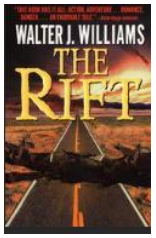

Geography Year 9 – Tectonic – Can we ever know enough about earthquakes and volcanoes to live safely?

12 weeks = 18 lessons

This unit further progresses pupil understanding of the distribution of earthquakes and volcanoes, the processes responsible for earthquake and volcanic events and the landforms associated with them. They will investigate current knowledge about the prediction, prevention and management of earthquakes and volcanoes and understand why people continue to live in hazardous zones. Pupils will locate the world's major earthquakes and volcanoes, explore the developing theories about plate tectonics and the causes behind these hazardous natural events, and develop an understanding them. The timescales involved are immense and this makes elements of the topic difficult to imagine. Pupils will consider how our knowledge of plate tectonics has evolved, and how volcanologists, seismologists and other scientists conduct fieldwork to better understand the processes involved. This helps pupils to understand some of the ways knowledge about plate tectonics, earthquakes and volcanoes has been, and continues to be, developed and tested, rather than just presenting current knowledge as a complete understanding of the topic.

Key learning for this unit

- The theory of plate tectonics
- How volcanoes and earthquakes are linked to plate tectonics
- The hazards for people associated with these events
- How scientists attempt to predict, manage and prevent these hazard

This unit follows on from previous Physical geography units, 'Shaping the Land' in year 7, 'Weather and Climate' and 'Sustainable Living' in year 8. It builds on knowledge of the structure of the earth and extends this knowledge to look at plate tectonics. This unit feeds directly into the year 9 unit of South America where students will look at some tectonic hazards in Chile and Colombia.

It is anticipated that all lessons will take 2 hours to complete.	**Lesson Intent** (i.e. how does support learning in the next lesson/future lesson/exam prep, etc.)	**Activities/Assessment (to including the metacognitive/learning verb**	**Vocabulary – Taught in lesson and set for homework**	**Retrieval and homework**
Lesson 1: KG – Evaluate if we can ever know enough about	The purpose of the lesson is to introduce the idea of the need to understand	Pupils state what they already know about volcanoes and earthquakes. They write down	**Natural Hazard Natural Disaster**	Geography in the News

earthquakes and volcanoes to live safely • The theory of plate tectonics. • How volcanoes and earthquakes are linked to plate tectonics. • The hazards for people associated with these events. • How scientists attempt to predict, manage and prevent these hazards	the causes of natural hazards, specifically volcano and earthquake events, as well as how to predict and manage future events to prevent loss of life. This follows on from lessons in yr 7 and 8 on the earth's structure. It feeds forwards to Yr 9 term 3 lessons on South America and Paper 1 AQA GCSE	three things. Pupils share with a partner and all ideas are written on the board. Pupils consider the question, 'Will we ever understand enough about volcanoes and earthquakes to live safely alongside them?' Pupils discuss in pairs the most recent earthquake/volcanic eruption they know about, including the level of damage, whether people were killed, where in the world did the earthquake occur and what do we need to find out if we are to avoid such disasters in the future? Pupils share with another pair. Their current knowledge and what they think they need to find out in the future is recorded. Pupils use enquiry questions to investigate photographs of a volcano and an earthquake. They imagine what they would feel when witnessing an eruption or earthquake. They study fact files for an eruption and an earthquake event. In pairs, pupils discuss what they already know about earthquakes and volcanoes. They explain why it is important that we study natural hazard events. Multiple Choice Knowledge test. Marked Work – Explain why it is important to study past earthquakes and volcanic eruptions and understand where and why they occur. (Q4, page 203, Hodder)	**Earthquake** **Volcano**	Homework: To be set on a weekly basis. From the vocabulary identified for retrieval in the next lesson. Homework set on the last lesson of the week, using vocab from that lesson in preparation for retrieval in the first lesson of the next week.
Lesson 2: KG - Explain how the continents fit together like a jigsaw.	The purpose of the lesson is to examine Wegener's theory of Pangea and to	Pupils are asked to think about the shapes of the continents. What do they notice? What do they	**Pangea** **Continental drift**	**Vocabulary Retrieval:** Natural Disaster

