

Paper 1- Living with the physical environment

Section A: The challenge of natural hazards

Natural hazards

Key idea: Natural hazards pose major risks to people and property.

Command words, p.6

1. **Define** 'natural hazard' and give examples.

2. Add the events to the table below. **Events:** *earthquake, volcanic eruption, tsunami, tropical storm, hurricane/typhoon/cyclone, climate change*

Event	Meaning
	Lava erupts from a vent in the earth's crust. This occurs at destructive and constructive plate boundaries.
	Changes to the earth's atmospheric patterns, especially rainfall and temperature. These changes vary region to region, but in many places they involve increases in temperature.
	Different names are given to tropical storms depending on where they occur.
	Shaking of the ground due to tectonic movement. This occurs at all plate boundary types.
	A series of fast moving, long and high waves resulting from tectonic movement under the ocean floor.
	A powerful storm that moves at more than 74 miles per hour. They form over water and spin in an anticlockwise direction, gathering power as they move over water & losing power when they reach land.

3. Complete the paragraph about hazard risk by filling in the gaps with the provided vocabulary. **Vocabulary:** *equipped, earthquakes, probability, density, magnitude, nature, defences, flooding, rebuild, greater, human, frequently, cope, severe.*

Hazard risk is the _____ that a natural hazard occurs. To count as a hazard, the event has to affect _____ activities. Several factors influence hazard risk. One is vulnerability. The denser the population is in an area exposed to natural hazards, the greater the risk that they will be affected by a natural hazard. For example, an area with a high population _____ along a very active plate boundary (e.g. San Francisco) is especially vulnerable to earthquakes, and a densely populated floodplain (e.g. Bangladesh) is especially vulnerable to _____ caused by extreme weather. Another factor is capacity to _____. The better a population can cope with an extreme event, the lower the impact will be. For example, HICs are often better _____ than LICs to deal with the impacts of natural hazards such as flooding or volcanic eruptions., because they are more able to build _____, evacuate people, provide swift medical assistance and _____ quickly. Another factor is that the _____ of natural hazards varies considerably. Some hazards can be **predicted** (e.g. tropical storms) giving people and governments time to prepare and evacuate, while others cannot be predicted and happen suddenly (e.g. _____) meaning that people are caught unaware. Some hazards occur more _____ than others, increasing hazard risk. Some hazards are more _____ than others, e.g. an earthquake of 9.2 on the Richter scale will have a far _____ hazard risk than one that registers in at 4.6. To summarise, some key factors affecting hazard risk are: vulnerability, population density, capacity to cope, level of preparation, hazard type, hazard frequency, and _____.

4. Would hazard risk be greatest for A or B? In the final column, give reasons for your choice. An example has been done for you.

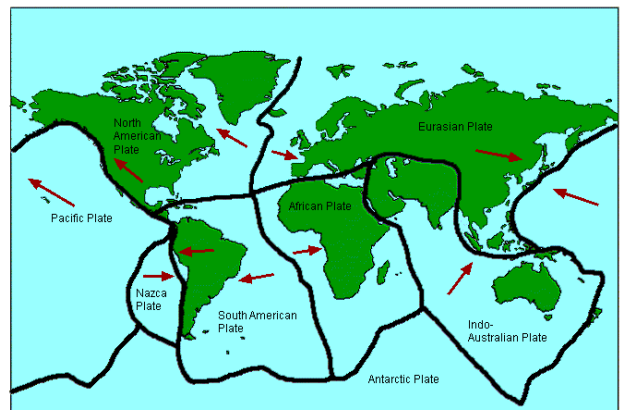
Question	A	B	Risk would be greatest in... (A or B)	Reasons
Where will economic cost be greatest?	<i>Volcanic eruption in a rural area</i>	<i>Volcanic eruption in an urban area</i>	B	Urban areas have more buildings and businesses so insurance and reconstruction costs would be higher. Replacement of belongings is costly for individuals.
Where will economic cost be greatest?	<i>Earthquake in an urban area in a HIC</i>	<i>Earthquake in an urban area in a LIC</i>		
Where will human cost be greatest?	<i>A tsunami strikes a densely populated coastline</i>	<i>A tsunami strikes a sparsely populated coastline</i>		
Where will human cost be greatest?	<i>Rising sea levels- mountainous region</i>	<i>Rising sea levels- small Pacific islands</i>		

Tectonic hazards

Key idea: Earthquakes and volcanic eruptions are the result of physical processes.

