Canadian Geographic EDUCATION

ENERGY IQ

LEARNING INQUIRIES

ENERGY DEVELOPMENT IN CANADA

TIME: SIX 30-MINUTE CLASSES

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OVERVIEW/FOCUS QUESTION

According to Natural Resources Canada, Canada is the sixth largest producer of energy in the world. The following activities are designed to help students:

- Understand which natural resources are used to produce energy in Canada and to classify these natural resources as either non-renewable or renewable resources;
- Locate where energy sources are produced across the country;
- Identify which energy sources are used to create electricity across the country;
- Identify other uses of energy resources to create other products;
- Compare and contrast the development of one energy source/energy region with another energy source/region in Canada;
- Identify the impacts (positive/negative) energy development has on the natural environment, the local and/or Indigenous populations in various regions, and/or on the local, national and/or international economy.

ACTIVITY #1: RENEWABLE AND NON-RENEWABLE ENERGY RESOURCES

Using the table provided for Activity #1 in the Student Activity Sheets section, classify the different types of energy as non-renewable or renewable energy resources.

RESOURCES:

- https://www.eia.gov/energyexplained/?page=nonrenewable_home
- https://www.nrcan.gc.ca/maps-tools-and-publications/maps/energy-maps/16872
- https://www.nrcan.gc.ca/renewable-energy-facts/20069

ACTIVITY #2: WHERE IN CANADA? ENERGY DEVELOPMENT ACCORDING TO PROVINCE OR TERRITORY

In this activity, students will discover which energy resources are used in which provinces/ territories to produce electricity. Students can use the table in Activity #2 in the Student Activity Sheets section to complete their research.

RESOURCES:

- https://www.nrcan.gc.ca/electricity-facts/20068
- https://electricity.ca/learn/electricity-today/generating-electricity/
- https://energyrates.ca/the-main-electricity-sources-in-canada-by-province/
- https://energyiq.canadiangeographic.ca/energy-map/
- https://energyiq.canadiangeographic.ca/resources/canada-factbook/

ACTIVITY #3: TURNING THE LIGHTS ON – A SNAPSHOT OF ELECTRICITY PRODUCTION ACROSS CANADA

For this activity, students will research the top three energy resources used in each province and territory in Canada to produce electricity. Students can use the table for Activity #3 in the Student Activity Sheets section to complete their research. Use the following questions to guide students in their research:

1. Which provinces/territories in Canada produce most of their electricity from non-renewable resources?
2. Which provinces/territories in Canada produce most of their electricity from renewable resources?

RESOURCES:

- https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/index-eng.html
- https://energyiq.canadiangeographic.ca/energy-map/
- https://energyiq.canadiangeographic.ca/resources/canada-factbook/

ACTIVITY #4: WHAT DO WE GET FROM REFINED PETROLEUM PRODUCTS?

Oil is more than just an energy source, many of the items we used in our day-to-day lives come from refined petroleum products, which are made from oil. In this activity, students will explore what items they use on a day-to-day basis that rely on the oil industry.

Have students create a document (e.g., booklet, pamphlet, poster, slide presentation) advertising 10 different items that we use every day that are made from petroleum products. They must explain how each item is manufactured and what it is used for and include an image of the item.

RESOURCES:

- https://www.nrcan.gc.ca/petroleum-products-facts/20065
- https://www.innovativewealth.com/inflation-monitor/what-products-made-from-petroleum-outside-of-gasoline/
- https://oilandgasinfo.ca/patchworks/products-made-from-oil-gas-part-1/
- http://www.geography-site.co.uk/pages/citizenship/oil_products.html

ACTIVITY #5: COMPARING ENERGY-PRODUCING REGIONS – ALBERTA VERSUS QUEBEC

Part 1: Students will compare two energy-producing regions in Canada: oilsands development in Alberta versus hydroelectric development in Quebec.

Have students use the table for Activity #5 in the Student Activity Sheets section to compare and contrast hydroelectric development in Quebec versus oilsands development in Alberta.

Part 2: For further inquiry, have students consider the following questions:

- Who is responsible for developing energy resources in the province of Alberta?
- What is the advantage/disadvantage for different companies to be involved in oilsands production in Alberta?
- What role do the Indigenous People of Alberta play in energy development?
- What issues have arisen over land use by energy companies and/or the provincial government in Alberta in relation to traditional Indigenous land?
- What are the oil companies of Alberta doing to reduce their impact on the environment? What new technologies are in development and/or been implemented to lower GHG emissions?
- What are the oilsands companies of Alberta doing to reduce their impact on the environment?
- Oilsands are often seen as a highly polluting energy source, but is that truly the case? What strategies are the oilsands companies implementing to change the image that oilsands have in the rest of Canada?
- Who is responsible for developing energy resources in the province of Quebec?
- What is the advantage/disadvantage to Hydro Quebec having a monopoly on hydroelectric development in Quebec?
- What role did the Cree living in the James Bay area have in the development of Hydro Quebec's facilities in the region?

