

# Chapter 5

## Heat

### LESSON PLAN

#### SPECIFIC OBJECTIVES

Students will learn about

- ❖ basic introduction to feeling of hot and cold, and temperature
- ❖ heat as a form of energy
- ❖ units of heat
- ❖ temperature
- ❖ thermometer
- ❖ temperature scales and relation between them
- ❖ effects of heat
- ❖ transfer of heat
- ❖ conduction, i.e., conductors and insulators and their applications
- ❖ convection and its applications
- ❖ radiation and its applications
- ❖ thermos flask (Dewar flask)

#### Teaching Aids

Pictures/charts/models/animation based on heat and its effects; pictures of all three temperature scales; pictures related to conduction, convection and radiation, and their applications; picture of thermos flask.

#### Teaching Strategy

- ❖ The teacher should ask the students to study feeling of hot and cold in brief, and temperature; heat as a form of energy, i.e., thermal energy. He/She should ask the students to study units of heat and relation between calorie and joule; temperature and its related activity 1 showing to measure the temperature by sense of touch given at page 74; thermometer and related question-answer given at page 74.
- ❖ The teacher should ask the students to study marking of upper and lower fixed points on a

thermometer and discuss the reason why mercury is used in thermometer. He/She should also ask the students to learn question-answer related to Fahrenheit.

- ❖ The teacher should ask the students to learn something more, temperature scales and relation between these three temperature scales and related numerical examples given at pages 76-77.
- ❖ Students should be asked to solve check point 1 given at page 77.
- ❖ Students should be encouraged to study effects of heat; definition of thermal expansion or thermal contraction, change in state and related question-answer and illustrations given at page 78, and chemical change and related diagram.
- ❖ The teacher should ask the students to solve check point 2 given at page 79.
- ❖ The teacher should teach the students about transfer of heat through conduction, convection and radiation and their details, activity 2 showing the conduction of heat in metals given at page 79; conductors and insulators with definition and examples; activity 3 related to conductor and matter in screen given at page 80, something more, activity 4 and activity 5 related to insulator given at page 81.
- ❖ Students should be encouraged to learn applications of good and bad conductors of heat and discuss about both of them for taking few objects. They should be asked to solve check point 3 given at page 83. They should also be asked to study convection, related question-answer, what happens during convection, related activities 6, 7 and 8 given at pages 83-84 and application of convection, i.e., land and sea breezes, something more given at page 85.
- ❖ Students should be asked to solve check point 4 given at page 85. They should be asked to study radiation; absorption and reflection of thermal radiation, and to discuss why black bodies are good absorbers and radiators of heat with the help of activities 9 and 10 respectively given at page 86. They should also be asked to study applications of radiation and related question-answer; thermos flask (Dewar flask) and to learn Table 5.1 showing differences between conduction, convection and radiation.
- ❖ The teacher should ask the students to solve check point 5 given at page 88. He/She should ask the students to recap the chapter with the help of wrapping it up and know these terms. He/She should also ask the students to answer the questions given in test yourself and discuss the think zone given in it.

### Boost UP

- ❖ The teacher should ask each student of the class one-by-one to define heat and tell its units. He/She should also ask each student to establish the relation between joule and calorie.
- ❖ Students should be asked to tell the definition of temperature, its SI unit and its measuring instrument. They should be asked to convert the value of one temperature scale into other temperature scale.
- ❖ Students should be queried about the topics effects of state; thermal expansion or contraction.
- ❖ The teacher should ask each student of the class to tell the three ways through which heat transfers. He/She should ask the students to define conduction; to tell one insulator and one conductor orally. He/She should also arise few questions to the students related to convection and radiation and their application, and thermos flask.

## Expected Learning Outcomes

Students will be able to know the

- ❖ feeling of hot and cold, and temperature.
- ❖ heat as a form of energy, i.e., thermal energy.
- ❖ units of heat.
- ❖ definition of temperature, its SI unit and measuring instrument.
- ❖ Three temperature scales and relation between them.
- ❖ effects of heat, i.e., change in temperature, thermal expansion/contraction, change in state, chemical change.
- ❖ transfer of heat, i.e., conduction, convection and radiation.
- ❖ details of conduction, differences between conductors and insulators, and its applications.
- ❖ applications of good and bad conductors of heat.
- ❖ detail of convection and its applications, i.e., sea and land breezes.
- ❖ detail of radiation; absorption and reflection of thermal radiation; applications of radiation.
- ❖ thermos flask (Dewar flask).
- ❖ differences between conduction, convection and radiation.

## Evaluative Questions

The teacher should ask the following questions to evaluate the students.

1. Define heat and write its SI unit.
2. Define temperature.
3. Name the instrument used to measure the temperature.
4. Establish the relation between Celsius, Fahrenheit and Kelvin scales.
5. What is meant by thermal expansion?
6. Mention two examples each of conductors and insulators.
7. What is the difference between convection and radiation?
8. How does sea breeze occur?