

## Friends of the Earth 2022 Review for Pollinator Content in Science Curriculum at Elementary and High School Levels

Province	Grade level	Year published	Inclusion of material addressing pollinators: mandatory core curriculum	Inclusion of material addressing pollinators: examples or guiding material	Key terms: Bees / honey bees / pollen / pollinator / pollination / hive / nest / insect	Key word: Biodiversity	Links
<b>Alberta</b>	Elementary (grades 1-6)	1996	Describe some common living things and identify needs of those living things  Animal life cycles: describe the appearances and lifecycles of some common animals, and identify their adaptations to different environments  Describe the general structure and life habits of small crawling and flying animals e.g. insects, spiders, worms, and slugs	Give examples of ways in which animals depend on plants and ways in which plants depend on animals; e.g., particular plants may serve as a source of food and shelter, animals may help spread pollen and seeds. (section B.5)  Insect (section B.15)  identify each animal's role within the food chain (section B.10)	Pollen  insect  insect	not found	<a href="https://education.alberta.ca/media/159711/elemsci.pdf">https://education.alberta.ca/media/159711/elemsci.pdf</a>
	Middle (7-9)	2003	<b>1)</b> identify and interpret relationships among human needs, technologies, environments, and the culture and use of living things as sources of food and fibre; <b>2)</b> identify impacts of human action on species survival and variation within species; <b>3)</b> analyze and evaluate mechanisms affecting the distribution of potentially harmful substances within an environment.  Unit A: Investigate life processes and structures of plants, and interpret related characteristics and needs of plants in a local environment	<b>1)</b> intended and unintended consequences of environmental management practices (e.g. susceptibility to insect infestation or loss of diversity); <b>2)</b> describe the relative abundance of species on Earth and in different environments (e.g. note the overall abundance of insect species); <b>3)</b> identify and evaluate information and evidence related to an issue in which environmental chemistry plays a major role (e.g. evaluate evidence that the use of insecticides to control mosquitoes has an effect/has no effect on bird populations)  Describe life cycles of seed plants, and identify example methods used to ensure their germination, growth and reproduction (e.g., describe propagation of plants from seeds and vegetative techniques, such as cuttings; conduct a germination study; describe the use of beehives to support pollination)	insect  pollination	not found	<a href="https://www.learnalberta.ca/ProgramOfStudy.aspx?lang=en&amp;Programid=511711#">https://www.learnalberta.ca/ProgramOfStudy.aspx?lang=en&amp;Programid=511711#</a>
	Highschool	2014	Not found	not found	Not found	biodiversity: Students will evaluate the impact that human activity has or could have on the biodiversity of an ecosystem: wetlands management, land use, interbasin water transfer, habitat fragmentation, urbanization, slash-and-burn and clearcutting practices, monocultures of forests, lawns, field crops (page 26)	<a href="https://education.alberta.ca/media/3069386/pos_bio_20_30.pdf">https://education.alberta.ca/media/3069386/pos_bio_20_30.pdf</a>



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British Columbia	Elementary	Up-date underway	Not found	not found	Not found	learning standard: biodiversity in the local environment. Sample questions: what is biodiversity? Why is biodiversity important in an ecosystem (page 13)	<a href="https://curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/curriculum/science/en_science_k-9.pdf">https://curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/curriculum/science/en_science_k-9.pdf</a>
	Highschool	Up-date underway	Not found	Content elaborations: Relationships between organisms (e.g., predator/prey, competition, pollination, symbiosis, mutualism, parasitism, commensalism, mimicry). Ecosystem services: pollination (page 6)	Pollination	Grade 10: how does DNA result in biodiversity?	<a href="https://curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/curriculum/science/en_science_11_environmental-science_elab.pdf">https://curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/curriculum/science/en_science_11_environmental-science_elab.pdf</a> <a href="https://curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/curriculum/science/en_science_10_core_elab.pdf">https://curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/curriculum/science/en_science_10_core_elab.pdf</a>
