

# KNOWLEDGE ORGANISER

## WORLD STUDIES

### KS4 Geography

### Topic 1: Hazards Earth EQ3

Name:

Class Teacher:

Big Question	Task	Due Date
3	Retrieval questions p.8	
5	Exam questions p.11	
11	Retrieval questions p.14	



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1. What is the Earth's structure and physical properties
2. How do hazards form at constructive plate boundaries?
3. How do hazards form at conservative and destructive plate boundaries?
4. What are the differences between composite and shield volcanoes?
5. What are the causes of earthquakes and their hazards?
6. What were the impacts of the Japanese Tohoku earthquake?
7. What were the impacts of the Nepalese earthquake?
8. How did the management of the Japanese and Nepalese earthquake compare?
9. How do you answer the longer mark evaluate questions?

# EXAM STRUCTURE & CASE STUDIES

## Paper 1: Global Geographical Issues (37.5%)

- ☐ Topic 1: Hazardous Earth
- ☐ Topic 2: Development dynamics
- ☐ Topic 3: Challenges of an urbanising world

Written examination: 1 hour and 30 minutes, 94 marks.

Answer all questions

## Paper 2: UK Geographical Issues (37.5%)

- ☐ Topic 4: The UK's evolving physical landscape
- ☐ Topic 5: The UK's evolving human landscape
- ☐ Topic 6: Geographical investigations

Written examination: 1 hour and 30 minutes, 94 marks.

Answer all questions  
in Topic 4 and 5

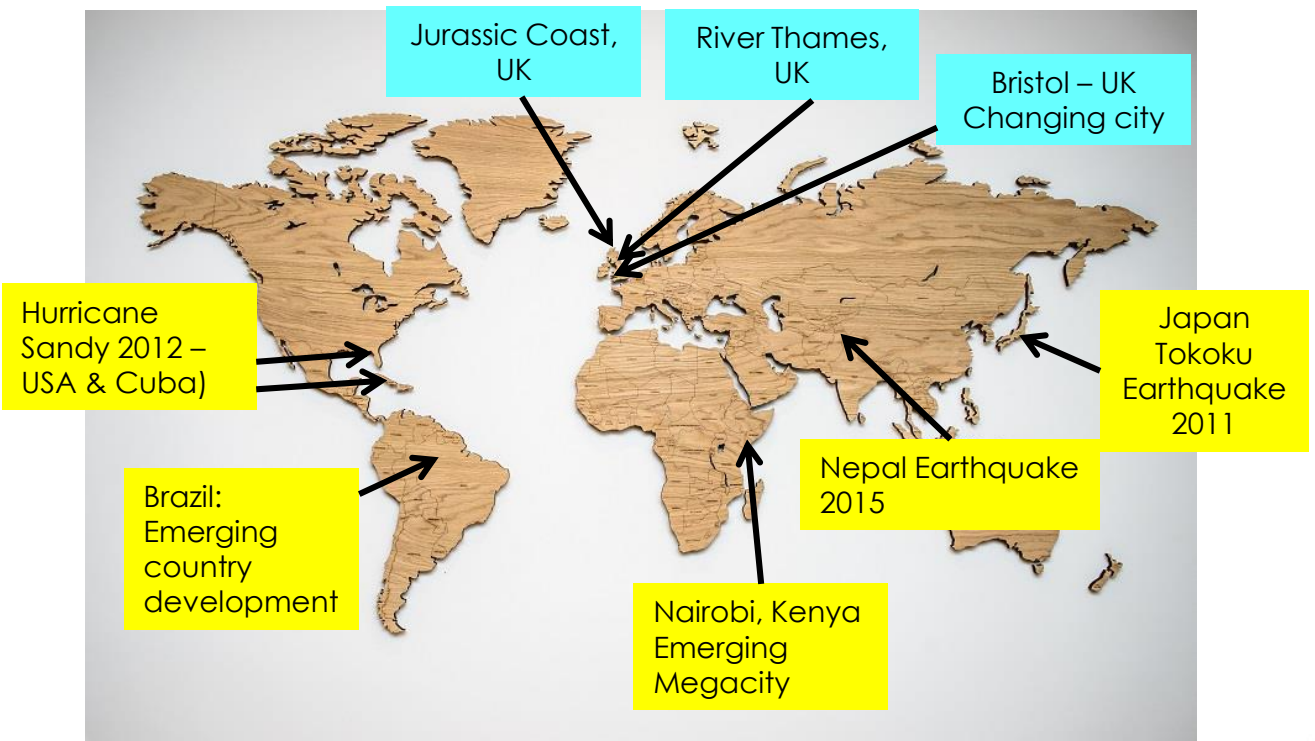
Topic 6: Answer Q 8 &  
Q10

## Paper 3: People and Environment Issues – Making Geographical Decisions (25%)

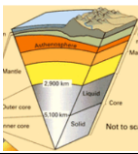







- ☐ Topic 7: People and the biosphere
- ☐ Topic 8: Forests under threat
- ☐ Topic 9: Consuming energy resources

Written examination, 1 hour and 30 minutes, 64 marks.

