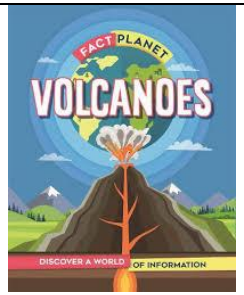
<table>
<tr><th>Enquiry Question</th><td colspan="3"><h1>What makes the Earth angry?</h1></td></tr>
<tr><th>NC Objectives</th><td colspan="3">Earthquakes and Volcanoes
Identify the position and significance of Equator, Northern and Southern Hemisphere, Tropics of Cancer and Capricorn. (Location knowledge)
The location and characteristics of a range of the world’s most significant physical features - key aspects of earthquakes and volcanoes. (Human and physical geography)
Use models and maps to discuss land shape i.e contours and slopes. (Mapping)
Ask more searching questions including how and why as well as where and what when investigating places and processes (Being a geographer)
Identify and explain increasingly complex geographical features, processes (changes), patterns, relationships and ideas; using geographical language relating to the physical and human processes eg tributary and source when learning about rivers (Being a geographer)
Communicate geographical information in a variety of ways including through maps, diagrams, numerical and quantitative skills and writing at increasing length (Being a geographer)</td></tr>
<tr><th>Curriculum Coherence</th><td>Prior Knowledge
Children have experienced the concept of physical geographical features – rivers and mountains, plus environmental areas and their characteristics. In addition:
Location of the Amazon River, Atlantic Ocean (Year 4)
Rainforests
Trade links in the Caribbean
Future Learning</td><td>Key knowledge (substantive)
The earth is structured into different layers – inner core, outer core, mantle, crust. Inner core - a mixture of solid metals (iron and nickel) – around 6100^{o}C; Outer core - a mixture of liquid metals (iron and nickel) – around 4400^{o}C; Mantle – about 2900km thick, made from molten (liquefied by heat) rock = magma. 3000^{o}C; Crust – solid rock – granite and basalt (0-60km thick). Broken into tectonic plates which move around on top of the mantle. There are two different types of crust - oceanic and continental.
The location of the world’s tectonic plates and the ring of fire
Formation of a volcano - Tectonic plates collide or move apart, magma travels to the earth’s surface through a vent, lava flows and ash deposits (gas and rocks) the lava cools to form rock.
Shape of a volacono depends on type and amount of lava that comes out and how explosive it is. Four main shapes – shield, stratovolcano, lava dome, cinder cone.</td><td>Substantive Concepts
Location
Mountains
Earthquakes
Physical geography

Second Order Concepts
Cause
Change
Impact – significance</td></tr>
</table>

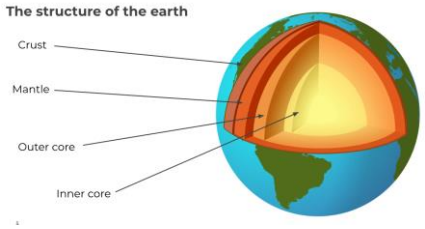
	• Sustainability of natural resources	• Volcanoes produce pyroclastic flows (fast moving cloud of hot ash, gas and rock); ash clouds (small pieces of rock and glass that can be carried in the air for many kilometres) and volcanic bombs (large bits of very hot rock blown out of a volcano). • Earthquakes - The crust (together with the upper layer of the mantle) is made up of different pieces, called tectonic plates. These plates fit together like a jigsaw and are moving at a rate of a few centimetres a year, in different directions and at different speeds. Some plates slide past each other, others move away from each other and some bump into each other. Sometimes these plates lock together when they meet. This is called a plate boundary or a fault line. As plates move in different directions over long periods of time, friction causes energy to build up. It becomes so great that the energy is released, which creates a shock wave - an earthquake.	

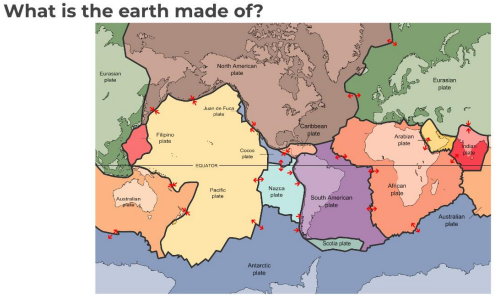
Quality Texts and vocabulary	 	Earth Inner core Outer core Mantle Crust Metal Molten magma	Granite Basalt Tectonic plates Vent Lava flows Ash Shield stratovolcano	Lava dome Cinder cone Pyroclastic flows Plate boundary Fault line Friction Energy Richter scale

