

Science

Science Grade 12

Curriculum Map

Topic D: Energy & the Environment

Resources Included: *Academic One File, Global Issues in Context, CBC News in Review, Science in Context, Canada in Context*

Betty-Lou Ayers

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User Guide

Curricular Topic

I. Themes.....	5
II. Overview.....	5
III. Focusing Questions.....	5
IV. Key Concepts.....	5
V. General Outcome 1.....	6

(taken from Alberta Education's Program of Studies)

Section 1: General Topic Reference.....7

Title ([hyperlinked](#)): ORC Database: Brief Description of what is included.

Section 2: Reference.....9

"Title." ([hyperlinked](#)) *Publication:* Author, Publication Date/Info. ORC Database. Date located.

Section 3: Websites.....13

"Title." ([hyperlinked](#)) *Publication:* Author, Publication Date/Info. pg. ORC Database. Date located.

Section 4: Articles.....16

"Title." ([hyperlinked](#)) *Publication:* Publication Date/Info. ORC Database. Date located.

Section 5: Videos.....24

"Title." (hyperlinked) *Publication:* Publication Date/Info. ORC Database. Date located.

Section 6: Experiments.....26

"Title." (hyperlinked) *Publication:* Publication Date/Info. ORC Database. Date located.

Section 7: Audio.....26

"Title." (hyperlinked) *Publication:* Author, Publication Date/Info. ORC Database. Date located.

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Topic D: Energy & the Environment

Themes

Energy and Systems

Overview

Sustainable development requires balancing global energy demands with maintaining a viable biosphere. Students investigate and analyze the sources of renewable and nonrenewable energy and, in doing so, explore the need for multiple perspectives and the need to develop energy-efficient technologies. This unit provides an opportunity for students to address the demand for environmentally sustainable solutions to meet global energy needs.

Focusing Questions

How can Canadians and other members of the international community conserve energy and maintain quality of life? What are the benefits and costs of available nonrenewable energy sources and of developing renewable energy sources? What is our energy future?

Key Concepts: The following concepts are developed in this unit and may also be addressed in other units or in other courses. The intended level and scope of treatment is defined by the learning outcomes.

- global energy consumption and its impact on the biosphere
- sources of renewable energy
- balancing energy use with sustainable development
- conversion of solar energy, fossil fuels and wind and water power into thermal and electrical energy
- fission and fusion, nuclear change
- heats of formation and Hess's law
- nuclear, wind, hydro, biomass, tidal, solar, fuel cell and geothermal alternative energy technologies

General Outcome 1

Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.

Specific Outcomes for Knowledge

Students will:

- compare the energy consumption of contemporary society with that of traditional cultures and precontact Aboriginal societies, and investigate and analyze the exponential growth of global energy consumption in recent history
- compare Canada's per-capita energy consumption with developed and developing countries and identify factors that affect consumption; *e.g., economy, lifestyle, level of technology, geography, climate*
- apply the concept of sustainable development to increasing the efficient use of energy; *e.g., efficient use of energy in the home, in industry and in transportation*
- explain the need to develop technologies that use renewable and nonrenewable energy sources to meet the increasing global demand
- describe the environmental impact of developing and using various energy sources; *i.e., conventional oil, oil sands, solar power, wind power, biomass, hydroelectricity, coal burning power, nuclear power, geothermal*
- describe how the Aboriginal perspective of an interconnected environment demonstrates the need to balance resource extraction with environmental impact.

Section 1: General Topic Reference

[Alberta Oil Sands](#): *Global Issues in Context*: Topic/overview page contains links to global viewpoints, podcasts, primary sources, reference, statistics, websites, academic journals, news and magazine articles.

[Alternative and Renewable Energy](#): *Science in Context*: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.

[Alternative and Renewable Energy](#): *Global Issues in Context*: Topic/overview page contains links to global viewpoints, podcasts, primary sources, reference, statistics, websites, academic journals, news and magazine articles.

[Biofuels](#): *Science in Context*: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.

[Energy](#): *Science in Context*: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.

[Ethanol](#): *Canada in Context*: Topic/definition page contains links to reference articles, biographies, news, magazines, academic journals, images, videos, primary sources, audio, and websites.

[Energy Efficiency](#): *Science in Context*: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.

[Environmental Economics](#): *Science in Context*: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.

[Fossil Fuels](#): *Science in Context*: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.

[Geothermal Energy](#): *Science in Context*: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.

[Green Engineering](#): *Science in Context: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.*

[Hybrid Vehicles](#): *Science in Context: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.*

[Hydroelectric Power](#): *Science in Context: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.*

[Nuclear Energy](#): *Science in Context: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.*

[Nuclear Power](#): *Canada in Context: Topic/definition page contains links to reference articles, biographies, news, magazines, academic journals, images, videos, primary sources, audio, and websites.*

[Photosynthesis](#): *Science in Context: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.*

[Radioactivity](#): *Science in Context: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.*

[Renewable Energy](#): *Canada in Context: Topic/definition page contains links to reference articles, biographies, news, magazines, academic journals, images, videos, primary sources, audio, and websites.*

[Solar Energy](#): *Canada in Context: Topic/definition page contains links to reference articles, biographies, news, magazines, academic journals, images, videos, primary sources, audio, and websites.*

[Solar Energy](#): *Science in Context: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.*

[Sun](#): *Science in Context: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.*

[Sustainability](#): *Science in Context: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.*

[Wind Energy](#): *Science in Context: Topic/definition page contains links to featured content, reference, biographies, images, news, videos, academic journals, magazine articles, and websites.*

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