Answer all questions



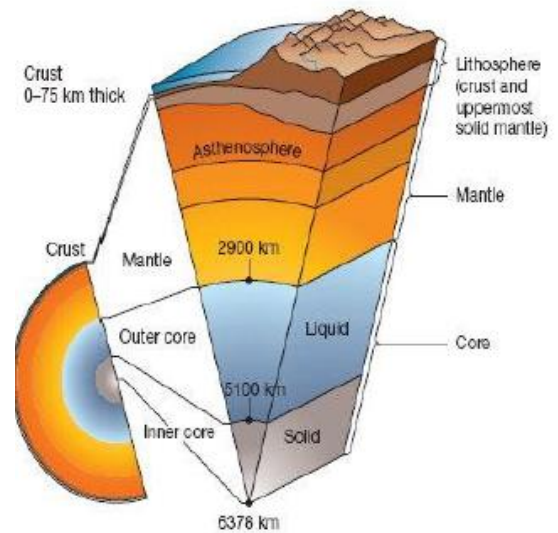
# GLOSSARY

Key term	Icon	Definition
<b>Asthenosphere</b>		The upper layer of Earth's mantle below the lithosphere.
<b>Conservative boundary</b>		Convection currents cause tectonic plates to slide past each other e.g. Haiti.
<b>Convergent plate boundary</b>		Where two plates are moving towards each other, resulting in the oceanic plate subducting e.g. Japan.
<b>Divergent boundary</b>		Where two plates are moving apart e.g. Iceland.
<b>Explosivity</b>		A measure of the relative explosiveness of volcanic eruptions varying due to formation on convergent or divergent boundaries.
<b>Lithosphere</b>		Includes both the crust and the top layer of the upper mantle.
<b>Short-term relief</b>		Immediate support that includes rescuing people, providing medical aid, and restoring water and electricity.
<b>Warning strategies</b>		Forecasting, monitoring and prediction that allows advance warnings for preparation and evacuation.

# BQ1: WHAT IS THE EARTH'S STRUCTURE AND PHYSICAL PROPERTIES?

The Earth is divided into layers.

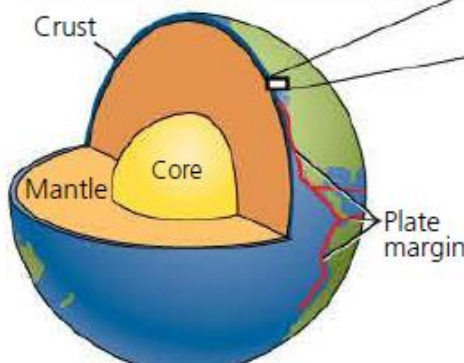
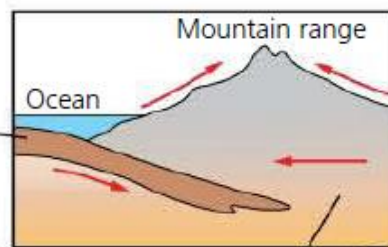
- The **lithosphere** is the uppermost layer and is split into continental crust (granite) and oceanic crust (basalt).
- The mantle can be divided into two layers. The **thinner asthenosphere**, a partly molten 'lubricating' layer under the lithosphere. The lower mantle which is solid.



The core is also split into two layers. The outer core is liquid, whilst the inner core is solid because the pressure is so great. The composition of both is iron and nickel.

Layer		Physical State	Composition	Temperature (°C)
Crust	Continental	Solid	Granite	1000
	Oceanic (sea)		Basalt	
Mantle	Upper	Solid	Silica-based	1000-4000
	Lower	Liquid		
Core	Outer Core	Liquid	Iron/Nickel	4000-5000+
	Inner Core	Solid		

**Oceanic crust (lithosphere)**  
Thin: 5-10 km, dense  
Formed of basaltic rock  
Sinks when it meets continental plate  
Is recycled at destructive margins  
Young: usually less than 200 million years old



**Continental crust (lithosphere)**  
Thick: 20-200 km, less dense  
Composed mainly of granite rock  
Is not destroyed  
Old: Up to 3.8 billion years old