Location	**Volcanoes**	**Earthquakes**	**Global**
	Mount Etna Mount St Helens Mount Pinatubo Hawaii Iceland	Japan Pacific rim	Ring of fire

<table>
<tr>
<td>Knowledge Sequence</td>
<td>
Lesson 1 – What is the Earth made of? WALT: know how the Earth is structured

Intro to planet earth, what do we know about how it is formed and what it is made of? Imagine we could take a chain saw to Earth and slice it in half. What would it look like? Intro video - Everything You Need to Know About Planet Earth - YouTube
BBC 6 Minute English September 24, 2015 - The Earth's Core (youtube.com) Use video to identify the structure of the Earth and characteristics of each layer – Inner core - a mixture of solid metals (iron and nickel) – around 6100°C; Outer core - a mixture of liquid metals (iron and nickel) – around 4400°C; Mantle – about 2900km thick, made from molten (liquefied by heat) rock = magma. 3000°C; Crust – solid rock – granite and basalt (0-60km thick). Broken into tectonic plates which move around on top of the mantle.
Further knowledge by examining the different crust types – oceanic and continental. Oceanic is the sea floor, made of basalt, heavier than the continental crust and less than 200 million years old. Continental crust forms land masses, made of granite, lighter than the oceanic crust, more than 1500 million years old and cannot be renewed or destroyed. Question how it is older and why this may be?
Explore location the world’s plates – there are 7 major plates, 10 minor plates and 1 micro plate. Use map to show location. What do you think happens when they move? (More later in enquiry – earthquakes).
Page 1 of Pop Up Volcano describes how the Earth is structured and introduces concept of a volcano.





see larger image below
</td>
</tr>
<tr>
<td></td>
<td>
Lesson 1 Key Lesson Skills (disciplinary knowledge)
Year 4:

Locate and name the continents on a world map
Describe and understand key aspects of physical geography
Use geographical language relating to the physical and human processes
Understand what a tectonic plate is
Ask more searching questions including how and why as well as where and what when investigating processes

</td>
<td>
UKS2:

Identify the position and significance of the equator, northern and southern hemisphere
Describe and understand key aspects of physical geography
Use more precise geographical language relating to the physical human processes
Ask and answer questions

</td>
</tr>
</table>

		• Understand what a tectonic plate is and the location of the world's plates
	Lesson 2 – How are volcanoes made? WALT know how a volcano is formed • Lesson hook - Earth's Hidden Volcanos | A Perfect Planet | BBC Earth (youtube.com) • School Learning Zone - Volcanoes and Earthquakes (school-learningzone.co.uk) Introduction to how a volcano is made. Tectonic plates collide or move apart, magma travels to the earth's surface through a vent, lava flows and ash deposits (gas and rocks) the lava cools to form rock. Use 'Fact Planet Volcanoes' book p4-7 • Two types of volcanoes – active volcano (erupted in last 10,000 years) and dormant volcano (will erupt again) • Use 'Fact Planet Volcanoes' book p12-13 to understand the different shapes of a volcano – ash and lava from eruptions hardens which changes the shape of volcanoes. Shape depends on type and amount of lava that comes out and how explosive it is. Four main shapes – shield, stratovolcano, lava dome, cinder cone. • Location of world's volcanoes using concept of ring of fire to identify location. Use 'Fact Planet Volcanoes' book p8-9	
	Lesson 2 Key Lesson Skills (disciplinary knowledge) Year 4: • Describe and understand key aspects of physical geography • Use geographical language relating to the physical and human processes • Label the different parts of a volcano • Ask more searching questions including how and why as well as where and what when investigating processes	UKS2: • Describe and understand key aspects of physical geography • Use more precise geographical language relating to the physical human processes • Ask and answer questions • Label the different parts of a volcano, describe the associated process with each part
	Lesson 3 – What happens when a volcano erupts? WALT know what happens during an volcanic eruption • Lesson hook – amazing eruption footage from Mount Etna Amazing Volcano Footage: See Smoke and Lava Erupt From Mount Etna | National Geographic (youtube.com) Volcano webcams - Live from Iceland - Webcams around Iceland Live Hawaii volcanoes - Webcams - Hawai'i Volcanoes National Park (U.S. National Park Service) (nps.gov) • Use 'Fact Planet Volcanoes' book p10-11 to study the process of an eruption (previous lesson) • Eruptions from volcanoes can be dangerous – they can produce pyroclastic flows (fast moving cloud of hot ash, gas and rock); ash clouds (small pieces of rock and glass that can be carried in the air for many kilometres) and volcanic bombs (large bits of very hot rock blown out of a volcano). Use 'Fact Planet Volcanoes' book p14-15 and the different types of lava – pahoehow lava (flows very smoothly and slowly then hardens in folds and bulges) and a'a lava (it is thinner so moves quickly, it picks up rough pieces of solid lava as it moves, hardens into a rocky surface).	

