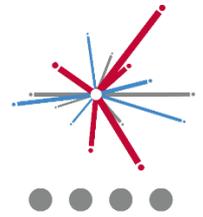


# Ark Pioneer learning at Home

## Core Curriculum

### Science



#### Work to be completed

- Day 1- Knowledge organiser-based revision
- Day 2- Earth and Sedimentary rock questions
- Day 3- Knowledge organiser-based revision
- Day 4- Rock cycles questions
- Day 5- News article plus questions

#### Resources / links to help with work:

Earth and its atmosphere

<https://www.bbc.co.uk/bitesize/guides/zysbgk7/revision/1>

<https://www.bbc.co.uk/bitesize/guides/zysbgk7/revision/2>

<http://www.bbc.com/future/bespoke/story/20150306-journey-to-the-centre-of-earth/>

Rock types

<https://www.bbc.co.uk/bitesize/guides/zgb9kqt/revision/1>

Sedimentary

<https://www.bbc.co.uk/bitesize/guides/zgb9kqt/revision/3>

<https://www.bbc.co.uk/bitesize/clips/zmwvcdm>

<https://www.youtube.com/watch?v=vsL8ic9nGUE>

Metamorphic

<https://www.bbc.co.uk/bitesize/guides/zgb9kqt/revision/4>

<https://www.youtube.com/watch?v=YLo4zr42fXM>

Igneous

<https://www.bbc.co.uk/bitesize/guides/zgb9kqt/revision/2>

<https://www.youtube.com/watch?v=flmdKuk9ENA>

Rock cycle

<https://www.youtube.com/watch?v=set8lX8ERxc&feature=youtu.be>

[https://www.youtube.com/watch?v=pm6cCg\\_Do6k](https://www.youtube.com/watch?v=pm6cCg_Do6k)

#### How will this work be checked?

Each week you will be given 'red pen work' to carry out corrections on the learning that you are doing at home. Please make sure this work is done and that you correct all work in your exercise book.

You must also complete the weekly quiz for your core curriculum subjects online and the link to those is on our school website in the 'quizzes' drop-down option from 'Home Learning'.

#### How much time should I be studying and what happens if I don't finish all my work?

For core curriculum subjects you are expected to do 30min each day as a minimum. Those subjects are English language, English literature, Maths, Science, History and Geography. These subjects all have a weekly quiz and will be checked in on by your form teacher when they call each week.

All other subjects are 'Extended Curriculum' and they should be done after you have finished the Core Curriculum tasks for the day. You should plan to do work in different subjects each day. We recommend that pupils do one hour per week in each of the 'extended curriculum' subjects.

We recognise that it is not possible for all pupils to complete all work given the exceptional circumstance. Please speak with your form tutor about the work if it is becoming unmanageable.



*Aim high*



*Have integrity*



*Be kind*



*Model determination*

## Structure of the Earth

The Earth is made from three main layers: the core, the mantle and the crust.

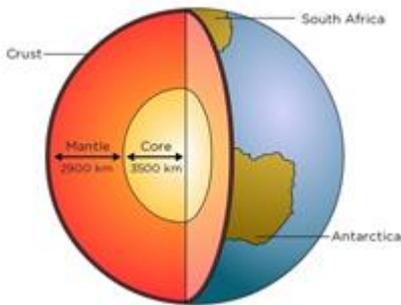
The Earth's crust is vital to life because it provides supplies such as building material, metals, fuels, and soil for growing crops.

The **crust** formed as molten rock which has cooled over many billions of years. It contains hundreds of different rocks such as sandstone, granite, schist, obsidian, marble, slate and basalt. These can all be found in the UK.

The crust is a thin solid made of rock.

The **Mantle** is solid but can flow very slowly.

The **core** is divided into two. The outer core is a liquid and the inner core is a dense solid made from **iron and nickel**.



## Rock types

Rocks are made from chemical substances called minerals. Different rocks may be made from different minerals. Rock are classified into three types:

Sedimentary, Metamorphic or Igneous.