# BQ1: WHAT IS THE EARTH'S STRUCTURE AND PHYSICAL PROPERTIES?

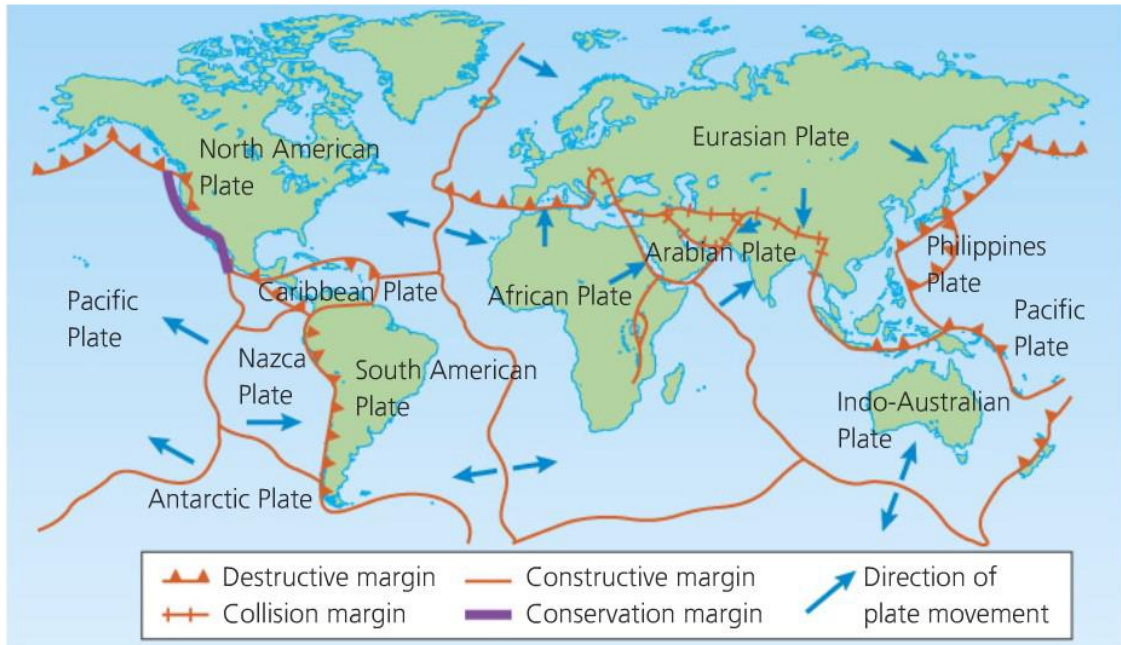
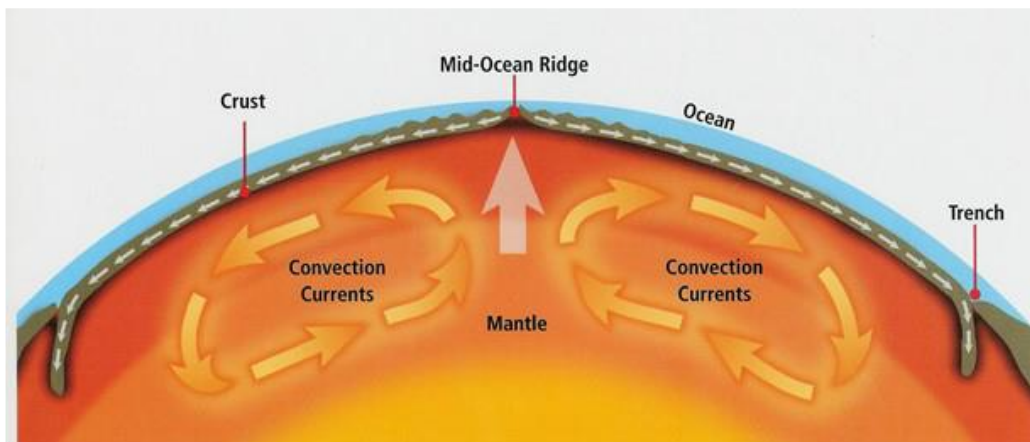


Figure 5: The Earth's tectonic plates and their boundaries

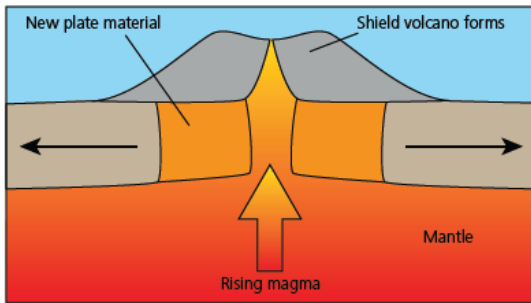
## How do the earths tectonic plates move?

1. Residual heat and radioactive decay in the core generates heat which passes through the molten liquid rock in the mantle in circular currents.
2. As it heats up and becomes less dense it rises then as it cools and hits the lithosphere it spreads out and sinks towards the core (like a lava lamp).
3. These circular movements or CONVECTION CURRENTS causes the crust (plates) to collide, slide or be pulled apart leading to earthquakes and volcanoes.



According to one theory, convection currents in Earth's mantle drag along tectonic plates. Here the currents move two plates apart.

