

# CHAPTER 6 = DENUDATION (WEATHERING)

Weathering is the breakdown of rock by the weather.

erosion is the breakdown, transportation and deposition of rock by rivers, seas and glaciers.

## 2 types of weathering

(1) mechanical/physical

(2) chemical

### (1) mechanical/physical weathering

-weather breaks rock into screen

### First type of mechanical/physical weathering

=freeze thaw/frost action

Temperature must go below zero and above zero. you need jointed or cracked rock eg limestone, sandstone. plentiful supply of water. it happens in mountains especially in winter. every 1,000m drops by 7 degrees the air gets thinner. at day = water flows into any cracks in the rock

At night = the water in the cracks freezes and expands by 9 percent and puts pressure on rock and overtime breaks the rock into soil/scree and you get a lot of relief rain in croaghpatrick.

### 2nd type of mechanical/physical weathering

-sudden changes/exfoliation of temperature.

It will only occur in countries where there's a large temperature range hottest-cold temp. its common in desert areas eg the sahara desert in africa. day time it gets hot by 50 degrees celsius. rock expands by (1) low latitude (2) cloudless skies (3) land heats very quickly. at night time it gets very cold. (1) cloudless skies (2) land cools very fast rock contracts gets smaller eventually rock weakens over time and eventually rocks break down layer by layer.

sand is broken down rock in a desert

diagram = (draw your own diagram)



## (2)chemical weathering

-breakdown of rock by a chemical reaction between weather and rock.when some gas/water by a reacts with a mineral in the rock with a bonding agent.rocks have all minerals and join with a bonding agent .mineral rock (1)iron (2)magnesium

### Type of chemical weathering

Chemical carbonation=that is when rainwater absorbs carbon dioxide and it becomes a mild carbonic acid.the acidic rainwater reacts with calcium carbonate that limestone bonding agent now forming calcium bicarbonate which is soluble in water.calcium carbonate over a long period of time dissolve the limestone.

**Calcium carbonate**=not soluble

**Calcium bicarbonate**=soluble

**Stratified rock**=layers of compressed rock,silt,sand,mud.each strata separated by a bedding plane.

**porous**=cotton is porous.

Carbonation shapes karst landscapes.karst region area of exposed limestone(not covered by soil/vegetation)

**Karst landscape**=is a landscape of exposed limestone the vegetation/soil that is covered is gone .Vegetation is gone because trees cut down by farmers and soil down by glaciers.glaciers erode the soil or melt water by glaciers causing soil erosion.it forms a limestone pavement.

### Surface feature in a karst region

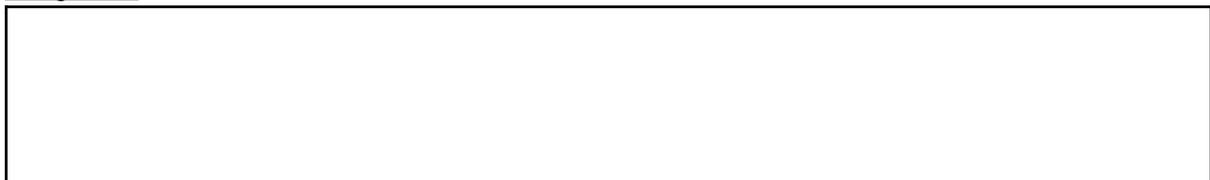
#### FEED

**Feature/landform**=limestone

**example**=burren co.clare

**explain**=limestone is made up of layers of compressed sea fossils and separating each layer is a line of weakness called a bedding plane (horizontal skinny lines between them).limestone pavement are formed by carbonation this is when rainwater flows through atmosphere calcium carbonate which is soluble in water and breaks down soil.limestone has vertical underground lines of weakness called joints acidic rainwater deepens and widens these joints to form grikes.the slabs of more resistant limestone called clints.if there is a pre existing hollow on the clint carbonation enlarges it to form a karren.in upland area grikes are enlarges by freeze thaw action.eg of swallow hole=pollnagollum

### Diagram=



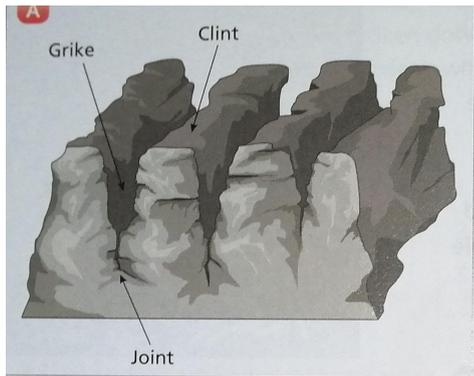


diagram of grikes,joints,clints

Differences between mechanical and chemical weathering

Mechanical weathering only changes physical appearance of rock changes.the chemical compaction is unchanged.minerals/bonding apart.chemical weathering is the physical appearance and chemical composition changes.

