

## NCERT QUESTIONS WITH SOLUTION

1. What is the composition of air?

**Ans.** Air is a mixture of 78% nitrogen, 21% oxygen, 1% carbon dioxide, water vapours and some other gases. Air also contains dust particles.

2. Which gas in the atmosphere is essential for respiration?

**Ans.** Oxygen gas is essential for respiration.

3. How will you prove that air supports burning?

**Ans.** Take a candle. Place it in a tub. Light the candle and also fill the tub with some water. Cover the candle with an inverted glass. You will find that the candle blows out after burning for some time, and the water level inside the inverted glass rises up to some extent.



The component, oxygen, of air inside the glass is used up in burning. Therefore, water occupies that space. This shows that air supports burning.

4. How will you show that air is dissolved in water?

**Ans.** To show that air is dissolved in water we take water in a pan and heat it. Just before it boils, you will notice some bubbles at the inner surface of the pan. These bubbles are formed because of air dissolved in water.

5. Why does a lump of cotton wool shrink in water?

**Ans.** A lump of cotton wool shrinks when immersed in water. This is because air present in the cotton wool escapes. Thus, the volume of the cotton wool decreases.

6. The layer of air around the Earth is known as \_\_\_\_.

**Ans.** The layer of air around the Earth is known as atmosphere.

7. The component of air used by green plants to make their food is \_\_\_\_.

**Ans.** The component of air used by green plants to make their food is carbon dioxide.

8. List five activities that are possible due to the presence of air.

**Ans.** (i) Respiration  
(ii) Photosynthesis  
(iii) Burning  
(iv) Movement of sailing yachts, gliders, parachutes, airplanes  
(v) Generation of electricity by windmills

9. How do plants and animals help each other in exchange of gases in the atmosphere?

**Ans.** Plants utilize carbon dioxide present in the atmosphere for the process of photosynthesis. They release oxygen in the atmosphere. This oxygen is inhaled by humans and in turn, carbon dioxide is exhaled.



In this way, plants and animals help each other in exchange of gases in the atmosphere.

**EXERCISE-01****Multiple choice questions**

1. Air is
  - (1) mixture
  - (2) pure substance
  - (3) an element
  - (4) depends on the place where found
2. What is wind?
  - (1) Air around us
  - (2) Rising hot air
  - (3) Air in motion
  - (4) None of these
3. Air is present in
  - (1) atmosphere
  - (2) soil
  - (3) water of ponds, lakes and seas
  - (4) everywhere
4. Which gas helps in burning?
  - (1) Nitrogen
  - (2) Oxygen
  - (3) Carbon dioxide
  - (4) Carbon monoxide
5. Which gas we use in breathing?
  - (1) Carbon dioxide
  - (2) Nitrogen
  - (3) Oxygen
  - (4) None of these
6. Which of these is not true for combustion?
  - (1) Oxygen is formed
  - (2) Carbon dioxide is formed
  - (3) Oxygen is used up
  - (4) Nitrogen does not change
7. Which of these can plants not absorb directly from the atmosphere?
  - (1) Oxygen
  - (2) Nitrogen
  - (3) Carbon dioxide
  - (4) All of these
8. Which of the following is not true for nitrogen?
  - (1) Slightly soluble in water
  - (2) Needed by plants to make proteins
  - (3) Colourless
  - (4) Essential for breathing
9. Major part of the air is constituted by
  - (1) nitrogen
  - (2) oxygen
  - (3) carbon dioxide
  - (4) inert gases
10. The gas which comprises 21 % of air is
  - (1) nitrogen
  - (2) oxygen
  - (3) carbon dioxide
  - (4) hydrogen
11. The presence of which of these components in air varies from place to place?
  - (1) Oxygen
  - (2) Nitrogen
  - (3) Carbon dioxide
  - (4) Water vapour
12. The percentage amount of which of these gases in air is the least?
  - (1) Oxygen
  - (2) Carbon dioxide
  - (3) Nitrogen
  - (4) Cannot say because it varies from place to place

13. \_\_\_\_\_ is the device which measures the air pressure.

- (1) Barometer
- (2) Thermometer
- (3) Anemometer
- (4) Ammeter

14. Which of the following gases protects us from ultraviolet rays?

- (1) Oxygen
- (2) Ozone
- (3) Carbon dioxide
- (4) Nitrogen

15. The presence of oxygen in the air does not change because

- (1) oxygen is not used in any natural process.
- (2) oxygen used up in natural processes is negligible.
- (3) oxygen used up in some natural process is renewed by another natural process.
- (4) oxygen used up in natural processes is replenished by the ozone layer.

