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Shree Swaminarayan Gurukul, Zundal

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1	August	8: Winds, storms and cyclones	
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CHAPTER 8

WIND, STORMS AND CYCLONES

❖ Keypoints to remember:

- **Air :** The invisible gaseous substance surrounding the earth.
- **Composition of Air**: By volume, dry air contains 78.09% nitrogen, 20.95 % oxygen, 0.93% argon, 0.04% carbon dioxide, and small amounts of other gases. Air also contains a variable amount of water vapour.
- **Properties of Air:**

(i) Air around us exerts pressure.
(ii) Air expands on heating and contacts on cooling
(iii) Warm air rises up, whereas comparatively cooler air tends to sink towards earth's surface
(iv) As warm air rises, air pressure at that place is reduced and the cooler air moves to the place

- **Wind:** The moving air is called wind. Air moves from region of high air pressure to region of low air pressure.
- Winds carrying water vapour bring rain
- High –speed winds and air pressure differences can cause cyclones
- It has become easier to monitor cyclones with the help of advance technology like satellites and radars.

❖ Fill in the blanks:

1. Wind is **moving** air.
2. Winds are generated due to **uneven** heating on the earth
3. Near the earth's surface **warm** air rises up whereas **cooler** air comes down
4. Air moves from a region **high** of pressure to a region **low** of pressure
5. Increased wind speed is accompanied by **reduced** air pressure.
6. A dark funnel shaped cloud that reaches from the sky to the ground is called a tornado.
7. Air exerts **pressure**.

❖ **Tick the correct answer:**

1. In which year was Orissa hit by a cyclone?
   (a) 1999
   (b) 2000
   (c) 2001
   (d) 2004
2. Leaves of trees, banner or flags flutter when wind is blowing. Why?
   (a) Air occupies space
   (b) Air is a mixture of gases
   (c) Air exerts pressure
   (d) Air is colourless
3. A fire alarm usually detects smoke in case of fire. Where should such an alarm be placed in a room? (NCERT Exemplar)
   (a) Near the door
   (b) On the floor
   (c) On any wall
   (d) On the ceiling
4. The winds from oceans carry water and bring rain. These winds are called
   (a) typhoon
   (b) monsoon
   (c) cyclone
   (d) none of these
5. A cyclone warning can be issued
   (a) 48 hours in advance
   (b) 12 hours in advance
   (c) 6 hours in advance
   (d) 24 hours in advance

❖ **State True or False:**

1. Cyclones are beneficials to the people living in coastal areas.(**F**)
2. Tornadoes are very frequent in our country.(**F**)
3. It has become easier to monitor cyclones with the help of advanced technology like satellites and radars.(**T**)

4. Air contracts on heating and expands on cooling. (**F**)
5. Air around us exerts pressure.(**T**)

❖ **Answer in one word:**

1. What was the speed of wind of cyclone hit in Odisha on 18 October 1999?
   Ans: 200 km/hr
2. What do the wind, from the oceans carry?
   Ans: Water
3. Name natural disasters.
   Ans: Thunderstorm
4. Which instrument is used to measure the air pressure at any place?
   Ans: Barometer

❖ **Answer in one or two sentence:**

1. What is natural disaster?
   Ans: Natural disaster are extreme, sudden events caused by environmental factors that injure people and damage property.
2. Suggest two methods to find out wind direction at a given place.
   Ans: (i) Take a piece of a paper in your hand. Allow it to fall from your hand. It will flow in the direction in which wind is blowing.
   (ii) You can also use a wind-pane which helps us to know accurate wind direction.
3. State one experiences that made you think that air exerts pressure.
   Ans: Balloons and balls can be used only when they are inflated with air. When balloon is overfilled with air it bursts due to excessive air pressure
4. You want to buy a house. Would you like to buy a house having windows but no ventilators? Explain your answer.
5. Ans: No, a house which has no ventilators is not a safe or healthy house to live in. The air circulation is not there in such a house. So, it has no fresh air.
6. Name two devices that forecast a cyclone.
   Ans: Satellites and Radars

❖ **Long question answer:**

1. What planning is required in advance to deal with the situation created by a cyclone?
   Ans**:** To deal with cyclone, it is important to follow the following points :
   (i) carefully listening the warnings transmitted on T.V. and radio.
   (ii) moving to the safer places.
   (iii) keeping an emergency kit ready.
   (iv) store food in waterproof bags. .
   (v) not venturing into sea.
   (vi) keeping all the emergency numbers.

2. How do cyclones cause destruction?

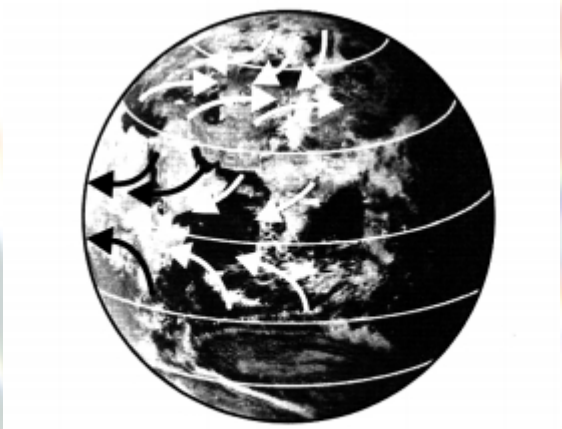
   Ans: Cyclones cause destruction to our life and property. The water waves produced by the wind are so powerful that a person cannot overcome them. The rising water may be as high as 3-12 metres. It moves towards the shore. As a result, the sea-water enters the low-lying coastal areas, causing severe loss of life and property.

