CURRICULUM ALIGNMENT – Costs & Benefits of Electricity Generation

Ontario

Grade	Course Name and Number	Strand	Expectations
9	Issues in Canadian Geography, Grade 9 CGC1D	A: Geographic Inquiry and Skill Development	**A2.** Developing Transferable Skills: apply in everyday contexts skills, including spatial technology skills, developed through the investigation of Canadian geography, and identify some careers in which a background in geography might be an asset.
9	Issues in Canadian Geography, Grade 9 CGC1D	C: Managing Canada's Resources and Industries	**C1.** The Sustainability of Resources: analyze impacts of resource policy, resource management, and consumer choices on resource sustainability in Canada.
9	Issues in Canadian Geography, Grade 9 CGC1D	C: Managing Canada's Resources and Industries	**C2.** The Development of Resources: analyze issues related to the distribution, availability and development of natural resources in Canada from a geographic perspective.
9	Issues in Canadian Geography, Grade 9 CGC1D	C: Managing Canada's Resources and Industries	**C2.2** Analyze, from a geographic perspective, issues relating to the development, extraction and management of various natural resources found in Canada.
9	Issues in Canadian Geography, Grade 9 CGC1D	C: Managing Canada's Resources and Industries	**C2.3** Assess the renewability and non-renewability of various natural resources in Canada.
9	Issues in Canadian Geography, Grade 9 CGC1D	C: Managing Canada's Resources and Industries	**C2.4** Assess the feasibility of using selected renewable and alternative energy sources (e.g. solar, wind, tidal, hydro) to augment or replace existing power sources in various parts of Canada.

9	Issues in Canadian Geography, Grade 9 (CGC1P)	A: Geographic Inquiry and Skill Development	**A2.** Developing Transferable Skills: apply in everyday contexts skills, including spatial technology skills, developed through the investigation of Canadian geography, and identify some careers in which a background in geography might be an asset.
9	Issues in Canadian Geography, Grade 9 (CGC1P)	C: Managing Canada's Resources and Industries	**C1.** Managing Resources: assess the influence of personal choices and community actions on the use of natural resources in Canada.
9	Issues in Canadian Geography, Grade 9 (CGC1P)	C: Managing Canada's Resources and Industries	**C2.** Canadian Industries: describe the economic, environmental, social and political significance of selected aspects of Canada's resources and industries.
9	Issues in Canadian Geography, Grade 9 (CGC1P)	C: Managing Canada's Resources and Industries	**C2.1** Assess the value (e.g. in terms of gross national product and other measures, such as numbers employed, contribution to culture and national identity) of various industrial sectors in Canada.
9	Issues in Canadian Geography, Grade 9 (CGC1P)	C: Managing Canada's Resources and Industries	**C2.3** Assess the economic, environmental, social and political significance of a specific industry for their local area or another area of their choice.
9	Issues in Canadian Geography, Grade 9 (CGC1P)	C: Managing Canada's Resources and Industries	**C3.** The Use of Natural Resources: describe the distribution and use of selected natural resources in Canada.
9	Issues in Canadian Geography, Grade 9 (CGC1P)	C: Managing Canada's Resources and Industries	**C3.2** Describe the location, use and importance of selected natural resources, including water resources, that are found in Canada, and compare the availability of these resources with their availability in the rest of the world.

9	Issues in Canadian Geography, Grade 9 (CGC1P)	C: Managing Canada's Resources and Industries	**C3.3** Describe the characteristics (e.g. distribution, accessibility, abundance, sustainability, cost of developing) of various renewable, non-renewable and flow resources that are found in Canada.
9	Issues in Canadian Geography, Grade 9 (CGC1P)	C: Managing Canada's Resources and Industries	**C3.4** Describe how energy is used in Canada (e.g. transportation, residential use, industrial use).
9	Science, Grade 9 (SNC1D)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.3:** Identify and locate print, electronic and human sources that are relevant to research questions.
9	Science, Grade 9 (SNC1D)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.7:** Select, organize and record relevant information on research topics from various sources, including electronic, print, and/or human sources (e.g. Statistics Canada publications, NASA or EnerGuide websites, personal interviews), using recommended formats and an accepted form of academic documentation.
9	Science, Grade 9 (SNC1D)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.10:** Draw conclusions based on inquiry results and research findings, and justify their conclusions.
9	Science, Grade 9 (SNC1D)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.11:** Communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g. data tables, laboratory reports, presentations, debates, simulations, models).
9	Science, Grade 9 (SNC1D)	E. Physics: The Characteristics of Electricity	**Overall Expectation E1:** Assess some of the costs and benefits associated with the production of electrical energy from renewable and non-renewable sources, and analyze how electrical efficiencies and savings can be achieved, through both the design of technological devices and practices in the home.
9	Science, Grade 9 (SNC1D)	E. Physics: The Characteristics of Electricity	**Specific Expectation E1.2:** Assess some of the social, economic and environmental implications of the production of electrical energy in Canada from renewable and non-renewable sources (e.g. wind, solar, hydro, coal, oil, natural gas, nuclear).
9	Science, Grade 9 (SNC1P)	A. Scientific Investigation Skills and Career Development	**Overall Expectation A1:** Demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analyzing and interpreting, and communicating).
9	Science, Grade	A. Scientific Investigation Skills and	**Specific Expectation A1.3:** Identify and locate print, electronic and human sources that

