Brooke Weston Trust

Geography

Learn to change the World



GCSE Geography Revision Workbook

Paper 1 – The Challenge of Natural Hazards


Name:

Teacher / Group:

Contents

Guidance – How to use this revision workbook

You should attempt to answer the questions, complete the tasks in this revision workbook independently without using any additional support such as a revision guide, a case study booklet or a friend. Check your responses are correct using the revision guide, case study booklet or your teacher.

If you do not know the answer to a question, read the relevant information from your revision guide or case study booklet. You should then leave it at least 24hrs before attempting the question. DO NOT read the information and complete the task immediately afterwards or at the same time.

Paper 1 – Living with the Physical Environment

The Challenge of Natural Hazards

	Completed
Natural Hazards	
Tectonic Hazards	
Weather Hazards	
Climate Change	

The Challenge of Natural Hazards

Natural Hazards

Outline the difference between the terms **natural hazard** and **natural disaster.**

[4 marks]

There are two main **types of natural hazard**

Geological Hazards – these are caused by land and tectonic processes.

Meteorological Hazards – these are caused by the weather and climate.

Sort the following hazards into the table below.

Volcano, Heatwave, Cold Events (e.g. Beast from the East), Earthquake, Drought, Tropical Storm, Flooding, Avalanche, Climate Change, Landslides, Heatwave

Geological Hazard	Meteorological Hazard

Hazard Risk refers to the probability of a hazard causing harmful consequences e.g. loss of life, injuries, damage

Using the information below and your own knowledge, explain how each of the following factors could increase hazard risk

Level of Development	
Population Density	
Magnitude / Strength of Hazard	
Proximity to Hazard Zones	

Haiti 2010

Haiti is one of the poorest countries in the world, its GDP is only $1,200 per person, 207th in the world, and 80 % of its 9.7 Million people live below the poverty line. Port Au Prince, the countries capital, is on a tectonic plate boundary.

At 16:53 on 12th January 2010 a catastrophic earthquake struck Haiti. The earthquake measured 7.0 on the Richter Scale. The epicentre was centred just 10 miles southwest of Port au Prince where 2.7 million people lived. The quake was shallow — only about 10 km below the land's surface.

Japan 2011

Japan is the 3rd richest country in the world with a GDP of $40 000 per person.

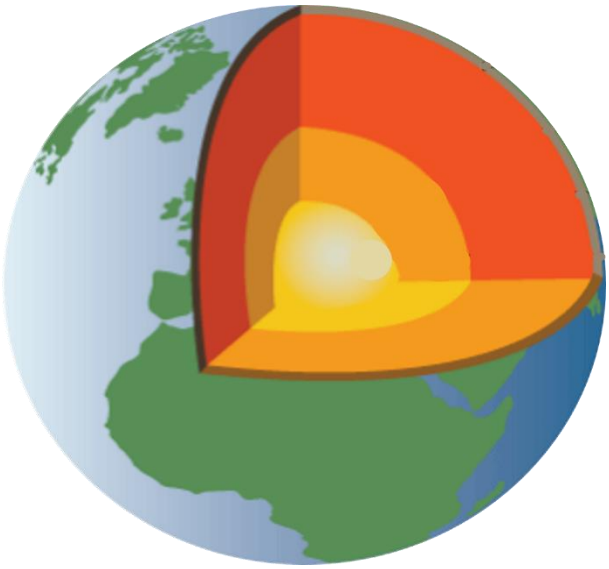
At 14:46 on 13th March 2011 an earthquake measuring 9.0 on the Richter Scale occurred off the coast of eastern Japan in the Pacific Ocean. The epicentre was 130km east of the city of Sendai and 375km northeast of the capital city, Tokyo.

The earthquake is the most powerful known earthquake to have ever hit Japan, and is one of the 5 most powerful earthquakes recorded anywhere in the world.

