Short Answer Type Questions

1. Write down the composition of the air.

Answer

Air is a mixture of 79% nitrogen, 20% oxygen, 1% carbon dioxide, water vapors, and some other gases. Air also contains dust particles.

2. How does oxygen and carbon dioxide remain nearly constant in the atmosphere?

Answer

Oxygen and carbon dioxide remain nearly constant in the atmosphere by the processes of photosynthesis (in plants) and respiration (in animals), respectively. This released oxygen is consumed by animals by the process of respiration, in which they release carbon dioxide.

3. How does the average temperature of Earth remain fairly steady?

Answer

The average temperature of the Earth is maintained fairly steady by the atmosphere. It prevents a sudden increase in temperature during the daytime and slows down the escape of heat into the outer space at night. It also acts as a blanket covering the Earth.

4. How are winds produced?

Answer

Unequal heating of landmass and water bodies by the sun's heat generate air movement and as a result wind is produced. When the air around landmass gets heated, it becomes lighter and rises up creating a region of low pressure. Air from high-pressure region escapes to the low-pressure region thus generating wind currents.

5. Set up an experiment to measure gain and loss of heat by water, sand, and air.

Answer

Take a closed bottle and place a thermometer in it. Keep these three in sunlight for three hours. Now, measure the temperatures of the three containers. You will observe that the temperature of the water is less than the temperature of the sand, as sand gets heated by the sun faster than water. The

temperature of a closed bottle will be higher than the temperature of the open bottle, because of the greenhouse effect.

6. Demonstrate the formation of convective currents.

Answer

Heat energy can be transferred by convection when there are temperature differences between two parts of a liquid. The formation of convective currents can be demonstrated by the following experiment

Required- Beaker, water, Potassium permanganate VII, Bunsen burner Potassium Permanganate (VII) is a colored compound that dissolved in water on heating.
Procedure:

Take water in a beaker and put potassium permanganate VII into it and put the contents of the beaker to heat on a Bunsen burner. This chemical compound will dissolve slowly in water and the movement of this colored compound will be visible thus showing the formation of convective currents.

7. Enumerate the factors that influence the movement of air.

Answer

- Pressure gradient- Air moves from areas of high pressure to areas of low pressure as observed during land and sea breeze.
- Coriolis effect- is the deflection of moving air caused by the rotation of the earth.
- Friction- It only affects the air movement in contact with the Earth. Friction slows down the air and if the air slows down, the Coriolis effect has more effect then of air movement.

8. How is rain produced?

Answer

Rain is droplets of water that fall from clouds. Heat from the Sun turns moisture (water) from plants and leaves, as well as oceans, lakes, and rivers, into water vapor (gas), which disappears into the air. This vapor rises, cools and changes into tiny water droplets, which form clouds

9. Set up an experiment to demonstrate the effect of low pressure and particulate nuclei over water vapors.

Answer

Take an empty plastic bottle and put 5–10 ml water into it. Close the bottle tightly and shake it well. Place it under the sun for 10 minutes. Now, open the bottle and allow some smoke from an incense stick to enter it. Close the bottle tightly. Now, press the bottle with your hands for a few seconds and then release it.

Observation - When the bottle is placed in the sunlight, the water evaporates and water vapors saturate the air inside the bottle. When the bottle is pressed hard, the internal pressure becomes high and the air inside the bottle moves to a region of low pressure. The smoke particles act as nuclei to condense the water vapors into tiny droplets. When the pressure is released, the air inside the bottle becomes foggy; and when pressure is again applied, the fog disappears.

This occurs because the smoke particles of the incense stick act as nuclei for the water vapors to condense into droplets.

10. Describe the major components of air pollution.

Answer

The major components of air pollution are Sulphur dioxide, nitrogen oxide, carbon monoxide, hydrogen sulfide, hydrogen cyanides, hydrogen fluorides, chlorine, methane and ammonia. Pollutant vapors include unburnt hydrocarbons (benzene).

