Tectonic Hazards

1. There are lots of features and processes you should be aware of from GCSE. Complete this key term mix and match to help refresh your memory of them.

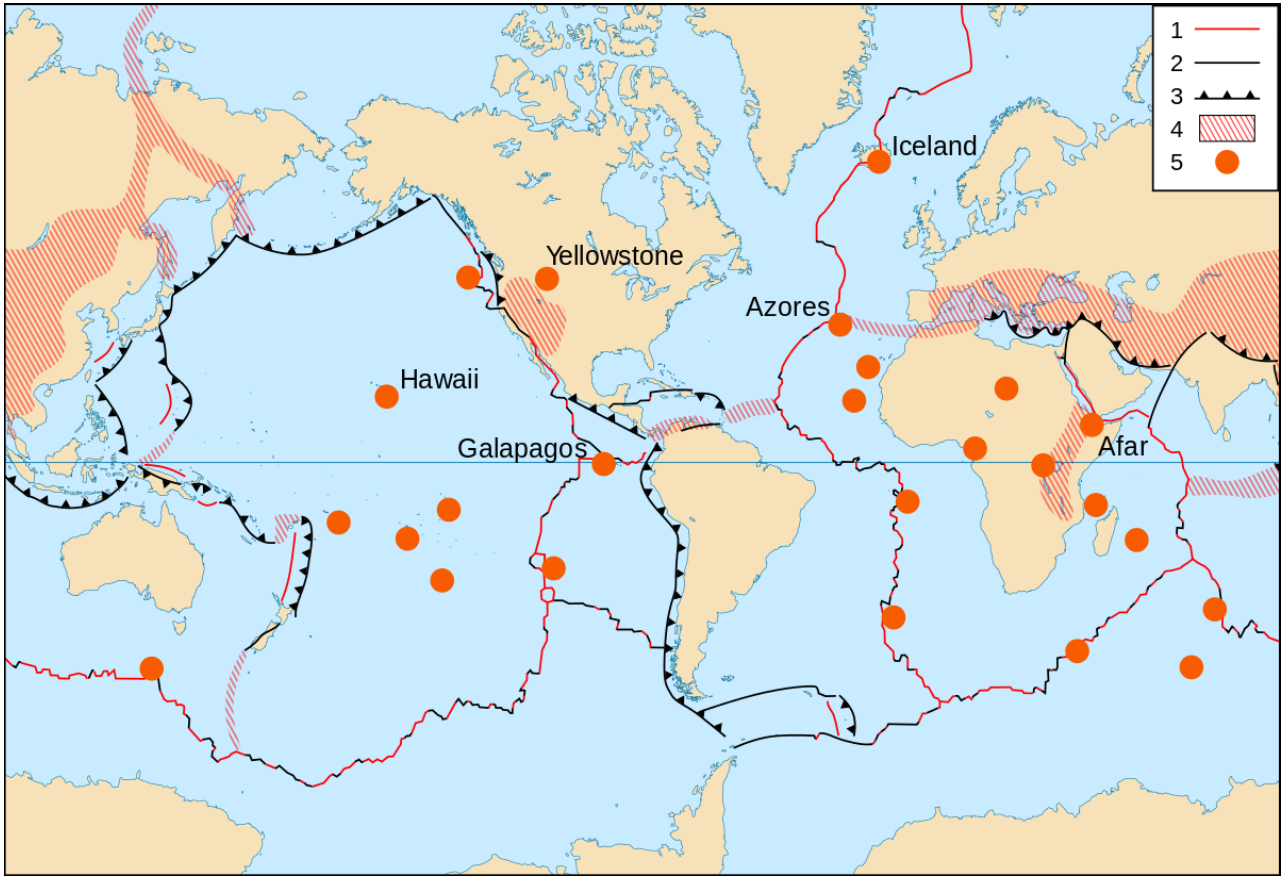
Term	Definition
Diverging plate margin	The point on the Earth's surface directly above the focus of an earthquake.
Converging plate margin	A fast-moving current of hot gas, ash and volcanic tephra which moves down a volcano at around 100 km/h.
Conservative plate margin	The solid outer part of the Earth, combining the crust and the upper mantle.
Seismometer	The point inside the Earth's crust where the pressure from an earthquake is released.
Magnitude	The area of the mantle where a descending plate melts.
Pyroclastic flow	A series of waves generated by an undersea earthquake, volcano or landslide which have a very long wavelength and so surge onshore when they reach the coast rather than breaking.
Lahar	Where two plates move away from each other, magma is able to well up and reach the surface, creating new crust.
Magma	The part of the mantle, below the lithosphere, where the rock is semi-molten.
Liquefaction	Where plates move past each other. Tend to be characterised by earthquakes due to build-up of pressure.
Epicentre	An instrument used to measure the movement of the ground.
Focus	Rock fragments that are ejected from a volcano. If they have a diameter of more than 64 mm, they are called bombs or blocks.
Tsunami	Points within the middle of a tectonic plate where plumes of hot magma rise and erupt.
Lithosphere	When two plates move together, crust is either destroyed (destructive margins if one plate is oceanic crust) or thrust upwards as fold mountains (collision margins when two continental plates meet).
Asthenosphere	The amount of energy released by a tectonic event.
Convection currents	A violent mudflow or debris flow made from a mixture of volcanic ash and debris, as well as soil and vegetation, which washes down the volcano.
Hotspot	The change of surface rocks and soil from a solid to a liquid due to intense shaking from an earthquake.
Subduction zone	The movement of hot material in the mantle towards the lithosphere, where it then starts to cool and return towards the core. This movement causes the plates to move.
Tephra	Molten, liquid rock found below the Earth's surface.

