

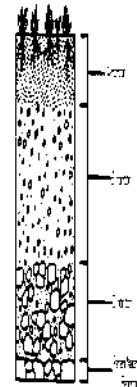
## Soil Formation Worksheet

**Soil** is a mixture of weathered rock & organic matter that usually covers **bedrock** (solid rock that underlies all soil). Both chemical & mechanical processes are involved in the development of soils.

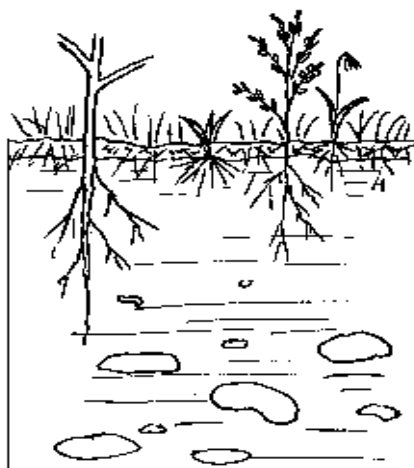
- Chemical weathering turns hard minerals into soft ones
- Mechanical weathering breaks solid rock into smaller pieces
- Plant & animals add organic materials in the form of waste products & dead organisms
- The decay of organic matter produces acids which accelerate chemical weathering
- Burrowing Animals, such as earthworms, insects, & rodents, help circulate air and water through the soil & mix mineral & organic remains

The material from which soil forms is called its **parent material**. Soil that has weathered directly from the bedrock beneath it and therefore matches its parent material is called **residual soil**.

Soil that does not match the bedrock it is over is called **transported soil**. It did not weather from the bedrock beneath it but was brought there by agents of erosion such as winds, rivers, or glaciers. Much of New England & the Midwest are covered by soil that was deposited by the movement of glaciers after the last Ice Age.



A cross section of soil exposed by digging is called the **soil profile**. The weathering of soil produces layers known as **soil horizons**. The topsoil or **A horizon** is usually rich in dark-colored organic remains called **humus** (labeled **O horizon** below). The subsoil or **B horizon**

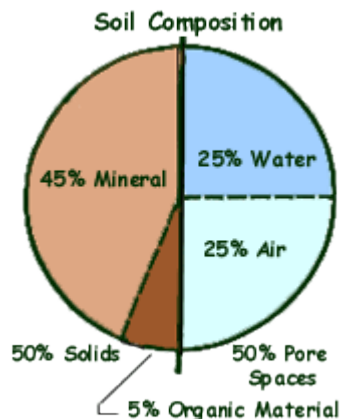


contains minerals that have been transported deeper by groundwater. Most of the clay in soil has also been washed down to this layer. The partially weathered bedrock or **C horizon** is composed of broken up bedrock on top of the solid bedrock (parent material).

**Soil erosion** is the removal of topsoil by the action of running water or wind. It takes between 100 & 400 years for one centimeter of topsoil to form.

Figure 4 - Scheme of a soil profile.

Loss of topsoil can be caused when plants root are no longer present to hold down soil. Salting roads can raise the salinity of the soil and kill the plants. Over grazing can kill plants. Winds construction, & mining can all affect plant cover.



Means of soil conservation include the following:

- **Windbreaks** – belts of trees along the edge of fields
- **Contour farming** – crops are planted in rows parallel to land contours p143
- **Terraces**- flattening hill slopes to slow the flow of water & erosion
- **Strip Cropping** – a crop that leaves bare ground between rows is alternated with a crop that completely covers the ground, ex. Corn & Alfalfa
- **No-till method**- plowing, planting and fertilizing are all done at the same time so there is less chance of wind removing topsoil

*Use the worksheet above to answer the following questions.*

\_\_\_\_\_ 1. Which layer in the diagram below contains the most organic material?

- A. A      B. B      C. C      D. the bedrock

\_\_\_\_\_ 2. How is soil created from rock?

- A. physical weathering without chemical weathering  
 B. chemical weathering without physical weathering  
 C. erosion without weathering  
 D. weathering without erosion

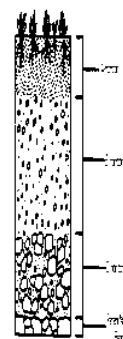
\_\_\_\_\_ 3. Which of the soil conservation methods is least used in NJ?

- A. Strip Cropping      C. Terraces  
 B. Windbreaks      D. no-till method

\_\_\_\_\_ 4. Approximately how many years does one centimeter of topsoil take to form?

- A. 100 – 400 years      C. 1000 – 4000 years  
 B. 10 – 40 years      D. 10,000 – 40,000 years

\_\_\_\_\_ 5. Which of the following is found in the greatest % in soil?