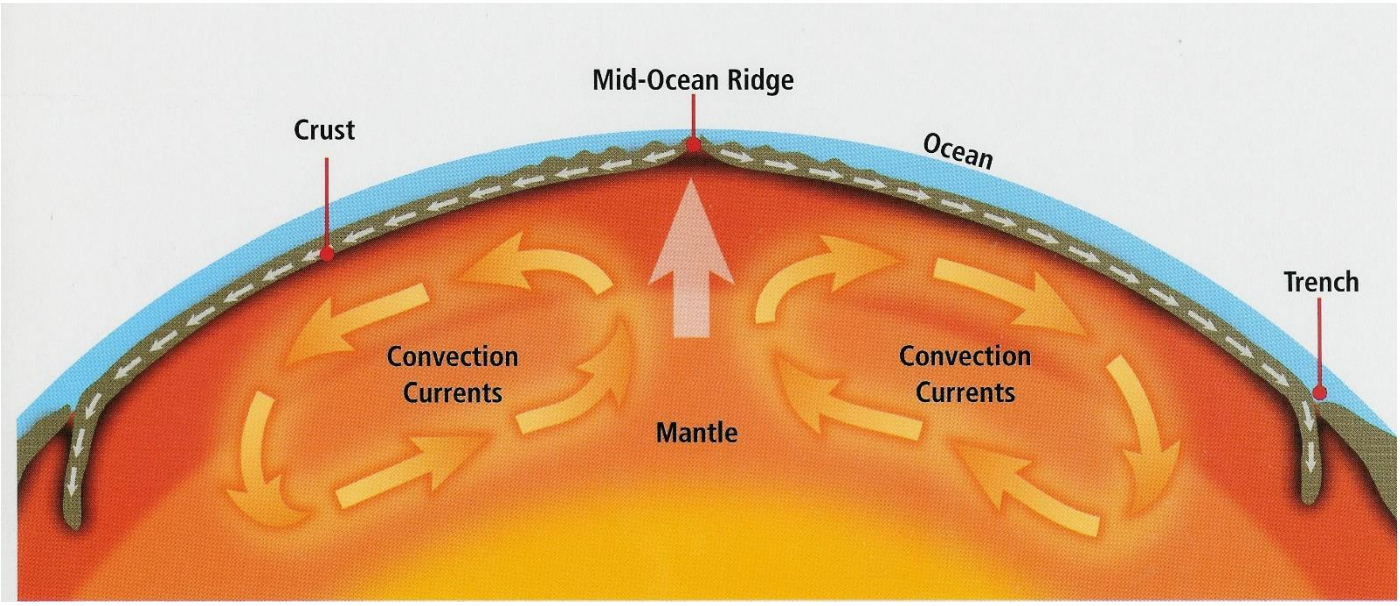
Tectonic Hazards

The structure of the Earth

Identify and describe the characteristics of each layer of the Earth.



Using the diagram above and below, explain how convection currents cause tectonic plates to move.

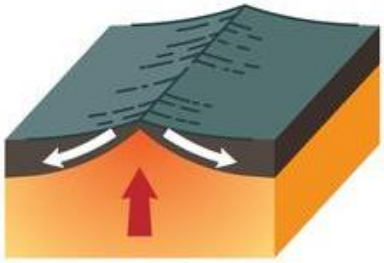


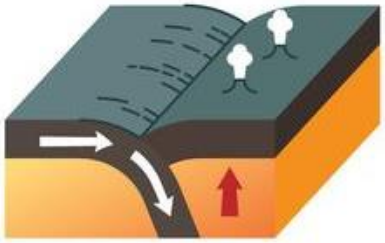
Can you also explain how ridge push and slab pull contribute to tectonic plate movement?

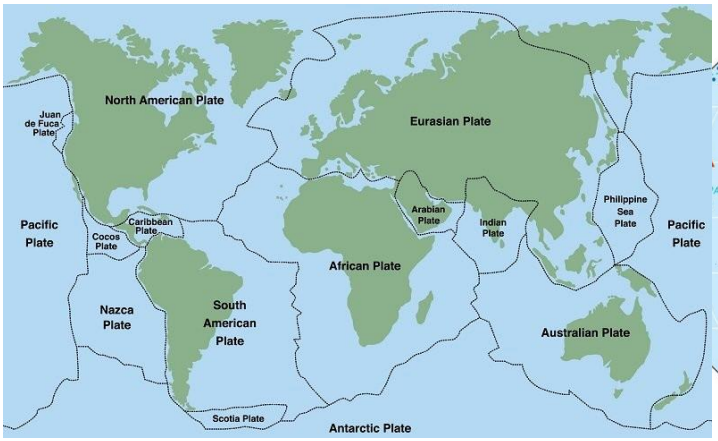
Identify the three main types of plate margin and describe the processes taking place.

PLATE BOUNDARIES

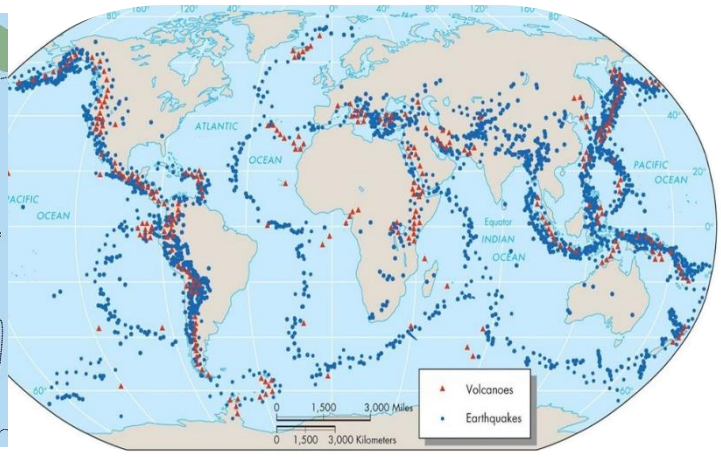
1. _____ **2.** _____ **3.** _____







Map showing the location of plate margins



Map showing the location of major earthquakes and volcanic eruptions

Using the images above, describe the relationship between tectonic plate margins and where volcanoes and earthquakes occur.

