

SCIENCE PRACTICE WORKSHEET

Chapter: Pressure, Winds, Storms, and Cyclones

Class VIII • Science

Student Name:

Roll No:

Date:

Max Marks: 80

SECTION A — Multiple Choice Questions (10 Marks)

Select the most appropriate option for each question. (1 Mark each)

Q1. Which of the following correctly shows the relation between pressure, force and area?

(1 Mark)

(a) Pressure = Force $\times$ Area

(b) Pressure = Force / Area

(c) Pressure = Area / Force

(d) Pressure = Force + Area

Q2. Assertion (A): Overhead water tanks are placed at a height on the rooftops of buildings.

(1 Mark)

Reason (R): The pressure exerted by a liquid increases with the height of its column.

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

Q3. When a rubber sucker is pressed firmly against a smooth surface and then pulled, it is difficult to remove because:

(1 Mark)

(a) atmospheric pressure outside is less than inside the sucker.

(b) atmospheric pressure outside is greater than inside the sucker.

(c) the sucker has no air inside it initially.

(d) the surface exerts an upward force on the sucker.

Q4. Assertion (A): High-speed winds can sometimes blow off the roofs of houses.

(1 Mark)

Reason (R): High-speed winds are accompanied by reduced air pressure.

(a) Both A and R are true and R is the correct explanation of A.

(b) Both A and R are true but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

Q5. In Activity 6.5, when one balloon is inflated and connected to an uninflated balloon through a straw, air moves from the inflated balloon to the uninflated one because:

(1 Mark)

(a) air always moves from low pressure to high pressure.

(b) air moves from high pressure to low pressure.

(c) the balloons have different volumes initially.

(d) the straw creates a vacuum.

Q6. The base of a dam is made broader than its top because:

(1 Mark)

(a) it increases the weight of the dam.

(b) water pressure is higher at greater depths and acts horizontally.

(c) broader base reduces evaporation.

(d) it helps in faster construction.

Q7. Which of the following is **NOT** a safety measure during lightning?

(1 Mark)

(a) Staying inside a car or bus.

(b) Crouching in a low-lying open area.

(c) Holding an umbrella with a metallic rod.

(d) Moving away from tall trees and buildings.

Q8. The region of lowest pressure in a cyclone is called:

(1 Mark)

(a) the eye of the cyclone.

(b) the wall of the cyclone.

(c) the land breeze region.

(d) the thunderstorm centre.

Q9. When warm moist air rises over land during the day, it creates:

(1 Mark)

(a) high pressure over land and sea breeze.

(b) low pressure over land and sea breeze.

(c) high pressure over sea and land breeze.

(d) low pressure over sea and land breeze.

Q10. The SI unit of pressure is:

(1 Mark)

(a) newton

(b) pascal

(c) joule

(d) metre

SECTION B — Very Short Answer Questions (12 Marks)

Answer each of the following questions briefly. (2 Marks each)

- Q11.** Define pressure. Write its SI unit and one everyday example where increasing area reduces pressure. (2 Marks)
- Q12.** Why do the two balloons in Activity 6.1 bulge equally when water columns of equal height but different diameters are used? (2 Marks)
- Q13.** State two observations from Activity 6.2 that show liquids exert pressure on the sides of a container. (2 Marks)
- Q14.** What happens to the size of two balloons connected by a straw when air pressure in one is higher? Why does the flow of air stop after some time? (2 Marks)
- Q15.** Why is it advised to keep doors and windows open during a storm with high-speed winds? (2 Marks)
- Q16.** Name the instrument used to protect tall buildings from lightning and state one feature of its installation. (2 Marks)

SECTION C — Short Answer Questions (15 Marks)

Answer the following questions in detail. (3 Marks each)