5. The theory of plate tectonics is that...

6. Look at the map. The black lines show plate margins. In one sentence, say what a plate margin is.



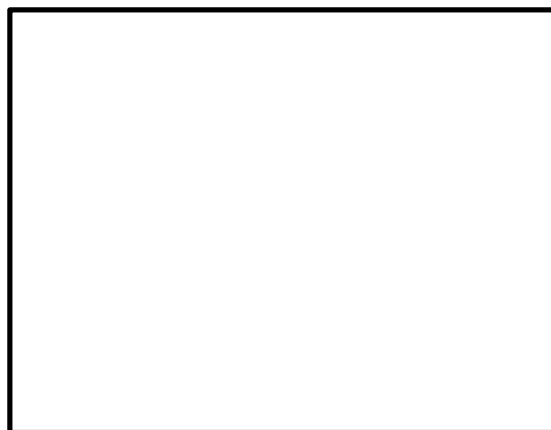
7. Why do most earthquakes and volcanoes occur near plate margins? In your answer, try to use geographical terms such as: *convection currents, tectonic plates, plate boundaries, collision, energy, etc.*

8. Where do more tectonic hazards occur? Circle the correct answers.
- On or near plate margins / far from plate margins
 - Near the Pacific Ring of Fire / far from the Pacific Ring of Fire
 - Near coastal areas / inland areas
 - The western coastline of North and South America / the eastern coastline of North and South America
 - Southern Africa / south and eastern Asia
9. There are three main types of plate margin (destructive, constructive and conservative). For each plate margin type:
- Draw a diagram showing how the plates move (Towards each other? Apart? Alongside each other?)
 - Write a sentence describing what happens
 - Indicate whether earthquakes and/or volcanic eruptions occur as a result
 - Give an example (use the map above to help you) e.g. 'where the South American and Nazca plates meet'

Destructive plate margin

- The plates move together / apart / alongside each other
- At a destructive plate margin, _____

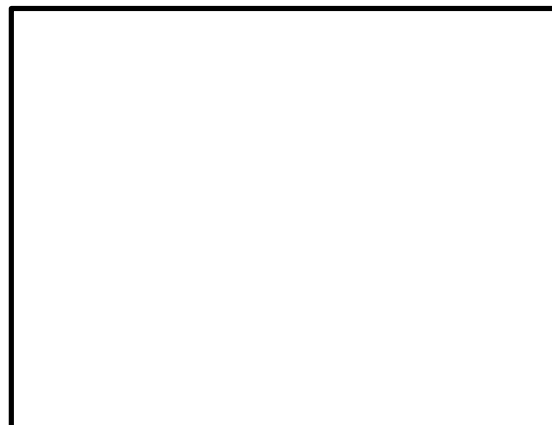
_____.
- Earthquakes occur here / volcanoes occur here / earthquakes and volcanoes occur here
- Example: _____



Constructive plate margin

- The plates move together / apart / alongside each other
- At a constructive plate margin, _____

_____.
- Earthquakes occur here / volcanoes occur here / earthquakes and volcanoes occur here
- Example: _____



Conservative plate margin

- The plates move together / apart / alongside each other
- At a conservative plate margin, _____

_____.
- Earthquakes occur here / volcanoes occur here / earthquakes and volcanoes occur here
- Example: _____



Key idea: The effects of, and responses to, a tectonic hazard vary between areas of contrasting levels of wealth.