_____

_____

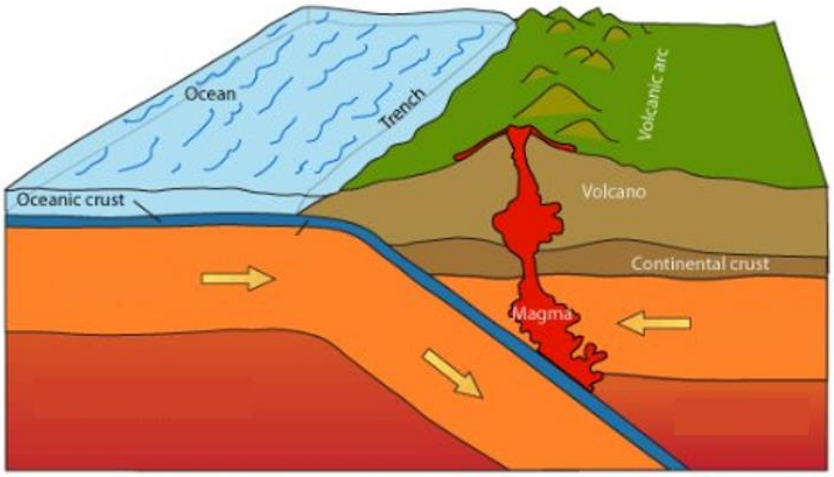
_____

_____

_____

Using the diagram to help, explain why earthquakes and volcanoes occur at destructive plate margins.

Destructive Plate Margin



Complete the table below with the relevant case study information.

Case Study	Primary Effects	Secondary Effects
Earthquake in a HIC		
Earthquake in a LIC/NEE		

You need to know how and why the effects to a tectonic hazard vary between two areas of contrasting levels of wealth i.e. a LIC/NEE and a HIC.

Can you explain how each of the following factors would influence the severity of an earthquake?

Population density - _____

_____

Location - _____

_____

Level of development (HIC/NEE/LIC) - _____

_____

Prediction, Protection and Planning - _____

_____

Type - _____

_____

Frequency - _____

_____

Magnitude- _____

_____

Now complete the statement below. Remember to use place specific detail in your response.

The primary effects of an earthquake in a LIC/NEE e.g. _____were very severe because

_____

_____

_____.

whereas the primary effects of an earthquake in a HIC e.g. _____ were not very severe because _____

_____

_____

_____

Now create your own paragraph comparing the secondary effects of an earthquake in two areas of contrasting levels of wealth.

_____

_____

_____

_____

_____

_____

_____

_____

You should be able to identify, explain and evaluate the immediate and long-term responses to a tectonic hazard (earthquake).

Complete the table below – some examples have been provided for you.

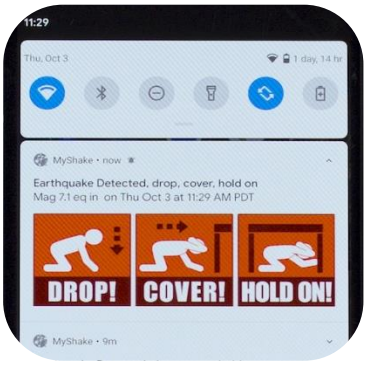
Case Study		Identify	Explain	Evaluate
Earthquake in a HIC - Japan 2011	**Immediate Response**	The army was mobilised… Food, water and shelter was immediately distributed…	…to help search for survivors after the tsunami had hit…	…which helped to reduce the overall death toll as survivors were found trapped under buildings that had been destroyed.
	Long-term response	Tsunami shelters and evacuation sites have been relocated to safer locations… 119 countries contributed to rebuilding projects… Building regulations have been reviewed…	…as more than a hundred evacuation sites and shelters were washed away at Sendai…	…which will help to keep people safe and reduce deaths and injuries in the event of another major earthquake and tsunami in the future.
Earthquake in a LIC/NEE - Nepal 2015	**Immediate Response**	Search and rescue teams were quick to arrive from the UK, India and China… Field hospitals were set up…		
	Long-term response	Roads were repaired and landslides cleared…		

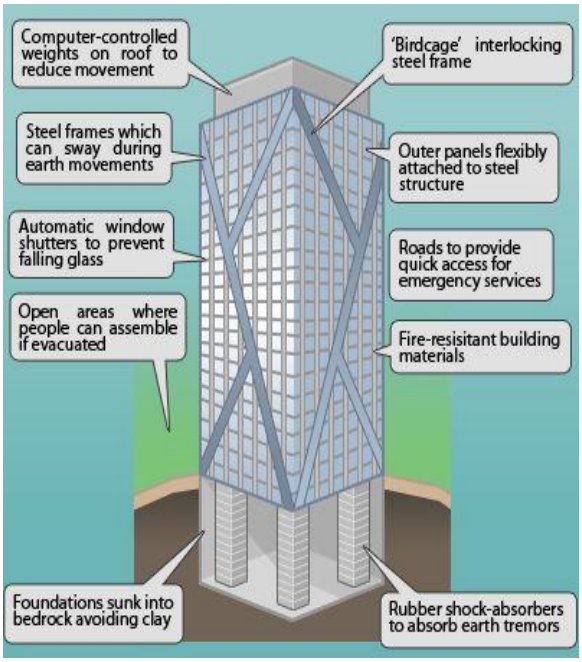
Using the images below, explain how living in areas that are at risk from a tectonic hazard(s) may have both advantages and disadvantages.