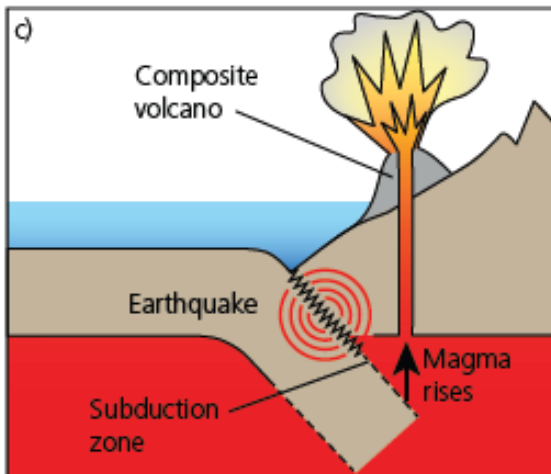
# BQ2 & BQ3: HOW DO HAZARDS FORM AT DIFFERENT PLATE BOUNDARIES?



## **Constructive/Divergent plate boundary**

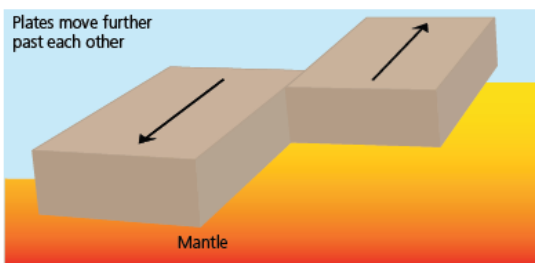
Rising magma in opposite directions moves plates apart leaving cracks allowing magma from the mantle to fill the gap, erupts onto the surface and cools as new land or a shield volcano. E.g. Mid-Atlantic Ridge.

Earthquakes can also occur as the plates don't always move apart smoothly.



## **Convergent/ Destructive plate boundary**

Rising magma in the same direction causes plates to converge. The denser oceanic plate sinks beneath the less dense, granitic continental plate (subduction) creating a deep oceanic trench. The oceanic plate sinks into the mantle and melts creating composite volcanoes E.g. Nazca plate and South American plate. Sudden movements can cause earthquakes or when two plates of equal density collide fold mountains are formed.



## **Conservative/Transform plate boundary**

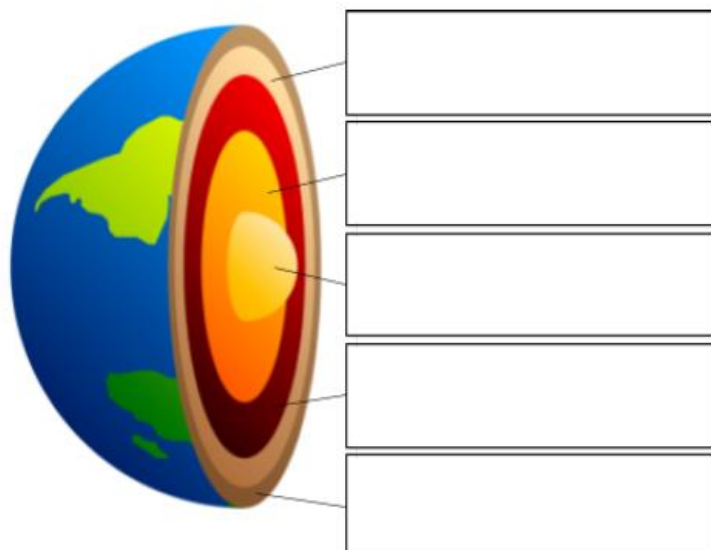
Rising magma causes plates to slide past each other or in the same direction as each other. No crust is destroyed or created. Earthquakes occur along these faults when pressure builds along the boundary although volcanoes do not form here. E.g. San Andreas Fault, USA.

# HOMWORK 1

Try to answer all of these key knowledge questions. Then check your answers using the answer page. These are some of the questions that will be in the knowledge quizzes and the mid and end of unit tests.

**Questions in *italics* are from older work.**

Key knowledge question	Your answer
When did the earth form?	
What shape is the earth?	
Which crust is thicker?	
What is the oceanic plate made of?	
What is the main driving force of plate tectonics?	
What percentage of the earth's volume is made by the crust?	
What is the very top layer of upper mantle known as?	
How thick is the Earth's crust?	
Give one difference between the Inner Core and the Outer core	
<i>Who proposed continental drift? (KS3 retrieval)</i>	
Label the layers of the earth and state what they are made of	