### Igneous rock

- Igneous rocks are formed when molten rock cools.
- Igneous rocks **contain crystals** and **never** contain **fossils** or layers.
- Igneous rocks are **not porous**; they are **strong** and can be polished.
- The size of the crystals in igneous rocks depends on how quickly the molten rock cools.



Hot liquid rock is called magma. **Magma** is formed under the Earth surface in places where there is enough heat to melt the rock. Sometimes the molten rock is forced upwards. If it reaches the Earth's surface this is called **lava**.

Magma can cool and harden below the surface and this **slow cooling** will produce rock with **large crystals** like granite.

Hot lava **cools quickly** on the surface of the Earth and produces rock with **small crystals** like basalt.



Examples are: **basalt, granite and obsidian**.

### Metamorphic rock

Metamorphic rocks are made from rocks which already exist. Morph means to change.

- Metamorphic rocks are formed from the action of **heat and/or pressure** beneath the Earth's surface.
- Metamorphic rock is **hard wearing, durable and resistant to weathering**.
- Metamorphic rocks can **contain thin layers and crystals**. Distorted **fossils** might be present.
- **Uplift** moves metamorphic rocks from where they are formed deep underground to the surface.

Slate is formed by high pressures on mudstone. It has thin layers that can be split easily. Roof tiles are made from slate. They are thin, hard wearing and waterproof – ideal for a roof.

Schist has crystals and thin layers due to the action of both heat and pressure.

Marble is a metamorphic rock formed from limestone.

Examples are: **Marble, slate, schist**

### Sedimentary rock

Rocks on cliffs and mountains are being eroded by all types of weather. Small parts of rock break away.

A river or stream carries pieces of broken rock to a lake or the sea. The flow of water slows.

The rock settles to the bottom. This is called **deposition**.

The deposited rock builds up in layers called sediments.

This is called **sedimentation**. Animal or plant bodies may get trapped in these layers and this explains why fossils are found in sedimentary rocks.

**Pressure** from layers above squashes sediments together. This is called **compaction**.

Water is squeezed out of the sediments and grains become cemented together and harden. This is called **cementation**.

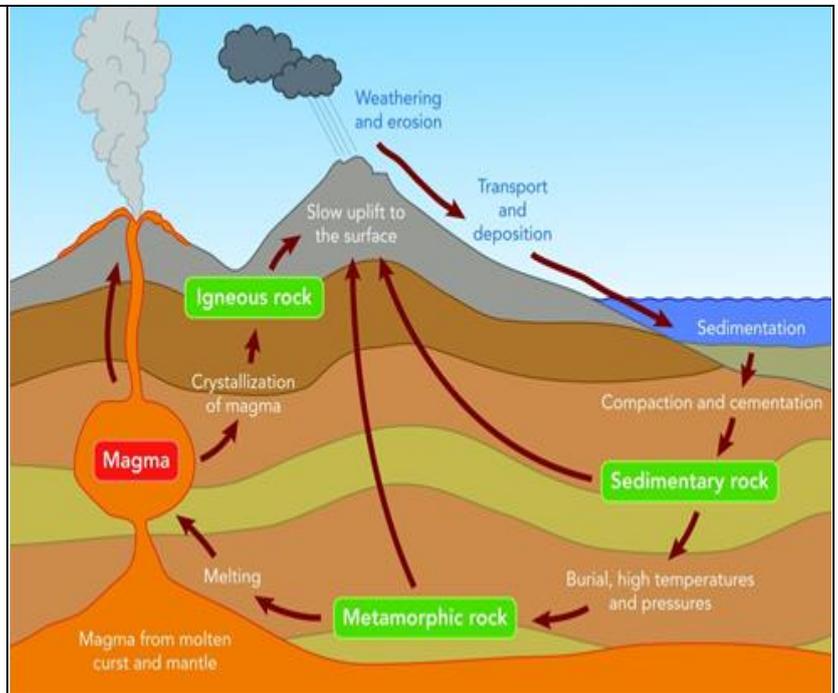
- Sedimentary rocks are more **porous** and **softer** than other rock types. They are easily **scratched**.
- They often contain **fossils**.