   It also reduces the fertility of the soil. High-speed winds accompanying a cyclone can damage houses, telephones and other communication systems, trees, etc., causing tremendous loss of life and property. Continuous rainfall may further worsen the flood situation.

3. Explain how are wind currents generated due to uneven heating between the equator and the poles.

   Ans: The areas close to the equator get maximum heat from the sun. As a result, the air in these regions gets warm. The warm air moves upwards and the cooler air from the regions in the 0-30° latitudes belt on either side of the equator moves in.

   These winds blow from the north and south towards the equator. At the poles the air is colder than that at latitudes about 60 degrees. The warm air at these latitudes rises up and cold wind from the polar regions rushes in, to take its place. In this way, wind circulation is set up between these poles and the warmer latitudes as shown below



The wind flow pattern because of uneven heating on the earth

❖ **HOTS:**

1. Paheli kept an empty bottle made of plastic inside a refrigerator. After few hours, when she opened the refrigerator she found the bottle had collapsed. Explain the possible reason.
Ans: The air inside the bottle contracts due to low temperature. Hence pressure inside the bottle becomes less than the outside and the bottle collapsed.

2. Why an umbrella held upright, at times, gets upturned when high speed wind blows?

Ans: High speed wind passing over the umbrella creates a low pressure. Thus, the umbrella upturns.

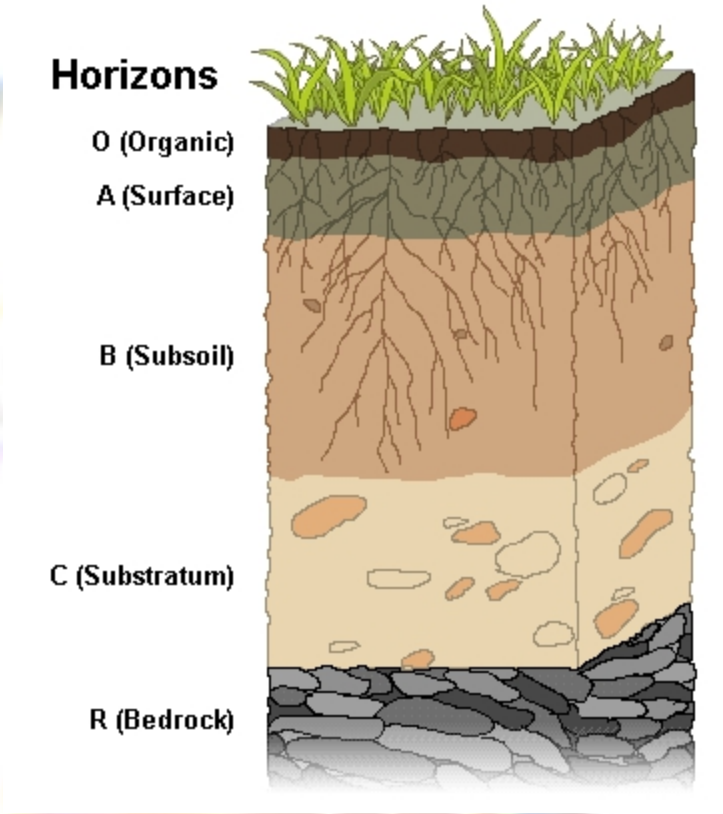
3. During lightning and thunderstorm, one should not take shelter under a tree or lie on the ground. Why?
   Ans: Tree may be the tallest object around, making it perfect target of lightning and one of the worst place to seek shelter. If we lie down, an electrical current passing through the ground from a nearby lightning strike can pass right through our body. So the above two positions may prove fatal in case lightning strike.

❖ **Activity**

- Collect articles and photographs from newspaper and magazines about storms and cyclones. Make a story on the basis of what you learnt in this chapter and the information collected by you.

CHAPTER 9

SOIL



❖ Keypoints to remember:

- Soil is important for life on earth
- Soil profile is a section through different layers of soil. Various layers are called horizons.
- Soil is of different types: clayey, loamy and sandy.
- Percolation rate of water is different in different types of soil. It is highest in sandy soil and least in clayey soil.
- Different types of soils are used to cultivate different types of crops. Clay and loam are suitable for growing wheat, gram and paddy. Cotton is grown in loamy soil.
- Soil holds water in it, which is called soil moisture. The capacity of a soil to hold water is important for various crops.
- Clayey soil is used to make pots, toys and statues.

❖ Fill in the blanks:

1. Soil is formed by **weathering** of rocks.
2. A dark soil is usually rich in **humus.**
3. Soil erosion can be stopped by **plantation.**
4. **Soil profile** is a section through different layers of the soil.

