

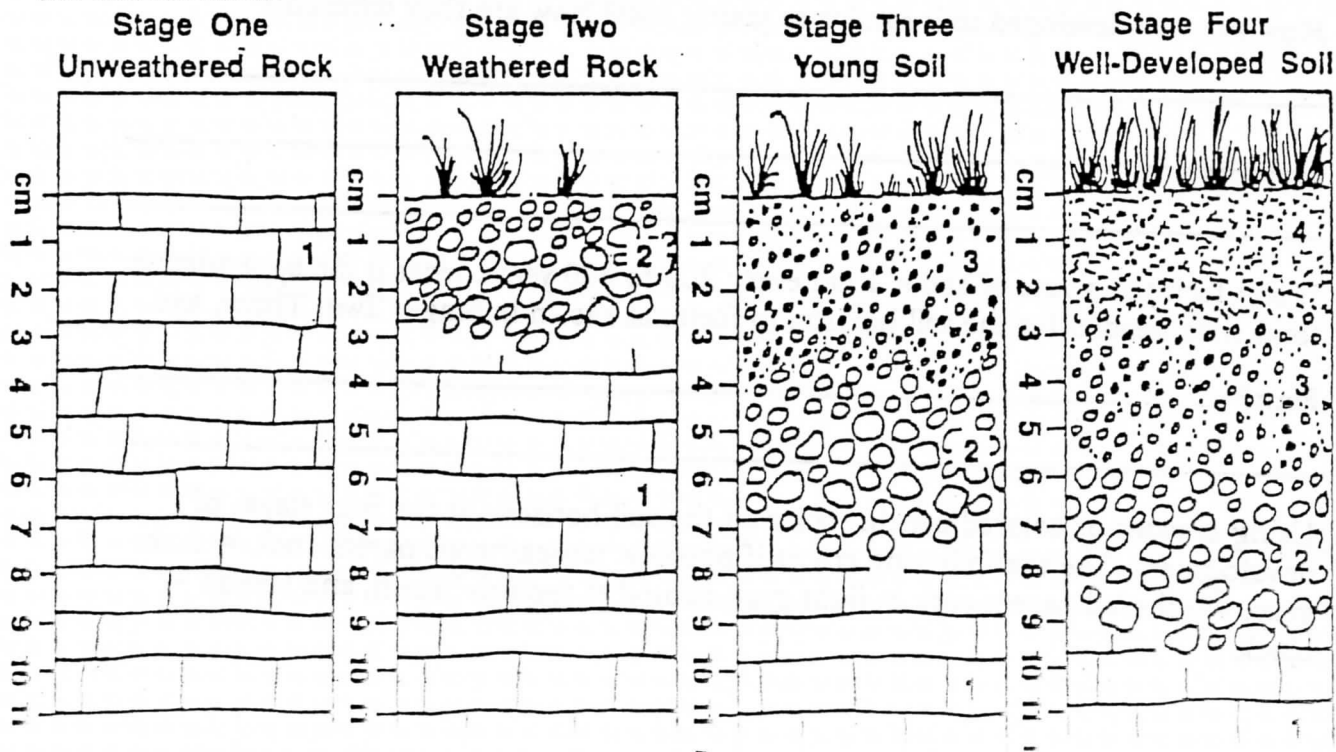
ACTIVITY ■ Weathering and Soil Formation

Examining Soil Profiles and Horizons

Soil begins to form as rock material breaks down into smaller and smaller pieces. Some of these smaller pieces are changed chemically by weathering processes. Organic matter, which comes from the remains of plants and animals, is also added at or near the surface. As time passes, the weathering process changes rock at deeper and deeper levels. The thin layer of soil that first formed becomes thicker and thicker. The soil-forming process continues to move downward with time. Eventually, different layers or zones of soil become noticeable. Such zones or layers of soil are known as horizons, while the entire arrangement of horizons is called a soil profile. Each zone or horizon within the profile has its own distinct characteristics. Broken and weathered rock closely resembles the parent rock from which it came. It is sometimes referred to as the C Horizon. The layer that forms at or near the surface, which contains organic matter, is called topsoil and is often dark in color. It is known as the A Horizon. The layer beneath the topsoil is called subsoil and is often brown or reddish-brown in color. It is referred to as the B Horizon.

The time that it takes for a complete soil profile to form varies from place to place, but usually takes centuries. Some scientists feel that it takes between 200 and 300 years for 1 cm of soil to form from parent rock. Well-formed soil profiles may be hundreds of centimeters thick.

Carefully examine the four diagrams in this activity. Each drawing represents a soil profile in a different stage of development. Notice that a scale in centimeters is provided that indicates the depth of development of each horizon. Answer the following questions based on your observations of these soil profile diagrams and the information provided in the introduction.



1. Describe the difference between a soil horizon and a soil profile. _____

2. Label each soil horizon illustrated in each of the four diagrams.

3. a. List and describe each of the soil horizons illustrated in Stage Two. How thick is each horizon in centimeters? _____

b. List and describe each of the soil horizons illustrated in Stage Three. How thick is each horizon in centimeters? _____

c. List and describe each of the soil horizons illustrated in Stage Four. How thick is each horizon in centimeters? _____

4. Which soil horizon is present in Stage Four but missing from the other three stages? _____

5. At a rate of 1 cm of soil forming every 200 to 300 years, about how long did it take for the subsoil horizon in Stage Four to form? _____

6. How are well-developed soils similar to young soils? How are they different? _____

7. If soil forms at a rate of about 1 cm every 200 to 300 years, what is the approximate total time needed for the soil horizon to form, as shown in Stages Two, Three, and Four? _____

8. Using crayons or colored pencils, color all the soil horizons in the four stages of development. Use the following colors if possible: unweathered parent rock = dark gray, weathered parent rock = light gray, subsoil = reddish-brown, and topsoil = black.