Examples are: **Sandstone, limestone, chalk**



## The Earth's Atmosphere

- The **atmosphere** is an envelope of gases that surround a planet.
- The Earth's atmosphere has changed over the last millions of years.
- The Earth's atmosphere now contains **78% nitrogen, 21% oxygen**, 1% argon, 0.04% carbon dioxide.
- When the Earth first formed, volcanoes emitted large concentrations of carbon dioxide, ammonia, methane and water vapour.
- Water vapour condensed to form the oceans.
- Algae and plants evolved and took in carbon dioxide by photosynthesis.



## Day One

Test yourself on the week's questions by:

1. Study the knowledge organiser for your set topic.
2. Write the answer to each question in Copy column (you can do this in your workbook).
3. Check your answers using the knowledge organiser. Tick if correct, and add any missing information in red pen.
4. Cover the answers in Copy column and answer the question from memory in the Cover, Check column.
5. Uncover the answers and mark the Cover, Check column with a red pen. Tick if correct, and add any missing information.

	<b>Question</b>	<b>Copy, Cover</b>	<b>Check</b>
	<b>1. What is the Earth's crust?</b>		
	<b>2. What is the mantle made from?</b>		
	<b>3. What is magma?</b>		
	<b>4. What is lava?</b>		
	<b>5. What are the names of the 3 types of rocks?</b>		
	<b>6. How are large crystals in rocks formed?</b>		
	<b>7. How are small crystals in rocks formed?</b>		
	<b>8. Names two examples of igneous rocks</b>		

## Day Two- Earth and Sedimentary Rock

1. Match the layer with the best description.

Mantle
Crust
Outer Core
Inner Core

Liquid containing nickel and iron
Properties of a solid but flows very slowly
Thin solid layer made from rock
Solid containing nickel and iron

2. Use the web-link to find out the answers: <http://www.bbc.com/future/ bespoke/story/20150306-journey-to-the-centre-of-earth/>

The distance between the Earth's crust and the mantle is \_\_\_\_\_ m

The distance between the Earth's crust and the centre of the Earth is \_\_\_\_\_ m

The distance between the Earth's crust and the outer core is \_\_\_\_\_ m

3. The Earth is surrounded by a layer of gases called the atmosphere.

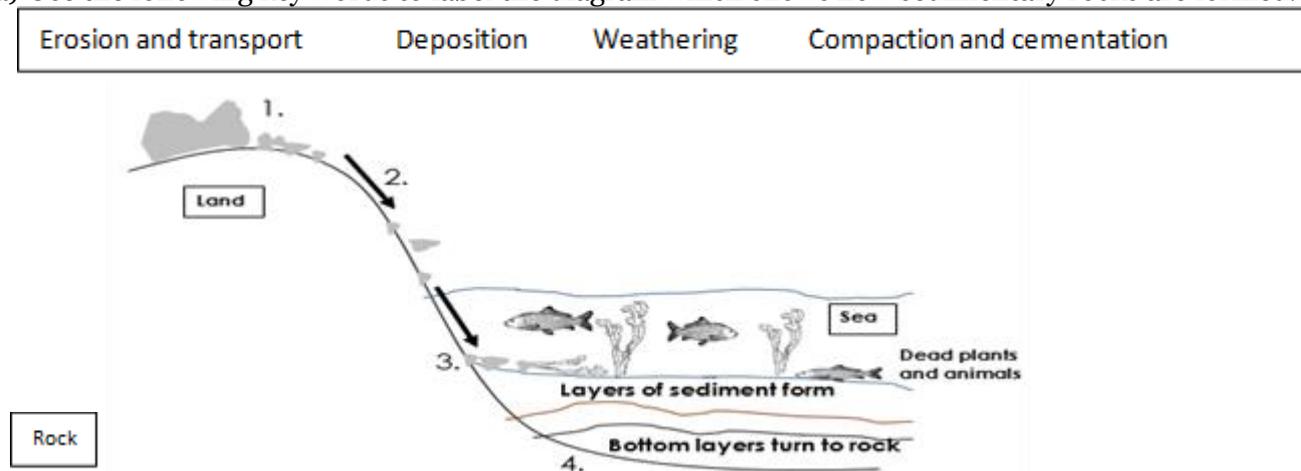
What are the three most abundant gases in the atmosphere?