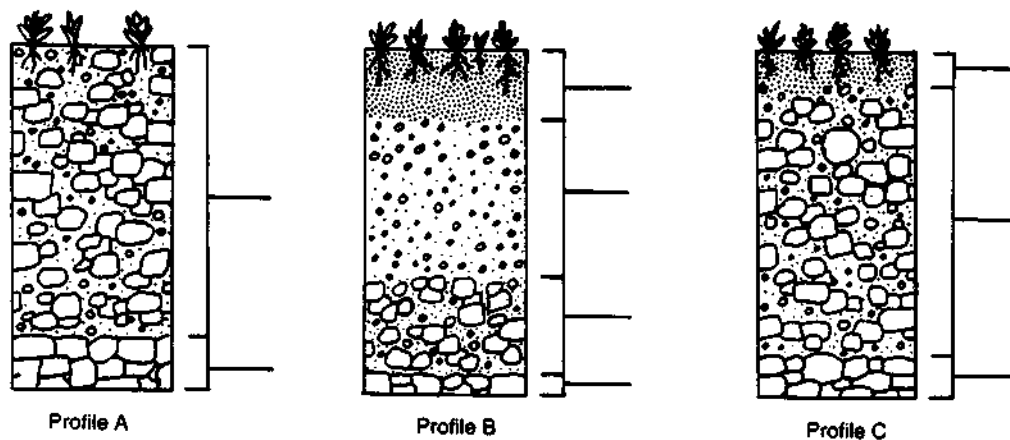


A. Mineral matter B. Organic matter C. Water D. Air

6. Which layer of a soil profile forms first from the bedrock?

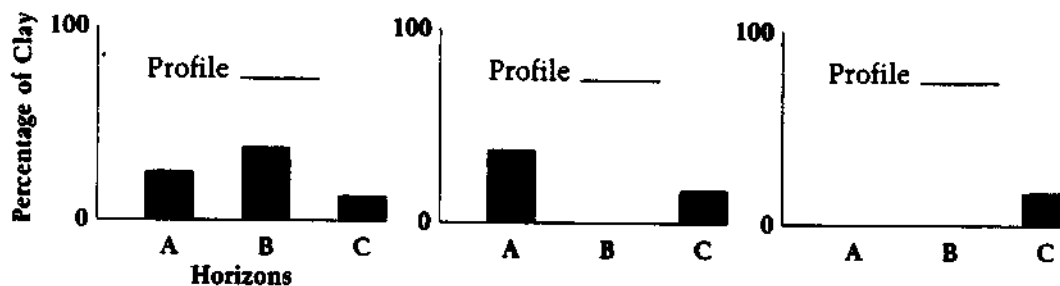
A. A horizon B. B horizon C. C horizon D. humus

7. For the soil profiles below, label the horizons (A, B, or C) and the parent material in each of the soil profiles using the spaces provided next to each image.



8. At the base of each profile above, number the profiles according to the proper sequence of development.

9. Match each soil profile above to the graph below that would most likely represent that profile. Write the letter of the matching profile in the space provided below each graph.



**Guided Reading Questions (Answer the following after reading the passage at the beginning of the assignment):**

1. Define soil. \_\_\_\_\_  
\_\_\_\_\_
2. Describe chemical weathering and mechanical weathering. \_\_\_\_\_  
\_\_\_\_\_
3. How do plants and animals add materials to the soil? \_\_\_\_\_  
\_\_\_\_\_
4. What is parent material? \_\_\_\_\_  
\_\_\_\_\_
5. What is residual soil? \_\_\_\_\_  
\_\_\_\_\_
6. What is transported soil? \_\_\_\_\_  
\_\_\_\_\_
7. How is soil transported? \_\_\_\_\_  
\_\_\_\_\_
8. Where did much of the soil in New England and the Midwest come from? \_\_\_\_\_  
\_\_\_\_\_
9. What is a soil profile? \_\_\_\_\_  
\_\_\_\_\_
10. How are soil horizons produced? \_\_\_\_\_  
\_\_\_\_\_
11. Match the layers from the diagram in your notebook to the soil horizons described in the reading.  
    O Horizon: \_\_\_\_\_  
    A Horizon: \_\_\_\_\_  
    B Horizon: \_\_\_\_\_  
    C Horizon: \_\_\_\_\_
12. What is soil erosion? \_\_\_\_\_  
\_\_\_\_\_
13. List 3 different actions that can affect plant survival. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
14. Describe 3 means of soil conservation. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_