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COMPONENTS OF THE ENVIRONMENT:

SOIL

Soil is a continuous layer that covers the earth's surface.
Or
Soil is a medium in which plants grow and get water and mineral salts.

HOW SOIL IS FORMED

- By weathering
- By decomposition of organic matter.

Weathering is the physical and chemical breakdown of rocks into small particles to form soil.

Decomposition is the rotting of dead organic matter.

TYPES OF SOIL

There are three types of soil

i. Clay soil.
ii. Loam soil.
iii. Sandy soil.

a) CLAY SOIL

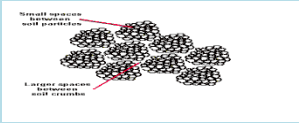
Characteristics of clay soil

- It has fine particles.
- It has closely packed particles.
- It does not allow water to pass through it very fast.
- It has a high water retention capacity so it easily becomes water logged.
- Clay soil has the highest rate of capillarity

Importance of clay soil

- Clay soil is good for pottery work (making pots, ceramics and modeling).
- Clay soil is good for making bricks for building.
- Clay soil is good for making tiles for roofing.

Illustration of arrangement of particles in clay soil.



Activity

1. What is soil?
2. Identify any three components of soil.
3. How is soil formed?
4. Mention the three types of soil.
5. How is clay useful to man?

Tuesday

b) LOAM SOIL

Loam soil is a mixture of clay soil and organic matter
Organic matter (humus) consists of decayed plants and animal matter
Loam soil usually has adequate water, air and humus to sustain plant growth.

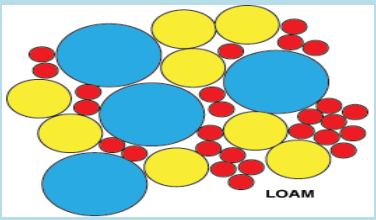
Characteristics of loam soil.

- It's particles are fairly arranged
- It contains both clay and sand particles.
- It has a lot of humus for plant growth.
- Has fairly larger air spaces as compared to clay soil

Importance of loam soil

- It is good for crop growing.

Illustration of arrangement of particles in loam soil.



1. Why is loam soil the best for plant growth?

- It contains a lot of humus.
- It contains balanced particles of sand and clay.

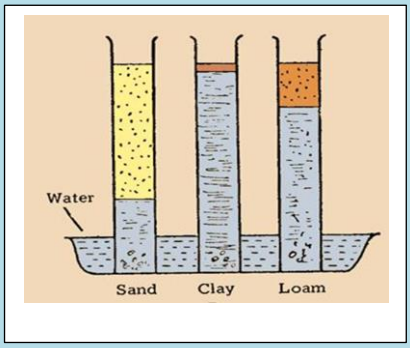
c) SANDY SOIL

Illustration of arrangement of particles in sandy soil.

- Has large particles that make it to be well aerated
- Water passes through it easily
- Has poor water retention capacity
- Has high water drainage
- It is easy to dig
- Has a poor rate of capillarity

Capillarity is the up take of water through the soil particles.
Capillarity is the tendency of water to rise through small narrow spaces.

Experiment showing soil capillarity.



a. Name the soil sample with the highest capillarity.
b. Which soil sample has the lowest capillarity?
c. Which of the soil samples has moderate capillarity?

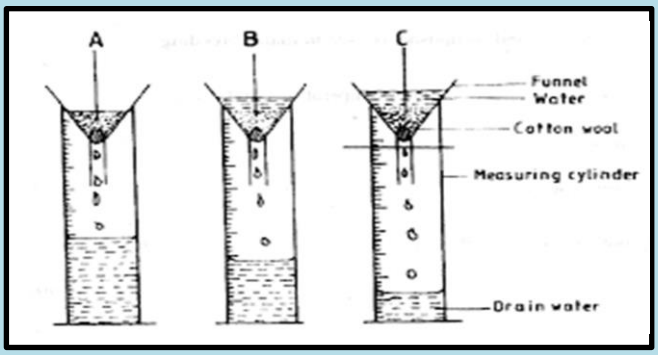
Drainage is the capacity of the soil to allow water to pass through it.