2. In the table below, create a fully labelled diagram for each plate margin. There is a word box at the bottom; some of the words can be used more than once.

Plate margin	Diagram
Constructive	
Destructive	
Collision	
Conservative	

Keywords to include on the diagrams:
subduction zone, magma chamber, earthquake foci, plate movement (needs an arrow), new land created, crust melting, rising magma, fold mountains, oceanic crust, continental crust, ocean ridge, rising magma, volcano, ocean trench, Benioff zone, convection currents

3. Study the map below and complete the following activities on the map:
   a. Neatly label the main plates on the map: Eurasian, North America, South American, African, Indo-Australian, Antarctic, Pacific, Nazca, Caribbean.
   b. Identify and name the following hotspots: East African Rift Valley, Canary Islands.



1: Divergent plate boundaries
2: Transform plate boundaries
3: Convergent plate boundaries
4: Plate boundary zones
5: Selected prominent hotspots

c. What plate do we live on?

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d. Are we moving away from or towards North America?

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e. What do most of the hotspots on plate boundaries have in common?

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f. Why is the Pacific often called the 'Ring of Fire'?

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4. Study the image below and answer the questions in the surrounding boxes.

What tectonic hazard has struck this region? Explain how you made your decision.

How could this have been predicted?

What are the main features of this hazard? You could draw an annotated diagram.

How could you assess the vulnerability of this community?

