

The Rock Cycle

VOCABULARY:

erosion

The action or process of wearing away by the action of water, wind, or glacial ice.

Context:

Wind, water, or ice can cause erosion of sedimentary rock, resulting in some of the rock being broken down into smaller pieces and carried away.

igneous

Relating to, resulting from, or suggestive of the intrusion or extrusion of magma or volcanic activity; formed by solidification of magma.

Context:

After a volcanic eruption, lava cools and forms igneous rock.

metamorphic

Of or relating to a change of physical form, structure, or substance.

Context:

Metamorphic rock is formed when sedimentary or igneous rock is exposed to high heat and pressure, thus transforming the rock.

sedimentary

Formed by or from material transported and deposited by water, wind, or glaciers, or by the secretions of organisms.

Context:

Sedimentary rock is created when small pieces of rock are deposited and compressed into larger rock formations.

Chapter 6 High Temperature and Pressure Rocks

6:1 The Rock Cycle

Study the diagram of the rock cycle below. Begin at the bottom with magma. Follow the main arrows counterclockwise around the diagram. Explain the changes in your own terms. Tell what must happen for one rock type to change to another. Then go back and explain the cycles within the main cycle.

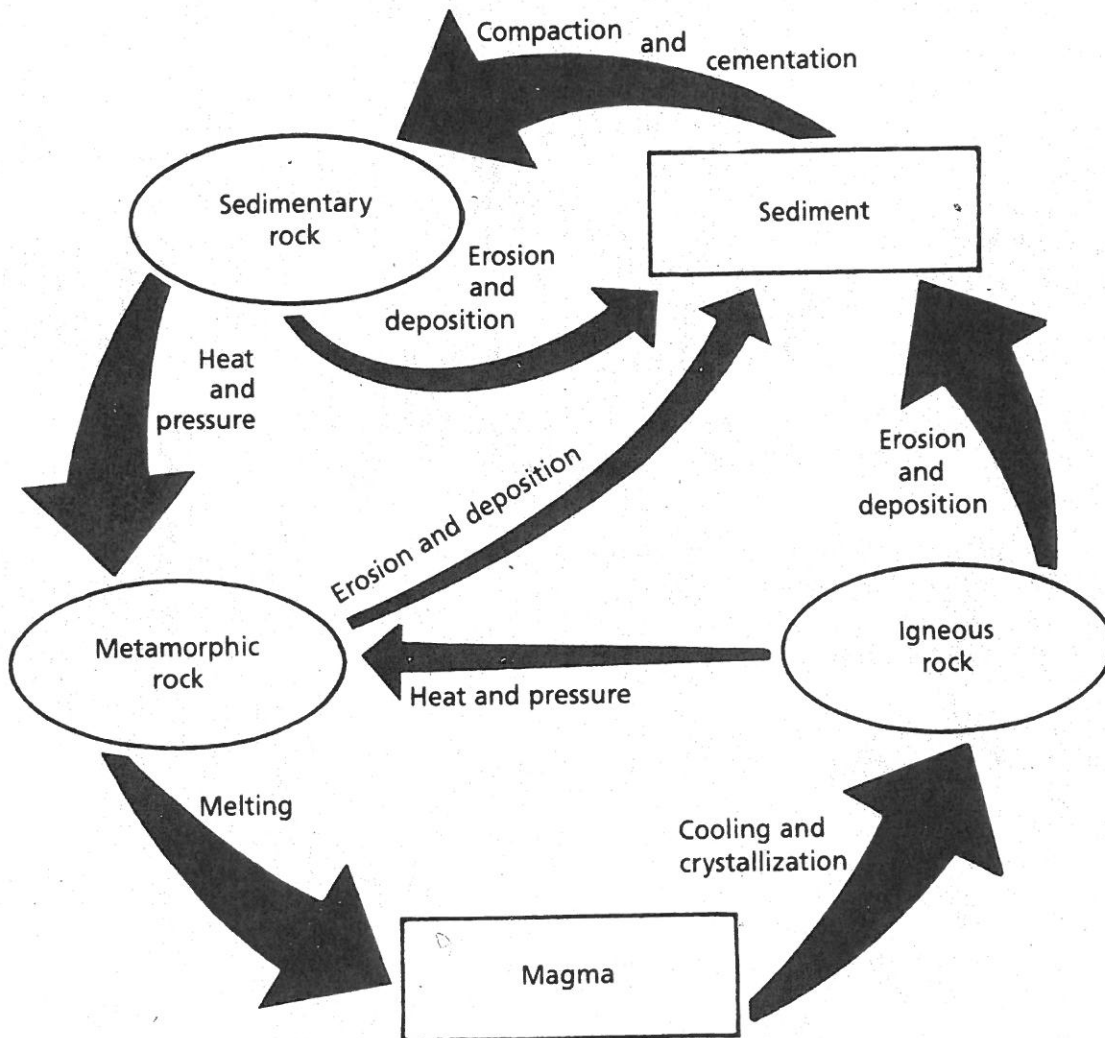


FIGURE 6-1. Rock cycle

Soil & the Soil Ecosystem