- What land claim agreements have been negotiated between the provincial government of Quebec and the Indigenous groups affected by hydroelectric development in northern Quebec?
- What are some strategies that are being implemented to reduce our energy consumption and in particular the consumption of non-renewable energy sources?
- What strategies has Hydro Quebec implemented to limit the company's impact on the environment when it comes to providing electricity to the population of Quebec?

RESOURCES:

- https://energyiq.canadiangeographic.ca/resources/quebec-factbook/
- http://www.hydroquebec.com/about/our-energy.html
- https://mern.gouv.qc.ca/en/energy/
- https://www.alberta.ca/energy.aspx
- https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/ab-eng.html
- https://energyiq.canadiangeographic.ca/resources/alberta-factbook/
- https://saveonenergy.ca/
- http://www.hydroquebec.com/residential/
- https://www.nrcan.gc.ca/energy-and-greenhouse-gas-emissions-ghgs/20063
- https://www.alberta.ca/oil-sands-facts-and-statistics.aspx
- https://www.capp.ca/canadian-oil-and-natural-gas/oil-sands
- https://www.hydroquebec.com/sustainable-development/our-approach.html
- https://www.cbc.ca/archives/topic/the-james-bay-project-and-the-cree

STUDENT ACTIVITY SHEETS

ACTIVITY #1 RENEWABLE AND NON-RENEWABLE ENERGY RESOURCES

Using the table below, classify the different types of energy as non-renewable or renewable energy resources.

- Coal
- Hydro
- Oil
- Natural Gas
- Solar
- Wind
- Tidal
- Nuclear
- Biomass

NON-RENEWABLE RESOURCES	RENEWABLE RESOURCES

RESOURCES:

- https://www.eia.gov/energyexplained/?page=nonrenewable_home
- https://www.nrcan.gc.ca/maps-tools-and-publications/maps/energy-maps/16872
- https://www.nrcan.gc.ca/renewable-energy-facts/20069

ACTIVITY #2 WHERE IN CANADA? ENERGY DEVELOPMENT ACCORDING TO PROVINCE OR TERRITORY

Which energy resources are used in which provinces/territories to produce electricity?

ENERGY SOURCE	PROVINCE/TERRITORY		
Hydropower			
Nuclear			
Wind			
Biomass			
Natural Gas			
Oil			
Solar			
Coal			
Tidal			

RESOURCES:

- https://www.nrcan.gc.ca/electricity-facts/20068
- https://electricity.ca/learn/electricity-today/generating-electricity/
- https://energyrates.ca/the-main-electricity-sources-in-canada-by-province/
- https://energyiq.canadiangeographic.ca/energy-map/
- https://energyiq.canadiangeographic.ca/resources/canada-factbook/

ACTIVITY #3 TURNING THE LIGHTS ON – A SNAPSHOT OF ELECTRICITY PRODUCTION ACROSS CANADA

Complete the following table by researching the top three energy resources used in each province and territory in Canada to produce electricity.

PROVINCE/TERRITORY	ENERGY RESOURCES		
British Columbia			
Alberta			
Saskatchewan			
Manitoba			
Ontario			
Quebec			
New Brunswick			
Prince Edward Island			
Nova Scotia			
Newfoundland and Labrador			
Nunavut			
Northwest Territories			
Yukon			

RESOURCES:

- https://energyiq.canadiangeographic.ca/energy-map/
- https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/index-eng.html
- https://energyiq.canadiangeographic.ca/resources/canada-factbook/

ACTIVITY #5 COMPARING ENERGY-PRODUCING REGIONS ALBERTA VERSUS QUEBEC

Part 1: Compare and contrast hydroelectric development in Quebec versus oilsands development in Alberta.

	ALBERTA	QUEBEC
Province population		
Primary type of energy produced		
Location of resource in province		
Extraction process		
Infrastructure required for resource development		
Primary use for energy resource		
Related industries		
Method of transportation		

	ALBERTA	QUEBEC
Other energy resources needed		
Other energy resources produced		
Company (or main companies) that provides energy		
Energy sector contribution to national economy		
Provincial GHG emissions for industry		
Impact on environment		
Impact on economy		
Impact on Indigenous communities/groups		
Land development issues		