10. Below some **effects** of and **responses** to tectonic hazards are listed. Code each one as either **PE** (primary effect), **SE** (secondary effect), **IR** (immediate response) or **LR** (long-term response).

buildings collapse	economic growth slows
water pipes burst	people moved permanently from the area
disease spreads	homelessness
evacuation	people die of cold and exposure
communication links destroyed	landslides
building regulations improved	new jobs in the construction industry
volunteers arrive to search for survivors	tents given out by charities
fires spread due to gas pipes bursting	schools and hospitals rebuilt
people are injured or killed	people live in refugee camps
income is lost	shops and businesses ruined
investment in the area is focussed on rebuilding	gas pipes burst
search and rescue teams deployed	rioting
evacuation services	farmland, crops and livestock destroyed
medical tents set up	water sources contaminated
money is donated to purchase medicines and other supplies	the government has to borrow money for reconstruction
homes are rebuilt at huge expense	sites of religious and cultural importance are lost
trade is made more difficult	water is contaminated

11. The effects of tectonic hazards are often worse in places that have low incomes. Select one effect from the list above, and create a flow chart in the space below to show why the effects may be more devastating in a LIC than a HIC.

The specification says that you need to 'Use named examples to show how the effects and responses to a tectonic hazard vary between **two areas of contrasting levels of wealth.**'



12. To help you do this, complete the table below. Try to **include place-specific details** (e.g. place names) and **facts and figures** (e.g. number of destroyed houses and lives lost).

	HIC named example Earthquake or volcano? _____ Place? _____ Year? _____	LIC named example Earthquake or volcano? _____ Place? _____ Year? _____
Primary effects		
Secondary effects		
Immediate responses		
Long-term responses		

Tip: you need to be able to **assess** which effects were most/least severe and which responses were most/least effective. Develop a **coding system** in the space below and label the information in your table above.

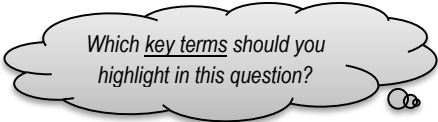
Command words, p.6

Key idea: Management can reduce the effects of a tectonic hazard.

13. Using the vocabulary provided, **explain** why people continue to live in areas at risk from a tectonic hazard. **Vocabulary:** *advantages, opportunities, fertile, tourism, apathy, sites of religious or cultural importance, denial, financial hardship*

Horizontal lines for writing the answer to question 13.

14. Think about the examples of monitoring, prediction, protection and planning below, then say how each can reduce the risks from a tectonic hazard.



Monitoring examples: seismometers, thermal imaging, volcano observatory, laser beams to detect plate movement, gas samples to measure sulphur levels, monitor radon gas levels, groundwater level changes.

Monitoring helps to reduce tectonic hazard risks by...
Horizontal lines for writing the answer.

Prediction examples: tracking hazard frequency, tremor detection, volcano observation

Prediction helps to reduce tectonic hazard risks by...
Horizontal lines for writing the answer.

Protection examples: earthquake-proofing buildings, strong and flexible materials for bridges and roads, lahar channels

Protection helps to reduce tectonic hazard risks by...
Horizontal lines for writing the answer.

Planning examples: training people e.g. earthquake drills, emergency supplies stored by local services and emergency kits in the home, good communication systems, being ready to evacuate, constructing new buildings away from areas of risk

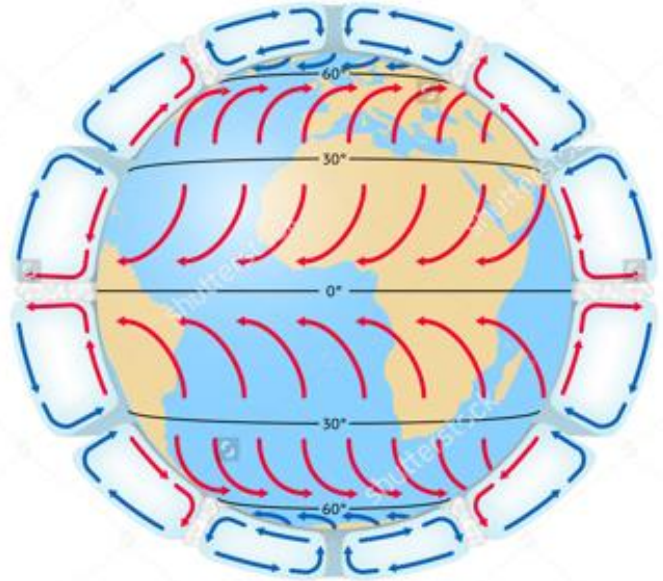
Planning helps to reduce tectonic hazard risks by...
Horizontal lines for writing the answer.