Importance of sandy soil.

- Used for building.
- Used for making glass and sand papers.

NB. It is not good for crop growing because it has a low water holding capacity.

Experiment showing soil drainage.



a) Which type of soil has the highest drainage capacity?
b) Which soil sample has the lowest drainage capacity?
c) Why does sand soil drain water very fast?

Activity

1. Why is loam soil the best for crop growing?
2. Mention one characteristic of loam soil
3. Identify the type of soil which used for making glass.
4. What is capillarity?
5. Which type of soil is porous?

Wednesday

COMPONENTS OF THE SOIL

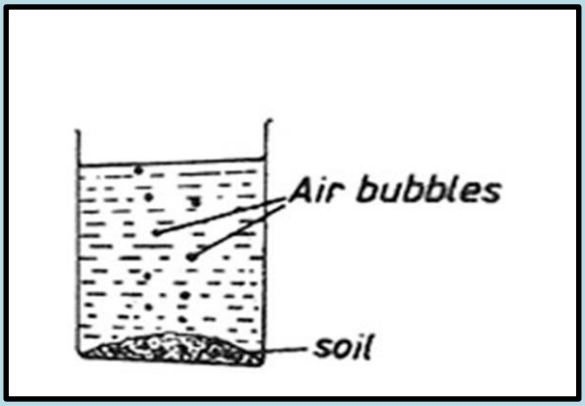
These are things which make up soil,
They include:
- Air.
- water
- humus
- rock particles
- living organisms eg bacteria, insects, earthworms etc.

Importance of components of soil

a) Air

- Air is used by animals in the soil to respiration.
- Air is used during germination.

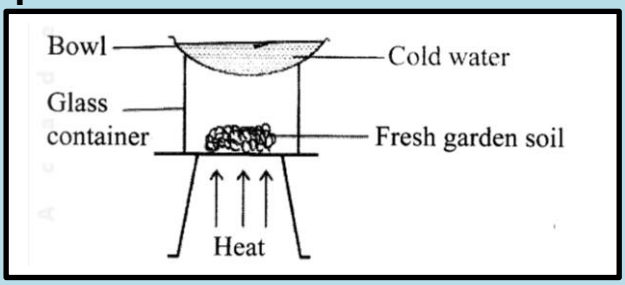
Experiment to show that soil contains air



b) Water

- Water is used by plants for germination
- Making starch (it is a raw material for photosynthesis)
- Promoting decay of matter

Experiment to show that soil contains water.



c) Rock particles (inorganic materials like: sand, gravels, clay formed by weathering)
- Provide space for air to occupy

d) Humus – dead decayed plants and animal matter
- Provide plant nutrients.
- Improve soil fertility
- Makes the soil appear dark in colour

e) Living organisms

Examples of animals that live in the soil.
- Bacteria
- Moles
- Porcupines
- Earthworms
- Ants

- Bacteria like nitrogen fixing bacteria fix nitrogen in the soil and hence improving on soil fertility.

Earthworms
- Aerate the soil.
- Softens the soil /plough the soil
- Add soil fertility by breaking down dead plants and animal remains.

NB: Why do you think earthworms come out of the soil after raining?
- To breathe /take in oxygen.

Properties of soil.
- It has air.
- It has water.
- It contains mineral salts.

SOIL PROFILE

This is the vertical arrangement of soil layers.

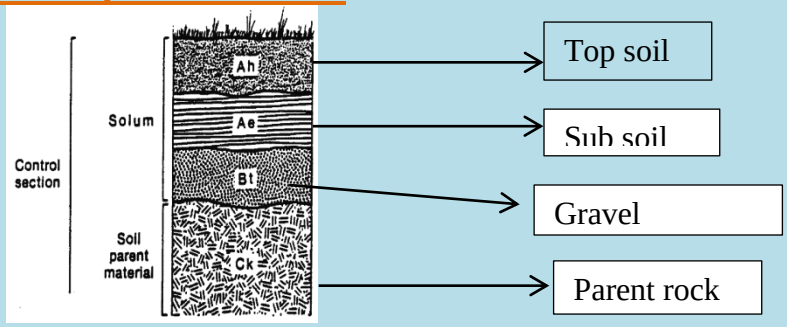
Or

This is the arrangement of soil layers from top to bottom.

