

Heat, Physical and Chemical Changes

Science · Class 7 · Topic-wise Practice Worksheet

TIME 45 minutes	QUESTIONS 18	TOTAL MARKS 24	MAX. SCORE ___ / 24
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Name: _____ Class/Sec: _____ Date: _____

INSTRUCTIONS

- There are **18 questions** in this worksheet. All questions are compulsory.
- Each question has four options (A), (B), (C) and (D). Exactly **one** option is correct.
- Questions 1–15 carry **1 mark** each. Questions 16–18 (Achievers Section) carry **3 marks** each.
- There is no negative marking. Study every diagram and table carefully.

Section A — Scientific Reasoning

Q1–Q8 · 1 mark each

- The transfer of heat through a solid, without the solid itself moving, is called _____.
 (A) Conduction (B) Convection
 (C) Radiation (D) Reflection
- Heat from the sun reaches the earth by _____.
 (A) Conduction (B) Convection
 (C) Evaporation (D) Radiation
- A clinical thermometer has a **kink** near the bulb. Its purpose is to _____.
 (A) Stop the mercury from falling back at once, so the reading can be taken (B) Make the thermometer stronger
 (C) Increase the range of the thermometer (D) Make the mercury rise faster
- The normal temperature of the human body is about _____.
 (A) 27 °C (B) 37 °C
 (C) 47 °C (D) 98 °C
- Which of these is a **chemical** change?
 (A) Melting of wax (B) Tearing of paper
 (C) Dissolving salt in water (D) Souring of milk
- Which of these best prevents heat loss from a room in winter?
 (A) Woollen curtains and double-glazed windows (B) Dark-coloured metal walls
 (C) Open windows (D) A tiled floor
- Rusting of iron requires the presence of _____.
 (A) Oxygen only (B) Water only
 (C) Both oxygen and water (D) Neither oxygen nor water
- Which of these is used to prevent rusting by coating iron with a layer of zinc?
 (A) Painting (B) Galvanisation
 (C) Oiling (D) Crystallisation

9. In the table below, which row is **incorrectly** matched?

Row	Everyday example	Mode of heat transfer
(A)	A metal spoon in hot tea becomes hot	Conduction
(B)	Warm air rising above a heater	Convection
(C)	Feeling warmth from a bonfire	Conduction
(D)	Sea breeze on a hot afternoon	Convection

Table 9.1 — Heat transfer in everyday life

- (A) Row (A)
- (B) Row (B)
- (C) Row (C)
- (D) Row (D)

10. Why are cooking pans given wooden or plastic handles?

- (A) They look attractive
- (B) They conduct heat quickly away
- (C) They are lighter than metal
- (D) Wood and plastic are poor conductors, so the handle stays cool enough to hold

11. Why do we wear light-coloured cotton clothes in summer?

- (A) Light colours reflect most of the heat and cotton absorbs sweat, helping it evaporate
- (B) They absorb more heat
- (C) Cotton conducts heat into the body
- (D) They are cheaper

12. Which of the following observations shows that a **chemical** change has taken place?

- (A) Water turns into ice
- (B) A magnesium ribbon burns with a bright light leaving a white ash
- (C) A rubber band is stretched
- (D) Sugar dissolves in tea

13. An iron nail is placed in a test tube of boiled water covered with a layer of oil. After several days it does **not** rust. Why?

- (A) Boiled water is too hot
- (B) Oil dissolves the iron
- (C) Boiling removes dissolved air and the oil keeps fresh air out, so oxygen is absent
- (D) Water alone cannot cause rust in a test tube

14. In a sea breeze, air moves from the sea to the land during the day. Why?

- (A) The sea heats up faster than the land
(B) The wind always blows towards land
(C) The sea is always colder at night
(D) The land heats up faster, so warm air rises over it and cooler air from the sea moves in

15. Why is the bulb of a laboratory thermometer often placed in a shiny silvered casing when measuring radiant heat?

- (A) Because a shiny surface reflects radiation, while a dull black surface absorbs it best
- (B) To make it look better
- (C) To make the mercury heavier
- (D) To stop the glass from breaking

16. Consider the following statements.

- (i) In a physical change no new substance is formed.
- (ii) All changes that give out heat are chemical changes.
- (iii) A chemical change is usually difficult to reverse.

Which of the statements is/are correct?

- | | |
|------------------------|-------------------------|
| (A) (i) and (ii) only | (B) (ii) and (iii) only |
| (C) (i) and (iii) only | (D) All three |

17. A thermos flask has a double wall with a vacuum between, silvered surfaces and an insulating stopper.

Which mode of heat transfer does the **vacuum** mainly stop?