Manitoba	Elementary (kindergarten-grade 4)	1999	Growth and changes in plants (section 3.38)	Describe the ways plants and animals depend on each other (animals help distribute pollen and seeds)	Pollen	essential science knowledge: life science deals with the growth and interactions of life forms within their environment in ways that reflect their uniqueness, diversity, genetic continuity, and changing nature. Life science includes the study of organisms, ecosystems, biodiversity, cells, biochemistry, and biotechnology (section 2.12)	<a href="https://www.edu.gov.mb.ca/k12/cur/science/outcomes/k-4/full_doc.pdf">https://www.edu.gov.mb.ca/k12/cur/science/outcomes/k-4/full_doc.pdf</a>
	Elementary (grade 5-8)	2000	not found	not found	not found		<a href="https://www.edu.gov.mb.ca/k12/cur/science/outcomes/5-8/full_doc.pdf">https://www.edu.gov.mb.ca/k12/cur/science/outcomes/5-8/full_doc.pdf</a>
	Highschool	2000-2013	Not found	not found	not found		<a href="https://www.edu.gov.mb.ca/k12/cur/science/found/gr12_bio/full_doc.pdf">https://www.edu.gov.mb.ca/k12/cur/science/found/gr12_bio/full_doc.pdf</a>
New Brunswick	Elementary	K-2: 2002, 3-6: 2019	Not found	not found	Not found	biodiversity (page 29)	<a href="https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade3.pdf">https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade3.pdf</a> <a href="https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade4.pdf">https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade4.pdf</a> <a href="https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade5.pdf">https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade5.pdf</a> <a href="https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/ScienceFoundation-K-12.pdf">https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/ScienceFoundation-K-12.pdf</a>
	Middle school (6,7,8)	2020-2021	Not found	not found	Not found	not found	<a href="https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade6.pdf">https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade6.pdf</a> <a href="https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade7.pdf">https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade7.pdf</a> <a href="https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade8.pdf">https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade8.pdf</a>
	Highschool - grade 11 and 12 biology	2008	Animal biology, class and orders of the animal kingdom  Plant biology, structures, functions in the environment	Students should focus on arthropods and on insects in particular, as the biologically most varied and numerous class of animals (page 32)  Teaching suggestion: the assistance from animals and wind in pollination, the presence of structures in plants specific to attracting certain animal pollinators which the plants supply with food. (page 30)	Insect  Pollination, pollinators	Chapter: biodiversity within ecosystems (page 34)	<a href="https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade10.pdf">https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Science-Grade10.pdf</a>  <a href="https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Biology11-112.pdf">https://www2.gnb.ca/content/dam/gnb/Departments/ed/pdf/K12/curric/Science/Biology11-112.pdf</a>



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Newfoundland	Elementary - grade 3	2015-2018	Life cycle of a flowering plant (page 110)	During pollination, pollen from the male stamen is transferred to the female pistil by the wind, insects, or other animals	pollination, pollen, insect	Preservation of biodiversity and habitat conservation (page 48)	<a href="https://www.gov.nl.ca/education/k12/curriculum/guides/science/">https://www.gov.nl.ca/education/k12/curriculum/guides/science/</a> <a href="https://www.gov.nl.ca/education/files/k12_curriculum_guides_science_science_3_curriculum_guide_2017.pdf">https://www.gov.nl.ca/education/files/k12_curriculum_guides_science_science_3_curriculum_guide_2017.pdf</a>
