



Science Knowledge Organiser

Rocks and Soils – Year 3



Sticky Learning

What you may already know...

This is new learning – write down what you know already:

- Rocks are a solid material (Y2)
- Different materials (including rocks) have different properties (Y1)

What you are going to know by the end of this learning...

- To be able to compare and group rocks based on their appearance and physical properties, giving reasons
- To know how soil is made
- To know how fossils are formed
- To know and explain the differences between sedimentary, metamorphic and igneous rock

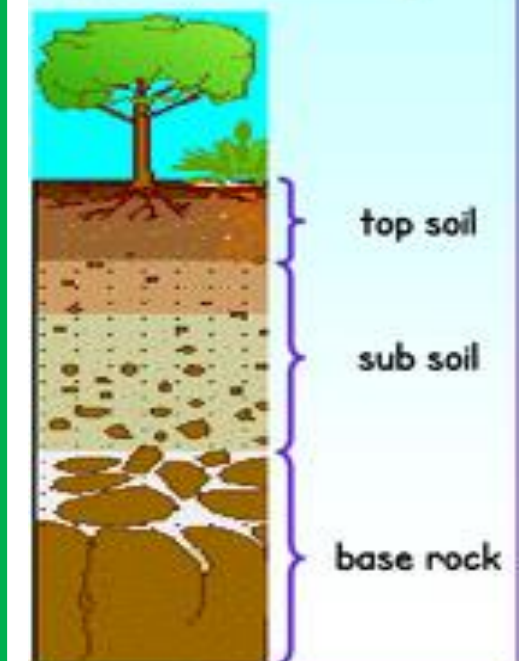
Key Vocabulary

	Term	Definition
1	Rock	A hard, solid material that is made of minerals and is found in nature.
2	Soil	The top layer of the ground, in which plants grow; dirt.
3	Mineral	A solid, natural material that does not come from a living thing.
4	Metamorphic rock	Rock formed when any type of rock goes through changes caused by extreme heat and pressure (e.g. marble, slate).
5	Igneous rock	Rock formed by the cooling and hardening of hot magma or lava. Formed by volcanoes! (e.g. basalt, granite).
6	Sedimentary rock	Rock formed when sediment is pressed together over time. Formed over a long period of time (e.g. shale, limestone, sandstone).
7	Rock cycle	The series of changes that rock undergoes over time as it shifts between different types.
8	Fossil	The remains of a plant or animal that turned to stone over a long period of time. Mostly found in sedimentary rock.
9	Weathering	The process of wearing away or otherwise changing Earth's surface, caused by natural forces.
10	Erosion	The process of transporting and wearing away rocks or soil as loose articles that are moved by water, wind, ice or gravity.
11	Bedrock	The solid rock underneath soil or loose rocks; the lowest of three main layers of soil.
12	Subsoil	The middle layer of soil, which contains more rocks than topsoil.
13	Topsoil	The top layer of soil, in which most plants have their roots.
14	Organic	Having to do with or coming from living organisms.
15	Refine	To remove unwanted materials from a substance.
16	Process	To cause something to go through steps that will change or improve it.

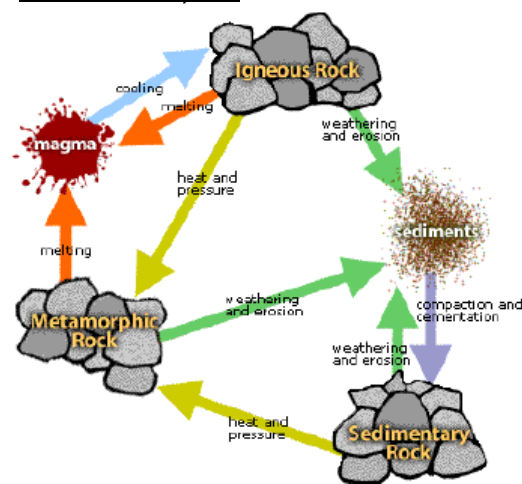
Why is soil important?
















1	Plants	Nutrients in soil help plants to grow & anchor roots in the ground.
2	Atmosphere	Soil releases gases such as carbon dioxide in to the air.
3	Living organisms	Many animals, fungi & bacteria live in soil.
4	Nutrient cycles	Soil is important in recycling nutrients.
5	Water	Soil helps to filter and clean water.

Layers of soil

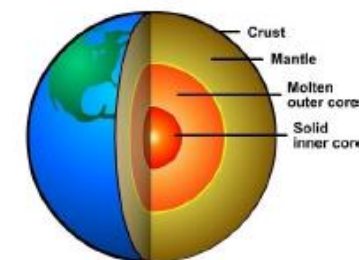


The Rock Cycle



Igneous rocks	... are rocks that form when lava cools creating crystal structure rocks.
	    
Metamorphic rocks	... are formed when other rocks are affected by great temperature and pressure
	    
Sedimentary rocks	... are formed by layers of sediment collecting and solidifying, these rocks will have layers throughout.
	    

Cross Section of the Earth



Core: The inner core is solid iron. Scientists believe that it contains sulphur and nickel. It is around 7000 degrees Celsius. The pressure is so high that it never melts.

