HOW ARE SOILS FORMED?

Soil forms continuously, but slowly, from the gradual breakdown of rocks through weathering

PHYSICAL WEATHERING

breakdown of rocks from the result of a mechanical action. Temperature changes, abrasion (when rocks collide with each other) or frost can all cause rocks to break down

CHEMICAL WEATHERING

breakdown of rocks through a change in their chemical makeup. This can happen when the minerals within rocks react with water, air or other chemicals

BIOLOGICAL WEATHERING

the breakdown of rocks by living things. Burrowing animals help water and air get into rock, and plant roots can grow into cracks in the rock, making it split

FACTORS AFFECTING SOIL FORMATION ...

parent material—minerals forming the basis of soil

living organisms—influencing soil formation

time—influencing soil properties

topography—grade of slope affecting drainage, erosion and deposition

climate—affecting the rate of weathering and organic decomposition

Parent materials

Soil minerals form the basis of soil. They are produced from rocks (parent material) through the processes of weathering and natural erosion. Water, wind, temperature change, gravity, chemical interaction, living organisms and pressure differences all help break down parent material.

The types of parent materials and the conditions under which they break down will influence the properties of the soil formed.

For example, soils formed from granite are often sandy and infertile whereas basalt under moist conditions breaks down to form fertile, clay soils.

Organisms

Soil formation is influenced by organisms (such as **plants**), micro-organisms (such as **bacteria or fungi**), **burrowing insects, animals and humans**. As soil forms, plants begin to grow in it. The plants mature, die and new ones take their place. Their leaves and roots are added to the soil. Animals eat plants and their wastes and eventually their bodies are added to the soil.This begins to change the soil. Bacteria, fungi, worms and other burrowers **break down plant litter and animal wastes and remains**, to eventually become organic matter. This may take the form of **peat, humus or charcoal**.

Climate

Temperature affects the rate of weathering and organic decomposition. With a **colder and drier climate**, these processes can be **slow** but, with **heat and moisture**, they are relatively **rapid**. Rainfall dissolves some of the soil materials and holds others in suspension. The water carries or leaches these materials down through the soil. Over time this process can change the soil, making it less fertile.

Topography

The shape, length and grade of a slope affects drainage. The aspect of a slope determines the type of vegetation and indicates the amount of rainfall received. These factors change the way soils form.Soil materials are progressively moved within the natural landscape by the action of water, gravity and wind (for example, heavy rains erode soils from the hills to lower areas, forming deep soils). The soils left on **steep hills** are usually **shallower**. Transported soils include: **alluvial (water transported)colluvial (gravity transported) aeolian (wind transported) soils.**

Time

Soil properties may vary depending on how long the soil has been weathered.Minerals from rocks are further weathered to form materials such as clays and oxides of iron and aluminium.