Knowledge organiser: Y7—Why is it important to study the lithosphere?

Formation and structure of the lithosphere.

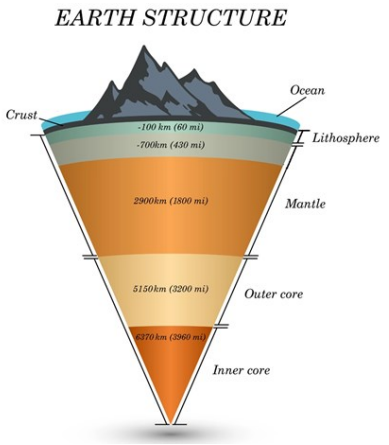
Geology is the study of the formation & the structure of the earth's lithosphere.

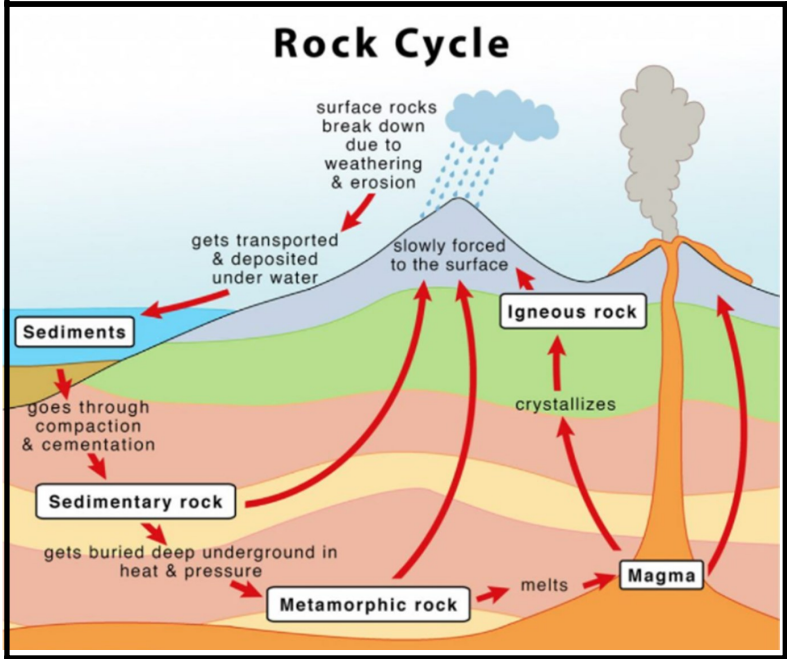
The earth formed over 4.6bn years and slowly changes have created the planet that we recognise today.

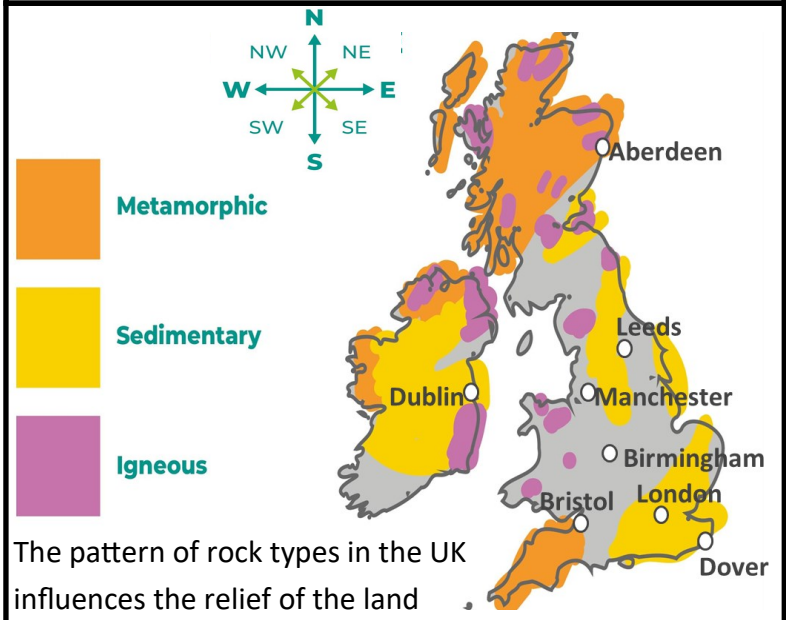
The lithosphere is the solid outer layers of the earth, including the crust.