4. **Underline** the named **rocks** which would be classified as sedimentary.

limestone granite basalt chalk marble schist

5. What are sedimentary rocks often used for?

6. a) Use the following key words to label the diagram which shows how sedimentary rocks are formed.



b) Explain in writing how sedimentary rocks are formed. Use full sentences.

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## **Day Three**

Test yourself on the week's questions by:

1. Study the knowledge organiser for your set topic.
2. Write the answer to each question in Copy column (you can do this in your workbook).
3. Check your answers using the knowledge organiser. Tick if correct, and add any missing information in red pen.
4. Cover the answers in Copy column and answer the question from memory in the Cover, Check column.
5. Uncover the answers and mark the Cover, Check column with a red pen. Tick if correct, and add any missing information.

	<b>Question</b>	<b>Copy, Cover</b>	<b>Check</b>
	<b>1. What is deposition?</b>		
	<b>2. What is sedimentation?</b>		
	<b>3. Name the two types of sedimentary rock.</b>		
	<b>4. What does morph mean?</b>		
	<b>5. What does uplift mean?</b>		
	<b>6. Name two types of metamorphic rock?</b>		
	<b>7. What is the atmosphere?</b>		

## Day Four- The rock cycle (use the knowledge organiser, and YouTube video to help you.)

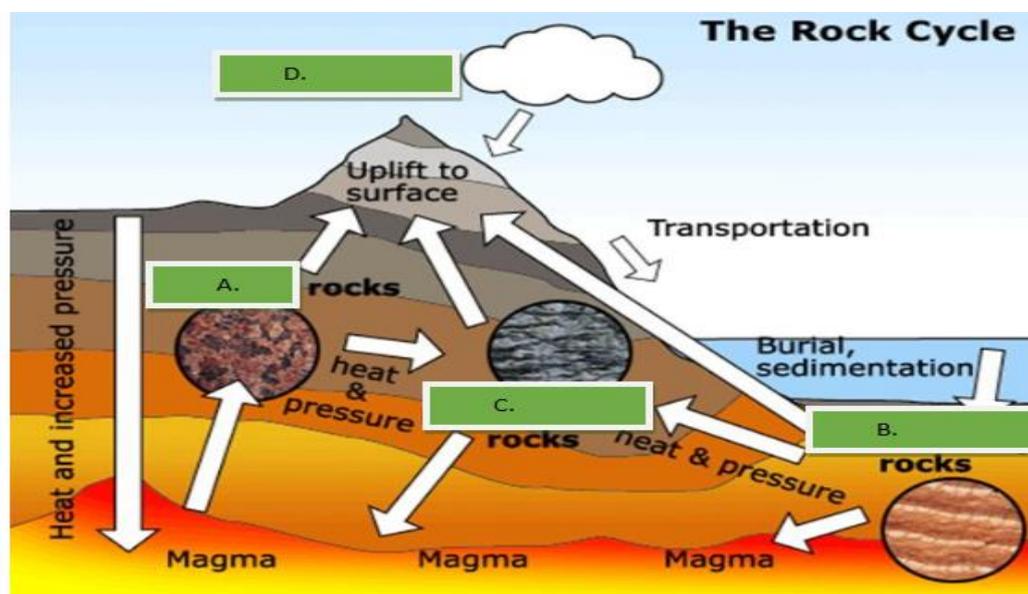
<https://www.youtube.com/watch?v=set8lX8ERxc&feature=youtu.be>

1. What is formed when metamorphic rocks melt?
2. If metamorphic rocks are formed underground, why can slate be found on the Earth's surface?
3. Explain why the Earth will never run out of magma.
4. Link the correct definition to the key word.

