

# 4

## Temperature and Heat Flow

### LESSON PLAN

#### SPECIFIC OBJECTIVES

The students will learn about

- ✧ temperature
- ✧ thermometer and how to read it
- ✧ laboratory thermometer and its structure
- ✧ clinical thermometer, its structure and use
- ✧ precautions taken while using a thermometer
- ✧ heat and its transfer
- ✧ convection: land and sea breezes
- ✧ radiation: choice of colours in our lives

#### TEACHING AIDS

**Pictures/charts/models/animations** on laboratory thermometer, clinical thermometer, conduction, convection and radiation of heat.

#### LESSON PLAN

- ✧ The teacher should start the chapter with introductory discussion on heat and energy.
- ✧ The teacher should define the concept of temperature and its measuring instrument, i.e., thermometer.
- ✧ The teacher should describe the concept of hot and cold bodies with the help of Activity 1.
- ✧ The teacher should discuss different scales used to measure temperature and the interconversion of temperature on these scales.
- ✧ The teacher should discuss the method of reading a thermometer.
- ✧ The teacher should describe the structure of a laboratory thermometer.
- ✧ The teacher should also discuss the method to measure the temperature using a laboratory thermometer by demonstrating Activity 2.
- ✧ The teacher should also discuss the precautions taken while using a laboratory thermometer.

- ✧ Now, the teacher should describe the structure of a clinical thermometer and its use to measure human body temperature and the precautions taken while using it.
- ✧ The teacher should demonstrate Activity 3 in the class and then ask students to use a clinical thermometer to measure their body temperature.
- ✧ Students should be asked to solve ‘Check Point 1’.
- ✧ Now, the teacher should define heat flow and its three modes.
- ✧ The teacher should describe heat flow by conduction in different solid substances by performing Activities 4 and 5.
- ✧ The teacher should describe good and poor conductors of heat and their uses in everyday life.
- ✧ Now, teacher should describe flow of heat by convection with the help of Activity 6.
- ✧ The teacher should discuss heat flow by convection in air by demonstrating Activity 7.
- ✧ The teacher should discuss the convection currents in nature by explaining the formation of sea breeze and land breeze.
- ✧ The teacher should discuss the applications of convection currents in everyday life.
- ✧ Now, the teacher should define radiation and thermal radiation.
- ✧ The teacher should describe that dark bodies are good absorber and good absorbers are good radiators.
- ✧ The teacher should explain the fact that choice of colour for different objects in our life is based on the amount of heat absorbed or radiated out by the colour of the objects. The teacher should give various examples from everyday life.
- ✧ Students should be asked to solve ‘Check Points’ 2, 3 and 4.
- ✧ The teacher will help the students to solve all the questions given in exercises under the head ‘Let’s Drill Our Skills’ and to complete the flowchart given under the head ‘Let’s Memorise’.

### **BOOST UP**

- ✧ The teacher should make students learn the method of measuring body temperature.
- ✧ The teacher should encourage students to observe various forms of transformation of energy in everyday life.
- ✧ Students should be asked to obtain body temperature on both the scales.
- ✧ Students should be asked to tell two-three examples each of poor and good conductors of heat. They should also be asked to tell the differences between sea and land breezes.

### **EXPECTED LEARNING OUTCOMES**

The students know about

- ✧ concept of heat and its transformation.
- ✧ hotness and coldness.
- ✧ temperature and measuring temperature with a thermometer.

- ✧ scales of temperature measurement and their interconversion.
- ✧ structure and uses of clinical and laboratory thermometers.
- ✧ precautions while handling thermometers.
- ✧ flow of heat.
- ✧ modes of heat flow, i.e., conduction, convection and radiation.
- ✧ poor and good conductors of heat.
- ✧ convection, convection currents, sea breeze and land breeze.
- ✧ radiation and choice of colours in our life.

### **EVALUATIVE QUESTIONS**

The teacher may ask the following questions for evaluating the understanding of students.

1. Define heat.
2. Is heat energy transformed into mechanical energy in a steam engine?
3. Which instrument is used to measure the human body temperature?
4. Mention the differences between clinical and laboratory thermometers.
5. Write the human body temperature in both Celsius and Fahrenheit scales.
6. Mention few precautions while handling a clinical thermometer.
7. Write the differences between poor and good conductors of heat. Give their two examples.
8. Mention the differences between land and sea breezes.