

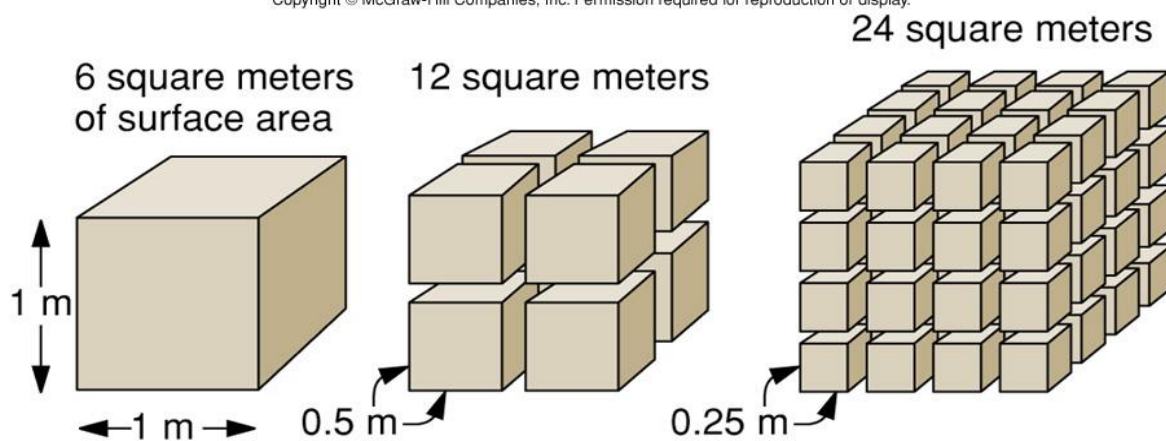
## PHYSICAL WEATHERING

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**PHYSICAL WEATHERING:** the rocks are disintegrated and are broken down to comparatively smaller pieces, without producing any new substances

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### 1. Physical condition of rocks:

The permeability of rocks is the most important single factor. Coarse textured (porous) sand stone weather more readily than a fine textured (almost solid) basalt. Unconsolidated volcanic ash weather quickly as compared to unconsolidated coarse deposits such as gravels.

### 2. Action of Temperature:

The variations in temperature exert great influence on the disintegration of rocks. During day time, the rocks get heated up by the sun and expand. At night, the temperature falls and the rocks get cooled and contract. This alternate expansion and contraction weakens the surface of the rock and crumbles it because the rocks do not conduct heat easily. The differential expansion of minerals in a rock surface generates stress between the heated surface and cooled un-expanded parts resulting in fragmentation of rocks. This process causes the surface layer to peel off from the parent mass and the rock ultimately disintegrates. This process is called **Exfoliation**

### 3. Action of Water

Water acts as a disintegrating, transporting and depositing agent.

i) **Fragmentation and transport:** Water beats over the surface of the rock when the rain occurs and starts flowing towards the ocean

Moving water has the great cutting and carrying force. It forms gullies and ravines and carries with the suspended soil material of variable sizes.

ii) **Action of freezing:**

Frost is much more effective than heat in producing physical weathering. In cold regions, the water in the cracks and crevices freezes into ice and the volume increases to one tenth. As the freezing starts from the top there is no possibility of its upward expansion. Hence, the increase in volume creates enormous outward pressure which breaks apart the rocks. This is called frost wedging.

iii) **Alternate wetting and Drying:**

Some natural substances increase considerably in volume on wetting and shrink on drying. (e.g.) smectite, montmorillonite. During dry summer/ dry weather - these clays shrink considerably forming deep cracks or wide cracks. On subsequent wetting, it swells. This alternate swelling and shrinking / wetting or drying of clay enriched rocks make them loose and eventually breaks.

iv) **Action of glaciers:**

In cold regions, when snow falls, it accumulates and change into a ice sheet. These big glaciers start moving owing to the change in temperature and/or gradient. On moving, these exert tremendous pressure over the rock on which they pass and carry the loose materials. These materials get deposited on reaching the warmer regions, where its movement stops with the melting of ice.

**4. Action of wind:**

Wind has an erosive and transporting effect. Often when the wind is laden with fine material *viz.*, fine sand, silt or clay particles, it has a serious abrasive effect and the sand laden winds itch the rocks and ultimately breaks down under its force. The dust storm may transport tons of material from one place to another. The shifting of soil causes serious wind erosion problem and may render cultivated land as degraded

(e.g) Rajasthan deserts

**5. Atmospheric electrical phenomenon**

It is an important factor causing break down during rainy season and lightning breaks up rocks and or widens cracks