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

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.

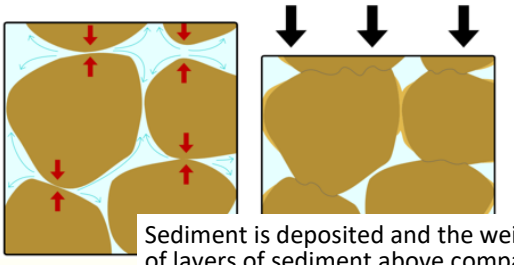






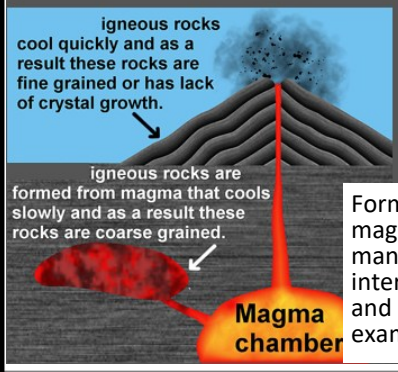
The pattern of rock types in the UK influences the relief of the land (how high and steep the land is).

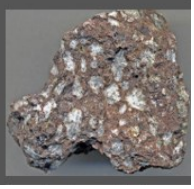
Sedimentary rocks



Sediment is deposited and the weight of layers of sediment above compacts the sediment into rock. These rocks contains fossils and most are weak (eg shale) but limestone is stronger.

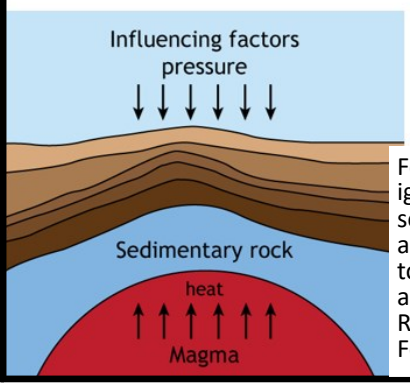
Igneous rocks





Formed from cooling magma from the mantle. Made of interlocking crystals and are tough. For example basalt.

Metamorphic rocks

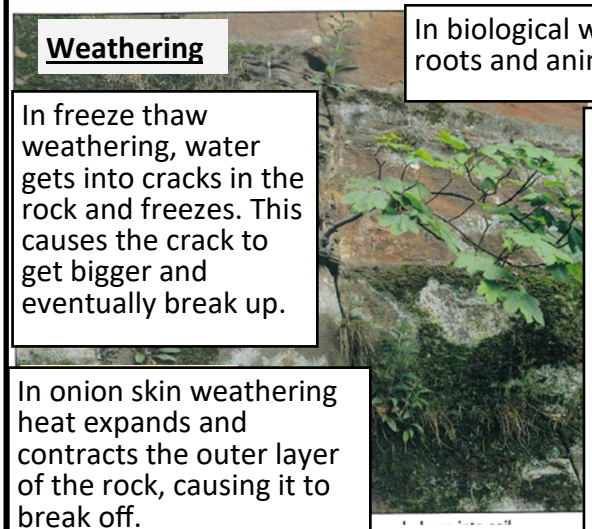


Formed when igneous and sedimentary rocks are changed due to extreme heat and pressure. Rocks are tough. For example slate.

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. EG the SE of the UK.

Weathering



In biological weather plant roots and animals break up

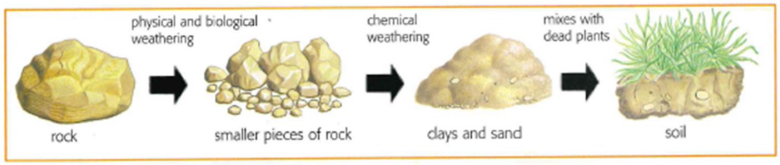
In freeze thaw weathering, water gets into cracks in the rock and freezes. This causes the crack to get bigger and eventually break up.

