

CLASS 7

SCIENCE

NCERT SOLUTIONS

## NCERT Solutions for Class 7 Science Chapter 7: Heat Transfer in Nature – Curiosity

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Complete NCERT Solutions for Class 7 Science Chapter 7 "Heat Transfer in Nature" from the Curiosity textbook, covering conduction, convection, radiation, sea/land breezes, water infiltration, and the water cycle.

### Contents

In-Text Questions

Exercise Questions

Chapter Activities

Complete NCERT Solutions for Class 7 Science Chapter 7 “Heat Transfer in Nature” from the Curiosity textbook, covering conduction, convection, radiation, sea/land breezes, water infiltration, and the water cycle.

## In-Text Questions

**Q1. How does heat get transferred in metal cooking utensils?**

**Answer:** Through **conduction**, where a heated particle passes heat to its neighbouring particles one after another, while the particles themselves stay fixed in position.

**Q2. Identify good/poor conductors:** Steel = **Good conductor**; Wood = **Poor conductor**; Plastic = **Poor conductor**; Bakelite = **Poor conductor**; Aluminium = **Good conductor**.

**Q3. Why does smoke rise upward?**

**Answer:** Hot air rises because, through **convection**, heated air becomes lighter than the surrounding cooler air, so the smoke (carried by this rising hot air) moves upward.

**Q4. How does heat transfer occur in liquids? Do liquids rise when heated, like air?**

**Answer:** When water is heated at the bottom of a container, it expands, becomes lighter, and rises; cooler, heavier water then moves down to take its place. This is **convection**, and yes, liquids rise when heated, just like air.

**Q5. How does heat from a fire reach us?**

**Answer:** Through **radiation** — heat energy radiates outward to the surroundings without needing any medium to travel through.

**Q6. How does water seep through the surface of the Earth?**

**Answer:** Through a process called **infiltration**, where water seeps through soil (sand, gravel, or clay) and gets stored in the pore spaces of sediments and rock openings known as **aquifers**.

## Exercise Questions

**Q1. Choose the correct option:**

(i) A saucepan made of two materials A and B — **Answer: (c) A is a good conductor and B is a poor conductor of heat.**

(ii) Pins stuck with wax on a metal strip heated at one end — **Answer: (d) Pins II and III will fall almost at the same time.**

(iii) Best location for a smoke detector — **Answer: (c) On the ceiling** (since smoke rises via convection, it reaches the ceiling first).

**Q2. Placing a leaky tumbler of cold lassi inside another tumbler — does this help keep it cold longer?**

**Answer:** Yes. The trapped air between the two tumblers acts as an insulator (since air is a poor conductor of heat), reducing heat transfer from the surroundings into the lassi and keeping it cool for longer.

### Q3. True or False:

Heat transfer in solids happens through convection. — **False**: it happens through **conduction**.

Convection involves actual movement of particles. — **True**

Clay allows more water seepage than sandy materials. — **False**: materials with larger particles/pores, like **gravel**, allow more seepage than sand or clay.

The movement of cooler air from land to sea is called land breeze. — **True**

### Q4. Ice cubes melt into water after some time. Where does the heat for this transformation come from?

**Answer:** The ice absorbs heat from its surroundings (the surrounding air and the surface it rests on), and this absorbed heat melts the ice into water.

### Q5. Which direction does smoke move from a downward-pointing incense stick?

**Answer:** The smoke moves **upward**, because it consists of hot gases and fine particles; since hot air rises through convection, the smoke rises regardless of which direction the stick points.

### Q6. Two test tubes heated by a candle, with thermometers placed differently — which records a higher temperature?

**Answer:** The thermometer placed at the **top** of a test tube heated from the bottom records the higher temperature, because heated water at the bottom rises via convection, carrying heat upward to the thermometer quickly. A thermometer at the bottom of a side-heated tube receives heat less effectively.

### Q7. Why are hollow bricks used for outer walls in hot regions?

**Answer:** The air trapped inside the hollow bricks acts as an insulator (being a poor conductor of heat), reducing heat transfer into the house and keeping the interior cooler.

### Q8. How do large water bodies prevent extreme temperatures nearby?

**Answer:** During the day, land heats faster than water, so cooler air from the sea flows toward land (**sea breeze**), moderating land temperature. At night, land cools faster than water, so cooler land air flows toward the (relatively warmer) sea (**land breeze**). This continuous exchange helps moderate temperature extremes in coastal areas.

### Q9. How does water seep through the Earth's surface and become groundwater?

**Answer:** Water gradually passes through soil and porous rock in a process called **infiltration**. It fills pores and cracks in rocks and soil, accumulating underground as groundwater; the water-storing rock/sediment layers are called **aquifers**.

### Q10. How does the water cycle help redistribute and replenish water on Earth?

**Answer:** Water evaporates from oceans, rivers, and lakes due to the Sun's heat, condenses into clouds, and falls back as precipitation (rain or snow). This continuous cycle refills lakes, rivers, and groundwater, ensuring water remains continuously available across the Earth.

## Chapter Activities

### Activity 7.1: Falling pins on a heated metal strip

Pin I (closest to the candle) fell first as the wax nearest the flame melted quickest; Pins II and III fell next in order as heat conducted along the strip; Pin IV (farthest) fell last. **Conclusion:** heat transfers from the hot end of the strip to the colder end via conduction.

### Activity 7.2: Convection with cups and a candle

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The cup placed over a burning candle rises, because the air near the candle (inside the cup) heats up, expands, and becomes lighter, causing it to rise — demonstrating convection in air.

### Activity 7.3: Convection in heated water

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When heat is applied to water containing a coloured streak, the colour moves upward through the middle and comes back down along the sides. **Conclusion:** heated water at the bottom expands, becomes lighter, and rises; cooler water from the sides moves down to replace it — this convection cycle continues until the entire volume is heated. Water, like air, is heated through convection.

### Activity 7.4: Comparing soil and water heating

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When soil and water are placed in sunlight and their temperatures measured after the same period, soil shows a greater temperature rise than water. **Conclusion:** soil heats up faster than water.

### Activity 7.5: Comparing seepage through clay, sand, and gravel

| Material | Seepage rate |
|----------|--------------|
| Clay     | Very slow    |
| Sand     | Slow         |
| Gravel   | Fast         |

**Conclusion:** the spaces (pores) between gravel particles are much larger than those in sand or clay, so water passes through gravel fastest. Clay has the smallest particles and pores, so water seeps through it slowest. Seepage rate depends on particle size and the spacing between particles.

Extra Questions: [Class 7 Science Chapter 7](#)

Revision Notes: [Class 7 Science Chapter 7](#)