What is the lithosphere and how is it shaped?

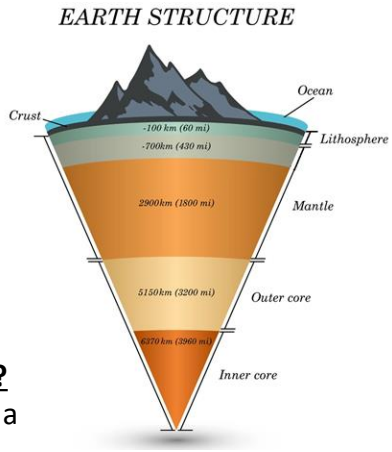
Formation and structure of the lithosphere.

Geology is the study of the formation & the structure of the earth's lithosphere.

The earth formed over 4.6bn years and slowly changes have created the planet that we recognise today.

The lithosphere is the solid outer layers of the earth, including the crust.

The layer underneath the lithosphere is semi-solid so the lithosphere can move, this causes volcanoes, earthquakes and mountain ranges.

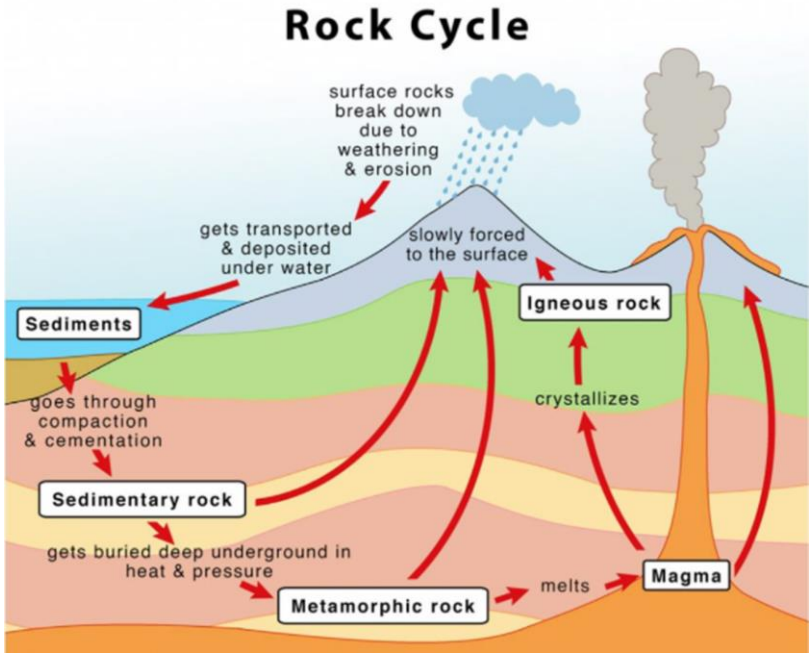


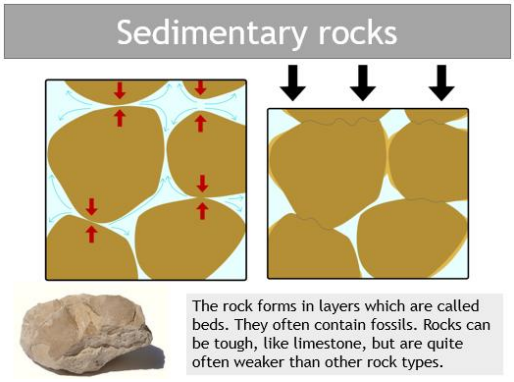
What are the main types of rocks that make up the lithosphere?

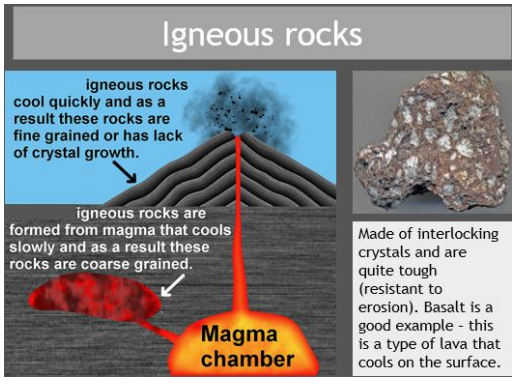
There are 3 main types of rocks: sedimentary, igneous and metamorphic rocks.