# BQ4: WHAT ARE THE DIFFERENCES BETWEEN COMPOSITE AND SHIELD VOLCANOES?



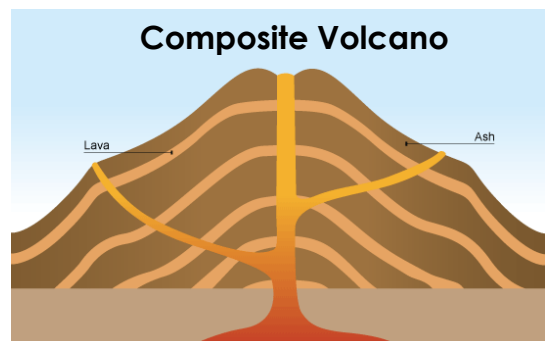
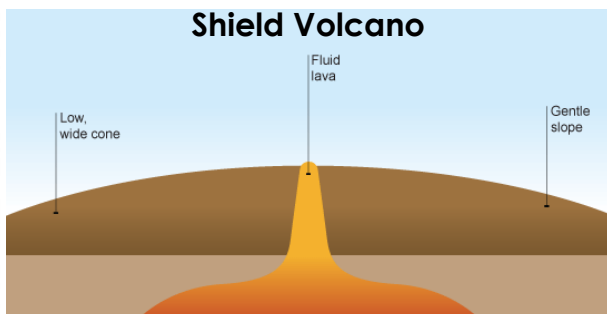
Most volcanoes occur in **belts** that follow plate margins. The most well-known is called the '**Ring of Fire**' around the edge of the Pacific Ocean.

Volcanoes are fed by **magma** which rises to the surface at **constructive and destructive plate margins**. They also form at thin areas of the Earth's crust where **magma** can break through.

## What are the different types of volcano and what are their features?

Volcanoes vary in shape and size. They are formed where molten rock from the magma chamber erupts onto the surface through a vent. Molten rock is called magma below the surface but when it erupts on to the surface it becomes lava. As well as lava volcanoes throw out ash, cinders, pumice, dust gases and steam from its crater. They are classified as per the table below:

	Shield (divergent)	Composite (convergent)	Hotspots (divergent)
Shape	Low, flat, gentle slopes	Steep sided, layers of ash and lava	Low, flat, gentle slopes
Magma/ lava type	Basaltic magma, fluid, flows very quickly	Granitic/andesitic magma. Viscous, flows slowly, hardens quickly	Basaltic magma, fluid, flows very quickly
Eruption	Frequent, gentle eruptions.	Infrequent, explosive	Frequent, gentle eruptions.
Example	Kilauea, Hawaii	Montserrat, Caribbean	Mauna Loa, Hawaii



# **BQ5: WHAT ARE THE CAUSES OF EARTHQUAKES AND THEIR HAZARDS?**

**Earthquakes** mostly occur on the margins of **tectonic plates**. The plates move, causing great amounts of pressure to build and be released. Earthquakes can occur on conservative plate margins. The point below the surface is called the FOCUS, the point on the ground above the FOCUS is called the EPICENTRE. Destructive margins account for 90% of the World's earthquakes.

Some earthquakes are caused by **human activity** (e.g. mining) so may not occur on plate margins.

## **Earthquake hazards**

### **1. Seismic waves**

Seismic waves are vibrations that travel under the ground or on the Earth's surface. Seismic waves are created by large dynamic sources such as earthquakes and explosions.

#### **a) P-waves**

Primary waves or P-waves are the **first waves to be produced by an earthquake**. Although they are weaker in comparison to S-waves, they travel faster and force the ground up and down in relation to longitude.

#### **b) S-waves**

Secondary waves or S-waves are the body waves that come after the primary waves. S-waves travel at a slower pace through the crust and cause it to move from side to side perpendicular to the direction of the main wave.

## **How are earthquakes measured?**

Earthquakes are recorded using seismometers and the magnitude is then given according to the Richter scale with a value of 1-10 (logarithmic Scale).



# HOMEWORK 2

Explain one difference between the type of volcanoes found at divergent and convergent plate boundaries. (3)

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Analyse Figure 2, which shows the global distribution of recently active volcanoes.

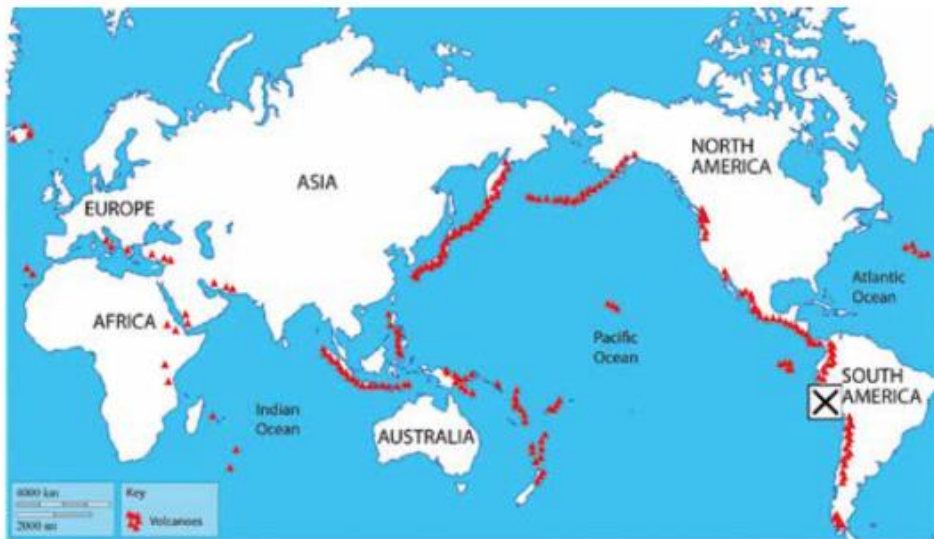


Figure 2

(i) Suggest **two** reasons for the distribution in Figure 2. (4)