	Highschool - grade 9	N/A	compare and contrast complete and incomplete metamorphosis, explain how various organisms reproduce sexually, including insects, moss, flowering plants (pollination - does not include role of insects or bees in pollination process). page 164	typical insect life cycles could include the grasshopper as an example of incomplete metamorphosis and the butterfly as an example of complete metamorphosis	insect, pollination	not found	<a href="https://www.gov.nl.ca/education/files/k12_curriculum_guides_science_grade9_unit_4_grade9_science.pdf">https://www.gov.nl.ca/education/files/k12_curriculum_guides_science_grade9_unit_4_grade9_science.pdf</a>
	Highschool - Biology	2020	Describes changes in population size (page 70)	sketch and explain the predicted population growth curve for an insect species capable of infesting an area when growing at its biotic potential	insect	Evolutionary change and biodiversity, evaluate relationships that affect the biodiversity and sustainability of life within the biosphere (page 21)	<a href="https://www.gov.nl.ca/education/files/biology_2201_2020.pdf">https://www.gov.nl.ca/education/files/biology_2201_2020.pdf</a>
	Highschool - environmental science	2010	represent the importance of protecting species (page 32)	Insects represent an extremely important part of the plant pollination process. Without specific insects, some plants are unable to reproduce and genetic continuity is disrupted	Pollination, insect	biodiversity chapters covered: eco-regions, species at risk, protecting biodiversity	<a href="https://www.gov.nl.ca/education/files/k12_curriculum_guides_science_envsci3205_3205_unit_1_revised_july2010.pdf">https://www.gov.nl.ca/education/files/k12_curriculum_guides_science_envsci3205_3205_unit_1_revised_july2010.pdf</a>
Nova Scotia	Elementary	2019	Not found	project suggestion: collections of leaves, seeds, or insects in jars (page 14)	insect	not found	<a href="https://curriculum.novascotia.ca/sites/default/files/documents/resource-files/Science%20Primary%20Guide%20%282019%29.pdf">https://curriculum.novascotia.ca/sites/default/files/documents/resource-files/Science%20Primary%20Guide%20%282019%29.pdf</a>
	Highschool	2012	taxa classification, hormones and chemical communication	pesticide resistant insect populations (page 118)	Pollen (referenced as an allergen), insect	biodiversity chapter (page 33)	<a href="https://curriculum.novascotia.ca/sites/default/files/documents/curriculum-files/Biology%2011-12%20Guide%20%282012%29.pdf">https://curriculum.novascotia.ca/sites/default/files/documents/curriculum-files/Biology%2011-12%20Guide%20%282012%29.pdf</a>
Nunavut	Curriculum not accessible on Nunavut Ministry of Education website						<a href="https://www.gov.nu.ca/education/curriculum/database?f%5B0%5D=field_subject%3A1073">https://www.gov.nu.ca/education/curriculum/database?f%5B0%5D=field_subject%3A1073</a>
NWT	Elementary	2004	Big idea: growth and changes in plants	Describe ways in which plants and animals depend on each other (e.g., animals eat plants, animals fertilize plants, animals disperse seeds and pollen); Compare living things to identify the different features that allow them to be transported by wind (e.g., spores, pollen, seeds) (page 27)	Pollen	not found	<a href="https://www.ece.gov.nt.ca/sites/ece/files/resources/k-6_science_technology_curriculum.pdf">https://www.ece.gov.nt.ca/sites/ece/files/resources/k-6_science_technology_curriculum.pdf</a>
			Big idea: organisms can be classified according to their unique characteristics	Compare the characteristics of different kinds of arthropods (crustaceans such as clams and snails, insects such as butterflies, mosquitoes, and bees) (page 32)	Bees, insect		



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<b>NWT</b>			Big idea: growth and changes in animals	identify and describe characteristics of different species (e.g. insects, mammals, reptiles); describe changes in the appearance and activity of an animal as it goes through a complete life cycle (e.g. insect metamorphosis) (page 24)	insect		
	Middle school (7-9)	2014	Investigate life processes and structures of plants, and interpret related characteristics and needs of plants in local environment	describe life cycles of seed plants, and identify example methods used to ensure their germination, growth and reproduction (e.g., describe propagation of plants from seeds and vegetative techniques, such as cuttings; conduct a germination study; describe the use of beehives to support pollination) (page 16)	Pollination, beehive	not found	<a href="https://www.ece.gov.nt.ca/sites/ece/files/resources/pos_science_7_9.pdf">https://www.ece.gov.nt.ca/sites/ece/files/resources/pos_science_7_9.pdf</a>