Weather hazards

Key idea: Global atmospheric circulation helps to determine patterns of weather and climate.

15. On the blank global circulation model, label:
- a. Polar cells
 - b. Ferrel cells
 - c. Hadley cells
 - d. The north-east trade winds, the south-east trade winds, and the westerly winds
 - e. Rising warm moist air/low pressure
 - f. Sinking cool dry air/high pressure

You may wish to use the **letters a-f** to do this so that you can fit it all in!

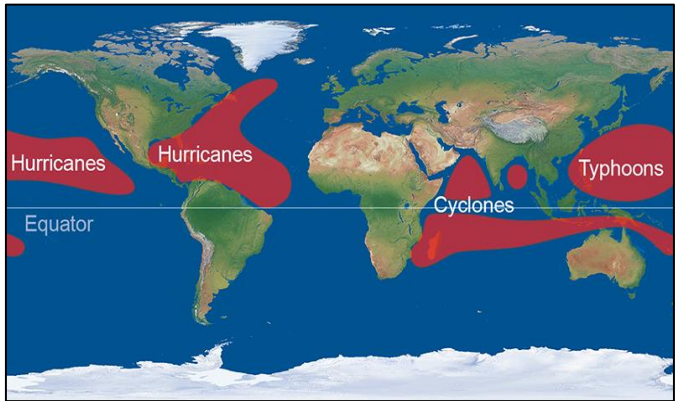


Key idea: Tropical storms (hurricanes, cyclones, typhoons) develop as a result of particular physical conditions.

16. Remind yourself of what 'distribution' means (page 9).

17. Using the map provided, **describe** the global distribution of tropical storms.

Command words, p.7



18. You need to be able to see the links between the tropical storms and atmospheric circulation. Using the map on this page, the model on the previous page and what you have learnt in class, make **a series of dot points** to explain why tropical storms form where they do (and why they do **not** form in other areas!). You should refer to factors such as low and high pressure, water temperature, wind, etc.
- a.
 - b.
 - c.
 - d.
 - e.

19. Below is a jumbled list of the events that occur in order for a tropical storm to form. In the box, draw the formation of a tropical storm, and **copy and number the events onto the diagram to show that you know the correct order.**

Jumbled sequence of events: trade winds/westerlies merge smaller clouds / cool air sinks downwards causing vapour in the warm air to condense / as the cloud moves over warm waters more condensation occurs increasing the cloud's size and intensity / cloud forms / if the storm reaches 74mph+ it is classed as a tropical storm / trade winds/westerlies spin the large cloud anticlockwise / oceans with temperatures of 26.5C+ cause mass evaporation

Labelled diagram: formation of a tropical storm

20. The paragraph below is about the structure and features of tropical storms. Using the vocabulary provided, fill in the blank spaces. **Vocabulary:** *descending, winds, circular, less, speed, clockwise, high, smaller, eye, eyewall, rain, anticlockwise, increases, hundreds, 7-14, 50km, rain, low*

Tropical storms are _____ in shape, _____ of kilometres wide and usually last _____ days. They spin _____ in the southern hemisphere and _____ in the northern hemisphere. The centre of the storm is called the _____. It is up to _____ across and is caused by _____ air. In the eye there is very _____ pressure, light winds, no clouds, no _____ and a _____ temperature. The eye is surrounded by the _____. Here there is spiralling rising air, very strong _____ (around 100 miles per hour), storm clouds, torrential _____ and a low temperature. Towards the edges of the storm the wind _____ falls, the clouds become _____ and more scattered, the rain becomes _____ intense and the temperature _____.

21. On the aerial image of a tropical storm, label:

- a. **the eye**
- b. **eyewall**
- c. **edge of the storm**
- d. **fastest winds**
- e. **torrential rain**



22. Many experts are worried that climate change will increase the **intensity, frequency** and **distribution** of tropical storms. **Suggest** and **explain** reasons why they are concerned.

Command words, pages 7 and 9

One reason why the **intensity** of TS's may increase: _____

One reason why the **frequency** of TS's may increase: _____

One reason why the **distribution** of TS's may increase: _____

Key idea: Tropical storms have significant effects on people and the environment.