Agriculture in the foreground with the volcano Mount Etna spewing ash into the sky in the background

Mount Etna spewing ash into the sky with lava and pyroclastic flows causing a hazard to people and property

How can monitoring, prediction, protection and planning help to reduce the risks from a tectonic hazard?





Use the images on the previous page to explain how **monitoring, prediction, protection** and **planning** help to reduce the risks from a tectonic hazard. Try to include specific examples from your case studies.

Monitoring & Prediction - _____

_____

_____

_____

Protection - _____

_____

_____

_____

Planning - _____

_____

_____

_____

<u>Example Longer Response Exam Questions</u>

1. Choose either an earthquake or a volcanic eruption. Assess the extent to which primary effects are more significant than secondary effects. Use the Figures and an example you have studied. [9 marks] [+ 3 SPaG marks]

2. Suggest why the effects of a tectonic hazard vary between areas of contrasting levels of wealth. [6 marks]

3. Assess the extent to which prediction is the most important factor in reducing the effects of tropical storms. [9 marks] [+ 3 SPaG marks]

4. Using the Figures, suggest why both volcanoes and earthquakes occur in New Zealand. [6 marks]

5. Using a named example, evaluate the immediate and long-term responses to a tectonic hazard. [9 marks] [+ 3 SPaG marks]

6. Assess the extent to which tectonic hazards have effects on people and the environment.

   Use the Figure and an example you have studied. [9 marks] [+ 3 SPaG marks]

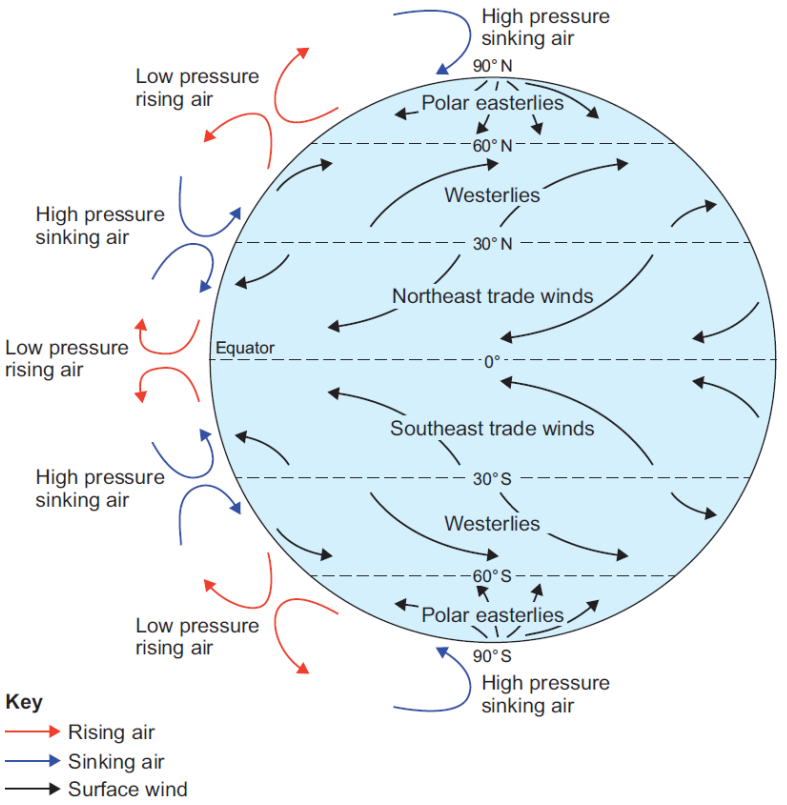
7. 'Long-term responses to a tectonic hazard are more important than immediate responses.'

   Do you agree?

   Using the Figure and one or more examples, explain your answer. [9 marks] [+3 SPaG marks]

Weather Hazards

Below is a diagram showing global atmospheric circulation. Complete the statements.



Areas of high pressure are located at

_____ and _____.

Areas of low pressure are located at

_____ and _____.

In areas of high pressure the air is

_____ whereas in areas of low pressure the air is_____.

The surface winds move from areas of

_____ pressure to areas of

_____ pressure.

Describe and explain the climate you would experience in areas of low and high pressure.

Low pressure- _____

_____

_____

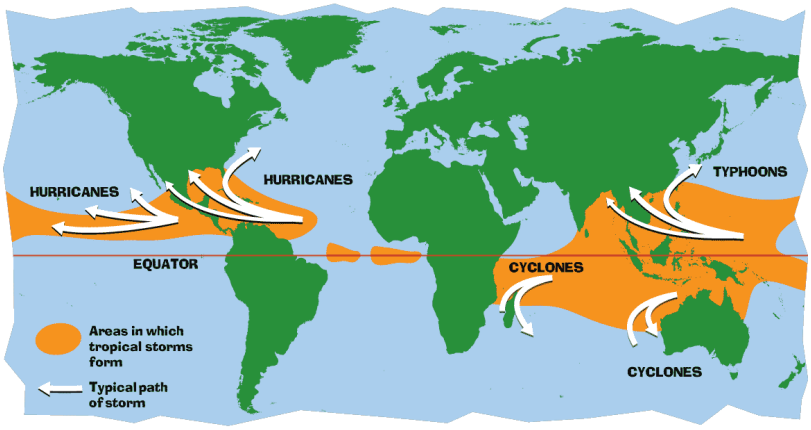
_____

High pressure- _____

_____

_____

_____



Describe the global distribution of tropical storms

_____

_____

_____

_____

_____

_____

Name two conditions that are needed for a tropical storm to form.

