11. SOIL

TEACHING TASK (PAGE NO:57)

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)

Multiple Choice Questions

1. What type of soil is best suited for agriculture due to its balanced composition?
   A) Clay soil B) Sandy soil
   C) Loamy soil D) Saline soil

Key: C

Explanation: Loamy soil has a good mix of sand, silt, and clay. It holds water and nutrients well, which is ideal for plants.

2. Which horizon is primarily composed of weathered rock and unconsolidated material?
   A) O Horizon B) E Horizon
   C) C Horizon D) R Horizon

Key: C

Explanation: The C horizon is the layer of partially broken-down rock (parent material) that sits below the subsoil.

3. What is humus?
   A) A type of mineral found in soil
   B) Decomposed organic material that enhances soil fertility
   C) A layer of soil
   D) Water found in soil

Key: B

Explanation: Humus is the dark, rich material made from decomposed leaves and plants. It makes soil fertile.

4. What effect does climate have on soil formation?
   A) It has no effect.
   B) It determines the color of the soil.
   C) It influences the rate of weathering and organic matter decomposition.
   D) It only affects soil texture.

Key: C

Explanation: Temperature and rainfall affect how fast rocks break down and how quickly dead plants decay into humus.

5. Which type of soil has high salt content and can lead to poor plant growth?
   A) Loamy soil B) Sandy soil
   C) Saline soil D) Peaty soil

Key: C

Explanation: Saline soil has too much salt. Most plants cannot grow well in it because the salt harms their roots.

ADVANCED LEVEL

More than One Answer Type

6. Which of the following factors contribute to soil formation?

A) Weathering B) Organic matter accumulation
C) Urbanization D) Climate

Key: A, B, D

Explanation: Soil forms over time from weathering of rocks, addition of dead plants (organic matter), and effects of climate.

7. What are the main components of soil?

A) Mineral particles B) Organic matter (humus)
C) Air D) Plastic

Key: A, B, C

Explanation: Soil is a mixture of minerals (from rocks), organic matter (humus), air, water, and living organisms.

8. Which soil types are characterized by high water retention?

A) Sandy soil B) Clay soil C) Peaty soil D) Loamy soil

Key: B, C

Explanation: Clay soil has tiny particles that hold water tightly. Peaty soil is spongy and can hold a lot of water.

Fill In the Blanks

9. The _____ horizon, or topsoil, is where most agricultural activity occurs and contains a mixture of organic matter and minerals.

Key: A

Explanation: The A horizon (topsoil) is the upper layer of soil. It is dark, fertile, and good for growing crops.

10. The _____ horizon is characterized by leached minerals and nutrients, often found in forest soils.

Key: E

Explanation: The E horizon is a pale layer where minerals and nutrients have been washed down (leached) by water.

Matching Type

11. Match each soil horizon with its description.

Column A	Column B
1. O Horizon	A. Composed of weathered rock and unconsolidated material
2. A Horizon	B. The most fertile layer, rich in or ganic matter
3. B Horizon	C. Contains accumulated minerals leached from above

4. C Horizon D. The topmost layer made of decom posed organic material

Key: 1–D, 2–B, 3–C, 4–A

Answer the Following Questions

12. How does the C Horizon contribute to the formation of soil above it, and why might it be considered less important than the A Horizon?

Answer: The C horizon is weathered parent material that slowly breaks down to form the upper layers. It is less important for plant growth because it has little organic matter or nutrients.

It provides the raw mineral material, but plants grow in the richer A horizon which has humus and nutrients.

13. If a farmer notices that the B Horizon in their field is becoming denser and less fertile, what could this indicate about the soil's health and management practices?

Answer: This could indicate soil compaction or that nutrients are not reaching deeper layers. It suggests poor soil management, like over-tilling or lack of organic matter.

Healthy B horizon should have some accumulated minerals. Denseness can mean poor structure and reduced plant root growth.

