BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI – 110034
SUBJECT: SCIENCE
CHAPTER: HEAT

GUIDELINES:
Dear Students
-There is only **one Assignment**.
-Assignment: Based on **Radiation, Kind of clothes we wear in Summer and Winter.**
- Do the assignment in the Science notebook.

-**Video links** have been provided for better understanding of the concept through visuals. Watch the videos carefully as these will help you do the assignment.

- Read the lesson from the **NCERT textbook** also (page no.- 43,44)

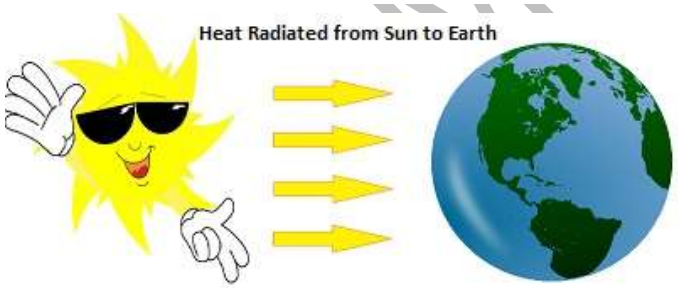
-**Link for lesson**: - http://ncert.nic.in/textbook/textbook.htm?gesc1=4-19

SUB TOPICS:

- **Radiation**
- **Types of clothes we wear in summer and winter**

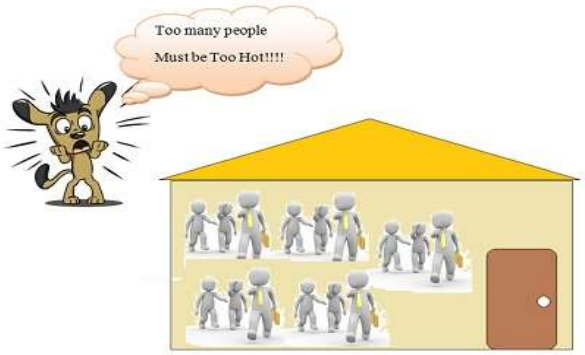
Radiation

- The heat given off from the sun cannot reach us by the process of conduction or convection because both the processes require a medium to transfer the heat but due to the absence of a medium such as air in maximum layers of space between the earth and the sun, these processes cannot transfer the heat to the earth.



- At this moment, another process called **radiation** comes into act to transfer the heat radiated by the sun to the earth.
- This heat transferring process **doesn't require any medium**.
- Not only the sun, but all hot bodies radiate heat, which can propagate through a medium or even in vacuum.
- **For example** when you keep your hand close to a standing hot iron you feel hot, it is due to the heat radiated by hot iron.
- Similarly when you keep your hand near a candle sideways, you feel hot because of the heat radiated by the candle.

- Heating of room by a room heater, cooling down of hot utensils when kept away from heat is all due to radiation.
- Human body releases heat to the surroundings and receives heat from it through the process of radiation. This can be proved using a simple example. You feel quite comfortable in a room with one person but if the same room has many people you feel hot due to the radiation of heat from the human body.



- All hot bodies radiate heat which falls on the nearby objects. The objects absorb some part of heat, reflect some part of heat and transmit some part of the heat falling on them. The temperature of the object increases due to the absorbed part of the heat.
- Dark colours are good absorbers of heat whereas light colours reflect most of the heat.
- Good absorbers of heat are also good heat radiators.