• To understand how maps helped us see the world differently. • To understand the theory of continental drift. • To observe and analyse evidence of a scientific theory.	evaluate the evidence for this theory and opposition to it. This follows on from the previous lesson as student now examine theories of how earthquakes and volcanoes are formed. It feeds forwards to the next lesson to identify where earthquakes and volcanoes are found. Yr 9 term 3 lessons on South America and Paper 1 AQA GCSE	know about the shapes of the continents? Do they have other questions? They will watch a video such as the Alfred Wegener Song by The Amoeba People which explains continental drift. Pupils consider the evidence for Wegener's theory of continental drift by analysing maps through a series of activities. They explain why most scientists disagreed with Wegener's theory. Multiple Choice knowledge test		Earthquake Volcano **Challenge:** Name 3 or more natural disasters. Explain how earthquakes and volcanoes are formed?
Lesson 3: KG - Describe where the world's earthquakes, volcanoes and mountain belts are. To recognise and describe the pattern of earthquakes, volcanoes and mountain belts	The purpose of this lesson is to identify where on the earth we find earthquakes and volcanoes. This follows on the previous lesson as students identify patterns of volcanoes and earthquakes. It feeds forward to the next lesson looking at the different physics of plate movement.	Pupils begin by explaining what they know about earthquakes and volcanoes – what they are and where they are located. They discuss new activity or unrest in volcanoes. Using maps showing distribution of earthquakes and volcanoes, pupils describe the distribution, and consider the patterns shown. They look at the distribution of mountain belts and ocean floor features and consider the patterns shown. Pupils consider the link between Wegener's theory of continental drift and what they have learnt in this lesson. Multiple Choice knowledge test Marked Work: Write a paragraph to **describe** the distribution of Earthquakes shown in Map A (from page 207 Hodder)	**Lithosphere** **Mountain belt** **Mid-ocean ridges** **Ocean trenches**	**Vocabulary Retrieval:** Pangea Continental drift **Challenge:** Describe how the map of the earth looks like a jigsaw? Explain the evidence we have for the theory of continental drift?

Lesson 4: KG - Describe what is happening beneath our feet. • To identify the structure of the Earth. • To understand the composition of the lithosphere. • To understand the theory of plate tectonics.	The purpose to this lesson is to understand the basic structure of the earth and gain an understanding of the theory of plate tectonics. The lessons follows on from the previous lesson as it looks in more detail at the structure of the earth. It feeds forward to the next lesson looking at the theories used to explain tectonic activity.	Establish what pupils know by asking 'how can we know what is happening in the earth when we have never been there?' Explain what evidence scientists use and how it is developing over time. Pupils study the layers of the Earth and label a diagram to look at the difference between continental and oceanic crust. Pupils compare a map of Earth's tectonic plates with the distribution of earthquakes, volcanoes and fold mountains. Using the map of Earth's tectonic plates, pupils name each main plate and answer a series of questions. Pupils write a summary about how the Earth is structured and what processes are taking place. Multiple Choice knowledge test	**Plate tectonics**	**Vocabulary Retrieval:** Lithosphere Mountain belt Mid-ocean ridges Ocean trenches **Challenge:** Describe what features you would expect to find in the lithosphere? Explain why mountain belts and ocean trenches follow similar lines.
Lesson 5: KG – Explain what happens at plate boundaries • To describe and understand the three different types of plate boundary and the events that occur there.	The purpose of this lesson is to look at the theory of plate movement and to examine how this theory has changed over time. The lesson follows on from the last as it examines the different types of plate boundaries and landforms.	Show the video 'What is Plate Tectonics?' https://vimeo.com/69911511 Pupils draw and annotate each type of plate boundary to show what is happening and what features can be found there. They look back at Lesson 11.4 to find examples of the plate types. Using the information explaining plate movement, pupils explain why the explanation for how plates move has recently been changed. Pupils describe this more recent theory. Pupils draw and label a cross-section to show how plates move and the forces that cause the	**Destructive** **Constructive** **Conservative plate boundaries** **Magma**	**Vocabulary retrieval:** Plate tectonics **Challenge:** Explain why theories about plate tectonics change.