LEARNERS TASK

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)

Multiple Choice Questions

1. What is soil primarily composed of?
   A) Water and air
   B) Organic matter, minerals, gases, and microorganisms
   C) Only minerals
   D) Only organic matter

Key: B

Explanation: Soil is a complex mixture of minerals, decayed organic matter (humus), air, water, and tiny living things.

2. Which process is essential for the breakdown of rocks into smaller particles?
   A) Erosion B) Accumulation
   C) Weathering D) Fertilization

Key: C

Explanation: Weathering is the natural process where wind, water, and temperature changes break rocks into smaller pieces.

3. What is the topmost layer of soil called?
   A) A Horizon B) B Horizon
   C) O Horizon D) C Horizon

Key: A

Explanation: The A horizon is the top layer of soil, also called topsoil. It is the most important layer for plant growth.

4. Which soil type is characterized by fine particles that hold moisture well?
   A) Sandy soil B) Loamy soil
   C) Clay soil D) Peaty soil

Key: C

Explanation: Clay soil has the smallest particles. They pack tightly, so clay holds a lot of water but drains slowly.

5. What is the main characteristic of the B Horizon (Subsoil)?
   A) High organic content
   B) Accumulation of leached minerals
   C) Composed mainly of decomposed material
   D) Rich in nutrients

Key: B

Explanation: The B horizon (subsoil) collects minerals like iron and clay that get washed down from the top layers above.

ADVANCED LEVEL

More than One Answer Type

6. What are the functions of the A horizon (Topsoil)?
   A) Supports plant growth by holding nutrients
   B) Contains mostly organic matter
   C) Is primarily composed of weathered rock
   D) Is the layer most affected by leaching

Key: A, B

Explanation: Topsoil (A horizon) is rich in humus and nutrients, making it the best layer for seeds to sprout and plants to grow.

7. Which layers are part of the soil profile?
   A) O Horizon B) E Horizon
   C) F Horizon D) C Horizon

Key: A, B, D

Explanation: A typical soil profile shows layers: O (organic), A (topsoil), E (eluviated), B (subsoil), C (weathered rock).

8. What characteristics are typical of the B horizon (Subsoil)?
   A) Contains accumulated minerals from upper layers
   B) Is the most fertile layer of soil
   C) Generally denser than topsoil
   D) Composed of weathered rock and unconsolidated material

Key: A, C

Explanation: Subsoil (B horizon) is denser and has minerals deposited from above. It is less fertile than topsoil.

Fill In the Blanks

9. Soil is composed of organic matter, minerals, gases, liquids, and _____.

Key: microorganisms

Explanation: Soil contains many tiny living things like bacteria and fungi that help break down dead material.

10. The _____ horizon, also known as subsoil, accumulates minerals leached from the upper layers and may store nutrients for deeper-rooted plants.

Key: B

Explanation: The B horizon is the subsoil. It gets minerals washed down from the topsoil and can feed plants with deep roots.

Matching Type

11. Match each type of soil with its characteristics.

Column A	Column B
1. Clay Soil	A. High organic matter content, dark color
2. Sandy Soil	B. Coarse texture, drains quickly
3. Loamy Soil	C. Balanced mixture of sand, silt, and clay; rich in organic matter
4. Peaty Soil	D. Fine particles, sticky when wet, poor drainage

Key: 1–D, 2–B, 3–C, 4–A

Answer the Following Questions

12. Which soil horizon is primarily composed of organic matter, and why is it critical for soil health?

Answer: The O horizon is primarily organic matter (like leaves). It is critical because it decomposes into humus, adding nutrients and improving soil structure.
This layer feeds the soil with organic material, making it fertile and helping it hold water.

13. What distinguishes the A Horizon from the E Horizon in terms of composition and nutrient content?

Answer: The A horizon (topsoil) is dark, rich in humus and nutrients. The E horizon is lighter, as nutrients and minerals have been washed out (leached) from it.
Topsoil is fertile for plants. The E layer is often less fertile because water has carried nutrients down to lower layers.