Crystallisation
Uplift
Melting
Compaction
Deposition
Magma
Lava

Sediment particles are squeezed together
When a solid turns into a liquid
Crystals form as a liquid cools into a solid
Rocks move towards the Earth's surface
Molten rock underground
Rock fragments being carried by rivers settle on river/sea bed as water flow slows down.
Cooled molten rock on the surface of the Earth

5. List 3 things which may cause erosion of a rocky mountain.
6. Replace A-D with suitable labels.



7. Why would fossils never be found in igneous rock?

## Day Five – Read the news article and answer the questions at the end.

### CO<sub>2</sub> emissions nose-dive as COVID-19 keeps people home



**By April, limits on travel and more had globally dropped daily emissions to 2006 levels**

Adapted from an article by Carolyn Gramling in ‘Science News for Students’ May 27 2020

Stay-at-home orders have curbed the spread of **COVID-19** in many places. Those limits on travel also have had an environmental benefit: cleaner air.

The **coronavirus** lock-downs across the world grounded airplanes. They also cut traffic and changed peoples’ patterns of energy use. One impact was a sharp drop in daily global **emissions of greenhouse gases**. Chief among these is carbon dioxide, or CO<sub>2</sub>. By early April, releases of carbon dioxide gas had dropped 17% from the 2019 average of 100 million metric tons per day.

Tallying up this impact proved tricky. Climate scientists had to be clever to come up with a real-time number. Most data on emissions are collected and reported once a year (not day by day or even month by month). Corinne Le Quéré of the University of East Anglia in Norwich, England, and her colleagues used different daily data as their starting point. These included data on traffic congestion. They also used data from smart meters in homes and other measures of energy use. From this, they estimated carbon dioxide releases for 69 countries. Scientists sometimes refer to such a value as a nation’s carbon footprint.

Next, the researchers created a “confinement index.” This accounted for how strict the stay-at-home policies had been from place to place. They used this to calculate how this should have affected that carbon footprint. During the strictest pandemic-related confinement, only essential workers (such as fire fighters and medical workers) were allowed to commute. At such times, air traffic fell by 75 percent, the team reports. Car and lorry traffic at that time reduced by about 50 percent. Electric power use shrank far less, only by about 15 percent.

What will happen if and when the world returns to a **pre-pandemic level** of activity? If everything returns to normal by mid-June, the researchers say, 2020’s CO<sub>2</sub> emissions will be about 4 percent lower than last year’s. If travel is restricted through to the end of the year, CO<sub>2</sub> emissions for the year could be as much as 7 percent lower than in 2019.

Such a steep decline in CO<sub>2</sub> will be hard to keep up, says co-author Rob Jackson. He’s an environmental scientist at Stanford University in Palo Alto, Calif. The drop came at a very high cost. It brought a major change in how — and how many — people worked and played. However, the changes also offer a lesson for people interested in slowing the growth of climate impact. Sharp cuts in the use of **fossil fuels** will be needed to reach emissions targets set in 2015 by the United Nations’ Paris Agreement. This is a United Nations treaty that was negotiated in Paris, France, on Dec. 12, 2015. Its key aim was to strengthen the response of nations around the world to the threat of **climate change** by keeping the average global rise in temperature by 2100 under 2 °C (3.6°F), as compared to pre-industrial levels. It would also work toward (if possible) holding the temperature rise to less than 1.5 °C (2.7° F).

Scientists say to achieve these goals; nations would need to reduce carbon dioxide emissions by 7.6 % each year for the next 10 years. This is more, each year, than the reductions that are to likely occur in 2020 if pandemic-related travel limits continued until December 31.

**Answer the following questions in full sentences:**

1. What is this news story about?
2. By early April the amount of carbon dioxide gas being released had dropped by 17%. Calculate how much carbon dioxide gas was still being released per day.
3. Why did scientists have to find a new way to work out the daily carbon dioxide emissions?
4. Suggest why electricity use did not shrink as much as traffic and air plane use during the strictest lock down times.
5. What was the Paris Treaty agreement about?
6. How has the pandemic helped scientists who are trying to raise awareness of climate change?
7. Write down the meanings of any words **in bold** in the article.