- | | |
|------------------------------|-------------------------------|
| (A) Radiation only | (B) Conduction and convection |
| (C) Radiation and conduction | (D) None of them |

18. Two identical iron nails are left out for a week: nail X in a dish of ordinary tap water open to the air, and nail Y in a stoppered tube of dry air with a drying agent. Which nail rusts, and what does the experiment show?

- | | |
|--|--|
| (A) Both rust, showing air alone causes rust | (B) Only X rusts, showing that both water and air are needed |
| (C) Only Y rusts, showing that dryness causes rust | (D) Neither rusts |

Answer Key

1	A	2	D	3	A	4	B	5	D
6	A	7	C	8	B	9	C	10	D
11	A	12	B	13	C	14	D	15	A
16	C	17	B	18	B				

Solutions

1. Answer: (A) Conduction

In **conduction**, heat passes from particle to particle through a solid. Convection needs the material itself to move, and radiation needs no medium at all.

2. Answer: (D) Radiation

Space is a vacuum with no particles, so heat cannot travel by conduction or convection. It reaches us by **radiation**, which needs no medium.

3. Answer: (A) Stop the mercury from falling back at once, so the reading can be taken

The kink is a narrow bend that **stops the mercury running back into the bulb the moment the thermometer is removed**, so the reading stays until the thermometer is shaken.

4. Answer: (B) 37 °C

Normal body temperature is about **37 °C**, which is 98.6 °F on the Fahrenheit scale.

5. Answer: (D) Souring of milk

When milk sours, bacteria convert its sugar into lactic acid — a new substance that cannot be changed back. So **souring of milk** is a chemical change; the other three are physical.

6. Answer: (A) Woollen curtains and double-glazed windows

Wool and the air trapped between two panes of glass are poor conductors, so **woollen curtains and double-glazed windows** slow the escape of heat. Metals conduct heat away quickly.

7. Answer: (C) Both oxygen and water

Iron rusts only when **both oxygen and water (moisture)** are present. An iron nail in dry air or in boiled water sealed with oil does not rust, which is how the experiment is set up.

8. Answer: (B) Galvanisation

Galvanisation is the coating of iron or steel with a layer of zinc, which keeps air and moisture away from the iron beneath.

9. Answer: (C) Row (C)

You feel a bonfire's warmth without touching it and even from the side, so the heat reaches you by **radiation**, not conduction. The other three rows are correct.

10. Answer: (D) Wood and plastic are poor conductors, so the handle stays cool enough to hold

Wood and plastic are poor conductors of heat, so very little heat travels along the handle and it stays cool enough to grip safely.

11. Answer: (A) Light colours reflect most of the heat and cotton absorbs sweat, helping it evaporate

Light colours reflect most of the radiant heat instead of absorbing it, and **cotton soaks up sweat and lets it evaporate**, which cools the body. Dark woollen clothes do the opposite, which is why they suit winter.

12. Answer: (B) A magnesium ribbon burns with a bright light leaving a white ash

Burning magnesium produces **magnesium oxide, a completely new white substance**, together with heat and light, and the change cannot be reversed. The other three are physical changes.

13. Answer: (C) Boiling removes dissolved air and the oil keeps fresh air out, so oxygen is absent

Rusting needs both water and oxygen. **Boiling drives out the dissolved air and the oil layer stops fresh air dissolving in**, so no oxygen is available and the nail stays bright. A nail in ordinary water open to air rusts within days.

14. Answer: (D) The land heats up faster, so warm air rises over it and cooler air from the sea moves in

Land heats up much faster than water. **The warm air above the land rises, and cooler air from over the sea flows in to take its place** — a convection current. At night the land cools faster and the flow reverses, giving a land breeze.

- 15. Answer: (A)** Because a shiny surface reflects radiation, while a dull black surface absorbs it best
Surfaces differ in how they handle radiation: **a dull black surface absorbs radiant heat best, while a shiny silvered surface reflects it.** This is why solar cookers are painted black inside and thermos flasks are silvered.
- 16. Answer: (C)** (i) and (iii) only
Statement (i) is true by definition. Statement (ii) is false — water freezing gives out heat but forms no new substance, so it is physical. Statement (iii) is true. Hence **(i) and (iii)**.
- 17. Answer: (B)** Conduction and convection
Conduction and convection both need particles to carry the heat, and a vacuum has none — so the gap between the walls blocks **conduction and convection**. Radiation can still cross a vacuum, which is exactly why the surfaces are silvered to reflect it, and the stopper stops convection through the mouth.
- 18. Answer: (B)** Only X rusts, showing that both water and air are needed
Nail X has both water and dissolved air, so it rusts. Nail Y has air but no moisture, so it stays bright. Since the only difference is the water, **only X rusts, showing that both water and air are needed.** A third nail in boiled water under oil — water but no air — would also stay bright, completing the proof.