	9 (SNC1P)	Career Development	are relevant to research questions.
9	Science, Grade 9 (SNC1P)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.7:** Select, organize and record relevant information on research topics from various sources, including electronic, print, and/or human sources (e.g. Statistics Canada publications, NASA or EnerGuide websites, personal interviews) using recommended formats and an accepted form of academic documentation.
9	Science, Grade 9 (SNC1P)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.10:** Draw conclusions based on inquiry results and research findings, and justify their conclusions.
9	Science, Grade 9 (SNC1P)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.11:** Communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g. data tables, laboratory reports, presentations, debates, simulations, models).
9	Science, Grade 9 (SNC1P)	E. Physics: Electrical Applications	**Overall Expectation E1:** Assess the major social, economic and environmental costs and benefits of using electrical energy, distinguishing between renewable and non-renewable sources, and propose a plan of action to reduce energy costs.
9	Science, Grade 9 (SNC1P)	E. Physics: Electrical Applications	**Specific Expectation E1.1:** Assess social, economic and environmental costs and benefits of using a renewable and a non-renewable source of electrical energy (e.g. solar, wind, hydro, nuclear, coal, oil, natural gas), taking the issue of sustainability into account.
10	Science, Grade 10 (SNC2P)	A. Scientific Investigation Skills and Career Development	**Overall Expectation A1:** Demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analyzing and interpreting, and communicating).
10	Science, Grade 10 (SNC2P)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.3:** Identify and locate print, electronic and human sources that are relevant to research questions.
10	Science, Grade 10 (SNC2P)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.7:** Select, organize and record relevant information on research topics from various sources, including electronic, print, and/or human sources (e.g. Statistics Canada publications, NASA or EnerGuide websites, personal interviews) using recommended formats and an accepted form of academic documentation.
10	Science, Grade 10 (SNC2P)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.10:** Draw conclusions based on inquiry results and research findings, and justify their conclusions with reference to scientific knowledge.
10	Science, Grade 10 (SNC2P)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.11:** Communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g. data tables, laboratory reports, presentations,

			debates, simulations, models).
10	Science, Grade 10 (SNC2P)	D. Earth and Space Science: Earth's Dynamic Climate	**Overall Expectation D1:** Analyze effects of human activity on climate change and effects of climate change on living things and natural systems.
10	Science, Grade 10 (SNC2P)	D. Earth and Space Science: Earth's Dynamic Climate	**Specific Expectation D1.2:** Analyze ways in which human actions (e.g. burning fossil fuels, implementing tree-planting programs) have increased or decreased the production of greenhouse gases.
11	Physics, Grade 11 (SPH3U)	A. Scientific Investigation Skills and Career Development	**Overall Expectation A1:** Demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analyzing and interpreting, and communicating).
11	Physics, Grade 11 (SPH3U)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.3:** Identify and locate a variety of print and electronic sources that enable them to address research topics fully and appropriately.
11	Physics, Grade 11 (SPH3U)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.7:** Select, organize and record relevant information on research topics from a variety of appropriate sources, including electronic, print, and/or human sources, using suitable formats and an accepted form of academic documentation.
11	Physics, Grade 11 (SPH3U)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.10:** Draw conclusions based on inquiry results and research findings, and justify their conclusions with reference to scientific knowledge.
11	Physics, Grade 11 (SPH3U)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.11:** Communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g. data tables, laboratory reports, presentations, debates, simulations, models).
11	Physics, Grade 11 (SPH3U)	D. Energy and Society	**Specific Expectation D1.2:** Assess, on the basis of research, how technologies related to nuclear, thermal or geothermal energy affect society and the environment (e.g. thermal regulating units, radiopharmaceuticals, dry-steam power plants, ground-source heat pumps).
11	Physics, Grade 11 (SPH3U)	D. Energy and Society	**Overall Expectations F1:** Analyze the social, economic and environmental impact of electrical energy production and technologies related to electromagnetism, and propose ways to improve the sustainability of electrical energy production.