Areas where one can clearly see soil profile.

- Pit latrines.
– In trenches.

Illustration of the layers of the soil.



Why is sub soil not suitable for crop growing?
-It can not be accessed by plant roots.

Importance of the top most layer.
- It contains most of the nutrients for plant growth.

Briefly explain the following terms.
- **Soil texture.** This is how rough or smooth the soil is.
- **Soil structure.** I the way soil particles are grouped/ arranged.

Activity
1. What is soil profile?
2. Name the soil layer which good for plant growth.
3. Suggest any place where one can clearly soil profile.
4. What is soil texture?
5. Name any two organisms found in the soil.

Thursday and Friday

SOIL EROSION
This is the removal of top soil by its agents.

Agents of soil erosion
These are forces that carry away top soil from one place to another. These include:
- Running water
- Wind
- Animals

CAUSES OF SOIL EROSION
These are main activities that enable the agents to take away top soil.
How?
- They expose the soil to agents

These include;
- Deforestation
- Overgrazing
- bush burning
- Monoculture (mono-cropping)
- Ploughing down slopes.
- Over cultivation.

TYPES OF SOIL EROSION
a) Sheet erosion: Top soil is washed away uniformly by running water
b) Gulley erosion (deep channels)
c) Rill erosion (shallow channels)
d) Splash erosion /raindrop erosion
e) Stream /river bank erosion
f) Wind erosion

Effects of soil erosion.

- Leads to soil exhaustion.
- It affects soil texture

PREVENTION AND CONTROL OF SOIL EROSION.

1. **Terracing:** reduces the speed of running water
2. **Strip cropping**: reduces the speed of running water
3. **Contour ploughing**: is the ploughing across a slope.
   It helps to reduces the speed of running water
4. **Afforestation**: is planting of trees where they have ever existed. This also keeps the soil covered from direct rain drops.
5. **Re-afforestation**: is the planting of trees where they have been ever existed. This also keeps the soil covered from direct rain drops.
6. **Cover cropping**: planting cover crops between plants that take long to mature.
   Cover crops
   These are crops that are planted between plants that take long to mature
   Qn: How does cover cropping prevent soil erosion?
   Cover crops reduce the speed of running water
   Qn: How does inter-cropping reduce soil erosion?
   Reduces the speed of running water
7. **Bush fallowing:** resting period of land to regain its fertility
   Importance: enables the land to regain its fertility
8. **Mulching:** is the covering of top soil with any plant material (dry plant materials)

Advantages of mulching.

- Controls soil erosion. **How?** By reducing the speed of running water.
- Maintains soil fertility. **How?** by reducing soil erosion and mulches rot to from humus.
- Keeps water in the soil. **How?** by controlling the rate evaporation of water from the soil.
- Increases on the crop yields.
- Reduces the rapid growth of the weeds.

Disadvantages of mulching

- Mulches keep pests.
- Dry mulches can be fire hazards.
- Some mulches can grow into weeds.

Soil fertility

This is the ability of the soil to support plant growth.

Soil exhaustion

This is the loss of soil fertility.

How soil loses its fertility

Through:

- Leaching. It is the sinking of plant nutrients deeper into the soil where plant roots can't reach.
- Soil erosion
- Monoculture (mono-culture)
- Bush burning

How can we improve soil fertility?

- Mulching
- Crop rotation
- Bush fallowing
- Addition of fertilizers
- By terracing
- A forestation

Activity

1. What is soil erosion?
2. Mention the three agents of soil erosion.
3. give any three causes of soil erosion
4. Name two types of soil erosion.
5. Identify any one effect of soil erosion.