1. _____

2. _____

The sequence and development of tropical storm formation.

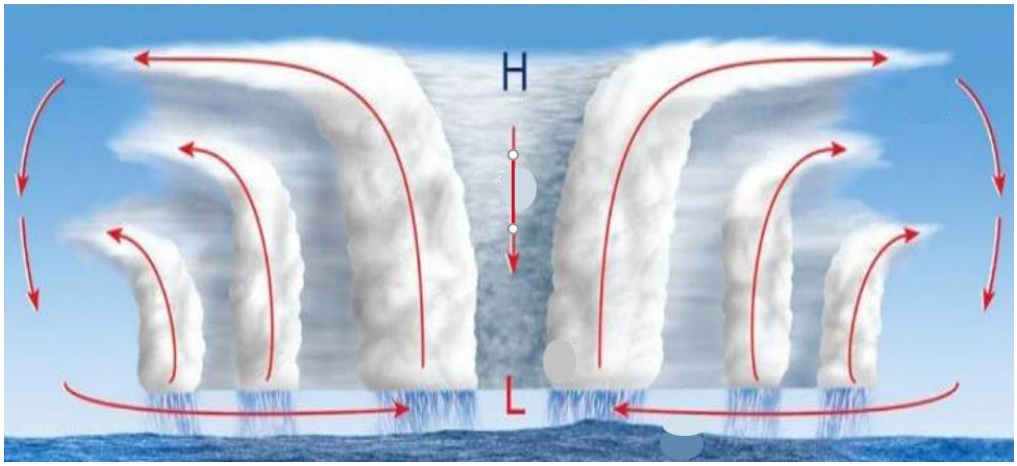
Arrange the following statements in the correct order. The has been completed.

As the storm is carried across the ocean by prevailing winds, it continues to gather strength	
Water vapour rises rapidly from the warm ocean surface	1
Several small thunderstorms join together to form a giant spinning storm. When winds reach 120 km per hour the storm officially becomes a tropical storm	
The air cools as it rises and condenses to form thunderstorm clouds	
When the storm reaches land, the energy supply (evaporated water) is cut off. Friction from the land slows it down and it begins to weaken. The storm may pick up strength again if it crosses over warm seas again	
The storm now develops an eye at its centre where air descends. The outer edge of the eye is the eyewall where the most intense weather conditions (strong winds, torrential rain and thunderstorms) are felt	

The structure of a tropical storm.

Add the following labels to the diagram below.

Eye of the storm, Eyewall, most intense wind, rain, thunder and lightning, least intense wind and rain, calm conditions due to sinking air, water evaporates from the warm sea and rises rapidly



How might climate change affect the distribution, frequency and intensity of tropical storms?

The effects and responses to tropical storms

Describe and explain the primary and secondary effects of a tropical storm you have studied.

Name of tropical storm _____

In your response to this question you should describe and explain the primary effects caused by the heavy rain, strong winds and storm surge. You should then describe the longer-term impacts that happened as a result of these primary effects e.g. homelessness and loss of income due to coastal flooding of farmland, residential areas and/or tourist resorts.

Complete the statements below

One immediate response to _____ was _____

this helped to _____

Another immediate response to was _____

this helped to _____

One long-term response was _____

_____ this helped to _____

Another long-tern response was _____

this helped to _____

Explain how **monitoring, prediction, protection** and **planning** help to reduce the effects of tropical storms. Try to include specific examples from your case studies.

Strategy	Description	Explanation
Monitoring & Prediction	Specialist centres use satellite images to detect and track tropical storms…	…this helps to reduce the effects as…
Protection		
Planning		

Weather hazards experienced in the UK

List all of the weather hazards that we experience in the UK. Which do you think has the most and least impact on people and property?

Weather hazards - _____

_____

_____

I think that_____ has the most impact on people and property because _____

_____

_____

_____

I think that_____ has the least impact on people and property because _____

_____

_____

_____

Example of a recent extreme weather event in the UK

Complete the table and answer the question.

Causes		
Impacts		
Social	**Economic**	**Environmental**
Management Strategies		

Snow warnings

Yellow:
- Some impacts
- Disrupted travel

Amber:
- Severe impacts
- Road and rail closures
- Potential risk to life and buildings

Red:
- Dangerous weather
- Risk to life
- Major disruption to travel and power supplies

'Beast from the East' causes chaos across Britain. The killer freeze costs the UK £1 billion per day as transport routes are disrupted by snow and ice. Businesses and schools are forced to close.

Study Figure 2, information about extreme weather in the UK in March 2018.