11	Physics, Grade 11 (SPH3U)	F. Electricity and Magnetism	**Specific Expectation F1.2:** Analyze the efficiency and the environmental impact of one type of electrical energy production (e.g. from hydroelectric, fossil fuel–burning, wind, solar, geothermal, or nuclear sources), and propose ways to improve the sustainability of electrical energy production.
11	Environmental Science, Grade 11 (SVN3M)	A. Scientific Investigation Skills and Career Development	**Overall Expectation A1:** demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analyzing and interpreting, and communicating).
11	Environmental Science, Grade 11 (SVN3M)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.3:** Identify and locate a variety of print and electronic sources that enable them to address research topics fully and appropriately.
11	Environmental Science, Grade 11 (SVN3M)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.7:** Select, organize and record relevant information on research topics from a variety of appropriate sources, including electronic, print, and/or human sources, using suitable formats and an accepted form of academic documentation.
11	Environmental Science, Grade 11 (SVN3M)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.10:** Draw conclusions based on inquiry results and research findings, and justify their conclusions with reference to scientific knowledge.
11	Environmental Science, Grade 11 (SVN3M)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.11:** Communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g. data tables, laboratory reports, presentations, debates, simulations, models).
11	Environmental Science, Grade 11 (SVN3M)	B. Scientific Solutions to Contemporary Environmental Challenges	**Overall Expectation B1:** Analyze social and economic issues related to an environmental challenge, and how societal needs influence scientific endeavours related to the environment.
11	Environmental Science, Grade 11 (SVN3M)	B. Scientific Solutions to Contemporary Environmental Challenges	**Specific Expectation B3.1:** Identify some major contemporary environmental challenges (e.g. global warming, acid precipitation), and explain their causes (e.g. deforestation, carbon and sulphur emissions) and effects (e.g. desertification, the creation of environmental refugees, the destruction of aquatic and terrestrial habitats).
11	Environmental Science, Grade 11 (SVN3M)	B. Scientific Solutions to Contemporary Environmental Challenges	**Specific Expectation B3.5:** Describe a variety of human activities that have led to environmental problems (e.g. burning fossil fuels for transportation or power generation; waste disposal) and/or contributed to their solution (e.g. the development of renewable sources of energy; programs to reduce, reuse and recycle).

11	Environmental Science, Grade 11 (SVN3M)	E. Reducing and Managing Waste	**Specific Expectation E1.2:** Evaluate the short- and long-term impact on the environment of a specific type of waste (e.g. waste products from animal farming; plastic shopping bags; tailings from mines).
11	Environmental Science, Grade 11 (SVN3M)	F. Conservation of Energy	**Overall Expectation F1:** Assess the impact on society and the environment of the use of various renewable and non-renewable energy sources and propose a plan to reduce energy consumption.
11	Environmental Science, Grade 11 (SVN3M)	F. Conservation of Energy	**Overall Expectation F3:** Demonstrate an understanding of energy production, consumption and conservation with respect to a variety of renewable and non-renewable sources.
11	Environmental Science, Grade 11 (SVN3M)	F. Conservation of Energy	**Specific Expectation F3.3:** Explain the basic principles and characteristics of various types of renewable (e.g. tidal, geothermal, solar, wind) and non-renewable (e.g. coal, oil, gas) energy production and their impact on the environment.
11	Environmental Science, Grade 11 (SVN3M)	F. Conservation of Energy	**Specific Expectation F3.4:** Describe methods of energy production and conservation intended to reduce greenhouse gas emissions (e.g. energy production methods at the Prince Edward Island Wind-Hydrogen Village; charging higher prices for energy used during peak hours).
11	Environmental Science, Grade 11 (SVN3E)	A. Scientific Investigation Skills and Career Development	**Overall Expectation A1:** Demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analyzing and interpreting, and communicating).
11	Environmental Science, Grade 11 (SVN3E)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.3:** Identify and locate a variety of print and electronic sources that enable them to address research topics fully and appropriately.
11	Environmental Science, Grade 11 (SVN3E)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.7:** Select, organize and record relevant information on research topics from a variety of appropriate sources, including electronic, print, and/or human sources, using suitable formats and an accepted form of academic documentation.
11	Environmental Science, Grade 11 (SVN3E)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.10:** Draw conclusions based on inquiry results and research findings, and justify their conclusions with reference to scientific knowledge.
11	Environmental Science, Grade 11 (SVN3E)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.11:** Communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g. data tables, laboratory reports, presentations, debates, simulations, models).