			identify impacts of human action on species survival and variation within species	describe the relative abundance of species on Earth and in different environments (e.g. note the overall abundance of insect species) (page 53)	Insect		
			analyze and evaluate mechanisms affecting the distribution of potentially harmful substances within an environment	identify and evaluate information and evidence related to an issue in which environmental chemistry plays a major role (e.g. evaluate evidence that the use of insecticides to control mosquitoes has an effect/has no effect on bird populations) (page 63)	insect		
			identify and interpret relationships among human needs, technologies, environments, and the culture and use of living things as sources of food and fibre	intended and unintended consequences of environmental management practices (e.g. susceptibility to insect infestation or loss of diversity) (page 16)	insect		
	Highschool - Grade 10	2014	Not found	not found	Not found	not found	<a href="https://www.ece.gov.nt.ca/sites/ece/files/resources/pos_science_10ab.pdf">https://www.ece.gov.nt.ca/sites/ece/files/resources/pos_science_10ab.pdf</a>
	Highschool - Biology	2014	Not found	not found	Not found	biodiversity: Students will evaluate the impact that human activity has or could have on the biodiversity of an ecosystem: wetlands management, land use, interbasin water transfer, habitat fragmentation, urbanization, slash-and-burn and clearcutting practices, monocultures of forests, lawns, field crops (page 26)	<a href="https://www.ece.gov.nt.ca/sites/ece/files/resources/pos_bio_20_30ab.pdf">https://www.ece.gov.nt.ca/sites/ece/files/resources/pos_bio_20_30ab.pdf</a>



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Ontario	Elementary	2007	describe interrelationships between species and explain how these interrelationships sustain biodiversity. Page 114  describe changes or problems that could result from the loss of some kinds of living things. Page 45  examples of positive and negative impacts humans have on animals. Page 59  identify structures in the natural environment. Page 74	e.g. bees take sustenance from plants and carry pollen between plants  e.g. if we lost all insects  e.g. pesticides used on lawns to kill insects.  e.g. a bee's nest/hive	Bees, pollen  insect  bees, hive, nest	Grade 6: understanding life systems - biodiversity (page 112)	<a href="http://www.edu.gov.on.ca/eng/curriculum/elementary/scientec18currb.pdf">http://www.edu.gov.on.ca/eng/curriculum/elementary/scientec18currb.pdf</a>
	Highschool	2008	Pathogens and disease (page 230)  Compare the various means of sexual reproduction. Page 73	insect-borne disease (page 231), pesticide and insecticide use (page 66, 68)  e.g. pollination	insect  Pollination	biodiversity (page 72, 159, 164, 168, 174, 175, 236)	<a href="http://www.edu.gov.on.ca/eng/curriculum/secondary/2009science11_12.pdf">http://www.edu.gov.on.ca/eng/curriculum/secondary/2009science11_12.pdf</a> <a href="https://curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/curriculum/science/ence_10_core_elab.pdf">https://curriculum.gov.bc.ca/sites/curriculum.gov.bc.ca/files/curriculum/science/ence_10_core_elab.pdf</a>
PEI	Elementary	Unknown	Life cycle of a plant (page 26)  Describe current investigations into local or regional habitat issues (page 32)	Grade 3: The whole sequence of plant growth (germination, sprouting, buds forming, flowering, pollination, fruit/seed growth) can be observed  e.g. the use of pesticides or herbicide sprays, insect infestation, oil pollution, or sewage treatment	Pollination, pollen  Insect	not found	<a href="https://www.princeedwardisland.ca/sites/default/files/publications/eelc_science_3.pdf">https://www.princeedwardisland.ca/sites/default/files/publications/eelc_science_3.pdf</a>  <a href="https://www.princeedwardisland.ca/sites/default/files/publications/eelc_science_4.pdf">https://www.princeedwardisland.ca/sites/default/files/publications/eelc_science_4.pdf</a>
	Highschool - agriscience	2012	Relate to the concepts of breeding, propagation, and selection to production practices (page 66)	The parts and function of the plant responsible for sexual reproduction should be discussed and students should understand the processes of pollination and fertilization of a flowering plant. The importance of seed dispersal and pollen transfer to agricultural practices should be outlined. Students should discuss how production practices could be impacted by changes to these systems (e.g., honey bee decline impacts on fruit crops).	Pollination, honey bee, pollen	biodiversity - 24 classes on chapter (classifying living things, diversity among living things)	<a href="https://www.princeedwardisland.ca/sites/default/files/publications/eelc_agr801a_621a.pdf">https://www.princeedwardisland.ca/sites/default/files/publications/eelc_agr801a_621a.pdf</a>