**True or False**

- 1. We cannot see air.
- 2. Air is a compound and not an element.
- 3. A firki rotates only in an open area or in a closed room with the ceiling fan switched on.
- 4. Air contains water vapour.
- 5. The major part of air is nitrogen.
- 6. Air becomes thinner and thinner as we go high up from the surface of earth.

7. We breathe in  $\text{CO}_2$  and breath out  $\text{O}_2$ .

8. Plants produce oxygen through photosynthesis.

9. Plants do not respire.

10. Reforestation is one of the best method to control air pollution.

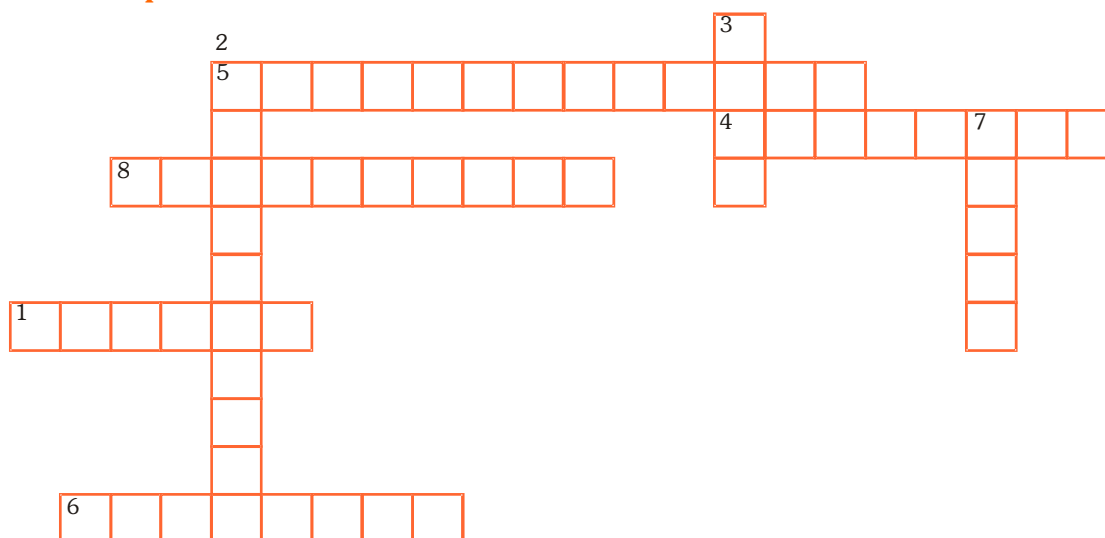
**Fill in the blanks**

- 1. When air is in ..... it is called wind.
- 2. Air has no ..... and one can see through it. It is .....
- 3. Air is really not one substance but a .....
- 4. The component of air that supports burning is called .....
- 5. The oxygen helps in breaking down the digested food in the body to release the .....
- 6. Air is present in, atmosphere, water and .....
- 7. The aquatic animals use dissolved oxygen in water for respiration. This is possible because oxygen is ..... in water.
- 8. Nitrogen of the air is used on a large scale to manufacture .....
- 9. The method of separating two components of a mixture which is based on the wind is .....
- 10. Initial drops of first rain bring a lot of ..... along with them.

## Match the column

	Column A		Column B
(1)	Air	(a)	Thin layer of air surrounding our earth.
(2)	Wind	(b)	Released in respiration.
(3)	Atmosphere	(c)	Makes three fourth part of total air.
(4)	Oxygen	(d)	Is process of burning of food to get energy.
(5)	Carbon dioxide	(e)	Uses wind power to rotate.
(6)	Nitrogen	(f)	Process of preparation of food by green plants.
(7)	Respiration	(g)	Allow air to move here and there.
(8)	Photosynthesis	(h)	Is a gaseous mixture.
(9)	Wind mill	(i)	Supports combustion.
(10)	Open areas	(j)	Is air in motion.

## Crossword puzzle



## Across

1. Gas supports burning.
4. Gas which makes 78% of air.
5. Gas used by plants to make food.
6. Uses wind power to rotate.
8. Envelope of earth.

