**Tectonic Processes and Hazards**

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| **EQ1: Why are some locations more at risk from tectonic hazards?** | | **Before topic** | **After Revision** | **Revision:**  ***Flash cards, Case studies and exam Qs*** |
| **RAG** | **RAG** | **RAG** |
| 1.1 | 1. Explain the global distribution and causes of earthquakes, volcanic eruptions and tsunamis. |  |  |  |
| 1. Explain the distribution of plate boundaries resulting from divergent, convergent and conservative (transform) plate movements (oceanic, continental and combined situations). |  |  |  |
| 1. Explain the causes of intra-plate earthquakes, and volcanoes associated with hot spots from mantle plumes. |  |  |  |
| 1.2 | 1. Explain the theory of plate tectonics and its key elements (the earth’s internal structure, mantle convection, palaeomagnetism and sea floor spreading, subduction and slab pull) |  |  |  |
| 1. Describe and explain the operation of these processes at different plate margins (destructive, constructive, collision and transform) |  |  |  |
| 1. Explain how physical processes impact on the magnitude and type of volcanic eruption, and earthquake magnitude and focal depth (Benioff zone). |  |  |  |
| 1.3 | 1. Describe and explain earthquake waves (P, S and L waves) and how they cause crustal fracturing, ground shaking and secondary hazards (landslides and liquefaction) |  |  |  |
| 1. Describe and explain how volcanoes cause lavaflows, pyroclastic flows, ash falls, gas eruptions, and secondary hazards (lahars, jökulhlaup) |  |  |  |
| 1. Explain how tunamis can be caused by sub-marine earthquakes at subduction zones as a result of sea-bed and water column displacement. |  |  |  |

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| **EQ2: Why do some tectonic hazards develop into disasters?** | | **Before topic** | **After Revision** | | **Revision:**  ***Flash cards, Case studies and exam Qs*** | |
| **RAG** | | **RAG** | | **RAG** |
| 1.4 | a. Define what a natural hazard and disaster are and explain the importance of vulnerability and a community’s threshold for resilience, the hazard risk equation. |  | |  | |  |
| b. Explain the Pressure and Release (PAR) model and the complex inter-relationships between the hazard and its wider context. |  | |  | |  |
| c. Identify the social and economic impacts of tectonic hazards (volcanic eruptions, earthquakes and tsunamis) on people, economy and environment of contrasting locations in the developed, emerging and developing world. |  | |  | |  |
| 1.5 | a. Describe how the magnitude and intensity of tectonic hazards is measured using different scales (Mercalli. Moment Magnitude Scale (MMS) and Volcanic Explosivity Index (VEI)). |  | |  | |  |
| b. Compare earthquakes, volcanoes and tsunamis (magnitude, speed of onset and areal extent, duration, frequency, spatial predictability) through hazard profiles. |  | |  | |  |
| c. Profiles of earthquake, volcano and tsunami events showing the severity of social and economic impact in developed, emerging and developing countries. |  | |  | |  |
| 1.6 | a. Explain how Inequality of access to education, housing, healthcare and income opportunities can influence vulnerability and resilience. |  | |  | |  |
| b. Explain governance (local and national government) and geographical factors (population density, isolation and accessibility, degree of urbanization) that influence vulnerability and a community’s resilience. |  | |  | |  |
| c. Study contrasting hazard events in developed, emerging and developing countries to show the interaction of physical factors and the significance of context in influencing the scale of disaster. |  | |  | |  |
| **EQ3: How successful is the management of tectonic hazards and disasters?** | | **Before topic** | | **After Revision** | | **Revision:**  ***Flash cards, Case studies and exam Qs*** |
| **RAG** | | **RAG** | | **RAG** |
| 1.7 | a. Discuss tectonic disaster trends since 1960 (number of deaths, numbers affected, level of economic damage) in the context of overall disaster trends. Research into the accuracy and reliability of the data to interpret complex trends. |  | |  | |  |
| b. Identify how tectonic mega-disasters can have regional or even global significance in terms of economic and human impacts. (2004 Asian tsunami, 2010 Eyafjallajokull, Japanese tsunami etc.). |  | |  | |  |
| c. Explain the concept of a multiple-hazard zone and how linked hydrometeorological hazards sometimes contribute to a tectonic disaster (the Philippines) |  | |  | |  |
| 1.8 | a. Explain how prediction and forecasting accuracy depend on the type and location of the tectonic hazard. (role of scientists) |  | |  | |  |
| b. Discuss the importance of different stages in the hazard management cycle (response, recovery, mitigation, preparedness) (role of emergency planners) |  | |  | |  |
| c. Explain the use of Park’s Model to compare the response curve of hazard events, comparing areas at different stages of development. |  | |  | |  |
| 1.9 | a. Discuss strategies to modify the event include lad-use zoning, hazard-resistant design and engineering defences as well as diversion of lava flows (role of planners, engineers) |  | |  | |  |
| b. Discuss strategies to modify vulnerability and resilience include high-tech monitoring, prediction, education, community preparedness and adaptation (models forecasting disaster impacts with and without modification). |  | |  | |  |
| c. Discuss strategies to modify loss include emergency, short and long-term aid and insurance and the actions of affected communities themselves (role of NGOs and insurers). |  | |  | |  |

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| Geographical Skills for Topic 3 |  | | | | |
| Note: These skills are not exclusive to the topic areas under which they appear; you will need to be able to apply these skills across any suitable topic area throughout their course of study. | **Before topic** | | **After Revision** | ***Exam Qs?*** | |
| RAG | RAG | | | RAG |
| (1) Analysis of hazard distribution patterns on world and regional scale maps. |  |  | | |  |
| (2) Use of block diagrams to identify key features of different plate boundary settings. |  |  | | |  |
| (3) Analysis of tsunami time-travel maps to aid prediction. |  |  | | |  |
| (4) Use of correlation techniques to analyse links between magnitude of events, deaths and damage |  |  | | |  |
| (5) Statistical analysis of contrasting events of similar magnitude to compare deaths and damage |  |  | | |  |
| (6) Interrogation of large data sets to assess data reliability and to identify and interpret complex trends |  |  | | |  |
| (7) Use of Geographic Information Systems (GIS) to identify hazard risk zones and degree of risk related to physical and human geographical features. |  |  | | |  |

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| **Useful websites** | |
| **Arc GIS** | [Plate tectonics, earthquakes, and volcanoes (arcgis.com)](https://learn.arcgis.com/en/paths/plate-tectonics-earthquakes-and-volcanoes/) |
| **USGS** | [Search | U.S. Geological Survey (usgs.gov)](https://www.usgs.gov/search?keywords=TECTONICS) |
| **Maths and Physics Tutor** | [pmt.physicsandmathstutor.com/download/Geography/A-level/Notes/Edexcel/1-Tectonic-Processes-and-Hazards/Detailed Notes - Tectonics - Edexcel Geography A-level.pdf](https://pmt.physicsandmathstutor.com/download/Geography/A-level/Notes/Edexcel/1-Tectonic-Processes-and-Hazards/Detailed%20Notes%20-%20Tectonics%20-%20Edexcel%20Geography%20A-level.pdf) |
| **Tutor2U** | [Tectonics | Geography | tutor2u](https://www.tutor2u.net/geography/topics/tectonics) |
| **RGS** | [Tectonic landscapes - RGS](https://www.rgs.org/schools/resources-for-schools/tectonic-landscapes) |