- Q17.** Explain with a labelled diagram how the pressure exerted by a liquid depends on the height of its column. (Use the setup of two pipes with balloons.) (3 Marks)
- Q18.** Differentiate between sea breeze and land breeze on the basis of (i) time of occurrence and (ii) direction of air flow. Give the reason for the difference. (3 Marks)
- Q19.** Describe the formation of lightning in a thunderstorm. How does charge separation occur inside a cloud? (3 Marks)
- Q20.** A force of 150 N is applied on a surface of area 3 m². Calculate the pressure exerted. If the same force is applied on a surface of area 0.5 m², what will be the new pressure? Show calculations. (3 Marks)
- Q21.** Why does the base of a dam need to be broader? Relate your answer to the pressure exerted by stored water. (3 Marks)

SECTION D — Long Answer Questions (15 Marks)

Answer the following detailed questions. (5 Marks each)

- Q22.** (a) Draw a neat labelled diagram of the activity that shows air moves from a region of high pressure to a region of low pressure using two balloons and a straw. (5 Marks)
- (b) Explain the observations and the conclusion drawn from this activity.
- Q23.** Explain the complete process of formation of a cyclone. Draw a labelled diagram showing the eye of the cyclone, direction of winds and pressure conditions. Why does a cyclone lose strength after reaching land? (5 Marks)
- Q24.** A water tank is placed at a height of 10 m above the ground floor of a building. (5 Marks)
- (a) Calculate the pressure exerted by the water at the ground-floor tap if the density of water is taken as 1000 kg/m³ and $g = 10 \text{ m/s}^2$ (use $P = h\rho g$).
- (b) If another identical tank is placed at 15 m height, calculate the new pressure.
- (c) A person living on the first floor receives a stronger stream of water than a person on the second floor. Give reason.

SECTION E — Case/Source-Based Questions (8 Marks)

Read the passages carefully and answer the sub-questions. (4 Marks each)

Case Study 1: Overhead Water Tanks

In many localities, overhead water tanks are placed on the roofs of buildings. Water from these tanks reaches the taps with good pressure. When the height of the water column increases, the pressure at the bottom also increases. This helps water flow out with greater force from the taps on lower floors.

- Q25.** Based on the passage above, answer the following: (4 Marks)
- (i) Why are overhead tanks placed at a height? (1 Mark)
- (ii) If two tanks have the same amount of water but one is placed higher, which tap will give a stronger stream? Why? (1 Mark)
- (iii) Relate this situation to the activity with balloons attached to pipes of different diameters. (1 Mark)
- (iv) What would happen if the tank is placed at ground level? (1 Mark)

Case Study 2: Lightning Conductor

A lightning conductor is a metallic rod fixed along the wall of a tall building. One end is pointed and kept higher than the building; the other end is buried deep in the ground. It provides an easy path for electric charges to reach the earth safely.

- Q26.** Based on the passage above, answer the following: (4 Marks)
- (i) Why is the upper end of the lightning conductor kept pointed? (1 Mark)
 - (ii) How does the lightning conductor protect the building during a thunderstorm? (1 Mark)
 - (iii) What would happen if a building does not have a lightning conductor and lightning strikes it? (1 Mark)
 - (iv) Name one other safety measure a person should follow if caught outdoors during lightning. (1 Mark)

SECTION F — HOTS and Application Questions (12 Marks)

Apply conceptual understanding to answer the following. (3 Marks each)

Q27. Predict-and-justify: What would happen to the two identical balloons hanging close to each other if air is blown very fast (3 Marks) between them? Justify your answer using the concept of air pressure.

Q28. Analyse an unexpected or anomalous observation: In an experiment, two bottles with holes at the same height from the (3 Marks) bottom are filled with water to different levels. Water comes out faster and farther from the bottle with higher water level. Analyse this observation and explain what it indicates about liquid pressure.

Q29. Apply the concept to an unfamiliar real-life situation: A person living near the coast observes that on a hot summer (3 Marks) afternoon the wind is blowing from the sea towards the land. Apply the concept of pressure difference to explain this observation in an unfamiliar coastal situation.

Q30. Compare two situations: Compare the following two situations and justify which outcome differs and why: (3 Marks)

Situation 1: A person carries a heavy suitcase with thin straps on the shoulder.

Situation 2: The same person carries the same suitcase with broad padded straps.

In which situation is the pressure on the shoulder less and why?