## Down

2. \_\_\_\_\_ air is used to fill tyres.
3. Blowing air.
7. Aquatic animals like fish respire with the help of their \_\_\_\_\_.

## ANSWER KEY

## Multiple choice questions

<b>Question</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>Answer</b>	1	3	4	2	3	1	2	4	1	2	4	2	1	2	3

## True/ False

1. True      2. False      3. True      4. True      5. True      6. True  
7. False      8. True      9. False      10. True

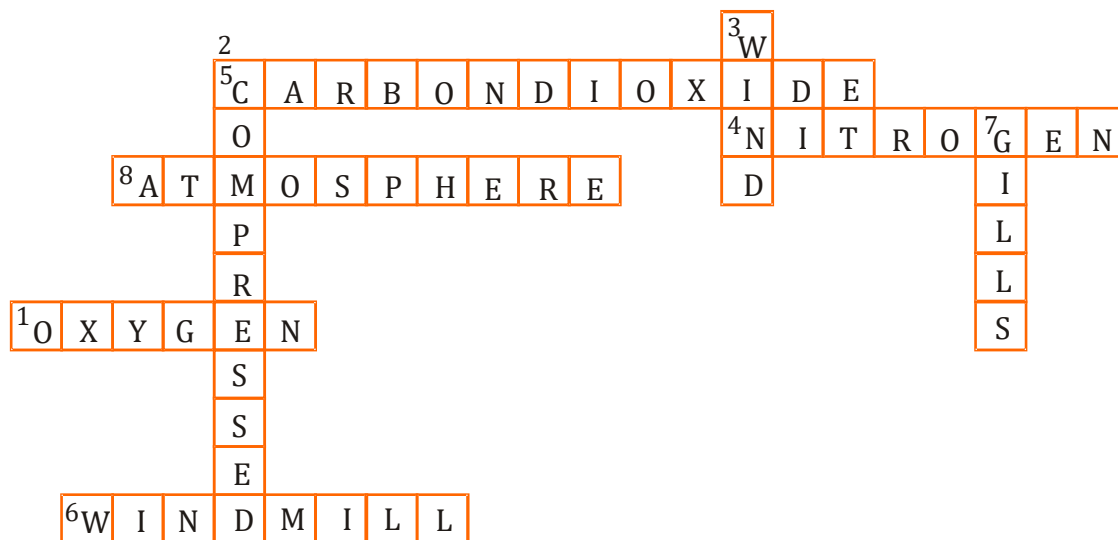
## Fill in the blanks

- |                     |                               |                   |                       |
|---------------------|-------------------------------|-------------------|-----------------------|
| <b>1. Motion</b>    | <b>2. Colour, Transparent</b> | <b>3. Mixture</b> | <b>4. Oxygen</b>      |
| <b>5. Energy</b>    | <b>6. Soil</b>                | <b>7. Soluble</b> | <b>8. Fertilizers</b> |
| <b>9. Winnowing</b> | <b>10. Dirt</b>               |                   |                       |

## Match the column

1. (1)  $\rightarrow$  h; (2)  $\rightarrow$  j; (3)  $\rightarrow$  a; (4)  $\rightarrow$  i; (5)  $\rightarrow$  b; (6)  $\rightarrow$  c; (7)  $\rightarrow$  d; (8)  $\rightarrow$  f; (9)  $\rightarrow$  e; (10)  $\rightarrow$  g

## Crossword puzzle



## EXERCISE-02

**Very short answer type questions**

1. State any two properties of air.
2. What is the composition of air?
3. Name two gases which together make up 99% of the air.
4. Which of the two is present in lesser amount in air: oxygen or nitrogen?
5. What name is given to the layer of air which surrounds the earth?
6. How does wind help in dispersal of seeds?
7. Why air dissolved in water is richer in oxygen than ordinary air?
8. What is the importance of atmosphere for us?
9. Which of the following is necessary for burning things?  
Argon, Carbon dioxide, Oxygen, Nitrogen, helium
10. Which gas is given to the patients having breathing problems?

**Short answer type questions**

1. Why do mountaineers carry oxygen cylinders with them while climbing high mountains?
2. Explain why, if the clothes of a person catch fire accidentally, he is covered with a woollen blanket. Give reason for your answer.
3. Why do policemen regulating traffic at a crowded city road crossing often wear masks?
4. "Air exerts pressure" Explain it.
5. Why is air considered as matter?
6. Mention any four uses of air.
7. Why is air considered to be a mixture?
8. (a) Name two processes which consume oxygen from air.  
(b) Name one process which puts back oxygen into air.

