

## Heat and Temperature Review

**What heat-related technologies do we use to meet human needs, based on what scientific principles?**

**What implications do these technologies have for sustainable use of resources?**

**Key Concepts**  
**(Unit At A Glance Science Focus 7**  
**p. 262)**  
**Links to Topic Notes provided**

**Guiding Questions and Activities to Help you Study**

**Topic 1**

Thermal Energy usage  
 Measuring temperature

- Can you identify how Thermal Energy is used?
- How is temperature measured?
- What is the relative temperature of freezing water, boiling water, normal body temperature and comfortable room temperature?

**Topic 2**

**Technological devices and systems using Thermal Energy**

- What is a thermocouple, a bimetallic strip, a recording thermometer and a infrared thermogram?

**Topic 3**

The **Particle Model of Matter**  
 Compressibility of solids, liquids and gases  
 Properties of solids, liquids and gases  
 Thermal Energy, heat and temperature

- What are the key points addressed in the **Particle Model of Matter**?
- Explain how gas particles can be compressed and what happens to the volume of the gas.
- What properties distinguish solids, liquids and gases?
- Define Thermal Energy, Heat and Temperature in terms of the **Particle Theory**.

**Topic 4**

Thermal expansion and contraction  
 Thermometers and Thermostats.

- Describe expansion and contraction of solids liquids and gases in terms of the **Particle Model**
- Why are two different metals used to make a thermocouple and a thermostat (bimetallic strip)?

**Topic 5**

Changes of state: melting, freezing, vaporization, condensation and sublimation

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

**Topic 6**

Energy transfer systems consist of an energy source; direction of energy transfer; control systems; and waste heat.

- Explain, using an operational definition, the differences between conduction, convection and radiation - in terms of energy transfer.
- Describe what creates a convection current.
- 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?

**Topic 7****Sources of Thermal Energy:**

chemical, electrical, mechanical, nuclear, geothermal, solar, wind and fossil fuels.

Advantages and disadvantages of using Fossil Fuels

Thermal Pollution

Greenhouse Effect

- Describe the impacts different energy sources have on the environment.
- The **Green Solution** involves using alternative energy. Why is it called the **Green Solution** and what positive impacts does it have on the environment?
- Alberta's main source of energy is Fossil Fuels. Describe this energy resource in terms of its abundance and importance to Albertans.
- Describe what happens to create the **Greenhouse Effect**.
- What is Thermal Pollution and what causes it?

**Topic 8**

Conservation technologies and strategies to help us conserve fossil fuels and make their use safer.

- Provide an operational definition of cogeneration.
- Describe technologies and practices that conserve fossil fuel resources
- How does a programmable thermostat work?
- What is an **ENERGUIDE**? What does this label tell the consumer?

**Design a Concept Map linking the ideas introduced and reinforced in this Unit on Heat and Temperature**

Try some of the **Practice Quizzes on Edquest.ca** to see how much you have recalled from this Unit

**These Internet links may help you find out more information about the key concepts from this Unit.**

- [heat energy needs and technologies](#)
- [change of state](#)
- [thermal energy](#)
- [heat transfer](#)
- [particle model \(matter\)](#)
- [insulation and thermal conductivity](#)
- [temperature](#)
- [thermal energy sources](#)
- [thermal expansion](#)
- [energy conservation \(energy efficiency ratings\)](#)