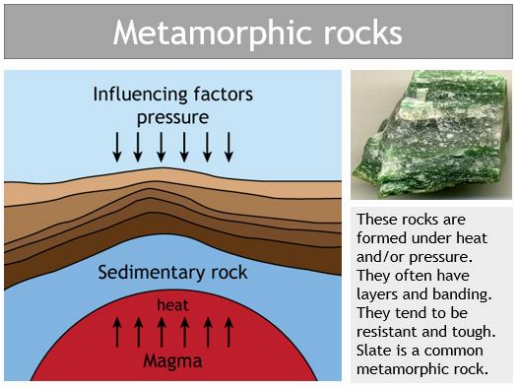
How do rocks change over time?

Rocks change over 1000 years in a process known as the rock cycle.









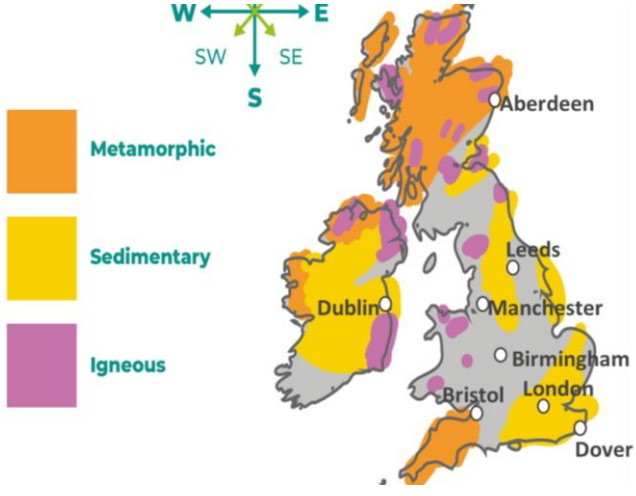
What types of rocks do we find in the UK and how do they affect us?

Metamorphic, sedimentary and igneous rocks are found throughout the UK.

The pattern of rock type in the UK influences the relief of the land (how high and steep the land is).

Where there are hard rocks, such as igneous and metamorphic rocks the land is high, here there is hill farming and fewer people.

Where there is soft sedimentary rocks there is flatter land so more crop farming and more people.



How is the lithosphere changed by weathering?

There are 4 types of weathering: freeze thaw weathering, biological weathering, chemical weathering and onion skin weathering.

Freeze-Thaw Weathering: Water gets into cracks in the rock and freezes. This causes the crack to get bigger and eventually break up.

Biological Weathering: Plant roots and animals break up rock and soil.

Chemical Weathering: Carbon dioxide in rainwater and oxygen from the air can react with rocks such as limestone, breaking them down.

Onion Skin Weathering: Heat expands and contracts the outer layer of the rock, causing it to break off.

What else can shape the lithosphere?

The lithosphere is constantly shaped by the wind (atmosphere), water (hydrosphere), people, plants and animals (biosphere). This is what creates, valleys, coastlines and other landforms that we see on our planet.

How does water get into a river?

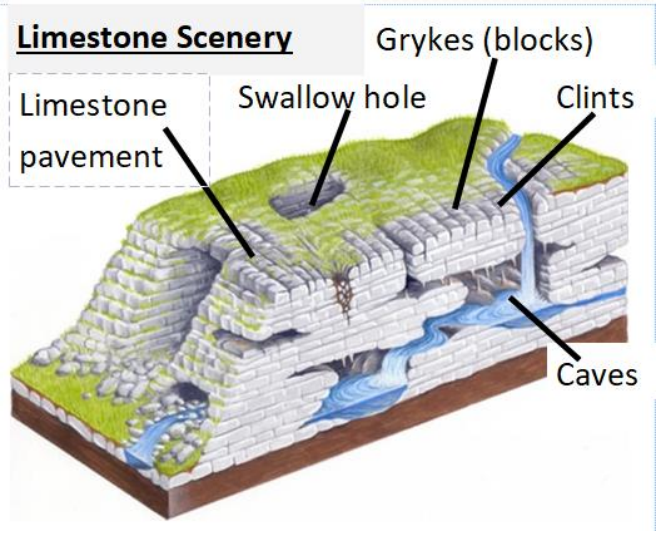
Water moves around our planet as part of the hydrological cycle. When it *precipitates* water lands in a drainage basin and has several ways it can return back to a body of water (sea or ocean).