Soil is often taken for granted...What 'services' do soils provide???

Soil:

Soil Components:

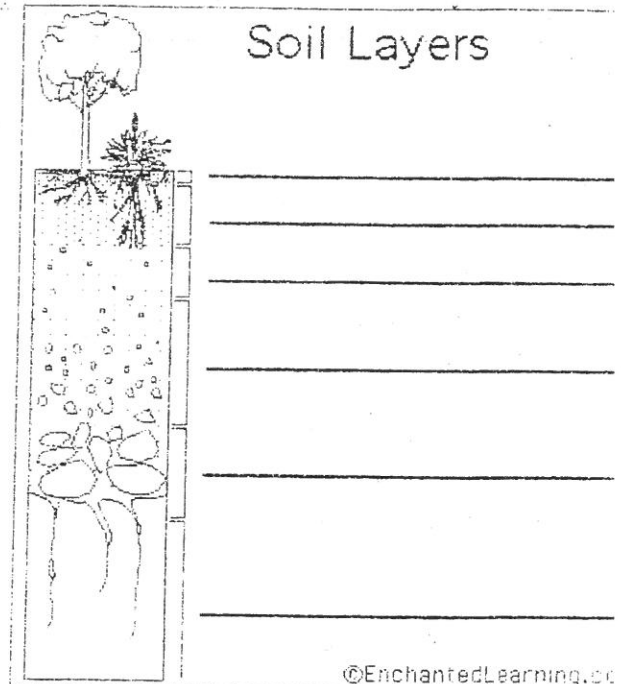
- 1.
- 2.
- 3.
- 4.

Soil Formation:

HOW LONG???

Soil Horizons:

100C



O Horizon - The top, organic layer of soil, made up mostly of leaf litter and humus (decomposed organic matter).

A Horizon - The layer called topsoil; it is found below the O horizon and above the E horizon. Seeds germinate and plant roots grow in this dark-colored layer. It is made up of humus (decomposed organic matter) mixed with mineral particles.

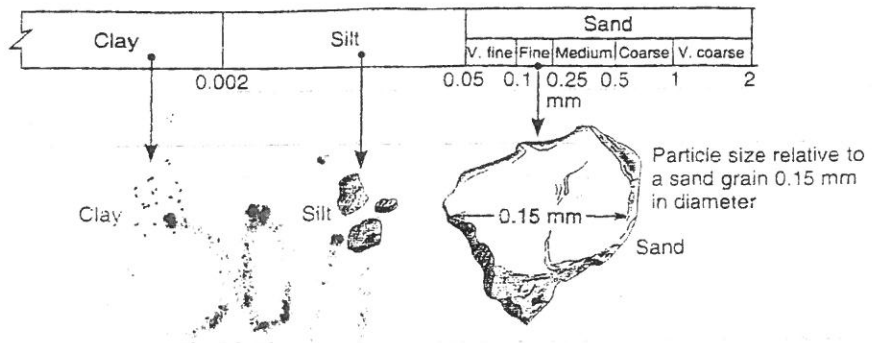
E Horizon - This eluviation (leaching) layer is light in color; this layer is beneath the A Horizon and above the B Horizon. It is made up mostly of sand and silt, having lost most of its minerals and clay as water drips through the soil (in the process of eluviation).

B Horizon - Also called the subsoil - this layer is beneath the E Horizon and above the C Horizon. It contains clay and mineral deposits (like iron, aluminum oxides, and calcium carbonate) that it receives from layers above it when mineralized water drips from the soil above.

C Horizon - Also called regolith: the layer beneath the B Horizon and above the R Horizon. It consists of slightly broken-up bedrock. Plant roots do not penetrate into this layer; very little organic material is found in this layer.

R Horizon - The unweathered rock (bedrock) layer that is beneath all the other layers.