11	Environmental Science, Grade 11 (SVN3E)	D. Energy Conservation	**Specific Expectation D2.4:** Conduct a risk-benefit analysis of different types of electricity generation (e.g. fossil fuel, hydro, nuclear, wind, and/or solar power).
11	Environmental Science, Grade 11 (SVN3E)	D. Energy Conservation	**Overall Expectation D3:** Demonstrate an understanding of the basic principles of energy production, with reference to both renewable and non-renewable sources, and of various methods of energy conservation.
11	Environmental Science, Grade 11 (SVN3E)	D. Energy Conservation	**Specific Expectation D3.1:** Explain the basic principles and characteristics of various types of power generation from non-renewable sources (e.g. coal, oil, natural gas, nuclear) and renewable sources (e.g. hydroelectric, tidal, geothermal, solar, wind, hydrogen fuel cells).
11	Environmental Science, Grade 11 (SVN3E)	D. Energy Conservation	**Specific Expectation D3.2:** Compare and contrast renewable and non-renewable energy sources, using criteria such as availability, cost and environmental impact (e.g. compare a fossil fuel and geothermal energy, using a graphic organizer).
12	Physics, Grade 12 (SPH4C)	A. Scientific Investigation Skills and Career Development	**Overall Expectation A1:** Demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analyzing and interpreting, and communicating).
12	Physics, Grade 12 (SPH4C)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.3:** Identify and locate a variety of print and electronic sources that enable them to address research topics fully and appropriately.
12	Physics, Grade 12 (SPH4C)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.7:** Select, organize and record relevant information on research topics from a variety of appropriate sources, including electronic, print, and/or human sources, using suitable formats and an accepted form of academic documentation.
12	Physics, Grade 12 (SPH4C)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.10:** Draw conclusions based on inquiry results and research findings, and justify their conclusions with reference to scientific knowledge.
12	Physics, Grade 12 (SPH4C)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.11:** Communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g. data tables, laboratory reports, presentations, debates, simulations, models).
12	Physics, Grade 12 (SPH4C)	E. Energy Transformations	**Specific Expectation E1.1:** Analyze an energy-transformation technology (e.g. wind turbines, refrigerators, telephones, steam engines, coal-fired electrical plants) and evaluate its impact on society and the environment.
12	Physics, Grade	E. Energy Transformations	**Specific Expectation E3.5:** Describe a variety of renewable and non-renewable sources

	12 (SPH4C)		of energy (e.g. solar energy, fossil fuels, hydroelectric energy, energy generated from biomass), and identify the strengths and weaknesses of each.
12	Chemistry, Grade 12 (SCH4U)	A. Scientific Investigation Skills and Career Development	**Overall Expectation A1:** Demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analyzing and interpreting, and communicating).
12	Chemistry, Grade 12 (SCH4U)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.3:** Identify and locate a variety of print and electronic sources that enable them to address research topics fully and appropriately.
12	Chemistry, Grade 12 (SCH4U)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.7:** Select, organize and record relevant information on research topics from a variety of appropriate sources, including electronic, print, and/or human sources, using suitable formats and an accepted form of academic documentation.
12	Chemistry, Grade 12 (SCH4U)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.10:** Draw conclusions based on inquiry results and research findings, and justify their conclusions with reference to scientific knowledge.
12	Chemistry, Grade 12 (SCH4U)	A. Scientific Investigation Skills and Career Development	**Specific Expectation A1.11:** Communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentations, using appropriate language and a variety of formats (e.g. data tables, laboratory reports, presentations, debates, simulations, models).
12	Chemistry, Grade 12 (SCH4U)	D. Energy Changes and Rates of Reactions	**Specific Expectation D1.1:** Analyze some conventional and alternative energy technologies (e.g. fossil fuel–burning power plants, hydro-powered generators, solar panels, wind turbines, fuel cells), and evaluate them in terms of their efficiency and impact on the environment.