TEACHING TASK (PAGE NO:63)

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)

Multiple Choice Questions

1. What is the purpose of cover cropping?
   A) To remove weeds from the soil
   B) To improve soil structure and prevent erosion
   C) To enhance the growth of main crops only

D) To create permanent crop fields

Key: B

Explanation: Cover crops, like clover, are planted between main crops. Their roots hold soil in place, preventing erosion.

2. What does soil fertility primarily refer to?
   A) The texture of the soil
   B) The ability of soil to provide essential nutrients for plant growth
   C) The amount of water in the soil
   D) The pH level of the soil

Key: B

Explanation: Fertile soil has the right balance of nutrients (like nitrogen and phosphorus) that plants need to grow healthy.

3. Which method is used to replenish nutrients in soil?
   A) Mulching B) Crop rotation
   C) Fertilization D) Soil testing

Key: C

Explanation: Fertilizers (natural or chemical) are added to soil to replace nutrients that plants have used up.

4. What is a benefit of conservation tillage?
   A) It reduces the need for fertilizers.
   B) It preserves soil structure and retains moisture.
   C) It increases soil erosion.
   D) It eliminates the need for cover crops.

Key: B

Explanation: Conservation tillage disturbs the soil less. This helps keep soil in place, reduces erosion, and saves water.

5. How can soil testing benefit farmers?
   A) By determining the soil color
   B) By assessing nutrient levels and allowing for targeted amendments
   C) By increasing soil compaction
   D) By predicting weather patterns

Key: B

Explanation: Soil testing tells a farmer exactly which nutrients are missing. They can then add only what is needed, saving money and protecting the soil.

ADVANCED LEVEL

More than One Answer Type

6. Which of the following are causes of soil erosion?
   A) Water erosion B) Wind erosion
   C) Deforestation D) Crop rotation

Key: A, B, C

Explanation: Soil erosion can be caused by water (rain, rivers), wind, and human activities like cutting down trees (deforestation).

7. What are some effects of soil erosion?

A) Loss of fertile topsoil B) Increased soil fertility
C) Water pollution D) Desertification

Key: A, C, D

Explanation: Erosion washes away good topsoil, makes rivers muddy (pollution), and can turn fertile land into desert.

8. Which practices are effective for soil conservation?

A) Contour plowing B) Terracing
C) Monocropping D) Cover cropping

Key: A, B, D

Explanation: Contour plowing, terracing (steps on hills), and planting cover crops all help slow down water and wind to protect soil.

Fill In the Blanks

9. One cause of soil erosion is _____, which involves the removal of trees that protect the soil.

Key: deforestation

Explanation: Tree roots hold soil together. When forests are cut down, the soil is exposed and can be easily washed or blown away.

10. Contour plowing involves plowing along the _____ of the land to reduce water runoff and soil erosion.

Key: contours / contour lines

Explanation: Plowing across a slope (following its shape) creates small ridges that slow water flow, preventing it from washing soil away.

Matching Type

11. Match each cause of soil erosion with its description or example.

Column A	Column B
1. Water Erosion	A. Strong winds transport loose soil particles
2. Wind Erosion	B. Rainfall causes soil particles to detach and wash away
3. Deforestation	C. Removing trees exposes soil to erosion
4. Agricultural Practices	D. Tilling disturbs soil structure, increasing susceptibility

Key: 1–B, 2–A, 3–C, 4–D

Answer the Following Questions

12. What are the effects of soil erosion on the environment and agriculture?

Answer: Effects include loss of fertile land for farming, pollution of water with silt, and destruction of habitats. It can lead to food shortages.

Erosion damages farmland, makes water dirty, and harms plants and animals that depend on healthy soil.

13. What practices can be used to enhance soil fertility, and why are they important?
Answer: Practices include adding compost/manure, crop rotation, and using fertilizers. They are important to keep soil productive for growing food.
These methods put nutrients back into the soil, ensuring crops have the food they need to grow well year after year.

