Class – VII

Lesson Plan (2023-24)

Subject- Science

Topic: Flow of heat

KPI DEFINITION ADDRESSED TO THE LESSON PLAN
KPI 1- To strengthen in- depth understanding of some complex scientific concepts
KPI 2- Enhancing analytical thinking and observation skill in order to establish connectivity with the real world situation and compare the different physical quantities.
KPI 3- Application of scientific concepts in doing experiments

Brief Description of the lesson: In this chapter students will be taught about different modes of transfer of heat.
This topic emphasizes on the the various modes of transfer of heat i.e conduction, convection and radiation. It also tells about the conductors and insulators. By this the learner would be able to apply the concept to the applications of materials as conductors and insulators I their daily life.

Objectives:

I - Specific Objectives

To enable the students to-

1) Categorize a given substance as hot & cold by touching and by finding temperature.(Comparing-U)
2) Differentiate conduction, convection and radiation. (Comparing-U)
3) Recall their previous knowledge that what is heat and its effects, temperature and what are the condition required for the transfer of heat. (Recalling- K)
4) Comprehend about the different modes of transfer of heat. (Explaining-U)
5) Explain the construction and working of thermoflask. (Explaining-U)
6) Know the uses of good and bad conductors of heat.(Recalling-K)
7) Exemplify the daily life applications of modes of transfer of heat such as sea breeze and land breeze, formation of wind, heating of water, thermos flask

II - Behavioural Objectives
To enable the students to:

1) Remember the complex scientific concepts

2) Identify conduction as heat transfer within and between solids, convection as heat transfer involving gases or liquids, radiation as heat transfer carried by little packets of energy that can travel through almost any material—even empty space .

3) The student will distinguish between temperature and heat.
4) Measure the temperature by using clinical thermometer and laboratory thermometer efficiently. (Executing-Ap)

5) Take safety measures before and after using the thermometer. (Executing-Ap)

6) Implement smart techniques for maintaining the temperature of the house without using coolers and heaters. (Implementing-Ap)

7) Select suitable materials according to the need of time.(Differentiating- An)

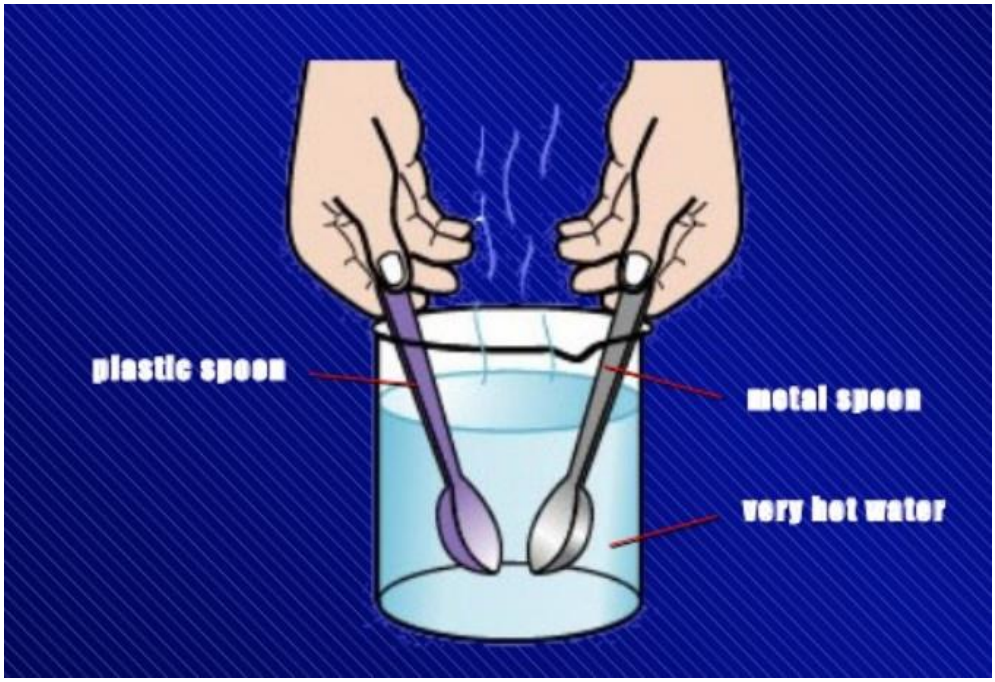
8) Correlate the modes of transfer of heat to the usage of different clothes in different parts of the world (Polar, temperature, tropical, etc.). (Organizing- An)