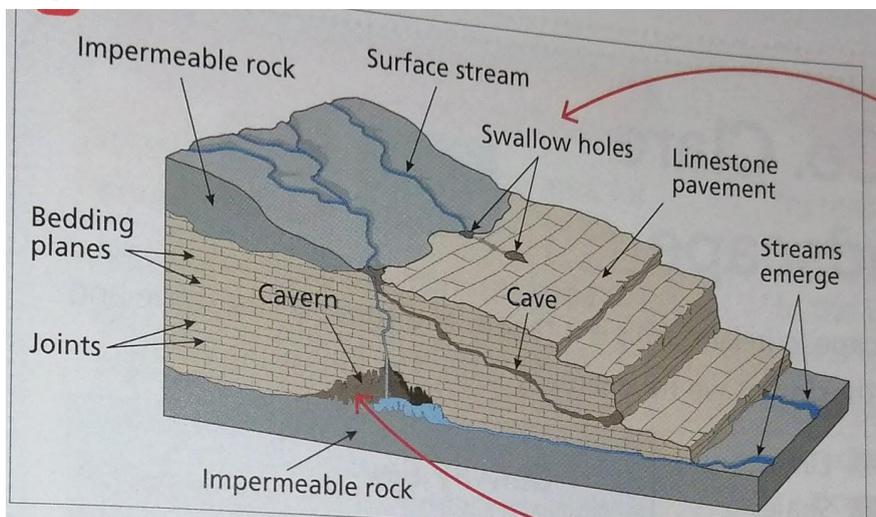
The processes and effects of weathering on a karst landscape.underground feature karst region.

feature=cave

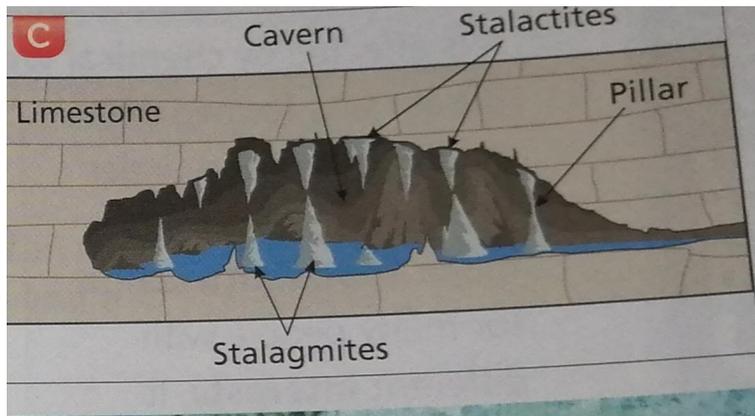
example=ailwee caves burren co.clare

Explain=caves form underground in areas of limestone because limestone is a porous rock.rivers in karst regions disappear underground through swallow holes.rivers flow down joints and along bedding planes and dissolve the limestone by carbonation to form a cave.all caves have dripstone features made up of hardened calcite.calcite is dissolved limestone.as water passes through limestone it absorbs calcite .carbonation this is when water absorbs carbon dioxide changed calcium carbonate to calcium bicarbonate.drips of water form on roof of a cave the water evaporates and specks of calcite grow down from ceiling to form stalactites.drops of water splash onto the floor of the cave water evaporates and specks of carbon calcite of dissolved limestone grown from the floor of cave they form stalagmites and the 4 pillars of calcite form if stalactites and stalagmites join.

diagram=



Dripstone features=(1)stalagmites (2)stalactites.



<u>Advantages of tourism</u>	<u>Disadvantages of tourism</u>
(1)provides employment in the area for local people (2)reduces migration in an area (3)brings income to the region and therefore the services and infrastructure improves	(1)increased pollution can cause damage to limestone (2)new buildings and increased services can destroy the scenic beauty of the region (3)walkers can cause damage to the rare flora and fauna in the region.

## EXAM QUESTIONS

### -SAMPLE ANSWERS

#### Process of physical/mechanical weathering

##### Freeze thaw/frost action

The temperature must go below zero and above. you need jointed or cracked rock eh limestone, sandstone. A plentiful supply of water. it happens in mountains especially in winter. every 1,000m drops by 7 degrees celsius the air gets thinner. at day time the water flows into any cracks in the rock. then at night time the water in the cracks freezes and expands by 9 percent and puts pressure on rock into soil/scree and you get lots of relief rain like for example in croagh patrick. relief rain gets weakened and cracks to screen.

#### Explain in detail how carbonation occurs.

Carbonation is the mixing of water (rain water) with carbon dioxide that then becomes a mild carbonic acid. Carbonation takes place when the rock minerals react with weak carbonic acid formed when water combines with carbon dioxide in the atmosphere. the acidic rainwater reacts with calcium carbonate that's limestone bonding agent now forming calcium bicarbonate which is soluble in water. Calcium carbonate acts on the rock like for example limestone by breaking down and dissolving its mineral contents. The dissolved materials are washed away by ground water, and the soluble ions are stored in the groundwater supply. Rocks such as limestone and feldspar experience this type of chemical weathering more. This type of weathering is important in the formation of caves.

#### Learning outcomes=

1. Analyse the processes and effects of weathering on our landscape