The specification says that you need to 'Use **a named example of a tropical storm** to show its effects and responses.'



23. Based on your learning of a named example of a tropical storm, complete the table below. Try to **include place-specific details** (e.g. place names) and **facts and figures** (e.g. number of destroyed houses and lives lost).

NAMED EXAMPLE OF A TROPICAL STORM			
Place? _____		Year? _____	
EFFECTS		RESPONSES	
PRIMARY	SECONDARY	IMMEDIATE	LONG-TERM

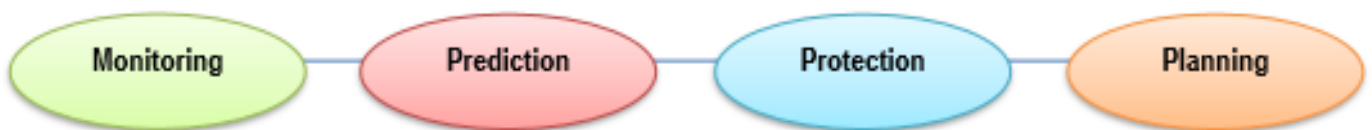
24. You need to be able to **assess** which effects were most/least severe and how effective the responses were for your named example.

The **most severe effects** of the tropical storm were the **primary / secondary** effects, because _____

The **most effective response** to the tropical storm was: _____, because _____

The **least effective response** to the tropical storm was: _____, because _____

25. **Annotate** each bubble below with examples and say how they can help to reduce the effects of tropical storms. For example, for 'Protection', you could write '*Afforestation absorbs much of the storm's energy when it hits the coastline, reducing the impact on protecting people, property and the environment further inland*'. You should have at least two examples for each bubble.



Key idea: The UK is affected by a number of weather hazards.

26. The UK experiences a wide range of weather hazards, which can have serious effects. Link the hazards to the effects using neat lines.

<p>Thunderstorms</p> <p>Rain</p> <p>Snow and ice</p> <p>Hailstorms</p> <p>Wind</p> <p>Drought</p> <p>Heatwaves</p>	Heavy rain, lightning and strong winds; lightning can cause deaths and fires, which ruin property.	Water supplies may run low, leading to crop failure. Rules may be imposed to conserve water, e.g. hosepipe bans.	Too much of this in a short time can cause flooding, which puts people, property, businesses and the environment at risk. It can disrupt transport networks, destroy communication lines, cause drownings, and may cost millions of pounds to recover.
	May cause injuries from slipping or deaths due to cold. Schools and businesses may be forced to close, and crops may be ruined.	This can damage crops, damage property and make driving very dangerous.	Can cause deaths from breathing difficulties or heat exhaustion. Roads can melt which disrupts transport, but tourism may benefit.
		This may uproot trees and destroy property e.g. ripping off roofs. Flying debris can kill. Forests may be damaged when trees are blown over.	

Key idea: Extreme weather events in the UK have impacts on human activity.

The specification says that you need to know '**An example of a recent extreme weather event in the UK:** causes; social, economic and environmental impacts; and how management strategies can reduce risk'.



27. Using the information that you have learned in lesson as well as your own research, complete the table below with facts and figures.

EXAMPLE OF A RECENT EXTREME WEATHER EVENT IN THE UK		
Weather event type? _____		
Place? _____		
When? _____		
CAUSES	IMPACTS	MANAGEMENT
	Social	Which management strategies were used (before, during and/or after)?
	Economic	Did they reduce risk? If so, how? If not, why not?
	Environmental	

The specification requires that you know evidence to show that weather is becoming more extreme in the UK. To be able to answer the question below, **you should revise the evidence**, for example evidence showing that **temperatures have become more extreme** in recent years, evidence to show that **it's raining more**, and evidence to show that **flooding occurs more often**. **Evidence should include examples and data: without this, you cannot attain more than 2 marks out of 6.**

28. **EXAM-STYLE QUESTION:** 'The weather of the UK is becoming more extreme.' Use evidence to support this statement.
(6)

Climate change

Key idea: Climate change is the result of natural and human factors, and has a range of effects.