Suggest how extreme weather in the UK can have economic and social impacts.

Use Figure 2 and your own understanding. [6 marks]

Exam tip – To achieve level 3 marks in your response, you must specifically refer to the figure and develop it further e.g. **'major disruption to travel and power supplies'** can affect people's daily lives such as meeting up with friends and families or attending school but may have severe effects on transport of supplies possibly causing shortages in shops and cause delays to employees getting to work.

You should also include an **additional example of an extreme weather event** you have studied

Is weather in the UK becoming more extreme?

Explain how the following evidence supports the idea that UK weather is becoming more extreme.

2013/14

- Somerset Levels Flooding – Most severe flooding ever recorded in the area

2017

- Storm Ophelia - the furthest east Major Hurricane (Category 3 or higher) on record in the Atlantic
- Worst storm to hit Ireland in 50 years

2018

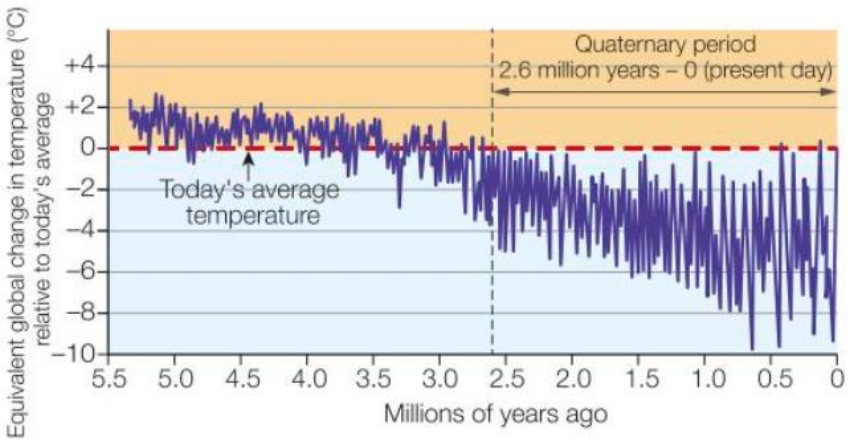
- Joint hottest year since records began
- Hottest summer since records began
- Beast from the East: daytime temperatures -12oC

The ten hottest years on record have all come within the last 20 years. In addition, 6 of 10 wettest years on record have come in the last 20 years.

Climate Change

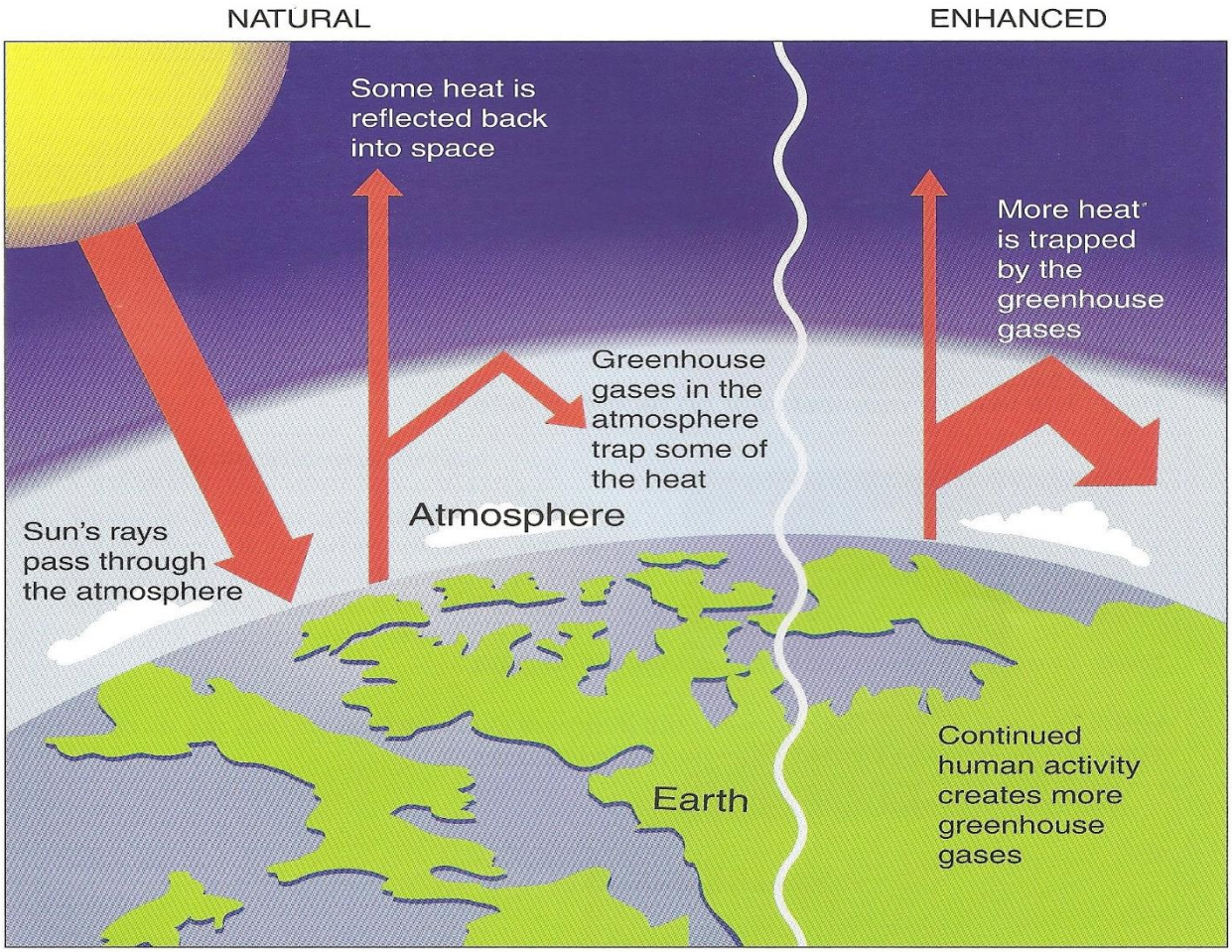
What is the evidence for climate change from the beginning of the Quaternary period to present day?

