CLASS 7 SCIENCE · 2026-27

Heat and its transfer

Heat

31	25	3
QUESTIONS	MINUTES	EXERCISES

This belongs to _____ Date _____

WHAT YOU'LL GET GOOD AT

- Distinguishes conduction, convection and radiation and gives the reason
- Explains why some materials are conductors and others insulators
- Reads and compares a clinical and a laboratory thermometer
- Explains an everyday observation in terms of heat transfer

Take your time, and have a go at every one. If you get stuck, look at the orange box — Ollie has already done one for you.

Heat and its transfer

Heat · 31 questions · tick each box as you finish

Exercise 1 of 3 · 10 questions Which mode of heat transfer, and why that one?

WRITE THE ANSWER

HERE'S ONE DONE FOR YOU

The steel spoon -> conduction, because the heat travels through the solid metal from the hot end to the cooler end. The mode is the easy half. Naming what is carrying the heat - a solid, a moving fluid, or nothing at all - is the half that is marked, and it is the half children leave out.

1) The handle of a steel spoon left in hot tea becomes warm

2) Water at the top of a pan gets hot although the flame is below

3) You feel warm standing near a fire without touching it

4) The heat of the Sun reaching the Earth

5) A room warming up when a heater is switched on

6) The bottom of a kettle becoming hot before the water does

7) Air near a hot radiator rising towards the ceiling

8) Feeling the heat of a bonfire on your face

9) A metal chair feeling colder than a wooden one in the same room

10) Warm air escaping through an open window at the top of a room

Exercise 2 of 3 · 12 questions

Conductor or insulator? One sentence saying how you know.

WRITE THE ANSWER

HERE'S ONE DONE FOR YOU

Wool is an insulator - and the reason is worth getting right. Wool itself is not especially remarkable; what keeps you warm is the air trapped between its fibres, and air is a poor conductor. A child who says 'wool is warm' has described the effect rather than explained it.

1) Copper

2) Wood

3) Air

4) Aluminium

5) Wool

6) Plastic

7) Silver

8) Cotton cloth

9) Iron

10) Glass

11) Water

12) Brass

Exercise 3 of 3 · 9 questions Explain in two or three sentences.

WRITE THE ANSWER

HERE'S ONE DONE FOR YOU

Two thin blankets: the trapped layer of air between them is a poor conductor, so body heat escapes more slowly than through one thick blanket. Notice that the answer is not about thickness at all - it is about the air. Nearly every 'why is this warmer' question in this chapter has trapped air as the answer, and spotting that pattern is worth more than remembering five separate explanations.

1) Why do we wear light-coloured clothes in summer?

2) Why are two thin blankets warmer than one thick blanket?

3) Why is the space between the two walls of a thermos flask emptied of air?

4) Why does a sea breeze blow from the sea towards the land during the day?

5) Why does a clinical thermometer have a much shorter range than a laboratory one?

6) Why are cooking pans given wooden or plastic handles?

7) Why is a land breeze the opposite of a sea breeze?

8) Why does a woollen sweater keep you warm even though wool itself gives out no heat?

9) Why should a clinical thermometer never be held by its bulb?

All done? How did that feel?

Colour in a star. Three stars means you could teach it to someone else.

☆ ☆ ☆ Tricky · Getting there · Easy now

Answer key

For grown-ups

Heat and its transfer · keep this page back until your child has finished.

1. Which mode of heat transfer, and why that one?

1) Conduction, because the heat travels through the solid metal from the hot end to the cooler end.
2) Convection, because the heated water rises and the cooler water sinks, setting up a current that carries heat through the liquid.
3) Radiation, because the heat reaches you directly without heating the air in between.
4) Radiation, because there is no material medium in space, and radiation is the only mode that does not need one.
5) Mainly convection - the warmed air rises and cooler air moves in - with some radiation from the heater itself.
6) Conduction, because heat passes through the solid metal base directly from the flame.
7) Convection, because the warmed air becomes lighter and rises while cooler air sinks to replace it.
8) Radiation, because the heat travels to you directly without needing the air in between to carry it.
9) Conduction, because metal conducts heat away from your skin far faster than wood does, so it feels colder at the same temperature.
10) Convection, because the warm air is lighter and rises, carrying heat out with it.

2. Conductor or insulator? One sentence saying how you know.

1) Conductor. Metals let heat pass through them easily, which is why pans are made of them.
2) Insulator. Heat passes through it very slowly, which is why wooden handles and ladles stay cool.
3) Insulator. Air is a poor conductor, which is why trapped air keeps things warm.
4) Conductor. It is a metal, and heat travels through it quickly.
5) Insulator. Wool traps a lot of air, and it is the trapped air that keeps the heat in.
6) Insulator. It does not let heat pass easily, which is why handles and switches are made of it.
7) Conductor. It is the best metallic conductor of heat, though it is too costly for everyday use.
8) Insulator. It traps air between its fibres, and it is that trapped air that slows the heat.
9) Conductor. It is a metal and heat passes through it readily.
10) Insulator. Heat travels through glass slowly, which is why a glass handle does not get hot quickly.
11) A poor conductor. Water conducts heat badly, which is why it is heated mainly by convection currents.
12) Conductor. It is an alloy of metals, so heat travels through it easily.

3. Explain in two or three sentences.

1) Because light colours reflect most of the heat radiation falling on them, while dark colours absorb it. Less heat is absorbed, so we feel cooler.

2) Because a layer of air is trapped between them, and air is a poor conductor of heat. That trapped layer slows the escape of body heat more than the extra thickness alone would.

3) Because a vacuum has no material in it, and both conduction and convection need a medium to travel through. Removing the air stops heat entering or leaving by either mode.

4) Because land heats up faster than the sea during the day. The warm air over the land rises, and cooler air from over the sea moves in to take its place - which is the breeze.

5) Because it only ever measures human body temperature, so a range of about 35°C to 42°C is enough. A laboratory thermometer has to measure a much wider range, from below 0°C to above 100°C.

6) Because the pan itself must be a good conductor to cook the food, but the handle must not be, or it would burn the hand. Wood and plastic are insulators, so they stay cool.

7) Because at night the land cools faster than the sea. The warmer air over the sea now rises and cooler air from the land moves out to take its place, so the breeze blows the other way.

8) Because it traps a layer of air in its fibres, and air is a poor conductor. That trapped air slows the escape of the heat your own body is producing.

9) Because the hand's own warmth would pass into the bulb and raise the reading. It should be held by the stem, well away from the mercury or the sensing tip.

WHILE YOUR CHILD WORKS

- Ask 'what is carrying the heat?' every time. A solid means conduction, a moving liquid or gas means convection, nothing at all means radiation.
- Trapped air explains most of this chapter - blankets, sweaters, birds fluffing their feathers, double walls. Say it once and the chapter halves.
- This is the easiest Class 7 chapter to make real. A spoon in hot water, a dark cloth and a white cloth in the sun - five minutes each.