

Class 7 Solutions Science Chapter 7 Heat Transfer in Nature

Let Us Enhance Our Learning

Q1 (i): Your father bought a saucepan made of two different materials, A and B. The materials A and B have the following properties —

- (a) Both A and B are good conductors of heat
- (b) Both A and B are poor conductors of heat
- (c) A is a good conductor and B is a poor conductor of heat
- (d) A is a poor conductor and B is a good conductor of heat

Ans: (c) A is a good conductor and B is a poor conductor of heat

Explanation: Saucepans usually have metal bases (good conductors) for heating and handles made of plastic or wood (poor conductors) to prevent burns.



(ii): Pins are stuck to a metal strip with wax and a burning candle is kept below the strip. Which of the following will happen?

- (a) All the pins will fall almost at the same time
- (b) Pins I and II will fall earlier than pins III and IV
- (c) Pins I and II will fall later than pins III and IV
- (d) Pins II and III will fall almost at the same time

Ans: (b) Pins I and II will fall earlier than pins III and IV

Explanation: Heat travels from the heated end to the other end via conduction. The pins near the flame fall first as the wax melts.

(iii): A smoke detector is a device that detects smoke and sounds an alarm. Where should it be placed in a room?

- (a) Near the floor
- (b) In the middle of a wall
- (c) On the ceiling
- (d) Anywhere in the room

Ans: (c) On the ceiling

Explanation: Smoke rises up due to convection, so detectors must be placed at the highest



point.



Smoke alarms beep loudly when there is a fire

Q2: A shopkeeper serves you cold lassi in a tumbler that has a leak. You are given another tumbler to place it in. Will this help keep the lassi cold for longer? Explain.

Ans: Yes, it will help.

Explanation: The air between the two tumblers acts as an insulator (a poor conductor of heat) and slows down the heat transfer from outside.

Q3 (i): Heat transfer takes place in solids through convection.

Ans: False

Reason: In solids, heat transfer happens through conduction, not convection.

(ii): Heat transfer through convection takes place by the actual movement of particles.

Ans: True

Reason: In convection, particles of liquids and gases move to transfer heat.

(iii): Areas with clay materials allow more seepage of water than those with sandy materials.

Ans: False

Reason: Clay has smaller pores than sand, so it allows less seepage.

(iv): The movement of cooler air from land to sea is called land breeze.

Ans: True

Reason: At night, land cools faster, and cooler air moves towards the sea.

Q4: Some ice cubes placed in a dish melt into water after some time. Where do they get heat for this transformation?

Ans: When ice cubes are placed in a dish, they start to **melt** and turn into water. For this transformation to happen, the ice needs to absorb **heat energy**.



- The ice cubes get heat from the surrounding environment.

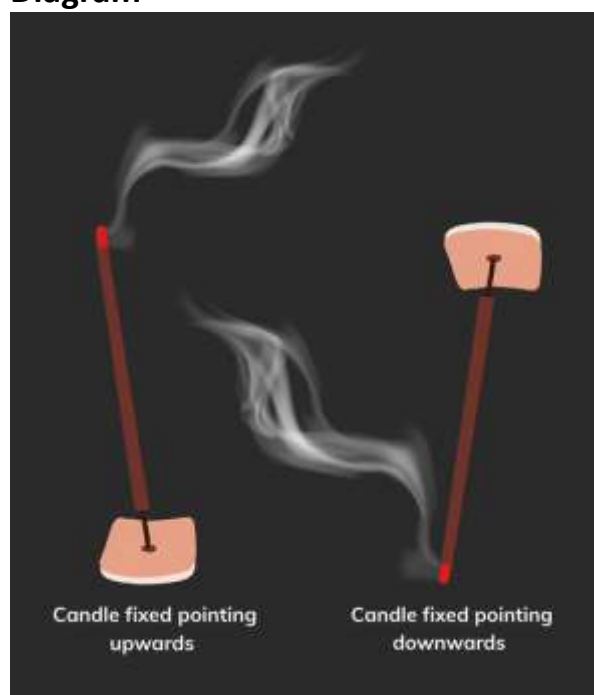
- This includes heat from the **air** around them, the **surface of the dish**, and even the **table** they are placed on.
- The heat causes the ice to melt and change into water.
- This heat makes the ice melt and turn into water.

Q5: A burning incense stick is fixed pointing downwards. In which direction would the smoke move? Show with a diagram.

Ans: When an incense stick is burning and fixed pointing downwards, the smoke will move **upwards**. This happens because smoke rises due to **convection**.

As the incense stick burns, it heats the air around it, making the air less dense. The cooler, denser air pushes the hot air (and smoke) upward. So, even if the incense stick is pointing downwards, the smoke will still rise.

Diagram



Q6: Two test tubes with water are heated by a candle. Which thermometer (Fig. 7.16a or Fig. 7.16b) will show a higher temperature? Why?

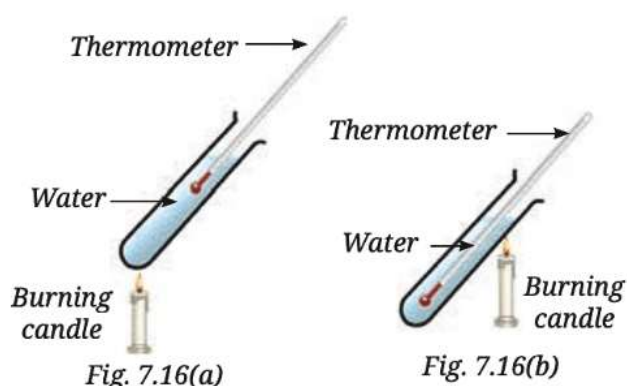


Fig. 7.16: Two thermometers dipped in two test tubes

Ans: In the given experiment, the test tube in **Fig. 7.16(b)**, where the thermometer is closer to the flame, will show a higher temperature.