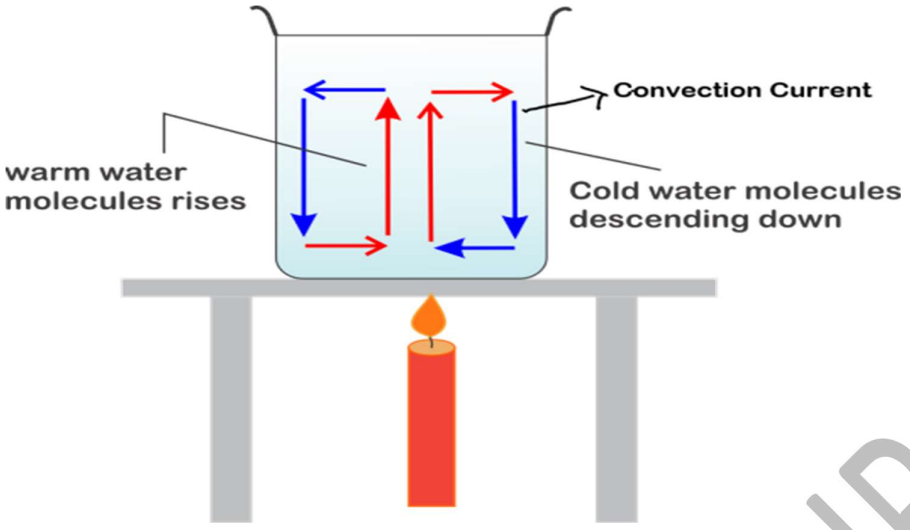
ACTIVITY: TO SHOW THAT DARK COLOURS ARE GOOD ABSORBERS OF HEAT

Take two identical tin cans. Paint the outer surface of one with black paint and of the other with white. Pour equal amounts of water in each and leave them in the mid-day sun for about an hour. Measure the temperature of water in both the cans. Do you find any difference in the temperatures? In which can is the water warmer? You can feel the difference even by touching the water in the two cans.

ACTIVITY: TO SHOW THAT DARK COLOURS ARE GOOD RADIATORS OF HEAT

Fill the same two cans used in above activity with the same amount of hot water at the same temperature (say, at 60^{o}C). Leave the cans in a room or in the shade. Note the temperature of water after 10–15 minutes. Does the temperature of water in both the cans fall by the same amount?
You will observe that water in the can painted black cools down faster.

EXAMPLE SHOWING ALL THREE MODES OF HEAT TRANSFER



Consider the above figure that shows heating of water in a pot. Here in this process, all three modes of heat transfer can be seen.

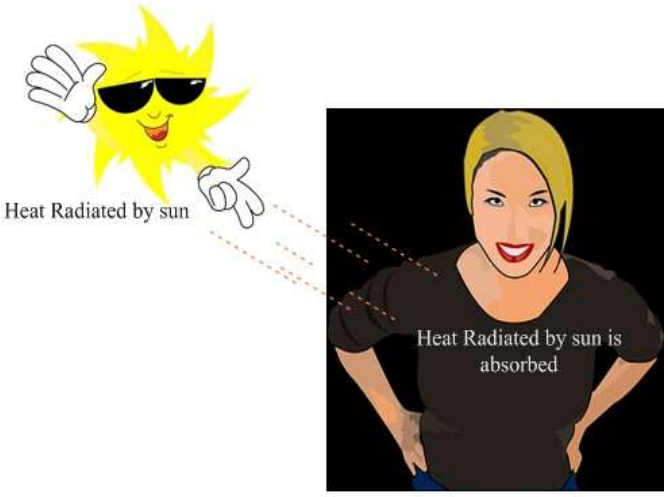
i. Pot is kept over the burner. In this case, heat is transferred to the pot by **conduction**
ii. Water in the pot gets heated by **convection**
iii. If you place your hand at a short distance from the burner, you can feel its heat on your hand. This means burner is transferring heat to the hand by **radiation**.

KINDS OF CLOTHES WE WEAR IN SUMMER AND WINTER

Reasons to wear white or light-coloured clothes in summer and dark-coloured and woollen clothes in winter

- **Light colours are the best reflectors of heat falling on them** and as a result light coloured clothes reflect maximum amount of heat they receive and makes us feel cool to some extent and hence we feel more comfortable wearing them in the summer.

- But on the other hand **dark colours are good absorbers of heat falling on them** and as a result the dark coloured clothes absorb maximum amount of heat they receive and makes us feel warm and comfortable during winter.



- **Winter season is also accompanied with woollen clothes**. This is due to the reason that wool being a poor conductor of heat traps the air in between the woollen fibres. The trapped air prevents the flow of heat from our body to the cold surroundings and vice versa thereby making us feel warm.

NOTE: For Better understanding, kindly go through the **video links** given below:

- https://www.youtube.com/watch?v=ae0iBDcvZ1U
- https://www.youtube.com/watch?v=DD828CfMbnc

ASSIGNMENT

Q1 Shopkeepers selling ice blocks usually cover them with jute sacks. Explain why.

Q2 Why is the box of solar cooker painted black from inside?

Q3 Why do iceboxes have a double wall?

Q4 A hot utensil kept away from the flame cools down. How?

Q5 Black objects absorb more heat than white or polished ones. Give two daily uses of this principle.

Q6 In places with hot climate, it is advised that the outer walls of houses be painted white. Explain why?

Q7 Why are cloudy nights warmer than clear nights?

Q8 How do the feathers of a bird protect it from the cold?