Humus:



Soil Textures:

1. Sand
2. Silt
3. Clay
4. Loam

Soil Acidity:

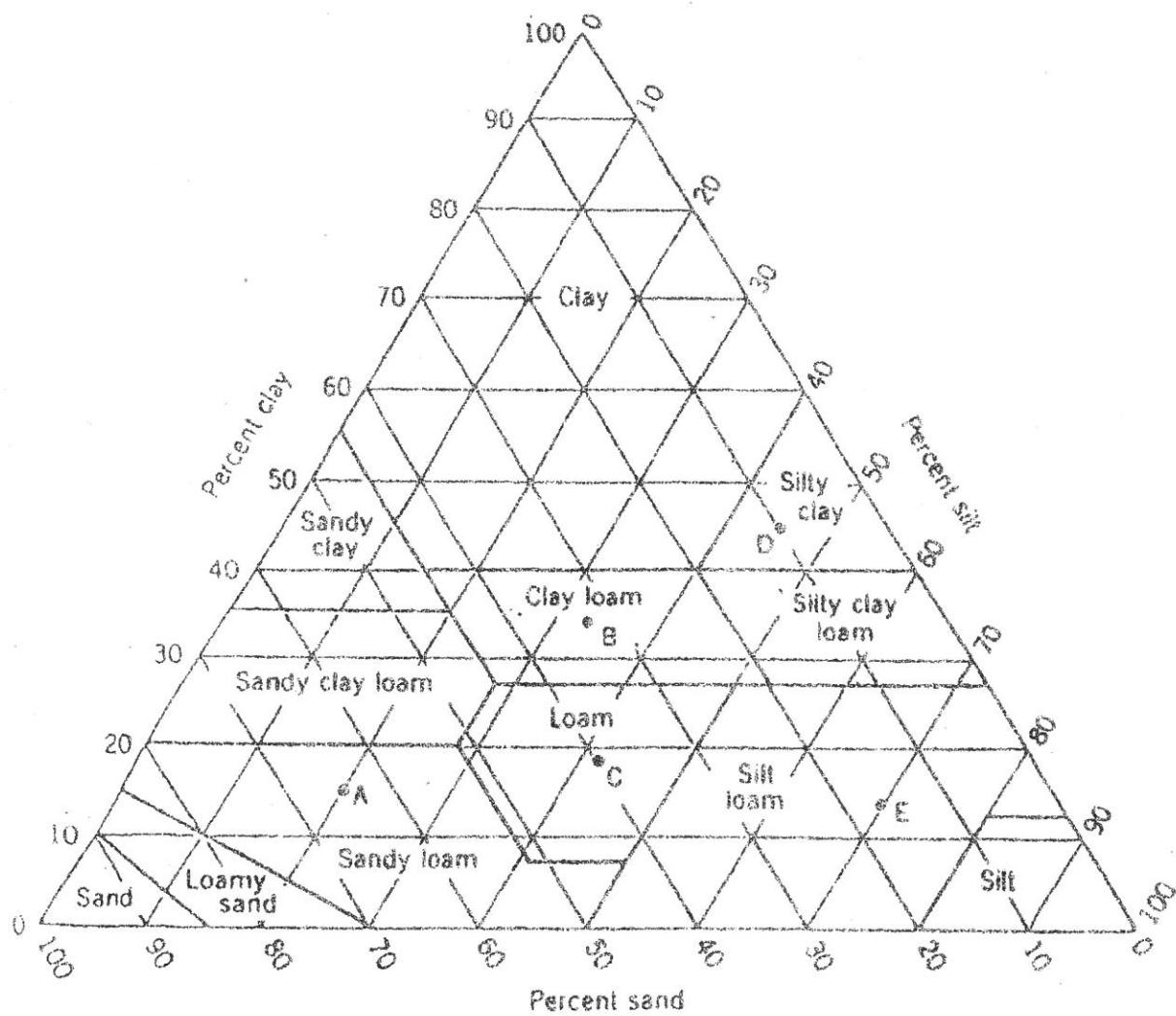
Soil Processes:

1. Leaching
2. Illuviation

Soil Problems:

1. Salinization
2. Erosion
3. Desertification

soil component	water infiltration capacity	water holding capacity	nutrient-holding capacity	aeration	workability ("till")
CLAY	poor	good	good	poor	poor
SILT	medium	medium	medium	medium	medium
SAND	excellent	poor	poor	good	good
ORGANIC MATTER	good	excellent	excellent	poor to good	poor to good



