NCERT Exemplar Solutions for Class 6 Science
Chapter 15: Air Around Us

Multiple Choice Questions

1. Which of the following statements is incorrect?

(a) All living things require air to breathe.
(b) We can feel air but we cannot see it.
(c) Moving air makes it possible to fly a kite.
(d) Air is present everywhere but not in soil.

Solution: (d) Air is present everywhere but not in soil.

Explanation: Air is omnipresent in nature and is present everywhere, including soil. This can be demonstrated through a simple experiment: Take a lump of dry soil in a beaker and add water to it. You will observe bubbles rising from the soil, which proves that air was trapped in the spaces between soil particles.

2. Wind does not help in the movement of which of the following?

(a) Firki
(b) Weathercock
(c) Ceiling fan
(d) Sailing yacht

Solution: (c) Ceiling fan

Explanation: A ceiling fan operates using electricity and does not depend on wind for its movement. In contrast, firki, weathercock, and sailing yacht all rely on wind energy for their movement.

3. What is not true about air?

(a) It makes the windmill rotate.
(b) It helps in the movements of aeroplanes.
(c) Birds can fly due to presence of air.
(d) It has no role in water cycle.

Solution: (d) It has no role in water cycle.

Explanation: Air plays a crucial role in the water cycle. Water vapor rises into the atmosphere to form clouds, and wind helps in the movement of clouds and distribution of rainfall across different regions.

4. Mountaineers carry oxygen cylinders with them because

(a) there is no oxygen on high mountains
(b) there is deficiency of oxygen on mountains at high altitude
(c) oxygen is used for cooking
(d) oxygen keeps them warm at low temperature

Solution: (b) there is deficiency of oxygen on mountains at high altitude

Explanation: As altitude increases, the atmosphere becomes thinner and the concentration of oxygen decreases. This makes breathing difficult at high altitudes, so mountaineers carry oxygen cylinders to ensure adequate oxygen supply.

5. Boojho took an empty plastic bottle, turned it upside down and dipped its open mouth into a bucket filled with water. He then tilted the bottle slightly and made the following observations.
(i) Bubbles of air came out from the bottle.
(ii) Some water entered the bottle.
(iii) Nitrogen gas came out in the form of bubbles and oxygen got dissolved in water.
(iv) No bubbles formed, only water entered the bottle.
Which observations is/are correct? (a) (i) and (ii)
(b) (iv) only
(c) (iii) and (iv)
(d) (i) only
Solution: (a) (i) and (ii)
Explanation: When the bottle is tilted, air trapped inside escapes as bubbles, creating space for water to enter. The observation about specific gases separating is incorrect.

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6. Which of the following components of air is present in the largest amount in the atmosphere?
(a) Nitrogen
(b) Oxygen
(c) Water vapor
(d) Carbon dioxide
Solution: (a) Nitrogen
Explanation: The atmosphere consists of approximately 78% nitrogen, 21% oxygen, and the remaining 1% includes carbon dioxide, water vapor, and other gases along with dust particles.

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7. The components of air which are harmful to living beings are
(a) nitrogen and carbon dioxide
(b) dust and water vapor
(c) dust and smoke
(d) smoke and water vapor
Solution: (c) dust and smoke
Explanation: While nitrogen, carbon dioxide, and water vapor are essential for various life processes, dust particles and smoke from factories and vehicles are harmful pollutants that can cause respiratory problems and other health issues.

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8. Usha took a lump of dry soil in a glass and added water to it till it was completely immersed. She observed bubbles coming out. The bubbles contain
(a) water vapor
(b) only oxygen gas
(c) air
(d) none of these
Solution: (c) air
Explanation: The bubbles contain air that was trapped in the spaces between soil particles. When water is added, it displaces this trapped air, causing it to escape as bubbles.

Very Short Answer Questions

9. State whether the following statements are true or false. If false, correct them.

(a) Plants consume oxygen for respiration.

(b) Plants produce oxygen during the process of making their own food.

(c) Air helps in the movements of sailing yachts and gliders but plays no role in the flight of birds and aeroplanes.

(d) Air does not occupy any space.

Solution: (a) True

(b) True

(c) False – Air helps in the movement of sailing yachts and gliders and also plays a crucial role in the flight of birds and aeroplanes.

(d) False – Air does occupy space, as demonstrated by various experiments.

10. In a number of musical instruments, air plays an important role. Can you name such instruments?

Solution: Air plays an important role in musical instruments such as:

- Mouth organ
- Harmonium
- Shehnai
- Trumpet
- Flute
- Saxophone
- Clarinet

11. Arrange the jumbled letters to form meaningful words.

(a) DILLMWIN → **WINDMILL**

(b) YNOGXE → **OXYGEN**

(c) MEKSO → **SMOKE**

(d) TUDS → **DUST**

12. Make sentences using the given set of words.

(a) 99%, oxygen, nitrogen, air, together

(b) Respiration, dissolved, animals, air, aquatic

(c) Air, wind, motion, called

Solution: (a) 99% of the air is made up of oxygen and nitrogen together.

(b) Aquatic animals use dissolved air for respiration.

(c) Air in motion is called wind.

Short Answer Questions

13. Fill in the blanks using appropriate words from the given list.

[Air, oxygen, wind, water vapor, mixture, combination, direction, road, bottles, cylinders]

(a) The _____ makes the windmill rotate.

(b) Air is a _____ of some gases.

(c) A weather cock shows the _____ in which the air is moving at that place.
(d) Mountaineers carry oxygen _____ with them, while climbing high mountains.
Solution: (a) wind
(b) mixture
(c) direction
(d) cylinders

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14. Observe the picture carefully and answer the following questions.