The river is comprised of multiple streams and rivers which all converge to form one large river in the drainage basin which exits into a body of water, usually the sea.

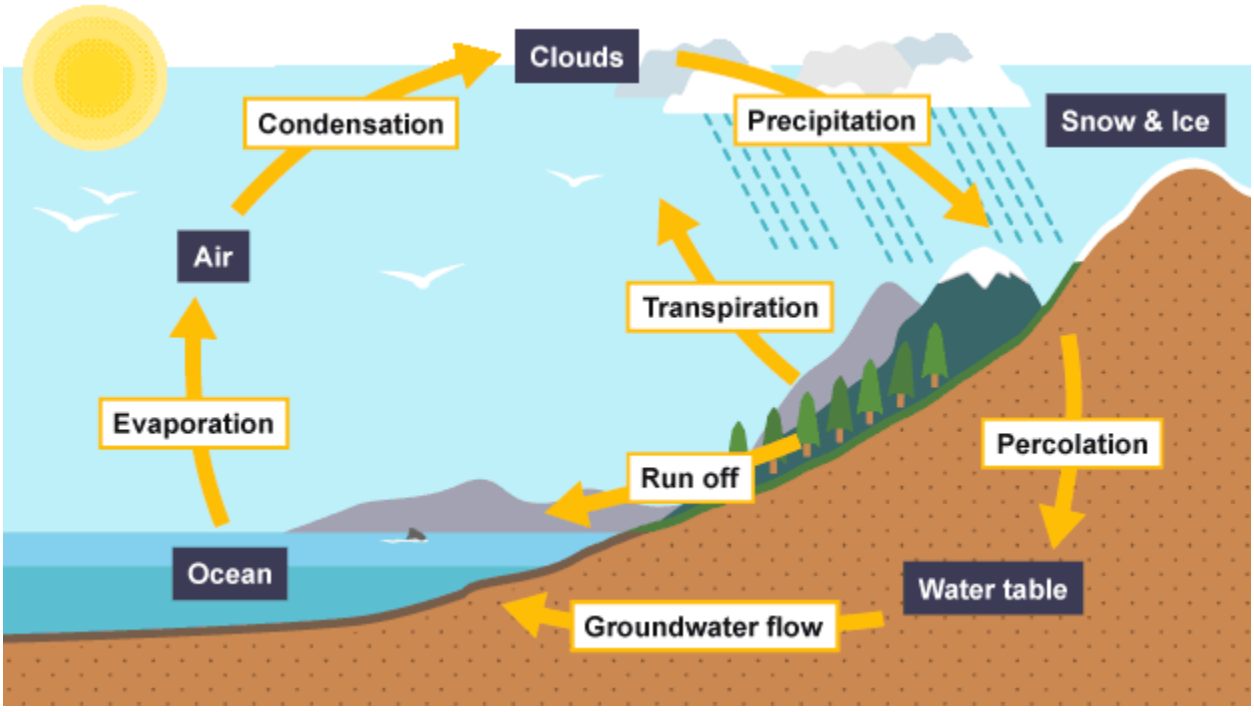
How does geology and weathering effect the Peak District?