Name _____ Date _____

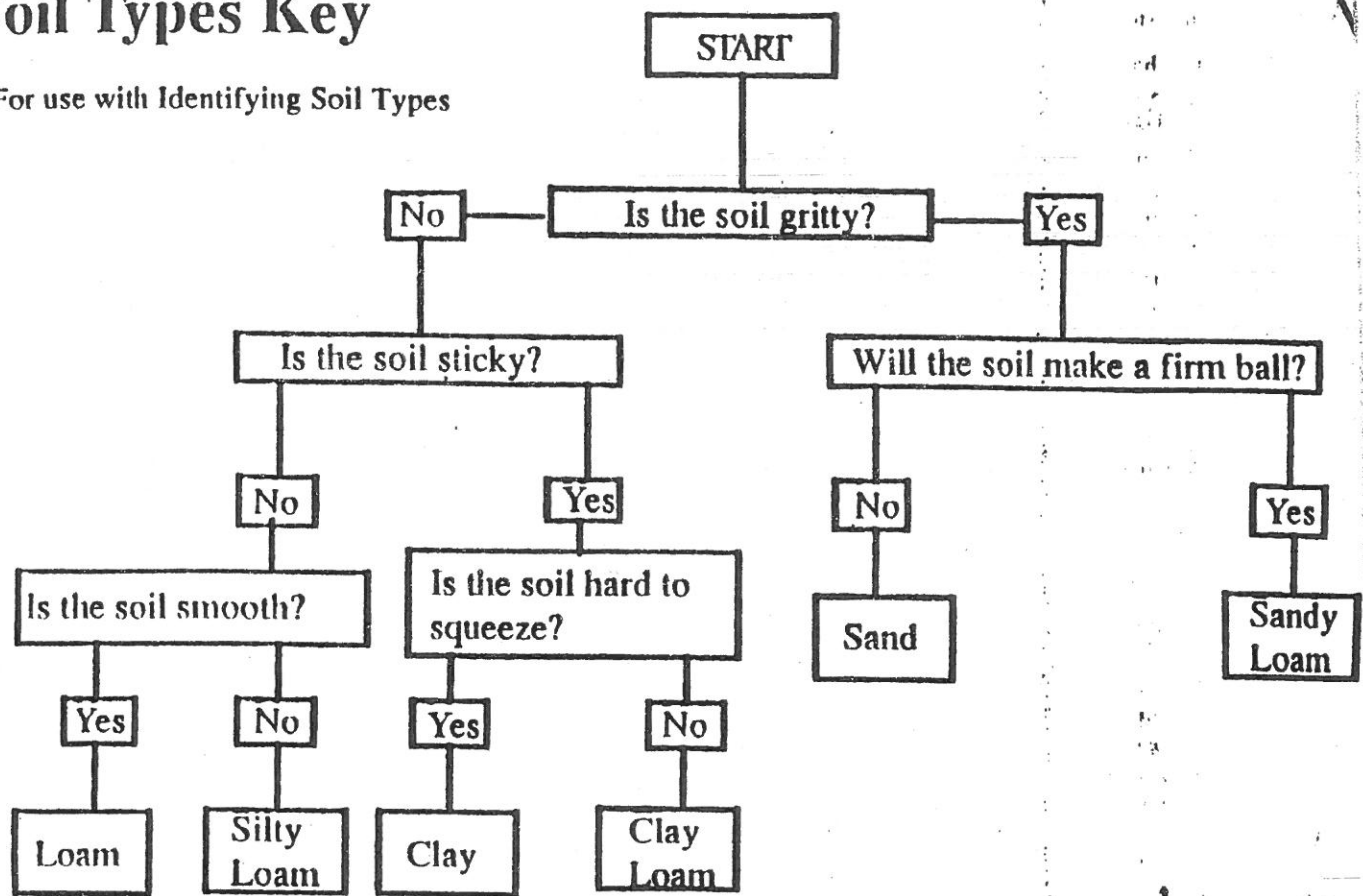
DETERMINING SOIL TEXTURE

Most soils in the United States have varying amounts of sand, silt, and clay. Twelve samples of soil were collected from different locations. Using the table on this page classify each soil sample collected to determine its soil texture. Hint: Zero percent of each soil particle size begins at the base of the triangle and proceeds to 100% at the apex.