	Highschool - Biology	2010	Explain why angiosperms are the most diverse plant group (page 50)	To explain the diversity of angiosperms, discussion should include mention of these key factors: 1) the assistance of animals, wind, and water in pollination; 2) the presence of structures in plants specific to attracting certain animal pollinators whom the plants supply with food; 3) the ways in which seeds are protected; 4) the functions of fruits and specialized structures in seed dispersal	Pollination, pollinators		<a href="https://www.princeedwardisland.ca/sites/default/files/publications/eelc_bio521a.pdf">https://www.princeedwardisland.ca/sites/default/files/publications/eelc_bio521a.pdf</a>



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Quebec	Elementary	2009	Reproduction in plants and animals (page 49)	not found	not found	not found	<a href="http://www.education.gouv.qc.ca/fileadmin/site_web/documents/education/jeunes/pfeq/PFEQ_sciences-technologie-primaire_EN.pdf">http://www.education.gouv.qc.ca/fileadmin/site_web/documents/education/jeunes/pfeq/PFEQ_sciences-technologie-primaire_EN.pdf</a>
	Highschool	N/A	Not found	not found	Pollen (referenced as an air contaminant)	biodiversity (page 38, 43)	<a href="http://www.education.gouv.qc.ca/fileadmin/site_web/documents/education/jeunes/pfeq/PFEQ_sciences-environnement_EN.pdf">http://www.education.gouv.qc.ca/fileadmin/site_web/documents/education/jeunes/pfeq/PFEQ_sciences-environnement_EN.pdf</a>
Saskatchewan	Elementary	2011	Analyze the interdependence among plants, individuals, society, and the environment. Page 28	Grade 3: Explain how and why plants are replenished naturally (e.g., forest fires and pollination) and artificially (e.g., tree farms, planting seedlings, and seed banks)	Pollination	Describe examples of plant biodiversity (e.g. trees, shrubs, bushes, herbs, grasses, vines, and mosses), assess the impact of natural and human activities on the biodiversity of plant species	<a href="https://www.edonline.sk.ca/webapps/moe-curriculum-BB5f208b6da4613/CurriculumHome?id=56">https://www.edonline.sk.ca/webapps/moe-curriculum-BB5f208b6da4613/CurriculumHome?id=56</a>
			Analyze the interdependence between soil and living things, including the importance of soil for individuals, society, and all components of the environment. Page 34	examine the interdependence between animals and soil (e.g. grubs and insects live in soil, soil provides shelter for some animals, and earthworms aerate soil)	Insect		
	Highschool - Grade 10	2015	Not found	not found	Not found	Outcomes: climate and ecosystem dynamics: Examine biodiversity through the analysis of interactions among populations within communities	<a href="https://www.edonline.sk.ca/webapps/moe-curriculum-BB5f208b6da4613/CurriculumHome?id=63">https://www.edonline.sk.ca/webapps/moe-curriculum-BB5f208b6da4613/CurriculumHome?id=63</a>
	Highschool - Biology	2016	Not found	not found	Not found	Not found	<a href="https://www.edonline.sk.ca/webapps/moe-curriculum-BB5f208b6da4613/CurriculumHome?id=68">https://www.edonline.sk.ca/webapps/moe-curriculum-BB5f208b6da4613/CurriculumHome?id=68</a>
	Highschool - environmental sciences 20	2016	Analyze the importance of soils as an integral component of terrestrial ecosystems	recognize the role and diversity of organisms (e.g. nitrogen fixing bacteria, fungi, mycorrhizae, insects, plants and protists) (page 35)	Insect	Recognize the need for intact habitat to support biodiversity (page 36), biodiversity in aquatic systems (page 33), the role of legislation and governing bodies in protecting biodiversity (page 36)	<a href="https://www.edonline.sk.ca/webapps/moe-curriculum-BB5f208b6da4613/CurriculumHome?id=73">https://www.edonline.sk.ca/webapps/moe-curriculum-BB5f208b6da4613/CurriculumHome?id=73</a>
			Identify factors that influence plant pollination and reproduction, including the role of integrated pest management. Page 35		Pollination		
Yukon	Yukon follows British Columbia's curriculum with minor changes to include Yukon content						