• To understand the forces that drive plate movement.	It feeds forward to the next lesson as it looks at the forces involved in an earthquake.	movement. They consider if it is likely that new theories to explain the movement of plates will emerge in the future. Multiple Choice knowledge test Marked work – Write a paragraph to **explain** the latest theory about the cause of plate movement. (Page 211 Hodder.)		
Lesson 6: KG - Explain what we know about earthquakes. • To understand what an earthquake is and what damage they may cause. • To understand what causes them to occur and how they are measured.	The purpose of this lesson is to examine what an earthquake is and the impact of the earthquake in Nepal 2015. This lessons follows on from the previous lessons as it looks at the impact of an earthquake in Nepal. It feeds forward to the next looking at how we can manage the effects of earthquakes.	Lesson begins with a dramatic compilation of Earthquake videos (NB some of these contain quite shocking footage): https://www.youtube.com/watch?v=h3ppo7B9ff0 Using a diagram, pupils explain what an earthquake is, and give definitions for key terms relating to earthquakes. Using text and resources about the earthquake in Nepal in 2015, pupils explain the tectonic processes at work. They write a letter from an aid worker in Nepal to their family at home to describe what the earthquake was like and what help the people of Nepal need. Multiple Choice knowledge test	**Main shock** **Seismic waves**	**Vocabulary Retrieval:** Destructive Constructive Conservative plate boundaries Magma **Challenge:** Explain the dangers found at plate boundaries.
Lesson 7: KG – To what extent can people manage risk living in earthquake zones? • To understand how people manage risk. • To understand how people can prepare for earthquakes. • To understand that the stage of development of a	The purpose of this lesson is to look at the ways we can manage the risk of living in an earthquake zone. Looking at the 3 P's: prediction, preparation and protection. This lesson follows on from the last looking at measure we can take to	Using the images from page 214, pupils imagine what they should do if they are in their house when an earthquake occurs. They think about what they would need to survive for up to two weeks after an earthquake has hit their home. Using a poster showing how to prepare a house for an earthquake, pupils discuss the guidance and consider what the most important safety measures would be. They look at how buildings can be made earthquake proof.	**Prediction** **Preparation** **Protection**	**Vocabulary Retrieval:** Main shock Seismic waves **Challenge:** Describe the instruments used to measure seismic waves.

country can affect the way the risk of living in an earthquake zone is managed.	protect people from the effects of earthquakes. This lesson feeds forward to the next set of lessons looking at how volcanoes work and how eruptions affect people.	Pupils look at the west coast of the USA to consider why it is prone to earthquakes, and consider why people still live there. After reading an article about Nepal 30 months after the 2015 earthquake, pupils use what they have learnt about Nepal in previous units to compare how the Nepalese government prepares people for an earthquake compared to the government in USA. They look at building standards and reconstructions in Nepal after the earthquake. Multiple Choice knowledge test		
Lesson 8: KG - Describe what we know about volcanoes • To understand what a volcano is and how a volcano forms. • To understand that there are different types of volcano depending on location.	The purpose of this lesson is to examine the two main types of volcanoes. Looking at the characteristics and locations of each type. This lesson follows on from previous lessons in this unit looking at how volcanoes are formed. It feeds forward to the next lesson which examines why people choose to live near volcanoes.	Start with any dramatic footage of an volcanic eruption such as the Kilauea Volcano's current eruption: https://www.wsj.com/video/footage-from-hawaii-kilauea-volcano-eruption/E22D0275-52B3-4577-AB03-67B6040C7490.html Or aerial views of the Leilani Fissure eruption of Kilauea Volcano's on 5 May 2018: https://vimeo.com/268237716 Ask the pupils what they think about the video. They may imagine that all volcanic eruptions produce tall volcanoes with steep sides and a symmetrical cone shape; provides an opportunity to introduce different-shaped volcanoes. Pupils describe the three categories of volcanoes. They locate two volcanoes to see what type of plate boundary each is on. They create a table to show the differences between shield and composite volcano. Using a diagram, pupils complete a matching exercise about the features of a volcano.	**Shield volcano** **Composite volcano** **Active** **Dormant** **Extinct**	**Vocabulary Retrieval:** Prediction Preparation Protection **Challenge:** Describe one way we can protect people against the effects of earthquakes.