Sample #	% Sand	% Silt	% Clay	Soil Texture
1	20	30	50	
2	15	65	20	
3	60	10	30	
4	05	90	05	
5	05	50	45	
6	80	20	00	
7	40	40	20	
8	90	05	00	
9	50	10	40	
10	60	30	10	
11	40	30	30	
2	05	60	35	

Soil Types Key

* For use with Identifying Soil Types



This test involves rubbing a bit of dry or moist soil between your fingers and noting its characteristics.

Soil texture	Dry soil	Moist soil
Sandy soil	<ul style="list-style-type: none"> Grains of sand are visible to the naked eye. The soil runs between your fingers like sugar. The soil is very gritty and rough. 	<ul style="list-style-type: none"> The soil doesn't clump together easily, and breaks apart when prodded with a finger. The soil isn't sticky between your fingers; it is rough and gritty.
Silty soil	<ul style="list-style-type: none"> The soil looks powdery or floury. The soil feels soft. 	<ul style="list-style-type: none"> The soil is very soft and slippery, like soap. It can be rolled into a coil, which breaks apart if you try to bend it. The soil isn't very sticky.
Clay soil	<ul style="list-style-type: none"> The soil contains very hard lumps that are difficult to break apart. 	<ul style="list-style-type: none"> The soil is very sticky; it is smooth and shiny. The soil is easy to mould; it can be rolled between the fingers into a long, flexible coil.
Loam	<ul style="list-style-type: none"> The soil is a bit gritty. The clumps will not break if handled carefully. 	<ul style="list-style-type: none"> The soil is slightly sticky and gritty. If rolled between the fingers, the soil will form a coil that cracks slightly.