Explain how **ice cores** (which show CO^2 and methane concentrations) help to show how the climate has changed.



Explain how **pollen analysis** helps to show how the climate has changed.

The figure below shows the natural greenhouse effect and the enhanced greenhouse effect.



Explain the difference between the greenhouse effect and the enhanced greenhouse effect.

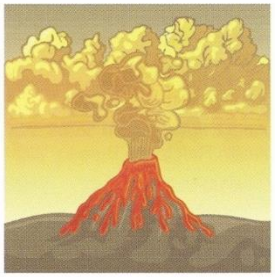
Human causes of climate change

- Use of fossil fuels
- Agriculture
- Deforestation

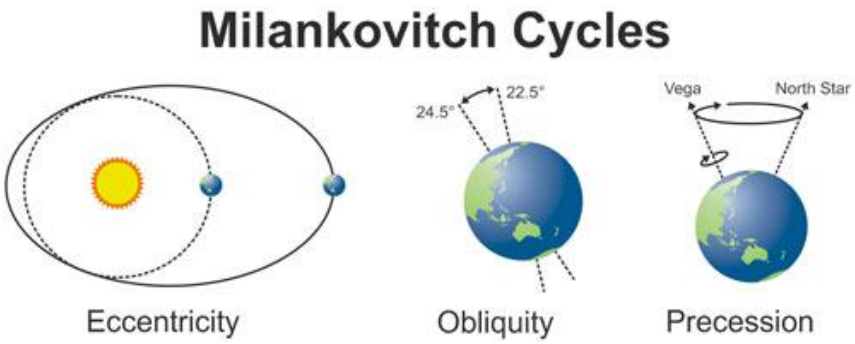
Explain how human activity results in the enhanced greenhouse effect

Natural causes of climate change

- Orbital changes
- Volcanic activity
- Solar output



Explain how volcanic activity and orbital changes lead to climate change



The effects of climate change on people and the environment

Complete the table below.

Effects on people	Effects on the environment

Managing climate change involves both mitigation (reducing causes) and adaptation (responding to change).

Sort the following strategies into the correct column.

- Alternative energy production
- Managing water supply
- Change in agricultural systems
- International agreements
- Planting trees
- Reducing risk from rising sea levels
- Carbon capture

Mitigation	Adaptation

Using examples to support, explain how international agreements and changes in agricultural systems help to manage climate change.

The Challenge of Natural Hazards (Tectonic) – Retrieval Challenge Grid

1 point | 2 points | 4 points | 6 points

Define the term natural hazard	Explain why both volcanoes and earthquakes occur at tectonic plates boundaries		Describe the plate movements at a destructive plate boundary	Define and name a meteorological hazard	Define the term 'primary effect' – give an example	What is the focus of an earthquake?	Describe one factor that affects hazard risk
'Long-term responses to a tectonic hazard are more important than immediate responses.' Do you agree?		Describe the characteristics of the crust and mantle	Define the term convection current	With reference to a case study earthquake, assess the extent to which primary effects are more significant than secondary effects		Suggest how monitoring and prediction can help to reduce the impacts of an earthquake	
Describe the plate movements at a conservative plate boundary	Explain why so many people live in areas at risk from tectonic hazards		**Key Points to Remember** • The case study of an earthquake in a HIC is Tohoku, Japan 2011 • The case study of an earthquake in a LIC is Nepal 2015			Suggest why the effects of a tectonic hazard may be more significant in a urban area	
Assess the extent to which protection and planning are the most important factor in reducing the effects of an earthquake		Define and name a geological hazard				How is the strength of an earthquake measured?	Explain what is meant by plate tectonics theory
What is the epicentre of an earthquake?	What is the difference between oceanic and continental crust?		Explain why so many people are 'displaced' after an earthquake	Describe the global distribution of earthquakes and volcanoes	Describe the primary effects of a named earthquake	Evaluate the immediate and long term responses to a named tectonic hazard	
Define the term 'secondary effect' – give an example	Assess the social, economic and environmental effects for a tectonic hazard you have studied		Name the four layers of the Earth	What is a tsunami?	Suggest why the responses to a tectonic hazard vary between areas of contrasting levels of development		Describe the plate movements at a constructive plate boundary
Suggest why the effects of a tectonic hazard vary between areas of contrasting levels of wealth		Explain the secondary effects of a named earthquake	What is a landslide and avalanche?	Explain how slab pull and ridge push contribute to the movement of tectonic plates		Suggest how protection and planning can help to reduce the impacts of an earthquake	

