

## LESSON 7: Information Sheet 6

### Physical, chemical and biological weathering

Weathering is the decay and disintegration of rock by the action of sun, rain, ice, wind and living things to form soil. There are three main types of weathering;

- Physical weathering caused by changes in temperature and pressure
- Chemical weathering caused by the action of water and chemicals
- Biological weathering caused by the action of plants or animals. It can be either physical or chemical (see below)

#### Physical weathering

Types of physical weathering include:

*Thermal stress* – happens when rock repeatedly warms up and cools down with changes in temperature. This is most likely to happen in deserts that are extremely hot by day and cold by night. The surface of the rock expands and contracts causing stress within the rock, making it break up.

*Freeze-thaw* – happens when water finds its way into a crack in a rock. In very cold weather, especially on mountains, the water may freeze. When water freezes it expands, like a wedge, forcing the crack to widen. If this happens repeatedly the rock will eventually split into fragments. This is why you often see lots of broken pieces of rock at the bottom of a mountain.

#### Chemical weathering

Types of chemical weathering include:

*Carbonation* – happens when rainfall absorbs carbon-dioxide from the atmosphere to form a weak acid called carbonic acid. Sometimes, in polluted air, the rain may absorb other gases, such as sulphur dioxide, to form an even stronger acid. Carbonic acid reacts with calcium carbonate in limestone or chalk to dissolve it. In this way, the rock slowly decays.

*Oxidation* – happens when oxygen in the atmosphere reacts with the minerals in a rock to form a new chemical. The most common example is when iron is turned into iron oxide (rust). As a result the rock changes colour, becoming browner, and begins to crumble. This is most likely to happen when the rock is wet.

#### Biological weathering

Biological weathering can be either physical or chemical, or both.

*Physical* – happens when plant roots find their way into the cracks in a rock and begin to grow. The roots force the crack to widen and eventually cause the rock to break apart. Small animals, such as worms, also help to break up the rocks.

*Chemical* – happens when small plants called lichens – a combination of fungi and algae – grow on the surface of a rock. They produce chemicals that slowly make the surface of the rock disintegrate.



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