Soil Texture Samples

Coarse - Sand, Loamy Sand

Moderately Coarse - Sandy Loam, Fine Sandy Loam

Medium - Very Fine Sandy Loam, Loam, Silt Loam, Silt

Moderately Fine - Sandy Clay Loam, Clay Loam, Silty Clay Loam

Fine - Sandy Clay, Clay, Silty Clay

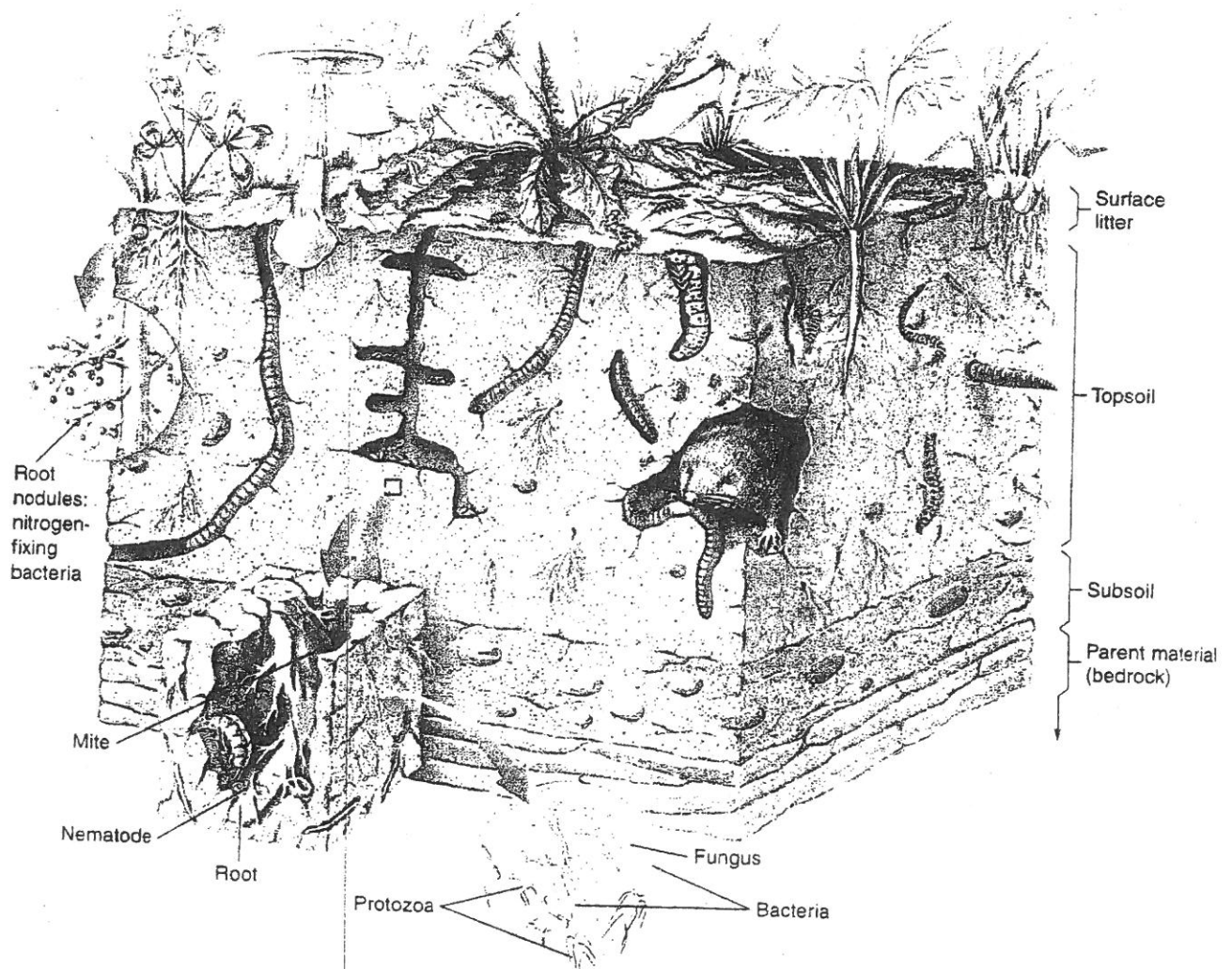
Soil Organisms

- ✓ Millions of organisms inhabit one teaspoon of fertile agricultural soil
- ✓ 170,000 species identified
- ✓ Provide many services such as maintaining soil fertility, preventing soil erosion, breaking down toxic materials, cleansing water

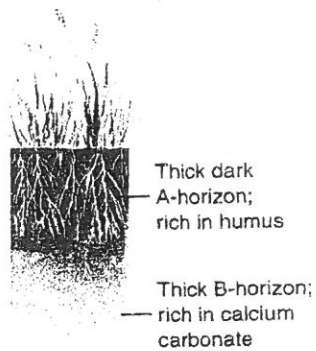
Earthworms:

- ✓ Brings nutrients in lower horizons to surface through castings
- ✓ Aerate soil
- ✓ Add to organic material

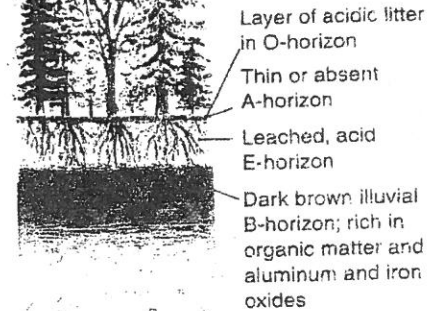
Mycorrhizae: Symbiotic associations between plant roots and fungi



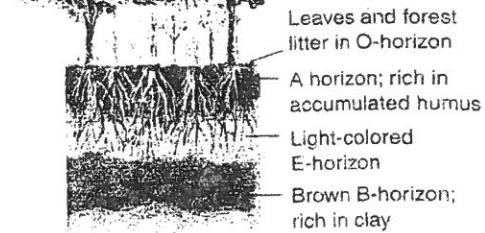
MOLLISOL
Temperate grassland
Semiarid climate with
hot summers and
cold winters



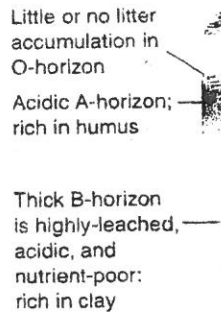
SPODOSOL
Northern evergreen forest
Cold (subarctic) climate



ALFISOL
Temperate,
deciduous forest
Humid climate
with hot summers
and cold winters



OXISOL
Tropical rain forest
Wet, hot climate



ARIDOSOL
Desert
Arid (hot, dry) climate

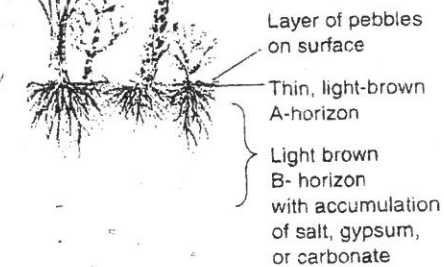


Figure 14-8

Five major soil groups are depicted, along with the vegetation and climate that are characteristic of each. Climate and vegetation help determine soil type.