

Light, Shadow, Sound and Heat

Science · Class 5 · Topic-wise Practice Worksheet

TIME 40 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. Do not use a calculator.
- Study every diagram and table carefully before answering.

Section A — Light, Sound and Heat Basics

Q1–Q7 · 1 mark each

- Light always travels _____.
 (A) In circles (B) In curved paths
 (C) In zig-zags (D) In straight lines
- A shadow is formed when _____ comes in the path of light.
 (A) An opaque object (B) A source of light
 (C) A mirror (D) A transparent object
- Sound is produced by objects that are _____.
 (A) Shining (B) Hot
 (C) Vibrating (D) Heavy
- Which travels faster?
 (A) Sound (B) Light
 (C) Both travel equally fast (D) Neither travels
- Heat always flows from a body at a _____ temperature to a body at a _____ temperature.
 (A) Lower, higher (B) Equal, equal
 (C) Higher, higher (D) Higher, lower
- Which of the following is the best **insulator** of heat?
 (A) Wood (B) Aluminium
 (C) Iron (D) Copper
- The instrument used to measure temperature is a _____.
 (A) Barometer (B) Thermometer
 (C) Speedometer (D) Ammeter

8. In the set-up shown, a ball is held between a lamp and a screen. If the **ball is moved closer to the lamp**, keeping the screen fixed, its shadow on the screen will become _____.

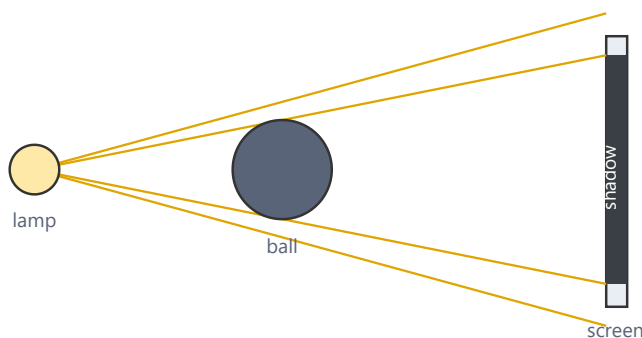


Fig. 8.1 — Formation of a shadow

- (A) Smaller
(B) Exactly the same
(C) Larger
(D) It will disappear
9. A wall clock is held in front of a plane mirror. The image in the mirror reads **3 o'clock**. What is the actual time shown by the clock?
- (A) 3 o'clock
(B) 6 o'clock
(C) 12 o'clock
(D) 9 o'clock
10. **Assertion (A):** During a storm we see the flash of lightning before we hear the thunder.
Reason (R): Light travels much faster than sound.
Choose the correct option.
- (A) Both A and R are true, and R explains A
(B) Both A and R are true, but R does not explain A
(C) A is true but R is false
(D) A is false but R is true
11. A boy shouts in front of a distant hill and hears his own voice again after a few seconds. This repeated sound is called an _____.
- (A) Echo
(B) Vibration
(C) Noise
(D) Vacuum
12. In the table below, which row is **incorrectly** matched?

Row	Object	Type
(A)	Clear glass window	Transparent
(B)	Frosted glass	Translucent
(C)	Wooden door	Transparent
(D)	Thin oiled paper	Translucent

Table 12.1 — Objects and how they treat light

- (A) Row (A)
(B) Row (B)
(C) Row (C)
(D) Row (D)
13. A steel spoon left standing in a cup of hot tea soon becomes hot at the top too. The heat travels up the spoon by _____.
- (A) Reflection
(B) Conduction
(C) Refraction
(D) Vibration of the spoon

14. When white sunlight passes through a glass prism it spreads out into a band of seven colours, as shown. This splitting of white light is called _____.

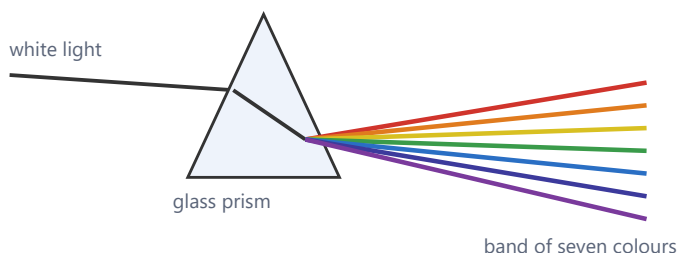


Fig. 14.1 — White light passing through a prism

- (A) Reflection (B) Conduction
(C) Dispersion (D) Absorption
15. Two drums are beaten. The first is struck gently and the second is struck hard. The sound of the second drum will be _____.
(A) Exactly the same (B) Higher in pitch than the first
(C) Softer than the first (D) Louder than the first

Achievers Section

Q16–Q18 · 3 marks each

16. Consider the following statements.
(i) Sound can travel through a vacuum.
(ii) A shadow is always of the same colour, whatever the colour of the object.
(iii) Shiny, light-coloured surfaces reflect more heat than dull black surfaces.
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 boy sees a flash of lightning and hears the thunder **3 seconds** later. Taking the speed of sound in air as 330 m/s, roughly how far away was the lightning?
(A) 990 m (B) 330 m
(C) 110 m (D) 3300 m
18. Match each observation in Column I with its correct explanation in Column II.