		Pupils revisit their fact files from Lesson 11.1 to identify the type of volcano shown. If any volcanoes erupt during this unit, pupils should gather information about it and write up a geographical report. Multiple Choice knowledge test		
Lesson 9 – KG: To what extent can people manage the risk living near volcanoes • To understand the advantages and disadvantages of living in a volcanic area. • To understand how volcanic eruptions can be monitored and predicted.	The purpose of the lesson is to understand why people continue to live near volcanoes despite the hazards they present. This follows on from the previous lesson looking at the dangers and benefits of living near volcanoes. It feeds forward to the next lesson which looks to review students understanding of the unit.	Watch, La Soufrière Part 3 https://www.youtube.com/watch?v=Vusr_o2rkww Discuss the messages about living with a volcano that pupils have picked up from the video. Pupils use the information in the textbook to explain why people live near volcanoes. They identify the main dangers people face from living near a volcano. They design a poster to help people who live near volcanoes understand the significance of prediction, planning and preparation. Pupils look at a variety of equipment used to monitor a volcano. Guidance from the Tokyo city authority is provided. Pupils use this to describe what people in Tokyo should do if there is a volcanic eruption. Multiple Choice knowledge test	**Prediction** **Planning** **Protection**	**Vocabulary Retrieval:** Shield volcano Composite volcano Active Dormant Extinct **Challenge:** On which boundary would you find a Shield Volcano?
Lesson 10 – Review lesson KG: Evaluate, can we ever know enough about earthquakes and volcanoes to live safely? • the theory of plate tectonics • how volcanoes and earthquakes are	The purpose of the lesson is to review the unit and determine whether pupils have made progress towards achieving the overarching learning objectives for the unit. This follows on from previous lessons in the unit as it gives students	Pupils answer a series of questions to help them and their teachers assess their understanding of what they have learnt in the unit. Pupils complete an activity about the key terms they have learnt in this unit. On a map of the world, pupils mark a list of all the places studied in this unit. Pupils create a timeline to summarise the discoveries and ideas that led to the theory of plate tectonics. For two photographs of volcanoes, pupils identify which type of volcano is shown.	**Natural Hazard** **Natural Disaster** **Earthquake** **Volcano** **Pangaea** **Continental drift** **Lithosphere** **Mountain belt** **Mid-ocean ridges**	

linked to plate tectonics • the hazards for people associated volcanoes and earthquakes • how scientists are trying to better understand how to predict, manage and prevent these hazards.	the opportunity to review their knowledge. It feeds forward to the next lesson which assesses students knowledge and application.	Pupils consider to what extent they agree with the view that 'Earthquakes don't kill people, collapsed buildings do'. Pupils explain whether we can ever know enough about earthquakes and volcanoes to live safely.	**Ocean trenches** **Plate tectonics** **Destructive** **Constructive** **Conservative plate boundaries** **Magma** **Main shock** **Seismic waves** **Prediction** **Preparation** **Protection** **Shield volcano** **Composite volcano** **Active** **Dormant** **Extinct**	
Lesson 11: Assessment lesson	The purpose of the lesson is to test students on knowledge covered in this unit.	Students work through a question sheet.		