobotany... fisheries)</li> </ul> </li> <li>▪ Unsustainable and sustainable ecosystem practices <ul style="list-style-type: none"> <li>• Traditional ecological knowledge practices (eg. Harvesting cycles)</li> </ul> </li> </ul> </li> </ul> </li> <li>• Conservation and Restoration of Ecosystems <ul style="list-style-type: none"> <li>○ Environmental stressors challenge ecosystem integrity, health and sustainability</li> <li>○ Ecological restoration principles and practices</li> <li>○ First Peoples concept of interconnectedness as related to conservation and restoration <ul style="list-style-type: none"> <li>▪ Selective harvesting, plant propagation and pruning, clam gardens</li> </ul> </li> <li>○ Engagement in ongoing and potential stewardship projects <ul style="list-style-type: none"> <li>▪ Local stewardship</li> </ul> </li> </ul> </li> </ul>	<p>BCAITC Programs</p> <ul style="list-style-type: none"> <li>• Spuds in Tubs <ul style="list-style-type: none"> <li>○ Test the effects of mutagens (microwaves, ultraviolet light etc) on seed potatoes ability to sprout.</li> </ul> </li> <li>• Harvest Bin <ul style="list-style-type: none"> <li>○ Use the raised planter beds to start a school garden and facilitate the lessons below</li> </ul> </li> <li>• Pencil Patch <ul style="list-style-type: none"> <li>○ Self-guided stations help students understand various aspects of garden ecology</li> </ul> </li> </ul> <p>Lesson Ideas</p> <ul style="list-style-type: none"> <li>• Plant an ethnobotanical garden</li> <li>• Use topsoil as a model ecosystem: <ul style="list-style-type: none"> <li>○ Investigate the abiotic and biotic components of topsoil</li> <li>○ Sample one meter squared areas to determine species numbers</li> <li>○ Create an arthropod pit trap</li> <li>○ Investigate how the health of the topsoil impacts plant growth</li> <li>○ Examine how various agricultural practices impact the topsoil</li> </ul> </li> <li>• Have students design an aquaponics system for the class</li> <li>• Research historical agricultural practices and how they parallel what is being used today</li> <li>• Investigate sustainable agriculture practices and how they are helping to protect the environment and public health</li> <li>• Have students investigate the carbon footprint of their food choices</li> <li>• Have students design a menu based on local food products</li> <li>• Investigate how First Nations clam gardens increase biodiversity of species and density of clams in the clam garden area</li> <li>• Investigate concurrent events known to First Peoples culture (eg. Salmon berries ripening when the sockeye salmon run starts) and find similar concurrent events in your local environment</li> <li>• Learn about the threats to bees and how humans can help minimize their decline</li> <li>• Field trip to local farms</li> </ul>
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<p><b>Anatomy and Physiology 12</b></p>	<ul style="list-style-type: none"> <li>• Biotechnology, cloning and recombinant DNA <ul style="list-style-type: none"> <li>○ 1000 Plant Genomes project, GMO's, transgenic organisms</li> </ul> </li> <li>• Nutrition and lifestyle differences affect human health</li> </ul> <p><b>Sample Curricular Elaboration Questions:</b></p> <ul style="list-style-type: none"> <li>• How might biotechnology be used to help maximize crop yield in the local and/or global community?</li> </ul>	<p>BCAITC Programs</p> <ul style="list-style-type: none"> <li>• Spuds in Tubs <ul style="list-style-type: none"> <li>○ Plant each tub with a different variety of potatoes including an Innate potato variety. Track soil nutrients, potato yield, product taste etc.</li> </ul> </li> </ul> <p>Lesson Ideas</p> <ul style="list-style-type: none"> <li>• Debate the pros and cons of genetically modified food</li> <li>• Have students research the health of various diets and nutritional fads</li> <li>• Have students investigate the impact of "eating local" on human and environmental health</li> </ul>
<p><b>Environmental Science 12</b></p>	<ul style="list-style-type: none"> <li>• Soil quality</li> <li>• Land use practices</li> <li>• Global food security and technologies <ul style="list-style-type: none"> <li>○ Availability, food access, food use, distribution, pollination, monocultures, crop rotation, fertilization, traditional ecological knowledge</li> </ul> </li> <li>• Land management and personal choices <ul style="list-style-type: none"> <li>○ Local plantings, harvesting regulations, ALR</li> <li>○ 100 mile diet, gardens, composting, organic, reduce reuse recycle</li> </ul> </li> </ul> <p><b>Sample Curricular Elaboration Questions:</b></p> <ul style="list-style-type: none"> <li>• How have rising mercury levels from industrial pollution affect the diet and health of Canada's northern First Peoples population?</li> <li>• How would you increase awareness of the availability of locally grown produce?</li> </ul>	<p>BCAITC Programs</p> <ul style="list-style-type: none"> <li>• Spuds in Tubs <ul style="list-style-type: none"> <li>○ Use different brands of soil in each tub to examine the effect on crop yield</li> </ul> </li> <li>• Harvest Bin <ul style="list-style-type: none"> <li>○ Use the raised planter beds to start a school garden and facilitate the lessons below</li> </ul> </li> <li>• Pencil Patch <ul style="list-style-type: none"> <li>○ Self-guided stations help students understand aspects of garden ecology</li> </ul> </li> </ul> <p>Lesson Ideas</p> <ul style="list-style-type: none"> <li>• Soil Unit – Chemistry, Fertilizer and the Environment</li> <li>• Investigate soil deficiencies and their impact on plant health</li> <li>• Set up a worm classroom worm composter</li> <li>• Start a school garden/farm <ul style="list-style-type: none"> <li>○ Students research land use laws and regulations in their area</li> <li>○ Students research, plan and map the crops to be planted</li> <li>○ Students facilitate a CSA program</li> <li>○ Students determine best practice for managing the soil</li> </ul> </li> <li>• Research the production cycle for locally produced foods</li> <li>• Have students investigate the impact of "eating local" on human and environmental health</li> <li>• Field trip to local farms</li> </ul>