1.....

.....

.....

2.....

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.....

Other than volcanoes, explain how two tectonic hazards could occur at **X**

1.....

.....

.....

2.....

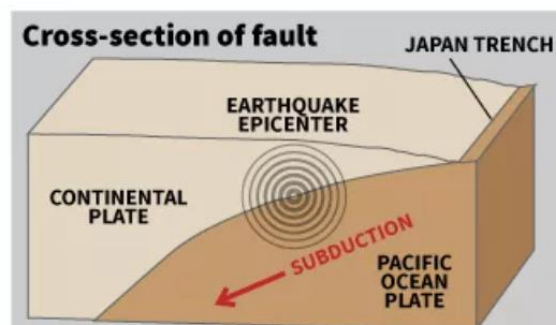
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# BQ6: WHAT WERE THE IMPACTS OF THE JAPANESE TOHOKU EARTHQUAKE?

Question	Japan 2011
What was the date and time of the earthquake?	Friday 11 <sup>th</sup> March 2011, at 2.46 pm
What was the magnitude?	magnitude 9.0 Mw
Where was the epicentre?	The epicentre was approximately 70km from the Oshika peninsula on Japan's north-east coast.
How long did the earthquake last?	The ground shook for approximately six minutes
What type of plate boundary?	Japan sits on the boundary of the Pacific and North American plates at <b>a destructive plate margin</b> at the Japan trench.
Why did the earthquake occur?	The earthquake was caused by the release of hundreds of years of pressure build-up as the Pacific plate was subducted.
How many people died?	100 from the earthquake and 16,000 from the tsunami and earthquake
How many were injured?	6,152
How many houses destroyed?	130,000
Economic cost	US \$300 billion
What other social impacts were there?	Millions lost power and water Phone lines were down 465,000 people were displaced
What other economic impacts were there?	78 bridges collapsed 4,000 roads damaged Fukushima power station leaked radiation costing \$50 billion to clean up

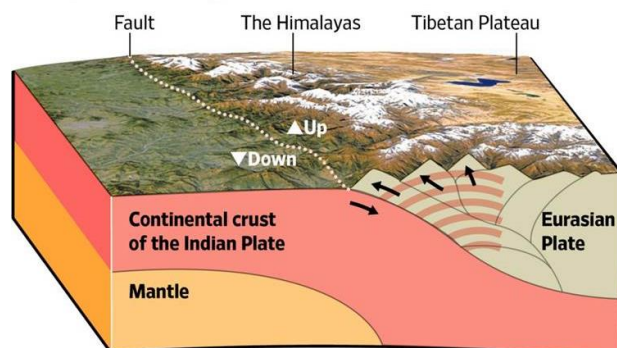






# BQ7: HOW WERE THE IMPACTS OF THE NEPALESE EARTHQUAKE?

Question	Nepal 2015
What was the date and time of the earthquake?	Saturday 25 <sup>th</sup> April 2015, at 11.56 and 2 <sup>nd</sup> one on the 12 <sup>th</sup> May
What was the magnitude?	Magnitude 7.8 Mw, followed by 7.3 Mw
Where was the epicentre?	The epicentre was 85km north-west of Kathmandu
How long did the earthquake last?	The ground shook for approximately 50 seconds
What type of plate boundary?	Nepal lies on the boundary of the Indian plate and Eurasian plate. These form a <b>collision plate boundary</b> , where the two plates converge at the rate of around 4.5cm per year.
Why did the earthquake occur?	The Indian plate suddenly shifted below the Eurasian plate by two to five metres, released stress – a 'thrust slip'.
How many people died?	8,969 after both earthquakes
How many were injured?	17,866
How many houses destroyed?	602,595
Economic cost	US \$5 billion
What other social impacts were there?	Farmers lost seed and livestock Loss of stored food = malnutrition People of lower caste had less access to supplies
What other economic impacts were there?	Climbing seasons suddenly ended due to avalanches Country's rice supply was destroyed Lost of livelihoods – 75% of population are farmers





# HOMWORK 3

Try to answer all of these key knowledge questions. Then check your answers using the answer page. These are some of the questions that will be in the knowledge quizzes and the mid and end of unit tests.