Process / Activities

Activity1 (To introduce conductors and insulators)
To show that metal is a good conductor and plastic is a bad conductors of heat

We take a beaker and fill it half with hot water. Let us take two spoons, one made of metal and the other of plastic. Place the metal spoon and the plastic spoon in the beaker containing hot water. After two minutes, we touch the top ends of both the spoons.

We find that the top end of metal spoon feels quite hot but the top end of plastic spoon does not feel hot. This is because heat from the hot water flows easily through the metal spoon and reaches its other end. But the heat does not flow easily through the plastic spoon. Thus activity tells us that metal spoon is a good conductor of heat whereas plastic spoon is a poor conductor of heat.



The students will be enabled to understand the concept and use of conductors and insulators.

Activity 2 (To introduce the convection current): -

Take a round bottom flask . Fill it with water. Place it on a tripod stand. Place a crystal of potassium permanganate at the bottom of the flask . Now, heat the water by placing the candle just below the stand.

When water is heated, the water near the flame gets hot. Hot water rises up. The cold water from the sides moves down .This water also gets hot and rises and water from the sides moves down. This process continues till the whole water gets heated. This mode of heat transfer is known as convection.

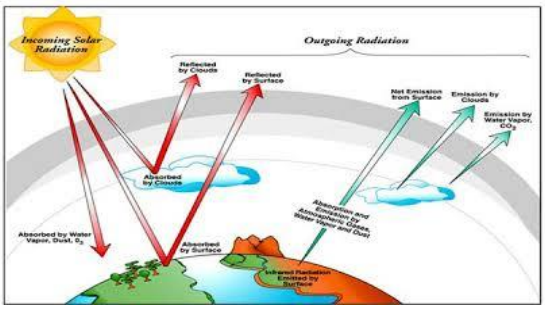
Convection of heat in water

The students will be enabled to understand the convection current through more examples such as sea breeze and land breeze

To introduce the concept of radiation .

Heat always travels from hotter objects to cooler objects in three ways.

- Radiation!
- Heat transfer by electromagnetic waves. Examples include the sun, a campfire, microwave oven or nuclear radiation. Similar to the sun, the Earth gives off or radiates heat. Do living things radiate heat?



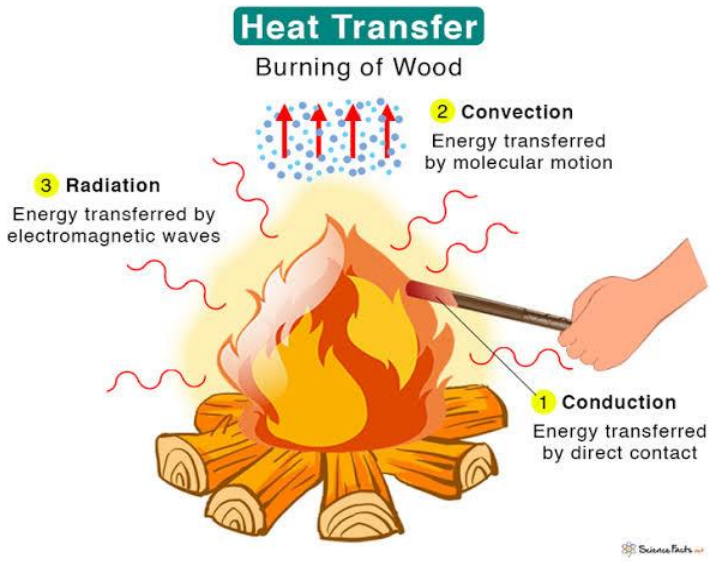
Expected Learning Outcomes
Students will be able to