LEARNERS TASK

CONCEPTUAL UNDERSTANDING QUESTIONS (CUQ's)

Multiple Choice Questions

1. What is soil erosion?
   A) The process of soil formation
   B) The removal of the upper layer of soil by natural forces or human activities
   C) The addition of nutrients to the soil
   D) The process of soil compaction

Key: B
Explanation: Soil erosion is when the top layer of soil is worn away by wind, water, or human activities like farming.

2. Which of the following is a cause of water erosion?
   A) Wind blowing over dry soil
   B) Heavy rainfall leading to runoff
   C) Overgrazing by livestock
   D) Urban development

Key: B
Explanation: When rain falls too hard or fast, it can't soak into the ground. The extra water flows over the land, carrying soil with it.

3. What is the main effect of soil erosion on agricultural land?
   A) Increased soil fertility
   B) Improved crop yields
   C) Loss of fertile topsoil
   D) Enhanced water retention

Key: C
Explanation: The topsoil is the best part for growing crops. Erosion removes this layer, leaving less fertile soil behind.

4. What practice involves planting trees or shrubs to reduce wind erosion?
   A) Terracing
   B) Cover cropping
   C) Building windbreaks
   D) Mulching

Key: C
Explanation: Windbreaks are rows of trees or bushes planted to block the wind and slow it down, protecting soil from being blown away.

5. Which of the following is an effective method for reducing soil erosion on slopes?
   A) Conventional plowing
   B) Contour plowing
   C) Tilling in a straight line
   D) Ignoring the slope

Key: B

Explanation: Contour plowing means plowing across a slope, not up and down. This creates barriers that stop water from flowing straight downhill and taking soil.

ADVANCED LEVEL

More than One Answer Type

6. What methods can enhance soil fertility?

A) Crop rotation
B) Soil compaction
C) Fertilization
D) Conservation tillage

Key: A, C, D

Explanation: Rotating crops, adding fertilizers, and using tillage that protects soil structure all help add or save nutrients in the soil.

7. Which practices are associated with maintaining soil health?

A) Mulching
B) Building windbreaks
C) Overgrazing
D) Soil testing

Key: A, B, D

Explanation: Mulching protects soil, windbreaks stop wind erosion, and soil testing tells you what your soil needs to stay healthy.

8. What are the benefits of cover cropping?

A) Reduces erosion
B) Decreases organic matter
C) Improves soil structure
D) Controls pests

Key: A, C, D

Explanation: Cover crops hold soil with their roots, add organic matter when they decompose, and can keep harmful insects away.

Fill In the Blanks

9. Soil fertility refers to the ability of soil to provide essential _____ for plant growth.

Key: nutrients

Explanation: Fertile soil contains important plant foods like nitrogen, phosphorus, and potassium.

10. Regularly testing soil to assess nutrient levels and pH is known as _____ testing.

Key: soil

Explanation: Soil testing is like a check-up for the ground. It helps farmers know what to add to keep their soil healthy.

Matching Type

11. Match each soil conservation practice with its benefit.

Column A	Column B
1. Contour Plowing	A. Helps retain soil and moisture
2. Terracing	B. Reduces water runoff and soil erosion
3. Cover Cropping	C. Suppresses weeds and retains moisture
4. Mulching	D. Adds organic matter and improves soil structure

Key: 1–B, 2–A, 3–D, 4–C

Answer the Following Questions

12. What is soil erosion, and what are its primary causes?

Answer: Soil erosion is the wearing away of topsoil. Primary causes are water (rain, rivers), wind, and human activities like deforestation and bad farming.

Natural forces and human actions can strip away the valuable top layer of soil faster than it can form.

13. How does contour plowing help in preventing soil erosion?

Answer: Contour plowing creates small ridges across a slope. These ridges act like speed bumps for water, slowing it down so it can soak in instead of washing soil away.

By plowing across the hill instead of up and down, farmers trap water and soil on their fields.