

ESO4B Weathering, Erosion and Soil Name: \_\_\_\_\_  
Date: \_\_\_ / \_\_\_ / \_\_\_ Period \_\_\_ Room \_\_\_



### Did you know?

- 1 Weathering breaks rocks into smaller pieces. Ice causes rocks to mechanically break apart because water expands when it freezes. Acid rain changes rocks chemically.
- 2 Erosion is the movement of the broken pieces of rock. Water and gravity cause the erosion of smaller rock particles downstream by placing them in a new location. This is called deposition.
- 3 Soil is made up of small pieces of rock that have broken down over hundreds, if not thousands, of years mixed with the remains of plants and animals. Soil is home to many organisms, from plants and roots to earthworms and ants (See Fig. 1).



Figure 1 -Rocks and soil are created in different ways.

### So, why is it important to me?

- 4 Soil is a precious resource. It allows us to grow food and provides the materials we use to make everything from the shirt you have on to the medicine you took this morning.
- 5 Soil can be damaged by unsustainable farming practices and clear-cut logging where all the trees in an area are removed.

### What are the big ideas I need to know?

- 6 Weathering changes solid rock into sediments. Sediments are different sizes of rock particles. Huge boulders are sediments; so is gravel. At the other end of the scale, silt and clay are also sediments (See Fig. 2).
- 7 Mechanical weathering breaks rock into smaller pieces without changing the rock itself. These smaller pieces are just like the bigger rock; they are just smaller.
- 8 Ice wedging happens because water expands as it goes from liquid to solid (See Fig. 3). When the temperature is warm, water works its way into cracks in rock. When the temperature cools below freezing, the ice takes up more space and cracks the rock.
- 9 With abrasion, one rock bumps against another rock. Moving water and gravity causes abrasion. Rocks tumble down a slope or are moved by water and bump against one another breaking them down into smaller pieces.



Figure 2 - Sediment can be different sizes

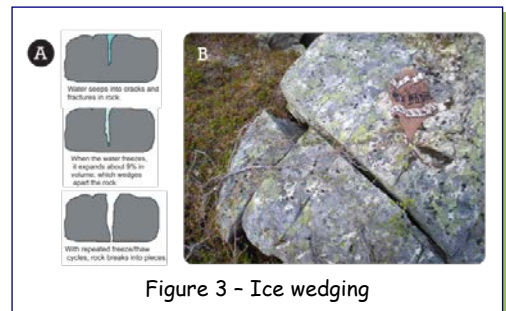


Figure 3 - Ice wedging

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10 As the roots of plants grow larger, they wedge open the crack. Burrowing animals can also cause weathering. By digging for food or creating a hole to live in, the animal may break apart rock.

11 Chemical weathering is different than mechanical weathering. The minerals in the rock change chemically and the result of this weathering is a different type of rock.

12 Water is remarkable in terms of all the things it can do. Some types of rock can completely dissolve in water! Other minerals change by adding water into their structure; this mineral rich water can become a stalactite or a stalagmite.

13 Soil is made of inorganic materials (non-living substances like pebbles and sand) and organic materials (from plants and animals).

14 In the spaces of the top layers of soil are millions of living organisms. The decomposers that eat plant materials and other animals include earthworms, ants, bacteria, and fungi.

15 Soil horizons are different layers of soil with depth. The most weathering occurs in the top layer. This layer is most exposed to weather! It is where fresh water comes into contact with the soil. Each layer lower is weathered just a little bit less than the layer above (See Fig. 4).

16 The "A" horizon is more commonly called the topsoil. The topsoil is usually the darkest layer of the soil. It is the layer with the most organic material. Humus forms from all the plant and animal litter that falls to or grows on the ground.

17 The "B" horizon is also called the subsoil. Soluble minerals and clays accumulate in the subsoil. Because it has less organic material, this layer is lighter brown in color than topsoil. It also holds more water due to the presence of iron and clay.

18 The "C" horizon is made of partially broken bedrock.

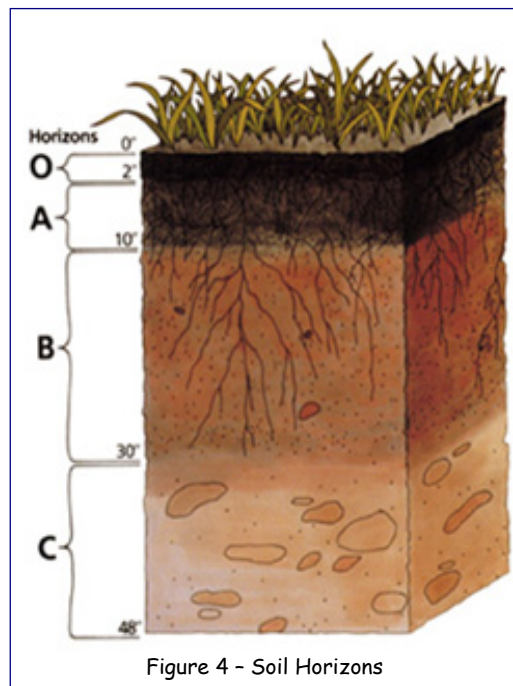


Figure 4 - Soil Horizons

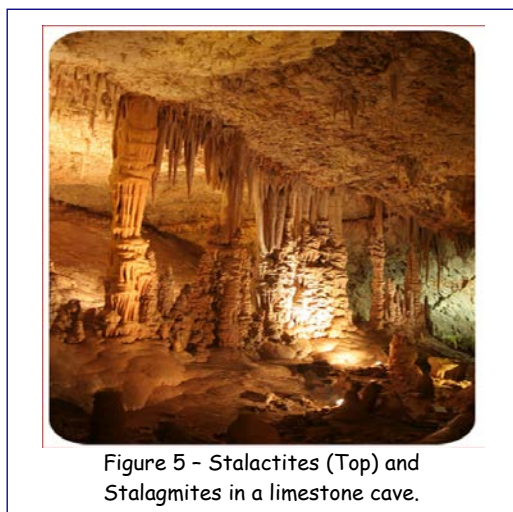


Figure 5 - Stalactites (Top) and Stalagmites in a limestone cave.

## What about?

19 Each type of rock weathers in its own way. Igneous rocks like granite tend to weather slowly because they are hard. Water cannot easily penetrate them. Other types of rock are easily weathered because they dissolve easily in weak acids. Limestone is a sedimentary rock that dissolves easily and makes Stalactites and Stalagmites in caves (See Fig. 5).