(a) What is covering the nose and mouth of the policeman?
(b) Why is he putting a cover on his nose?
(c) Can you comment on air quality of the place shown in the figure?
Solution: (a) The policeman has worn a mask to cover his nose and mouth.
(b) He is wearing a mask to protect himself from dust particles and polluted air. The mask prevents harmful exhaust fumes from vehicles and dust particles from entering his respiratory system.
(c) The air quality in the given area appears to be poor due to pollution. The presence of smoke and harmful gases such as carbon monoxide and sulfur dioxide emitted by automobiles, along with dust particles, has polluted the air.

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15. Garima observed that when she left her tightly capped bottle full of water in open sunlight, tiny bubbles were formed all around inside the bottle. Help Garima to know why it happened?
Solution: When water is exposed to sunlight, it gets heated. The air that was dissolved in water expands due to heat and escapes in the form of tiny bubbles. This is why bubbles appear inside the bottle when it's kept in sunlight.

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16. Match the items of Column I with the items of Column II.
Column I Column II (a) Weather cock **(i)** Gases and fine dust particles **(b)** Mountaineers **(ii)** Sailing yacht **(c)** Fine hair inside nose **(iii)** Oxygen cylinders **(d)** Smoke **(iv)** Direction of air flow **(e)** Wind **(v)** Prevent dust particles
Solution: (a) Weather cock → **(iv)** Direction of air flow
(b) Mountaineers → **(iii)** Oxygen cylinders

(c) Fine hair inside nose → **(v)** Prevent dust particles
(d) Smoke → **(i)** Gases and fine dust particles
(e) Wind → **(ii)** Sailing yacht

Long Answer Questions

17. Explain the following observations very briefly.

(a) A firki does not rotate in a closed area.
(b) The arrow of weather cock points towards a particular direction at a particular moment.
(c) An empty glass in fact is not empty.
(d) Breathing through mouth may harm you.

Solution:

(a) In a closed area, there is minimal air movement, which is essential for a firki to rotate. A firki rotates due to the kinetic energy of moving air (wind). In an open area, natural air currents provide the necessary force for rotation.
(b) A weather cock is designed to indicate wind direction. It consists of an arrow mounted at its center of gravity, allowing it to rotate freely around a vertical axis. The arrow aligns itself with the wind direction due to air pressure differences, pointing toward the direction from which the wind is blowing.
(c) An empty glass appears empty but is actually filled with air. This can be demonstrated by inverting an empty glass in water – the water doesn't enter immediately because air occupies the space. When the glass is tilted, air escapes as bubbles, allowing water to fill the space.
(d) Breathing through the mouth can be harmful because it bypasses the natural filtration system of the nose. The nose contains fine hair and mucus that filter out dust particles and harmful substances from the air. When we breathe through the mouth, these pollutants can directly enter our respiratory system, potentially causing illness.

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18. Write a few sentences for an imaginary situation if any of the following gases disappear from the atmosphere.

(a) Oxygen
(b) Nitrogen
(c) Carbon dioxide

Solution:

(a) If oxygen disappears: Life on Earth would become impossible as oxygen is essential for respiration in all living organisms. Animals and plants would be unable to carry out cellular respiration, leading to the death of all aerobic life forms. Combustion processes would also stop completely.
(b) If nitrogen disappears: The absence of nitrogen would be catastrophic as it makes up 78% of our atmosphere. Without nitrogen, the atmospheric pressure would drop dramatically, and combustible materials would burn much more rapidly due to the higher concentration of oxygen. Plants would also suffer as they need nitrogen compounds for protein synthesis and growth.
(c) If carbon dioxide disappears: Plants would be unable to perform photosynthesis, as carbon dioxide is a crucial raw material for this process. This would disrupt the entire

food chain and oxygen production. The carbon cycle would be completely disrupted, affecting the global climate and ecosystem balance.

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19. Paheli kept some water in a beaker for heating. She observed that tiny bubbles appeared before the water started to boil. She boiled the water for about 5 minutes and filled it in a bottle up to the brim and kept the bottle air tight till it cooled down to room temperature.
(a) Why did the tiny bubbles appear?
(b) Do you think tiny bubbles will appear on heating the water taken out from the bottle? Justify your answer.
Solution:
(a) The tiny bubbles appeared because air dissolved in water began to escape as the water was heated. As temperature increases, the solubility of gases in water decreases, causing the dissolved air to form bubbles and rise to the surface.
(b) No, tiny bubbles will not appear when heating the cooled boiled water from the bottle. During the prolonged boiling process, all the dissolved air was removed from the water. Since the bottle was sealed immediately after boiling and cooling, no new air could dissolve back into the water. Therefore, reheating this water will not produce bubbles as there is no dissolved air to escape.

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20. On a Sunday morning Paheli's friend visited her home. She wanted to see some flowering plants in the nearby garden. Both of them went to the garden. While returning from the garden they also observed some flowering plants on the roadside. But to their surprise they found that the leaves and flowers of these roadside plants were comparatively very dull. Can you help them to know why?
Solution: The dull appearance of roadside plants is primarily due to air pollution. Vehicle exhaust, factory emissions, and dust particles in the air settle on the leaves and flowers, forming a layer that:

1. **Blocks sunlight** from reaching the leaf surface effectively
2. **Clogs the stomata** (tiny pores on leaves), reducing gas exchange
3. **Interferes with photosynthesis** by reducing light absorption
4. **Accumulates harmful chemicals** that can damage plant tissues

Additionally, roadside plants are exposed to:

- Higher concentrations of carbon monoxide and sulfur dioxide
- Particulate matter from vehicle exhausts
- Salt and chemicals from road maintenance
- Heat from vehicle engines and road surfaces

This combination of factors makes roadside plants appear less vibrant and healthy compared to plants in cleaner environments like gardens.