9. (a) Name one process which removes carbon dioxide from air.  
(b) Name two processes which put back carbon dioxide into air.
10. How cultivation method can cause the air pollution?

**Long answer type questions**

1. How will you prove that air supports burning?
2. How can you show that air has mass?
3. State the uses of oxygen.
4. How do plants and animals help each other in the exchange of gases in the atmosphere?
5. List all the properties of carbon dioxide.
6. Give reason for the following  
(i) Water contains air.  
(ii) Animals depend on plants for respiration.  
(iii) Planting more trees reduces pollution of air.  
(iv) State the conditions required for rusting.
7. What is burning? Which gas is necessary for this process to occur?
8. Why is dry wood mostly used as a cooking fuel?
9. Define  
(i) Respiration  
(ii) Photosynthesis  
(iii) Combustion
10. Give reasons  
(i) Aquatic animals and plants are able to survive.  
(ii) A burning candle stops burning if covered with a glass tumbler.

Exercise-01 Solutions

Multiple choice questions

1. Option (1)

It consists of many gases like nitrogen, oxygen and  $\text{CO}_2$  and water vapour and even in dust particles.

2. Option (3)

Moving air is called wind.

3. Option (4)

Due to this on earth the life is sustained.

4. Option (2)

When oxygen combines chemically with another chemical, energy is released, which helps in burning.

5. Option (3)

Oxygen produces energy when inhaled and provide energy to every cell in our body and due to which we can work effectively.

6. Option (1)

Oxygen is used for combustion not the oxygen is formed.

7. Option (2)

Plants cannot absorb nitrogen from atomsphere

8. Option (4)

Nitrogen is not use in breathing process.

9. Option (1)

The percent of nitrogen is 78% in atmosphere.

10. Option (2)

Oxygen is the second largest composition in the air.

11. Option (4)

The content of vapour, dust and smoke and pollution differs from place to place.

12. Option (2)

Carbondioxide gas is only 0.03% in atmosphere.

13. Option (1)

Barometer is a measuring instrument for atmospheric pressure.

14. Option (2)

Ozone protect us from uv rays and absorbs most of the ultraviolet radiation reaching the earth from the sun.

15. Option (3)

Oxygen can be renewed easily when used i.e., if human takes in oxygen and gives  $\text{CO}_2$ , and plants gives oxygen and takes  $\text{CO}_2$ , this is how the oxygen's amount remains the same in atmosphere.

True or False

1. True

Because it is transparent.

2. False

Air is a mixture of various gases and dust particles.

3. True

This tells us, the presence of air.

4. True

It does contain vapours which varies from place to place.

- |   |  |
|---|--|
| <p><b>5. True</b></p> <p>The major constituent of air is Nitrogen i.e. 78%.</p> <p><b>6. True</b></p> <p>Because at higher altitude the content of air decreases.</p> | <p><b>7. False</b></p> <p>Human beings breathe in and breathe out <math>O_2</math>. But plants breathe in <math>CO_2</math> and breathe out <math>O_2</math>.</p> <p><b>8. True</b></p> <p>Yes, it does produce oxygen during photosynthesis.</p> <p><b>9. False</b></p> <p>Every living system respire.</p> <p><b>10. True</b></p> <p>Planting more and more trees help in controlling air pollution.</p> |
|---|--|



Exercise-02 Solutions

Very short answer type questions

- Properties of air :-  
(a) Air occupies space  
(b) Air has mass
- Composition of Air  
Nitrogen : 78%  
Oxygen : 21%  
CO<sub>2</sub> : 0.03%  
Argon and other noble gases with water vapour and dust particles : 0.97%.
- Nitrogen and Oxygen together makes 99% of air i.e., 78% of Nitrogen and 21% of oxygen.
- Oxygen is present in lesser amount in air than nitrogen.
- Atmosphere
- Air in motion called winds and due to these winds they scatter the seeds from one place to another.
- Because oxygen is more soluble in water where as nitrogen is insoluble in water.
- (i) To sustain life on earth.  
(ii) Protects us from harmful radiation reaching us.  
(iii) Formation of clouds, occurrence of rain etc. takes place here.
- Oxygen
- Oxygen Gas

Short answer type questions

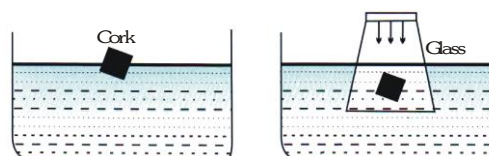
- Because the level of oxygen goes down when they go on higher altitude.