	• Case study of a volcano – Mount Etna. Establish facts, location and impact on surrounding area. Use hook vide to establish facts. • Make a volcano! How to make a volcano | Natural History Museum (nhm.ac.uk) resources will need to be gathered in advance.	
	Lesson 3 Key Lesson Skills (disciplinary knowledge) Year 4: • Describe and understand key aspects of physical geography • Use geographical language relating to the physical and human processes • Label the different parts of a volcano • Locate the ring of fire • Ask more searching questions including how and why as well as where and what when investigating processes	UKS2: • Describe and understand key aspects of physical geography • Use more precise geographical language relating to the physical human processes • Ask and answer questions • Label the different parts of a volcano • Locate and understand the ring of fire
	Lesson 4 – How does an earthquake occur? What happens when an earthquake occurs? WALT know how an earthquake occurs • Lesson hook – earthquake footage • Explore how an earthquake occurs Explore earthquakes - BBC Bitesize School Learning Zone - Volcanoes and Earthquakes (school-learningzone.co.uk) The crust (together with the upper layer of the mantle) is made up of different pieces, called tectonic plates**.** These plates fit together like a jigsaw and are moving at a rate of a few centimetres a year, in different directions and at different speeds. Some plates slide past each other, others move away from each other and some bump into each other. Sometimes these plates lock together when they meet. This is called a plate boundary or a fault line. As plates move in different directions over long periods of time, friction causes energy to build up. It becomes so great that the energy is released, which creates a shock wave - an earthquake**.** • If a quake occurs under the sea a tsunami occurs. • Seismographs measure the intensity of the earthquake. The Richter magnitude scale is used to measure the size of earthquakes. The higher the number, the more powerful the earthquake and the higher the chance that it will cause damage. The largest earthquake recorded in the UK happened in 1931, in the North Sea, and measured 6.1 on the Richter scale. Largest earthquake of all time On May 22, 1960 a 9.5 earthquake, Valdivia, occurred off the coast of southern Chile. This earthquake generated a tsunami that was destructive not only along the coast of Chile, but also across the Pacific in Hawaii, Japan, and the Philippines. • Location of earthquakes - Many earthquakes occur around the Pacific Ocean. Case study – Japan.	
	Lesson 4 Key Lesson Skills (disciplinary knowledge)	

	Year 4: • Describe and understand key aspects of physical geography • Use geographical language relating to the physical and human processes • Know what causes an earthquake • Know how an earthquake occurs • Ask more searching questions including how and why as well as where and what when investigating processes	UKS2: • Describe and understand key aspects of physical geography • Use more precise geographical language relating to the physical human processes • Ask and answer questions • Know what causes an earthquake • Know how an earthquake occurs • Understand what a tsunami is
	Lesson 5 – How do people and animals live with volcanoes? WALT know how humans behave around volanoes • Explore the human response to a volcano. Start with prediction and precaution - Use 'Fact Planet Volcanoes' book p20-21. Scientists monitor the amount of magma underneath volcanoes, once the levels become high it is a sign the volcano will erupt. Mount St Helens – a bulge was seen on the side of the volcano. • Use 'Fact Planet Volcanoes' book p22-23 to explore the impact on humans. Pop Up Volcano book – adaptations. Is it always negative? (Positives – ash can make soil very fertile, tourism, geothermal energy). • Return to enquiry question – what makes the earth angry? How angry is it?	
	Lesson 5 Key Lesson Skills (disciplinary knowledge) Year 4: • Describe and understand key aspects of physical geography • Use geographical language relating to the physical and human processes • Ask more searching questions including how and why as well as where and what when investigating processes • Show increasing empathy and describe similarities as well as differences	UKS2: • Describe and understand key aspects of physical geography • Use more precise geographical language relating to the physical human processes • Ask and answer questions • Develop their views and attitudes to critically evaluate responses to geographical issues.

What is the earth made of?