When water is heated by the candle, it becomes hot at the bottom of the test tube. The hot water rises because it is less dense than the cooler water. This movement of water from the bottom to the top is called **convection**.

Now, let's look at both test tubes:

- **In Fig. 7.16(a):** The thermometer is placed higher up, away from the hot water. It does not measure the rising hot water directly. So, it will show a lower temperature.
- **In Fig. 7.16(b):** The thermometer is placed in the area where the hot water is rising. Since the hot water is directly in contact with the thermometer, it will measure the higher temperature.

Therefore, the thermometer in **Fig. 7.16(b)** will show a higher temperature.

Q7: Why are hollow bricks used to construct the outer walls of houses in hot regions?

Ans: Hollow bricks are used because they trap **air** inside the spaces between the bricks. Air is a **poor conductor of heat**, meaning it does not allow heat to pass through easily. This helps to **reduce heat transfer** from the outside to the inside of the house. As a result, the house stays **cooler** in hot regions, as less heat enters through the walls.

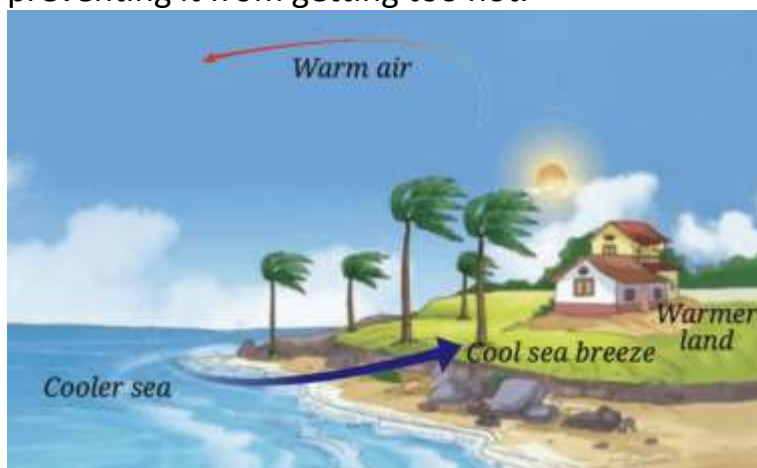


Q8: How do large water bodies prevent extreme temperatures in nearby areas?

Ans: Large water bodies, such as oceans and seas, help **prevent extreme temperatures** in nearby areas through the **sea and land breeze** effect.

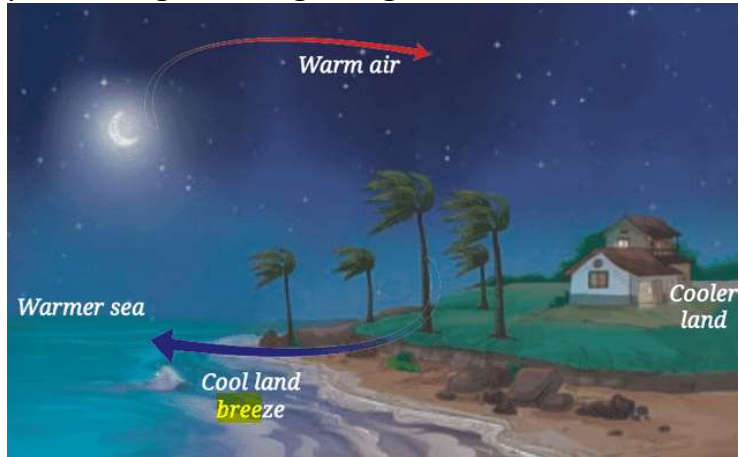
Sea Breeze:

- During the day, the land heats up faster than the water.
- The air over the **land** becomes warmer and rises, while the air over the **sea** remains cooler.
- The cooler air from the sea then moves towards the land, creating a **sea breeze**.
- This cool air from the sea helps **lower the temperature of the land** near the water, preventing it from getting too hot.



Land Breeze:

- During the night, land cools down faster than water.
- The air over the **land** becomes cooler and denser, while the air over the **sea** remains warmer.
- As a result, the cooler air from the land moves towards the sea, creating a **land breeze**.
- Thus at night, the water retains heat longer and warms the surrounding air, preventing it from getting too cold.



Q9: How does water seep through the surface of the Earth and get stored as groundwater?

Ans: Water seep through the surface of the Earth :

- When it rains, water falls to the ground and moves through the **soil** and **rocks**. This process is called **infiltration**.
- The water travels down through the layers of soil and rocks, filling the gaps and spaces between them. **Storage in aquifers:**
- Eventually, the water reaches underground layers called **aquifers**, which are large areas of rock or soil that can hold water. These aquifers store the water as **groundwater**.

Thus, water seeps through the soil and rocks into the ground, where it gets stored as **groundwater**.

Q10: The water cycle helps in the redistribution and replenishment of water on the Earth. Justify.

Ans: The **water cycle** helps move and refill water on Earth in the following ways:

1. Evaporation and Transpiration: Water from lakes, rivers, and oceans turns into vapor (gas) because of the Sun's heat. Plants also release water into the air through their leaves. This water vapor rises into the air.

2. Condensation: As the water vapor goes up, it cools down and forms clouds.



3. Precipitation: When the clouds get heavy, water falls back to Earth as **rain, snow, or hail**, giving water back to rivers, lakes, and the ground.

4. Infiltration and Runoff: Some water soaks into the ground to refill underground water sources. The rest flows over the land into oceans and lakes.

Thus, water cycle helps **move water** around the planet and **refill** water sources, keeping water available for plants, animals, and humans.