- As we know blanket is made up of wool which have a property of self extinguish, so we cover a person with woollen blanket to cut of the supply of oxygen and fire get extinguished.
- The crowded cities the level of smoke and dust particle is very high. As we know that the hairs and mucus present in our nose helps in preventing dust particles going in but when the pollution rate is high, policemen need to wear facemask in order to prevent dust & dirt going into his body.

4. Aim

To show that air exerts pressure.

**Materials required :** Cork, glass, water beaker.



Air exerts pressure

Method

- A glass vessel is taken and is half filled with water.
- A small piece of cork dropped on the water floats on it.
- A glass is inverted on the floating cork and is pushed over the floating piece of cork.

Conclusion & observation

The air in the glass exerts pressure and pushes down the cork. This shows that air exerts pressure.

5. Air is considered as matter because it has mass and occupies space .
6. Uses of Air :-
  - (a) Air contain  $\text{CO}_2$ , which is used by plants for photosynthesis.
  - (b) Nitrogen gas which is present in abundance in air helps in making nutrients for plants growth.
  - (c) The air is used for inflating the tyres of vehicle.
  - (d) Air is useful for the survival of life.
  - (e) Oxygen is used for combustion.
  - (f) Wind is made up of moving air which helps us in generating electricity.
7. Air is called a mixture because
  1. Air is not a single substance.
  2. It consists of many gases like nitrogen, oxygen, carbon dioxide and water vapour.
  3. The constituents of air are not chemically combined.
8. (a) (i) Respiration by living organisms  
(ii) Burning  
(b) Photosynthesis puts back oxygen in Air.
9. (a) Photosynthesis by green plants.  
(b) (i) Respiration of living organisms  
(ii) Burning of carbon containing fuel
10. For thousands of years, agriculture was natural process that did not harm the land it was done on. In fact, farmers use to pass their land from one generation to another and it remains as such i.e. Fertile.

However modern agricultural practices causes degradation of the eco-system, land and environment due to the use of modern day agricultural products like pesticides and fertilizers which releases harmful gases in air and cause air pollution.

### Long answer type questions

#### 1. Aim

To show that air contains oxygen.

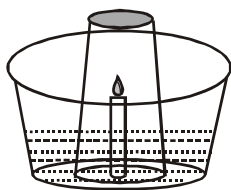
#### Materials required

Two small candles, two containers, two glasses.

#### Method

1. Fix two small candles of the same size in the middle of two shallow containers.
2. Fill the containers with some water.
3. Light the candles and then cover each one of them with an inverted glass (one much taller than the other) as shown in Fig.
4. Observe carefully what happens to the burning candles and the water level. Do the candles continue to burn or go off?

Take a candle. Place it in a tub. Light the candle and also fill the tub with some water. Cover the candle with an inverted glass. You will find that the candle blows out after burning for some time, and the water level inside the inverted glass rises up to some extent.



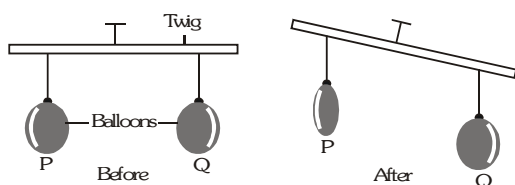
The component, oxygen, of air inside the glass is used up in burning. Therefore, water occupies that space. This shows that air supports burning.

## 2. Aim

To show that air has weight.

### Materials required

Balloons, twig of a broom, thread, needle.



Air has weight

### Method

1. Make a hole in the middle of a twig of broom.
2. From the middle point of the twig make two holes at an equal distance.
3. Introduce a thread from the middle hole of the twig and suspend it freely.
4. Tie balloons blown with air with equal volume.
5. The twig must be horizontal.
6. Make a tiny hole to the balloon on one side.

### Conclusion & observations :

The air goes out and the twig with the punctured balloon comes down showing that the balloon which has air in it has more weight.