Column I	Column II
(P) A spoon in a glass of water looks bent	(1) Reflection of light
(Q) You can see your face in a mirror	(2) Conduction of heat
(R) A metal handle of a pan gets hot	(3) Refraction of light
(S) A shadow forms behind a tree	(4) Light travels in straight lines

Table 18.1

- (A) P-1, Q-3, R-4, S-2 (B) P-3, Q-1, R-2, S-4
(C) P-3, Q-4, R-2, S-1 (D) P-4, Q-1, R-2, S-3

Answer Key

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

Solutions

1. Answer: (D) In straight lines

Light travels in straight lines, which is why you cannot see round a corner and why a beam of sunlight entering a dark room appears as a straight streak. This is also the reason shadows are formed.

2. Answer: (A) An opaque object

An opaque object does not allow light to pass through it, so a dark patch — the shadow — is formed behind it. Transparent objects let light through and cast almost no shadow.

3. Answer: (C) Vibrating

Every sound is produced by a vibrating object — the stretched skin of a drum, the strings of a guitar, or the vocal cords in our throat. If the vibration stops, the sound stops.

4. Answer: (B) Light

Light travels about 300,000 km in one second, while sound travels only about 330 m in one second in air. Light is therefore roughly a million times faster than sound.

5. Answer: (D) Higher, lower

Heat naturally flows from the hotter body to the colder one, and it keeps flowing until both reach the same temperature. This is why a hot cup of tea cools down and a cold drink warms up.

6. Answer: (A) Wood

An insulator does not let heat pass through easily. Wood, plastic and rubber are insulators, which is why cooking pan handles are made of them. Copper, aluminium and iron are metals and hence good conductors.

7. Answer: (B) Thermometer

A thermometer measures temperature, that is, how hot or cold a body is. A clinical thermometer is used for body temperature. A barometer measures air pressure and a speedometer measures speed.

8. Answer: (C) Larger

The rays that just graze the edges of the ball spread out as they travel on to the screen. Moving the ball nearer the lamp means it blocks the light closer to the source, so those edge rays have further to spread before they reach the screen — and the shadow grows larger. Moving the ball towards the screen makes the shadow smaller and sharper.

9. Answer: (D) 9 o'clock

A plane mirror reverses left and right — this is called lateral inversion. Reading a mirror clock is the same as subtracting the mirror time from 12: $12 - 3 = 9$ **o'clock**. You can check this by imagining the hour hand, which points right in the image, actually pointing left.

10. Answer: (A) Both A and R are true, and R explains A

Both statements are true. The flash and the thunder are produced at the same instant, but light covers the distance to us almost immediately while sound takes several seconds. The huge difference in speed is exactly the reason for the delay, so R explains A.

11. Answer: (A) Echo

An echo is a sound heard again after it has been reflected from a large hard surface such as a hillside or a high wall. The delay is the time the sound takes to travel to the hill and back.

12. Answer: (C) Row (C)

A wooden door is **opaque** — no light passes through it at all, which is why it casts a dark shadow. Clear glass is transparent, and frosted glass and oiled paper are translucent because they let some light through but you cannot see clearly through them.

13. Answer: (B) Conduction

Conduction is the passing of heat through a solid from its hotter part to its cooler part, without the material itself moving. Steel is a good conductor, so heat travels quickly up the handle. A plastic or wooden spoon would stay cool.

14. Answer: (C) Dispersion

Dispersion is the splitting of white light into its seven constituent colours — violet, indigo, blue, green, yellow, orange and red. It happens because each colour is bent by a slightly different amount as it passes through the glass. A rainbow is formed in the same way by raindrops.

15. Answer: (D) Louder than the first

Striking harder makes the drum skin vibrate through a larger distance, and a larger vibration produces a louder sound. Pitch — whether a sound is shrill or deep — depends on how **fast** the object vibrates, not on how hard it is struck.

16. Answer: (B) (ii) and (iii) only

Statement (i) is false — sound needs a material medium to travel through, so it cannot pass through a vacuum; this is why no sound is heard in outer space. Statement (ii) is true; a shadow is simply a region where light is absent, so it is always dark regardless of the object's colour. Statement (iii) is true, which is why white clothes feel cooler in summer. Hence (ii) and (iii).

17. Answer: (A) 990 m

The light reaches the boy almost instantly, so the 3-second gap is the time taken by the sound alone.

Distance = speed $\times$ time = $330 \times 3 = 990 \text{ m}$ (roughly 1 km). This is the basis of the well-known rule that every 3 seconds between flash and thunder means about one kilometre.

18. Answer: (B) P-3, Q-1, R-2, S-4

A spoon appears bent because light changes direction on passing from water into air — refraction (3). A mirror shows your face because it reflects light back to your eyes (1). A metal handle heats up by conduction through the solid (2). A shadow forms because light cannot bend round the tree — it travels in straight lines (4). Hence P-3, Q-1, R-2, S-4.