Outer core: Liquid iron (molten metal). It is around 5000 degrees Celsius. It is 1400 miles thick and creates the Earth's magnetic field. It is under less pressure, so it is molten.

Mantle: Heated rock, called silicates, which has the consistency of road tar. It is 1800 miles thick.

Crust: The outermost layer that we see. It varies from 5 miles thick under the ocean, to 25 miles thick beneath continents. Only the crust can be drilled into, the rest is known from seismic waves.

Soil



-Soil is a combination of a range of materials, including ground up pieces of rock, particles from dead plants and animals, air and soil.

The amounts of each of the above, in addition to the type of rocks that have been broken down, decide which of the three types of soil it will be:

-Sandy soil is dry soil with lots of air found in it.

-Clay soil is sticky and doesn't have much air in it. Clay soil often contains a lot of water.

-Loam soil is somewhere between the two – it has some water in it, and has a bit of air in it.

Loam soil is normally the best type of soil for growing plants in. If you dig through soil, you will find that there are different layers with different features.

Sedimentary Rocks

Sandstone

Chalk

Limestone

Marble

Metamorphic Rocks

Slate

Gneiss

Phyllite

Basalt

Igneous Rocks

Granite

Pumice



Science Knowledge Organiser

Right Beneath Your Feet – Fossils – Year 3

Key Questions

Who is Mary Anning and when did she live?
 What did Mary Anning find and what did she do?
 What is a fossil?
 What types of fossils are there?



How are fossils formed?		
1	Amber	Insects are often found preserved in hardened tree sap called amber.
2	Carbonization	When all the elements of the organism have dissolved apart from carbon leaving an outline.
3	Casts & molds	When an organism dissolved in the earth, a hollow mold is sometimes left behind. It is then filled by minerals.
4	Freezing	Preserved in ice, especially in glaciers.
5	Mummification	When a dead organism quickly dries out the remains can be preserved.

Fossils

A fossil is the preserved remains of something that was once living. The process in which fossils are formed is called fossilization. Most living things don't become fossilized – it takes very special conditions!

- After an animal dies, the soft parts of its body rot away (decompose) leaving just the hard things, like teeth and bones.
- The remains are buried by sediment.
- As more layers of sediment build on top, the sediment around the remains begins to harden into rock.
- Water seeps through, dissolving the bones. Minerals replace them, creating a rock replica of the bone – a fossil!

Did you know...?

Mary Anning is remembered as being one of the greatest fossil hunters to ever live. She was born on 21 May 1799. She lived in the English seaside town of Lyme Regis in Dorset. Her family were very poor, which meant she didn't get to attend school much. Instead, she mainly taught herself to read and write.

Mary would spend her time searching the coast looking for what she called 'curiosities'. Later in her life, as she developed a better understanding of her finds, she realised they were actually fossils. Over the course of her life she made many incredible discoveries. This made her famous among some of the most important scientists of the day. They would visit her for advice and to discuss scientific ideas about fossils.

Answers to Important Questions and Key Vocabulary		
What creatures were the fossils formed from?		<p>-Ichthyosaurs were a large marine reptile that lived at the time of the dinosaurs. They were particularly common throughout the late Triassic and early Jurassic periods. They ranged from around 1 to 16 metres in length, and most were carnivores!</p> <p>-The plesiosaur was another large ocean predator. They lived in oceans worldwide. They had a broad body and four long limbs that had evolved into flippers. They had a long neck and razor-sharp teeth.</p>
Was her job dangerous?		<p>-Yes, at times. The cliffs that she mined were often unstable, and the tide could be powerful.</p> <p>-Her dog, Trey, was her constant companion on fossil searches, but one day was killed by a landslide from one of the cliffs. It was only inches from killing her too. She had to learn how to avoid these hazards.</p>
Where is the Jurassic Coast?		<p>-The Jurassic Coast stretches 95 miles, from Dorset to Devon, along the southern English coast.</p> <p>-It is now a UNESCO World Heritage Site, which means it is protected in lots of ways. It was given this status because of the scientific value of the rocks and fossils in the area. Lyme Regis, where Anning found fossils, is on the centre-west of the Jurassic Coast.</p>
Why isn't Mary Anning more well-known?		<p>-Unfortunately, Mary Anning lived at a time in which women were not given equal rights to men. Also, people from poor backgrounds were looked down upon by richer people. Because she was a woman, Mary was not allowed to join many of the elite scientific groups, even though she had earned her place. Many people at the time discredited her work.</p>
		Key Vocabulary Scientist Paleontologist Biology Fossil Jurassic Era Triassic Era Dinosaur Marine Lizard Carnivore Geology Skeleton Lyme Regis Dorset

Books



Mary Anning Timeline

1799: Mary Anning is born in Lyme Regis.	1805-1810: Mary's father shows her how to mine for fossils.	1810: Mary's father dies.	1810-11: Mary and her brother Joseph find the world's first ichthyosaur skeleton.	1823: Mary discovers a plesiosaurus skeleton.	1828: She discovers the first pterosaurs outside of Germany.	1837: Queen Victoria comes to the throne.	1847: She dies at the age of 47, from breast cancer.	1878: A fossilized coral is named after Mary.	2010: Named in list of 10 British Women who most influenced science.
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