The Challenge of Natural Hazards (Weather & Climate Change) – Retrieval Challenge Grid

1 point | 2 points | 4 points | 6 points

What is the greenhouse effect?	How does global atmospheric circulation influence patterns of weather and climate around the world?	Explain the social and economic impacts of an extreme weather event in the UK	Explain how international agreements (such as those made at COP26) help to mitigate (reduce the causes) climate change	Identify the evidence for climate change
Assess the extent to which monitoring, prediction, protection and planning help to reduce the effects of tropical storms	Describe 'orbital theory'	What are 'sunspots'?	Assess the extent to which tropical storms have effects on people and the environment	Suggest how climate change might affect the distribution, frequency and intensity of tropical storms?
How can people reduce the risk from rising sea levels?	Explain the primary and secondary effects of a named tropical storm	**Key Points to Remember** • The case study tropical storm is Hurricane Matthew 2016 • An example of an extreme weather event in the UK is the Somerset Levels flooding 2013/14		Describe the environmental impacts of an extreme weather event in the UK
Using a named example, evaluate the immediate and long-term responses to tropical storms	Describe the global distribution of tropical storms		Define the term 'carbon sink'	Describe the structure and features of a tropical storm
What is alternative energy production?	Explain the causes of named extreme weather event in the UK	What is the enhanced greenhouse effect?	Explain how carbon capture and planting trees can help to mitigate (reduce the causes) climate change	Assess the effects of climate change on people and the environment
How can volcanic activity cause climate change?	Explain how changing agricultural systems and managing water supply help people adapt to climate change	Explain how fossil fuels and agriculture are causing climate change	What are the different types of weather hazard experienced in the UK?	How does deforestation cause climate change?
What evidence shows that the weather in the UK is becoming more extreme?	What is a greenhouse gas? Identify one source of GHGs	Explain the causes of tropical storms	Give one reason why the wind speed of a tropical storm (hurricane) may change as it reaches land	Explain how management strategies help to reduce the risk of the named extreme weather event

GCSE Geography Topic Review – Self Assessment

The Challenge of Natural Hazards

This section is made up of four themes:

How confident do you know feel answering the following questions? RAG the end column **RED, AMBER or GREEN**

Theme 1 – Natural Hazards	
What is the definition of a natural hazard?	
What are the different types of natural hazard?	
What factors affect hazard risk?	
Theme 2 – Tectonic Hazards	
What is meant by plate tectonics theory?	
What is the global distribution of earthquakes and volcanic eruptions?	
How do physical processes at the different tectonic plate boundaries result in earthquakes and volcanic activity?	
Answer the following questions about a **named tectonic hazard** in a HIC **'and'** LIC/NEE	
• What are the primary and secondary effects?	
• What are the immediate and long term responses? Were they successful?	
How and why do the effects and responses to a tectonic hazard vary between areas of contrasting wealth/development?	
Why do people live in areas at risk from tectonic hazards?	
How does monitoring, prediction and planning help to reduce the risks from a tectonic hazard?	
Theme 3 – Weather Hazards	
How does global atmospheric circulation (pressure belts and surface winds) help to determine patterns of weather and climate around the world?	
What is the global distribution of tropical storms?	
What are the causes of tropical storms? Including how they form and develop over time.	
What is the structure and features of a tropical storm?	
How does/will climate change might affect the distribution, frequency and intensity of tropical storms?	
Answer the following questions about a **named tropical storm**	
• What are the primary and secondary effects?	
• What are the immediate and long term responses? Were they successful?	
How does monitoring, prediction and planning help to reduce the effects of tropical storms?	
What are the different types of weather hazard experienced in the UK?	
Answer the following questions about a **named example** of a recent extreme weather event in the UK:	
• What are the causes?	
• What are the impacts (social, environmental and economic)?	
• How can management strategies reduce the risk of this extreme weather event?	
What evidence shows that the weather in the UK is becoming more extreme?	

Theme 4 – Climate Change	
What evidence can be used to show climate change from the beginning of the quaternary period to present day?	
How are the following human activities causing climate change?	
• The use of fossil fuels	
• Agriculture	
• Deforestation	
How do the following natural events cause climate change?	
• Orbital changes	
• Volcanic activity	
• Solar output (sunspots)	
What are the effects of climate change on people and the environment?	
How do the following **mitigation** (reducing causes) strategies work?	
• Alternative energy production	
• Carbon capture	
• Planting trees	
• International agreements	
How do the following **adaptation** (responding to change) strategies help?	
• Change in agricultural systems	
• Managing water supply	
• Reducing risk from rising sea levels	

Think about the statements that you identified as RED or AMBER. You will need to ensure that you revise these areas and then test your knowledge and understanding.