In chemical weathering carbon dioxide in rainwater and oxygen from the air can react with rocks such as limestone, breaking them down.

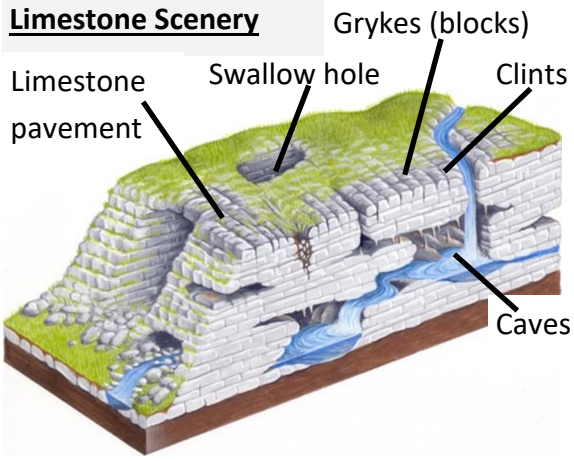
In onion skin weathering heat expands and contracts the outer layer of the rock, causing it to break off.

From rock to soil

This shows how weathering turns rock into soil:



Limestone Scenery



The calcium carbonate in limestone reacts with chemicals in the rain water.
This dissolves the limestone creating a limestone pavements and swallow holes on the surface
Underground caves and caverns with stalactites and stalagmites underground.

Human use of the lithosphere

Energy sources

Coal, oil and gas a re all extracted from the lithosphere. These are called fossil fuels..

We burn these fuels to generate heat and electricity.

However, when they are burnt they release carbon into the atmosphere which causes global warming.

Uranium is also used from the lithosphere. We use this to create nuclear energy

Building materials & shelter

Road, houses, golf courses, sea defences

Household products

crockery, toothpaste, make up, electrical wiring, cans for food storage.

Example—Hope Quarry, Peak District. 2m tonnes of limestone a year used for cement.

Positive impacts	Negative impacts
Directly employs almost 200 people.	Noise from blasting and lorries could irritate local residents.
Provides cement; a vital resource for building.	Natural habitats might be disturbed or destroyed.
Local businesses provide services to Hope Quarry and their employees (*e.g. fuel for machinery,*	Dust from quarrying can affect people's health.

How is Hope Quarry becoming more sustainable?

13000 trees planted since 2003 to make the landscape more natural.

35% of energy used comes from sustainable energy sources, not relying on fossil fuels completely.

Only blast for 100 days a year.

New rail route constructed means 6000 less lorries on the roads.

KEY VOCABULARY	Non-renewable—something that will eventually run out and cannot be replenished.
Coal—a sedimentary rock that is burnt to release energy and used for heating and generating electricity.	Quarrying—The removal of rock from the ground from an open pit with the purpose of using the rock
Crust—the outer layer of the earth which makes up part of the lithosphere.	Sedimentary rock — rock type formed from layers of sediment deposited and compacted together. For example limestone.
Erosion—the removal of rock material.	Soil—Soil is the loose substance that covers the underlying rock, which plants grow in. It is a mixture of tiny particles of rock, dead plants and animals, air and water and makes up the very top of the lithosphere.
Geology—the study of the formation and structure of the earth.	Sustainable—when materials and resources are used in a way that will balance the social, economic and environmental needs of the present without compromising the future.
Landscape—The visible features of an area of land including trees, hills, rivers, plants, buildings, cliffs.	Weathering—the process by which rocks and materials are broken down by biological and weather processes such as rainfall, ice, wind, plant roots and animals.

Extra resources & wider reading

British Geological Survey

Discover Geology

The Geological Society

The Rock Cycle & types of rocks

Seneca Learning

Links to videos on the rock cycle, geology of Britain and soil.

Oak Academy

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