11. Write a brief note on acid rain.

Answer

The rain with elevated concentration of sulphuric acid is known as acid rain. When SO_2 reacts with water in the atmosphere, it forms sulphuric acid, which washes the soil by rain. It is a disastrous effect of air pollution. It severely affects plant growth and salmon reproduction. It destroys buildings by eroding the stone and brickwork.

12. Explain what is smog. Give its effects.

Answer

Smog is a photochemical haze or smoky mist caused by the action of solar UV radiation on the atmosphere, which is polluted by primary pollutants. Secondary pollutants such as formaldehyde, aldehydes, and peroxyacetyl nitrate (PAN) collectively form smog.

Effects of smog:

(i) It reduces visibility.

(ii) It is highly suffocating and toxic.

13. What are the effects of air pollution on human beings?

Answer

Following are the effects of air pollution on human beings:

(i) Suspended particulate matter in air causes asthma, bronchitis, and allergic cold.

(ii) Air pollutants cause irritation in the eyes, throat, and lungs.

(iii) Hydrocarbon vapors cause cancer.

14. Explain the direction of air movement during the day and night in coastal areas.

Answer

During the daytime, the cool air flows from the sea towards the land, because at this time, the land gets heated faster than the water. It generates a low-pressure area above the land as compared to air over the sea. Hence, the air from the high-pressure area moves towards the low-pressure area.

During the night, cool air from the land flows back to the sea because the land gets cooled down rapidly at night and the pressure of the air above the land becomes higher than the air above the sea. Hence, there is a reverse flow of air.

15. Give the role of atmosphere in climatic control.

Answer

The Earth's atmosphere acts as a blanket for the Earth. It keeps the average temperature of the Earth steady, prevents the sudden increase in temperature during daylight hours, and slows down the escape of heat into the outer space at night.

16. Briefly explain the main layers of the atmosphere.

Answer

Following are the five main layers of the atmosphere:

(i) Troposphere: It is the lowest layer that contains air and that extends up to 8–20 km from the Earth.

(ii) Stratosphere: It is the second layer of atmosphere that extends up to 50 km from the Earth.

(iii) Mesosphere: It is the third layer of the atmosphere that lies above the stratosphere.

(iv) Thermosphere: It is the fourth layer of atmosphere that extends up to 100–120 km from the Earth.

(v) Exosphere: It is the outermost layer of the atmosphere.

17. Explain natural and human-made sources of air pollution.

Answer

Natural sources of air pollution include photochemical smog, ionizing radiations and biocides and pesticides.

Man-made sources of air pollution include industrial pollutants, heavy metals, radioactive elements and automobile exhaust and smoke.

18. How are clouds formed?

Answer

Clouds are formed by an enormous collection of tiny droplets that are formed by the condensation of water vapors in the air. Water vapors are condensed when dust and other suspended particles of the air act as a nucleus for them. These particles condense the vapors into tiny water droplets.

19. What is global warming? Give its effects.

Answer

The heating up of the atmosphere because of the greenhouse gases (carbon dioxide and methane) that trap the heat reflected by the Earth, thereby causing an increase in the Earth's temperature, is called global warming or greenhouse effect.

Effects of global warming:

(i) It causes a change in the weather and precipitation patterns on the Earth.

(ii) It leads to an increase in methane concentration because of the melting of methane hydrates in polar ice caps and sea floors.

20. Briefly explain the depletion of the ozone layer and its effects.

Answer

The depletion of the ozone layer refers to a reduction in the concentration of the ozone layer. It is caused by ozone-depleting substances (ODSs) such as chlorofluorocarbons (CFCs), methyl bromide, nitrogen oxides, and chlorine.

Effects of the depletion of the ozone layer:

(i) It causes skin cancer due to excess exposure to UV radiation.

(ii) It damages the eyes and the immune system.

(iii) It affects plants, thereby decreasing crop yields.