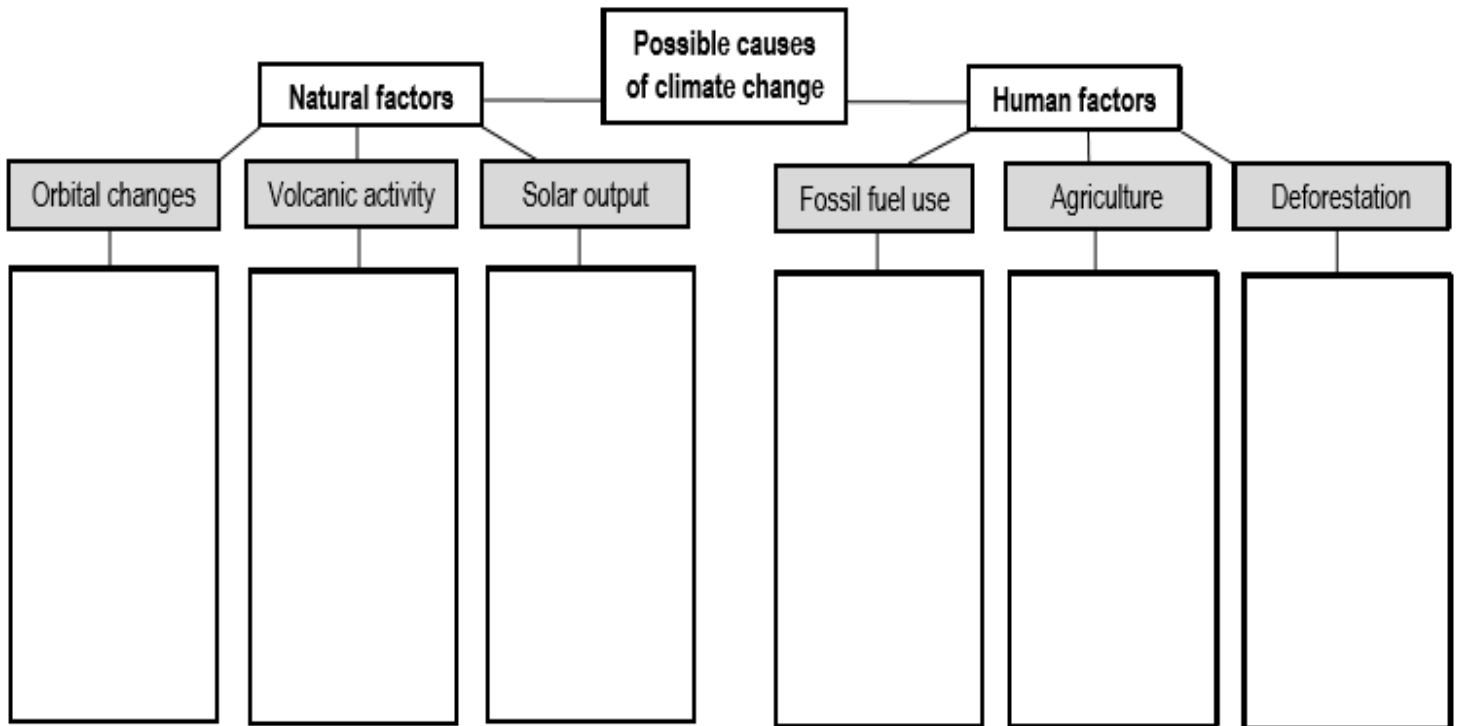
29. What does the term 'climate change' refer to?

30. What does 'Quaternary period' refer to?

31. Some evidence for climate change is found using data collected from **tree rings, ice core samples, pollen analysis and temperature records**. Select **one** of these and say how it provides evidence that climate change is occurring.

_____ provides evidence that climate change is occurring because _____

32. The figure below shows some of the **possible causes of climate change**. Underneath each factor, briefly **explain** how it is thought to cause climate change.



33. Outline the **effects** of climate change on **people** and the **environment**. You may wish to write a paragraph for each, or create a brainstorm. Try to refer to specific places in your answer.

Command words, p.8

