

Energy4Me STEM Teacher Workshop

Canadian Science Standards Represented

Alberta

Time	Agenda Item	Grade Level / Course																		
		K	1	2	3	4	5	6	7	8	9	10	Biology	Chemistry	Physics	Science 14-24	Science 20-30			
8:15	Science of Energy		1-9	2-1, 2-8, 2-9	3-1, 3-2	4-1, 4-2	5-2, 5-5	6-2, 6-8	7C-3					10A-1 and 10A-3**** (station 2), 10B-2	9B-2 (station 2), 9D-1	20.A1-1k †	30A-1, 30A-2, and 30B-2 (stations 2 and 5)‡	20B-2 (station 1 as intro); 20D-2 (station 3 as app); 30C-2 (station 3 as intro)	24A-2 (Station 2), 24B-1, 24B-2	20A-2 (Station 5 as intro)
9:30	Energy Roundup																			
12:15	Introduction to Oil and Gas								7C-1										24B-4	20A-3
12:45	Porosity		1-9	2-1	3-1, 3-2, 3-5	4-1, 4-2	5-2	6-2	7E-2						9C-3 **					20C-1
	Sound Waves		1-9	2-1	3-1, 3-2, 3-9	4-1, 4-2	5-2	6-2, 6-8										20D-2 as application		
	Density		1-9	2-1, 2-5, 2-7	3-1, 3-2	4-1, 4-2	5-2	6-2		8A-1										
	Cartesian Diver		1-9	2-1	3-1, 3-2	4-1, 4-2	5-2	6-2												
2:00	Core Sampling		1-9	2-1	3-1, 3-2, 3-5	4-1, 4-2	5-2	6-2, 6-8	7E-1, 7E-2, 7E-3											20C-1
	Perforated Well Casing		1-9	2-1	3-1, 3-2	4-1, 4-2	5-2	6-2	7E-1	8A-1, 8A-4									24B-4	
	Oil Seeps		1-9	2-1, 2-5	3-1, 3-2	4-1, 4-2	5-2	6-2, 6-8	7E-1	8E-4 *									24B-4	30B-2
	Getting the Oil Out		1-9	2-1	3-1, 3-2	4-1, 4-2	5-2	6-2											24B-4	

* Oil Seeps is a good activity introducing the impacts that offshore oil production can have on marine environments, but is not in itself a human activity-related subject

** Porosity is a good activity introducing the mechanisms of substance transfer within the environment, but does not address the harmfulness of substances

*** Science of Energy station 2 is good for introducing chemical reactions and thermochemistry, but does not provide more than two examples of chemical reactions

† Science of Energy is good for introducing energy transformations and heat loss in all transformations, but does not extend to the biosphere

‡ Science of Energy stations 2 and 5 are good introductions to thermochemistry and electrochemistry, respectively.

1–9 Use the senses to make general and specific observations, and communicate observations orally and by producing captioned pictures.

2–1 Investigate, with guidance, the nature of things, demonstrating an understanding of the procedures followed.

2–5 Describe some properties of water and other liquids, and recognize the importance of water to living and nonliving things.

2–7 Construct objects that will float on and move through water, and evaluate various designs for watercraft (introduction to density)

2–8 Describe the interaction of magnets with other magnets and with common materials.

2–9 Recognize the effects of heating and cooling, and identify methods for heating and cooling.

3–1 Investigate the nature of things, demonstrating purposeful action that leads to observations and inferences.

3–2 Identify patterns and order in objects and events studied; and, with guidance, record observations, using pictures, words and charts; and make predictions and generalizations, based on observations.

3–5 Demonstrate knowledge of materials that comprise Earth’s crust, and demonstrate skill in classifying these materials.

3–9 Describe the nature of sound, and demonstrate methods for producing and controlling sound.

4–1 Investigate the nature of things, demonstrating purposeful action that leads to inferences supported by observations.

4–2 Identify patterns and order in objects and events studied; and record observations, using pictures, words and charts, with guidance in the construction of charts; and make predictions and generalizations, based on observations.

5–2 Recognize the importance of accuracy in observation and measurement; and, with guidance, apply suitable methods to record, compile, interpret and evaluate observations and measurements.

5–5 Demonstrate safe methods for the study of magnetism and electricity, identify methods for measurement and control, and apply techniques for evaluating magnetic and electrical properties of materials.

6–2 Recognize the importance of accuracy in observation and measurement; and apply suitable methods to record, compile, interpret and evaluate observations and measurements.

6–8 Apply observation and inference skills to recognize and interpret patterns and to distinguish a specific pattern from a group of similar patterns.

7C-1 Illustrate and explain how human needs have led to technologies for obtaining and controlling thermal energy and to increased use of energy resources

7C-3 Apply an understanding of heat and temperature in interpreting natural phenomena and technological devices

7E-1 Describe and demonstrate methods used in the scientific study of Earth and in observing and interpreting its component materials

7E-2 Identify evidence for the rock cycle, and use the rock cycle concept to interpret and explain the characteristics of particular rocks

7E-3 Investigate and interpret evidence of major changes in landforms and the rock layers that underlie them

8A-1 Investigate and describe fluids used in technological devices and everyday materials

8A-4 Identify, interpret and apply technologies based on properties of fluids

8E-4 Analyze human impacts on aquatic systems; and identify the roles of science and technology in addressing related questions, problems and issues

9B-2 Describe and interpret patterns in chemical reactions

9C-3 Analyze and evaluate mechanisms affecting the distribution of potentially harmful substances within an environment

9D-1 Investigate and interpret the use of devices to convert various forms of energy to electrical energy, and electrical energy to other forms of energy

10A-1 Describe the basic particles that make up the underlying structure of matter, and investigate related technologies

10A-3 Identify and classify chemical changes, and write word and balanced chemical equations for significant chemical reactions, as applications of Lavoisier’s law of conservation of mass

10B-2 Explain and apply concepts used in theoretical and practical measures of energy in mechanical systems

20A-2 Explain oxidation, reduction and spontaneity and apply this knowledge to voltaic and electrolytic cells and to industrial processes

20A-3 Describe the properties of simple hydrocarbons and describe hydrocarbon-based industrial processes that are important in Alberta

20C-1 Analyze the scientific evidence and explanations for geologic phenomena that occurred long ago or are taking place over a long period of time

30B-2 Analyze the sources of organic compounds and their effects on the environment

24A-2 Investigate and classify chemical reactions

24B-1 Investigate and interpret transformation and conservation of various forms of energy in physical and technological systems

24B-2 Investigate and analyze electrical energy conversion devices in terms of energy conversions, rate of energy transfer and efficiency

24B-4 Analyze and describe the impact of fossil fuel based technologies and their importance in meeting human needs

Bio20.A1-1k Explain, in general terms, the one-way flow of energy through the biosphere and how stored energy in the biosphere, as a system, is eventually “lost” as heat

Chem30A-1 Determine and interpret energy changes in chemical reactions

Chem30A-2 Explain and communicate energy changes in chemical reactions.

Chem30B-2 Apply the principles of oxidation-reduction to electrochemical cells.

Phys20B-2 Explain that gravitational effects extend throughout the universe.

Phys20D-2 Describe the properties of mechanical waves and explain how mechanical waves transmit energy

Phys30C-2 Explain the photoelectric effect, using the quantum model.