3. Uses of Oxygen :
  - (a) Used for aquatic life and other living organisms.
  - (b) Supporter of combustion.
  - (c) Oxygen is provided to patient to increase their low oxygen level.
  - (d) Oxygen breaks down food substance in glucose to liberate energy.
4. In case of plants, plants take carbon - di - oxide which helps in the process of photosynthesis. This process of photosynthesis liberates oxygen gas. This oxygen gas is used for respiration by animals. When the animal inhales oxygen which helps in breaking the food into glucose and release energy and this energy is used for every task needed to be performed.
5. Properties of carbon - di - oxide :-
  - (a)  $\text{CO}_2$  is a colourless, odourless gas
  - (b) It is one - and half times heavier than air
  - (c) Moderately soluble in water
  - (d) Non - Combustible
  - (e) Used in fire extinguisher
  - (f)  $\text{CO}_2$  is slightly sour in taste
6.
  - (a) Water contains dissolved air which is necessary for aquatic plants and animals.
  - (b) Animals depend on plants for respiration plants require  $\text{CO}_2$  to complete their process of photosynthesis and in this process at the end oxygen is liberated which is required by animals for their survival.

(c) Planting more trees reduces pollution of air as :

- (a) Trees helps in removing  $\text{CO}_2$  from the atmosphere during photosynthesis
- (b) Removes air pollutions
- (c) Increase oxygen content in atmosphere
- (d) Regulates the temperature.

(d) Conditions required for rusting :

- (i) The presence of water and oxygen is essential for rusting.
- (ii) Impurities in iron, presence of water vapour, salts fasten rusting

7. Burning : - A process which rapidly undergo a combustion or consumes fuel is such a way to gives us heat, gases or light. Oxygen gas supports burning process.

8. Dry wood considered as a cooking fuel because :-

- (a) Burning of wood produce enough energy to cook food.
- (b) These burning of wood does not produce harmful gases as compared to other fuels.
- (c) These dry woods are easily available and are economical.

9. **(a)Respiration:** This is the most basic level of process in all living things. It is the process of inhaling of oxygen and exhaling of  $\text{CO}_2$ . This oxygen is inhaled by humans and animals to break down food into glucose and then providing energy which can be used for various work and activities.

**(b)Photosynthesis:** This is the process that plants use to change energy from sunlight.

"Photo" means "Light" and 'synthesis' means putting together. Plants need food but they do not have to wait on people or animals to provide for them. Most plants are able to make their own food whenever they needed it. This is done using sun light and the process is called photosynthesis.

**(c) Combustion:** Combustion is a chemical process in which substance reacts with oxygen and gives out energy during the process in the form of either heat or light or even both.

When a product/substance burns in air to produced heat and light called as combustible substance. Eg: Fuels like LPG, kerosene and Petrol. When a substance which do not burn in air to produced heat and light are called Non - Combustible substance. Eg :- Iron, Glass, Water it etc.

10. (i) Aquatic plants and animals are able to survive because of the dissolved oxygen in water. As we know in air the major composition is of Nitrogen gas and oxygen gas i.e., 78% & 21% respectively. But in case of water, oxygen is more soluble in water and nitrogen is insoluble in water.

(ii) **Aim**

To show that burning can occur only in presence of oxygen.

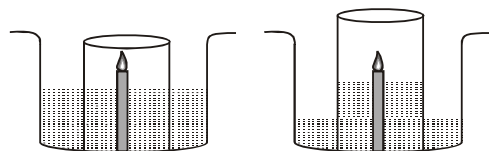
**Materials required**

Two small candles, two containers, two glasses.

**Method**

1. Fix two small candles of the same size in the middle of two shallow containers.
2. Fill the containers with some water.
3. Light the candles and then cover each one of them with an inverted glass (one much taller than the other) as shown in Fig.
4. Observe carefully what happens to the burning candles and the water level. Do the candles continue to burn or go off?

Does the level of water inside glasses remain the same?



Air has oxygen.

The burning of the candle must be due to presence of some component of air, isn't it? Do you find any difference in your observation with the two glasses of different heights? What can be the reason for this?

**Observation and conclusions**

As burning can occur only in the presence of oxygen, we see that, one component of air is oxygen.

But, the amount of air and oxygen inside each glass is limited. Thus, most of this oxygen is used up by the burning candle, it will no longer burn and thus it blows out. Hence, water rises up in the glass once the candle blows out, this rise in water level associated with the amount of oxygen utilised in burning of the candle.