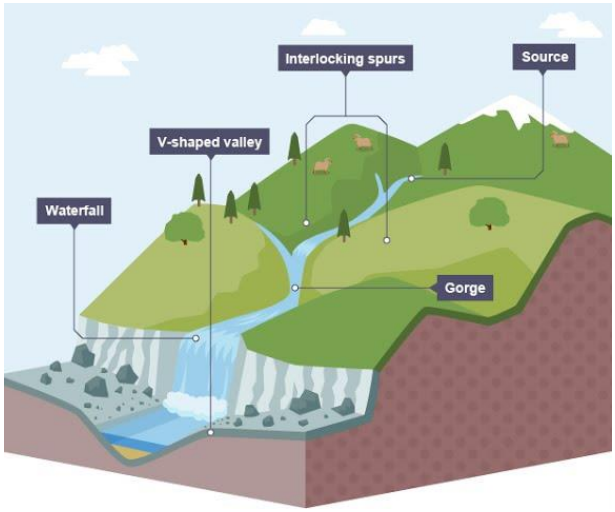
The Peak District has two main rock types – the Dark Peaks are a gritstone area with high moorland, steep cliffs and rocky edges and the White Peaks are a limestone area, with rolling hills and deep valleys.

The limestone areas of the Peak District are affected by chemical weathering from rain. This creates distinct formations such as limestone pavements, caves and caverns.



The geology and weathering of the Peak District means it has several uses for humans including tourism and quarrying,



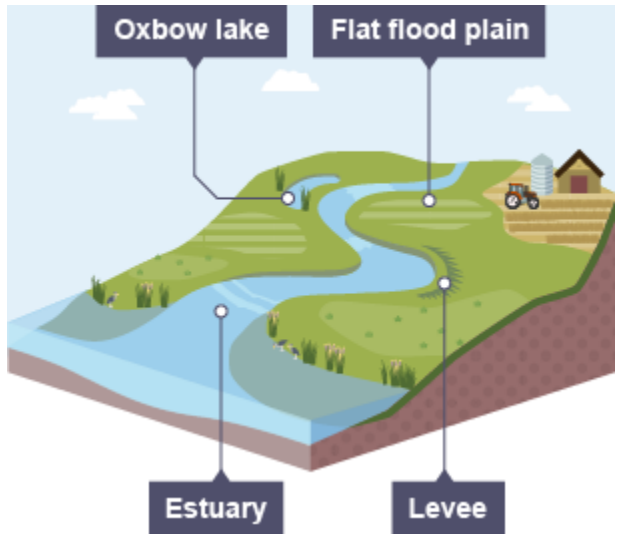


How does a river change upland areas?

As rivers flow from the **source** to the **mouth** they shape the land.

One area they shape is upland areas or the upper course of the river.

Through the process of **erosion** rivers create landforms in upland areas such as: v shaped valleys, waterfalls and gorges.



How does a river change lowland areas

As rivers move towards the **mouth** of the river not only do they wear away the land **(erosion)** they also move **(transportation)** and leave material behind (**deposition**). These processes form landforms such as meanders, ox-bow lakes, levees and flood plains.

How can we identify features of a river on an OS map?

OS maps show us a lot about the land.

For example we can see where the river starts, a v –shaped valley, a meander, waterfall, the mouth of the river.

KEY VOCABULARY	
Metamorphic – rocks formed during high heat and pressure.	**Source-** the point in upland areas where the river begins.
Sedimentary – formed from pre-existing rocks or pieces of once living organism that have been deposited and compressed.	**Mouth** –the point in lowland areas where a river enters a body of water (normally the sea).
Igneous – formed when hot molten rock (from volcanoes) solidifies.	**Erosion –** the process by which the lithosphere is worn away by wind and water.
Weathering – the wearing down or breaking of rocks. This can be biological, chemical and physical.	**Transportation** – the movement of material across the earth's surface by water, wind, ice and gravity.
Drainage Basin – the area of land around the river that is drained by the river.	**Deposition** – sediment dropped and left behind by wind, water, sea or ice.
Key words from previous topics: lithosphere, atmosphere, hydrosphere and biosphere.	

Oak Academy extra learning resources on water

The Geological Society

The Rock Cycle & types of rocks

Oak Academy

Geology unit—links to Peak District and uses of rocks cycle.