5. **Clayey** soil is used to make pots, toys and statues.

❖ **Tick the correct answer:**

1. In addition to the rock particles, the soil contains
   (i) Air and water
   (ii) Water and plants
   (iii) Minerals, organic matter, air and water
   (iv) Water, air and plants
2. The water holding capacity is the highest in
   (i) Sandy soil
   (ii) Clayey soil
   (iii) Loamy soil
   (iv) Mixture of sand and loam
3. Which factor influences soil formation?
   (i) Climate
   (ii) Vegetation
   (iii) Parent rock
   (iv) All of these
4. The proportion of sand, silt and clay in a soil sample determines
   (i) structure
   (ii) texture
   (iii) nutrient potential
   (iv) fertility level
5. Soil conservation measures are mainly aimed at protecting which of the following?
   (i) Plants
   (ii) Topsoil
   (iii) Sub soil
   (iv) Soil organisms

❖ **State True or False:**

1. Percolation rate of water is highest in the clayey soil and least in the sandy soil.(**F**)
2. Clay and loam are suitable for growing wheat, gram and paddy.(**T**)
3. Cotton is grown in sandy loam soil.(**T**)
4. Polythene bags and plastics pollute the soil.(**T**)
5. Upper portion of soil always contains air.(**T**)

❖ **Answer in one word:**

1. Name the best soil for growing plants.

Ans: Loamy soil

2. A granular material having size between sand and clay is known as?
   Ans: Silt
3. Which soil contains greater proportion of big particles?
   Ans: Sandy soil
4. What comes below C' horizon?
   Ans: Bedrock

❖ **Answer in one or two sentence:**

1. What is soil erosion?
   Ans: The removal of top soil by the action of water and wind is called soil erosion.
2. What do you mean by deforestation?
   Ans: The process of cutting of trees on large scale which harms the environment is known as deforestation.
3. What is soil moisture?
   Ans: Soil absorbs water and also hold water in it, which is known as soil moisture.
4. What processes does formation of soil involve?
   Ans: Formation of soil involves two processes: (a) Breaking of rocks (b)Mixing of soil with organic matter.
5. What is the soft, porous layer of the soil called?
   Ans: It is called top soil or the A-horizon.

❖ **Answer in Long:**

1. List the differences between clayey soil and sandy soil.
   Ans:

Clayey Soil	Loamy Soil
(i) It has much smaller particles	(i) It has much larger particles.
(ii) It can hold good amount of water.	(ii) It cannot hold water.
(iii) It is fertile.	(iii) It is not fertile.
(iv) Particles are tightly packed	(iv) Particles are loosely packed

2. Explain physical properties of soil.
   Ans:

- Soil colour: Soil can be black, red, brown or grey in colour.
- Water-holding capacity: The ability of a particular soil to hold water is called its water holding capacity.

- Soil texture: Roughness, grittiness and smoothness are the properties which gives soil texture. It depends on the amount of sand, silt and clay in a particular soil.
- Acidity or alkalinity: Based on minerals and salts found in a particular area, the soil may be acidic or alkaline. Determining this property of soil is very important to decide which kind of vegetation can be grown in that area.
- Soil structure: Soil structure refers to the way in which soil particles aggregates together. Soil structure modifies the effect of texture in regard of nutrient availability, moisture and air content.

3. Razia conducted an experiment in the field related to the rate of percolation. She observed that it took 40 min for 200 mL of water to percolate through the soil sample. Calculate the rate of percolation.
   Ans:

Given amount of water = 200 mL

Percolation time = 40 min

$$\text{Therefore, percolation rate} = \frac{\text{Amount of water (mL)}}{\text{Percolation time (min)}}$$
$$= \frac{200\,\text{mL}}{40\,\text{min}}$$
$$= 5\ \text{mL/min}$$

4. Explain how soil pollution could be prevented.

   Ans: The persistent build-up of toxic compounds in the soil is defined as soil pollution. To prevent soil pollution, its causes must be controlled.

   1. Reduce the use of plastics: Plastics and polythene bags destroy the fertility of soil. Hence, these should be disposed off properly and if possible, their use should be avoided.
   2. Industrial pollutants: Some waste products from industries and homes pollute soil. These pollutants should be treated chemically to make them harmless before they are disposed off.
   3. Insecticides: Other pollutants of soil include pesticides and insecticides. Therefore, excessive use of these substances should be avoided.

❖ **HOTS:**

1. Is it a good practice to remove grass and small plants from open or unused filed? Why?
   Ans: No, because roots of grass and small plants bind the soil particles and hold them in place. Thus, they help to prevent soil erosion.

2. In Rajasthan, during rainy season, several rivulents of rainwater is a common scene but stream of water is very rare. Explain.
   Ans: Deserts have vast stretches of sand. Sandy soil has high rate of percolation. So it percolates rainwater immediately downwards in the spaces between sand.

3. Why continuously water-logged soils are harmful for standing crops?
   Ans: In water-logged soils, water occupies the spaces between soil particles and thus making roots deprive of available air. This affects of growth of the crops and consequently the crops die.

❖ **Activity:**

1. Sketch the cross section of soil and label the various layers. Color it nicely