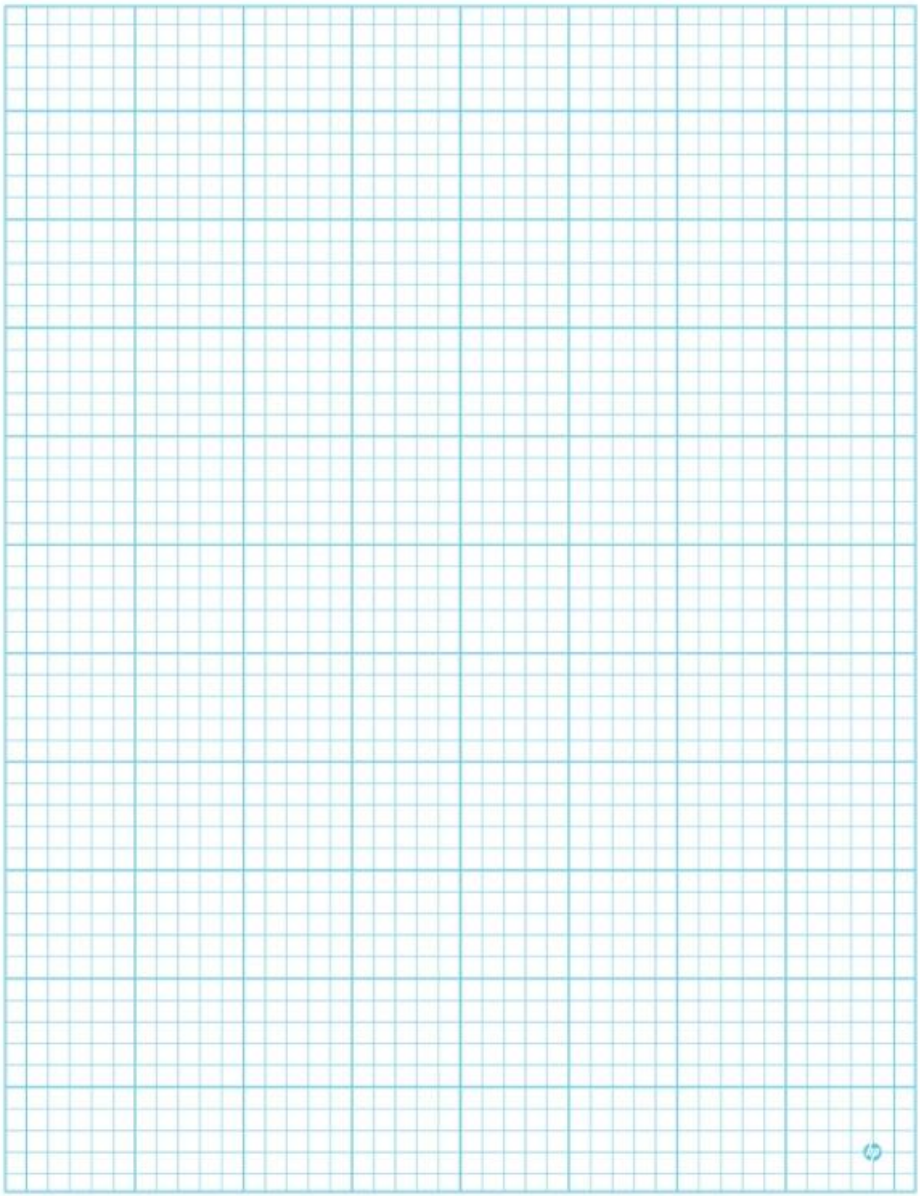
What actions should be taken in the future? Consider level of development.

5. The volcanic explosivity index (VEI) is used to describe the magnitude of volcanic eruptions on a scale from 0 (non-explosive) to 8 (extremely large). In the twenty-first century, the largest eruption so far has scored 5 on the scale. This is a logarithmic scale (each level on the scale increases by a factor of 10). A number of factors are used to decide the scale:
   a. Volume of material ejected (if less than 10,000 m^3 is ejected, it scores a 0 on the scale)
   b. The height that the ejected volcanic material reaches
   c. How long the eruption lasts
   d. Qualitative terms such as gentle, explosive

   Use the USGS website to get a diagram to show the VEI, and insert it below.

6. The table below shows the VEI index for some of the eruptions of the twenty-first century and the deaths they caused.
   a. To see whether there is a correlation between VEI and death rate, scatter graph the results and look for a correlation

Location	VEI	Deaths
Mt Nyiragongo 2002	1	14
Chaitén 2008	4	1
Eyjafjallajökull 2010	4	0
Mt Merapi 2010	4	353
Puyehue-Cordón Caulle 2011	5	0
Mt Sinabung 2014	2	15
Mt Ontake 2014	3	63
Volcán de Fuego 2018	3	190
Anak Krakatoa 2018	3	426
Stromboli 2019	2	1
White Island 2019	2	21
Taal 2020	4	39



b. Using your answer from the scatter graph, state whether there is a correlation between the VEI index and the death rate.

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c. Suggest what factors, other than VEI are likely to influence death rate.

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7. To what extent do secondary hazards cause greater impacts than primary hazards? (12 marks)
There are only 12 marks available, so you can't include everything, so make it clear in your introduction what your focus will be.

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