Key knowledge question	Your answer
What volcano type is at a constructive plate boundary?	
Outline two features of a shield volcano	
Outline two hazards of a composite volcano?	
Which type of lava has a high silica content?	
What is a hotspot?	
What is the Richter scale?	
Name the point in the earth's crust where the earthquake starts	
What is the name of the point on the earth's surface above the focus?	
What is the very top layer of upper mantle known as?	
Give one difference between the Inner Core and the Outer core	
Date and time of Japanese EQ	
What was the magnitude?	
How long was the earthquake?	
What was significant about the focus of the earthquake?	
What two plates were involved in the Japanese earthquake?	
Outline two primary effects of the earthquake	
Outline one secondary effect of the Japanese earthquake	



## BQ8: HOW WERE THE EARTHQUAKES MANAGED?

Question	Japan 2011	Nepal 2015
Types of aid provided?	<ul style="list-style-type: none"><li>• Food, water, medicine, blankets, shelter and fuel</li><li>• 116 countries offered help</li></ul>	Financial, rescuers, medical, supplies (tents, blankets), food and water and transport
3 other responses	<ol style="list-style-type: none"><li>1. 100,000 army members were mobilised to search and rescue</li><li>2. \$1 billion donated by the Japanese Red Cross</li><li>3. Special Zones of Reconstruction established to encourage rapid rebuilding e.g. low tax</li></ol>	<ol style="list-style-type: none"><li>1. State of Emergency announced and called for international help</li><li>2. 90% of Nepal's army drafted in to help</li><li>3. USA gave \$474 million and pledged \$242 million more.</li></ol>

Similarities	Differences
<ul style="list-style-type: none"><li>• Both declared a state of emergency and asked for international help</li><li>• Both provided short-term relief in the form of sheltered accommodation for those who had lost their homes.</li><li>• Many NGOs such as the Red Cross helped with short-term rescue efforts providing money, shelter, food and equipment</li><li>• Both countries deployed their military to help with the rescue efforts</li><li>• Both countries used technologies to assist in finding missing people e.g. FINDER in Nepal which detected heartbeats in the rubble and Google Person Finder in Japan</li></ul>	<ul style="list-style-type: none"><li>• Japan was more prepared for earthquakes in terms of predictions e.g. one minute warning to people's phones and 20 minute tsunami warning</li><li>• In Japan many buildings are designed to withstand earthquakes</li><li>• Nepal lacks this technology leading to more people losing their lives</li><li>• Short-term relief in Nepal was made more difficult by the aftershocks and heavy rain which caused landslides and floods, making road impassable.</li></ul>

# HOMWORK 3

Try to answer all of these key knowledge questions. Then check your answers using the answer page. These are some of the questions that will be in the knowledge quizzes and the mid and end of unit tests.

Key knowledge question	Your answer
What volcano type is at a constructive plate boundary?	Shield volcano
Outline two features of a shield volcano	Gently sloping/ basic lava/ non-violent/ wide base
Outline two hazards of a composite volcano?	Pyroclastic flows/ ash/ volcanic bombs
Which type of lava has a high silica content?	Acid (Granitic) lava
What is a hotspot?	A spot where superheated rock (not magma) rises very slowly through the mantle, in a plume.
What is the Richter scale?	This measures seismic waves using a seismograph ( <b>how strong it is</b> ).
Name the point in the earth's crust where the earthquake starts	Focus
What is the name of the point on the earth's surface above the focus?	Epicentre
What is the very top layer of upper mantle known as?	Asthenosphere
Give one difference between the Inner Core and the Outer core	Outer core is liquid where as the inner core is solid
Date and time of Japanese EQ	Friday 11 <sup>th</sup> March 2011, at 2.46 pm
What was the magnitude?	magnitude 9.0 Mw
How long was the earthquake?	The ground shook for six minutes
What was significant about the focus of the earthquake?	The earthquake was relatively shallow, focus at approximately 30km deep.
What two plates were involved in the Japanese earthquake?	Pacific and North American
Outline two primary effects of the earthquake	600,000 homes were destroyed 9,000 Nepalese people died
Outline one secondary effect of the Japanese earthquake	465,000 people were displaced

# KEY KNOWLEDGE QUESTIONS

Key knowledge question	Answer
When did the earth form?	4.5 billion years ago
What shape is the earth?	Ellipsoid
Which crust is thicker?	Continental
What is the oceanic plate made of?	Basalt
What is the main driving force of plate tectonics?	Slab pull
What percentage of the earth's volume is made by the crust?	84%
What is the very top layer of upper mantle known as?	Lithosphere
How thick is the Earth's crust?	between 5 and 70 km or 3.1 and 43.5 miles
Give one difference between the Inner Core and the Outer core	Magma (soft in the lower mantle and hard in the upper mantle)
Who proposed continental drift?(KS3 retrieval)	Alfred Wegener
Label the layers of the earth and state what they are made of	