1. Know about the condition for the transfer of heat and identify the direction of heat on the basis of their temperatures. (Recalling-K)
2. Identify the various modes of transfer of heat in their daily life experiences. (Recognizing-K)
3. Compare the different types of thermometer and select the most suitable one as per the requirement.(Differentiating-An)
4. Select colour of clothes according to season. Thus they give more preference to comfort rather than fashion.(Checking-Ev)
5. Appreciate the use thermos flask in order to maintain the temperature of liquid kept in it. (Executing-Ap)
6. Use clinical thermometer and the digital thermometer available at their home and study their features. (Executing-Ap)
7. Express one scale of temperature into another. (Interpreting-U)
8. Students can select thermometer on the basis of purpose of use.
9. Construct their own devices based on the transfer of heat. (Producing-SY)
10. Check for the essential steps to be taken for energy conservation by implementing the smart techniques of maintaining temperature based on the concept of heat transfer.(Checking-Ev)

ASSESSMENT ACTIVITY (CONVECTION IN AIR)

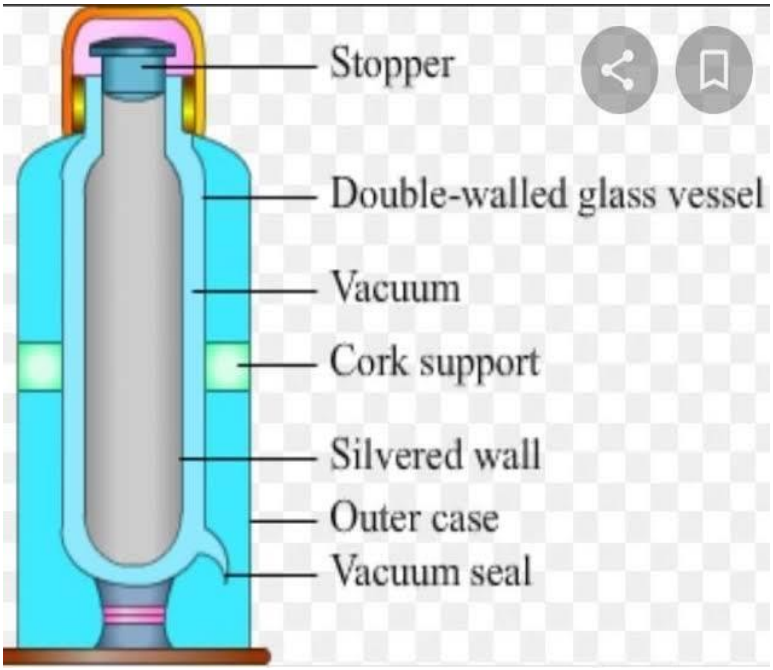
Light a candle. Keep one hand above the flame and one hand on the side of the flame. Do your hands feel equally hot? If not which hand feels hotter? And why? Notice that towards the top, the air gets heated by convection. Therefore, the hand above the flame feels hot. On the sides, however, there is no convection and air does not feel as hot as at the tradiation

To compare between conduction, convection and radiation.



Video demonstration on modes of transfer of heat
https://youtu.be/Me60Ti0E_rY

Demonstration of videos showing thethermoflask model construction followed by model making by students (Group Activity)



Video demonstration

https://youtu.be/lvyCe0UaqJY

On the basis of students' performance in the class test, practice sheet and assignment assessment will be done.

Review of the Lesson Plan: To be done when the lesson gets over

Problems faced –
Success-
Failure-
Real Learning Outcomes-
Students Response / Participation-
Teachers Learning to be added.

Placement of Objectives, Instructional Activities and Assessment
TOPIC/START DATE/ASSESSMENT

KNOWLEDGE	UNDERSTANDING	APPLICATION	ANALYSIS	SYNTHESIS	EVALUATION
S3, S4	S2 S5	S4 S5 S S7 B4 ,B5	B1, B8		