

### **Focusing Questions:**

What heat-related technologies do we use to meet human needs?
What scientific principles are these technologies based on?
What implications do these technologies have for sustainable use of resources?

Heat-related Technology	Science Principle	Implication for Sustainability		
	L			
Guiding Question	ons and Activities to Help you Stud	y Key Concepts		
Topic 1 Thermal Energy				
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Can you identify how Thermal Energy	is used?			
How is temperature <b>measured</b> ?				
now is temperature measureu:				
Identify the following relative temperate	tures:			
freezing water	°C boilin	g water°C		
noozing water		<u></u> 0		
	00			
normal body temperature	°C comfortable ro	om temperature°C		
Topic 2 Measuring Temperature - Technological devices and systems using Thermal Energy				
What is a thermocouple?				
what is a thermocouple!				



What is a bimetallic strip?
What is a recording thermometer?
What is an infrared <b>thermogram</b> ?
Topic 3 The Particle Model of Matter  What are the 4 key points addressed in the Particle Model of Matter?
Explain how gas particles can be <b>compressed</b> and what happens to the volume of the gas.
What <b>properties</b> distinguish solids, liquids and gases?
Define Thermal Energy, Heat and Temperature in terms of the Particle Theory.  Thermal Energy
Heat
Temperature



#### **Topic 4** Thermal Expansion and Contraction

Describe <b>expansion</b> and <b>o</b>	contraction of solids lig	uids and gases in	terms of the Particle Model.
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Expansion
Contraction
Why are two different metals used to make a thermocouple and a thermostat (bimetallic strip)?

<u>Topic 5</u> Changes of State: melting, freezing, vaporization, condensation and sublimation

Describe the Changes of State and the terminology when a substance undergoes a specific change.

Melting	
Freezing	GAS .
Evaporation	Sillis Silver Start of Containing the Containing of Containing the Containing of Containing the Containing of Containing the C
Condensation	solid freezing (also called solidification)  LIQUID
Sublimation	



#### **Topic 6** Energy Transfer Systems

Explain, using an operational definition, the differences between conduction, convection and radiation - in terms of energy transfer. Conduction \_\_\_\_\_ Convection \_\_\_\_\_ Radiation \_\_\_\_\_ Describe how a convection current is created. Illustration How is **energy transferred** differently in solids than it is in gases and liquids? What are the five common characteristics that are involved in all energy transfer systems?



<u>Topic 7</u> Sources of Thermal Energy: Advantages and disadvantages of using Fossil Fuels Thermal Pollution Greenhouse Effect

Describe the **impacts** different energy sources have on the environment.

Thermal Energy Source	Impact on th	ne Environment
chemical		
electrical		
mechanical		
nuclear		
geothermal		
solar		
wind		
tidal		
fossil fuels		
Alberta's main source of energy is <b>Fossil Fuels</b> . Describe this energy resource in terms of its abundance and importance to Albertans.		
Describe what happens to cre	eate the <b>Greenhouse Effect</b> .	- Illustration -
		-



What is <b>Thermal Pollution</b> and what causes it?	
Topic 8 Conservation Technologies and Strategies to help us Conservation	ve Fossil Fuels and make their Use Safer.
Provide an operational definition of <b>cogeneration</b> .	
Describe technologies and practices that conserve fossil fuel resource	s.
How does a programmable thermostat work?	
What is an <b>ENERGUIDE</b> label and what does it tell the consumer?	Illustration of EnerGuide label
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