**Upper Mantle  
(Asthenosphere)**

**Outer Core :** Made of iron and nickel.

**Inner Core :** Made of iron and nickel.

**Lower Mantle:** Made up of soft magma.

**Crust:** Made of basalt or granite

# KEY KNOWLEDGE QUESTIONS

Key knowledge question	Your answer
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Outline two primary effects of the earthquake	<i>600,000 homes were destroyed 9,000 Nepalese people died</i>
Outline one secondary effect of the Japanese earthquake	465,000 people were displaced





## Question 1: Impacts of tectonic hazards

Always read the question carefully before you start writing your answer. Make sure you are clear about what the topic of the question is.

**Assess** the importance of the **primary and secondary impacts** of either **earthquakes** or volcanoes in an **emerging or developing** country. **(8 marks)**

Be aware of the number of marks. This will dictate how much time you spend on the question.



### Structuring your answer

1

**Point** - identify your first impact

- This needs to be one sentence that is clear and concise
- **Connectives:** Firstly/Secondly/Finally or On one hand/On the other hand/Overall or To begin with

2

**Explain** your first impact. Use the so what effect.

- Always go into detail, aim for 2-3 sentences
- **Connectives:** This means that, Therefore, This links to, This causes, Consequently

3

**Evidence**

- Give an example or some evidence – the more specific you are, the better you will perform overall.
- **Connectives:** For example/For instance, Such as, This links to, As seen by/in

4

**Counter argument (be critical)**

- You should be critical i.e. consider counter arguments to your initial point
- **Connectives:** However, On the other hand, Although, Alternatively

5

**Evaluation** (link to the question)

- This is where you link your paragraph back to the question by stating what you think overall and how your response answers the question
- **Connectives:** Overall, To summarise, In conclusion, I believe that, Ultimately

Level 1	1–3	<ul style="list-style-type: none"><li>• Demonstrates isolated elements of understanding of concepts and the interrelationship of places, environments and processes. (AO2)</li><li>• Attempts to apply understanding to deconstruct information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. Judgements are supported by limited evidence. (AO3)</li></ul>
Level 2	4–6	<ul style="list-style-type: none"><li>• Demonstrates elements of understanding of concepts and the interrelationship of places, environments and processes. (AO2)</li><li>• Applies understanding to deconstruct information and provide some logical connections between concepts. An imbalanced argument that synthesises mostly relevant understanding but not entirely coherently, leading to judgements that are supported by evidence occasionally. (AO3)</li></ul>
Level 3	7–8	<ul style="list-style-type: none"><li>• Demonstrates accurate understanding of concepts and the interrelationship of places, environments and processes. (AO2)</li><li>• Applies understanding to deconstruct information and provide logical connections between concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently, leading to judgements that are supported by evidence throughout. (AO3)</li></ul>

## Plan your answer

Take the time to make a plan before you answer the question. Below is an example of how your plan should look.

**Assess** the importance of the **primary and secondary impacts** of either **earthquakes** or volcanoes in an **emerging or developing country**. **(8 marks)**

— The best responses are those that are well structured and organised.

**PEECE 1** – Primary impacts are more severe

- Comment on primary social and economic impacts
- Comment on the impact of the damage to the airport

- Keep your plan short and simple. There is no need to write full sentences at this stage.

**PEECE 2** – Secondary impacts were just as severe

- Comment on malnutrition
- Comment on the role of the caste system

- Note down your three PEECE paragraph headings

**PEECE 3** – Overall

- Primary impacts were more important
- Why?



*In my opinion the primary impacts of Nepal earthquake were more severe and more important than the secondary impacts of the magnitude 7.8 earthquake. This was because the primary impacts resulted in both high social and economic impacts. Firstly, the primary impacts resulted in the destruction of buildings and infrastructure. For example, an estimated 600,000 homes were destroyed, as well as cultural significant monuments in the Kathmandu Valley. The damage of the Tribhuvan international airport meant it was temporarily closed which hindered the relief effort. The destruction of these houses led to the deaths of 9,000 Nepalese people and a further 17,866 injured.*

*On the other hand the secondary impacts were just as severe, where thousands of people were displaced into makeshift camps resulting in increased levels of malnutrition. This was because there was a loss of stored food and the deaths of livestock and hens, resulting in the loss of meat and eggs from people's diet. For example, some people such as those of lower caste had less access to supplies. Although, arguably those living in small communities and living at high altitudes were more impacted due to their physical isolation.*

*To summarise, the primary impacts were more important as they had a more significant impact on the people and Nepal itself as a \$5 Billion had to be deployed to repair and rebuild the damaged buildings and infrastructure. This also impacted the distribution of aid which in turn meant more people were initially impacted by the earthquake itself.*