Paper 1: Section A KO – 'The challenge of natural hazards'

Natural hazards pose major risks to people and property (CGP page 2)

1. Definition of a natural hazard.	'a process or human activity that causes loss of life, injury / illness, property damage, social & economic disruption and / or environmental degradation'.
2. Types of natural hazard.	Tectonic (eg earthquakes), atmospheric (eg tropical storms), geomorphic (eg landslides) and biological (eg wildfires).
3. Factors affecting hazard risk.	a. Population change: high population densities causes overpopulation in urban environments. b. Social inequalities: the urban poor lived in marginalised land eg slopes and floodplains. c. Climate change: global warming leads to greater extremes of weather eg floods and droughts.

Earthquakes and volcanic eruptions are the result of physical processes (CGP: pages 4-5)

4. Plate tectonics theory.	Tectonic plates are driven by convention currents originating at the core-mantle boundary and meet at plate margins where volcanoes / earthquakes occur.
5. Global distribution of earthquakes and volcanic eruptions and their relationship to plate margins.	a. Sea floor spreading at the Mid Atlantic Ridge. b. Subduction zones on the Pacific Ring of Fire.
6. Physical processes taking place at different types of plate margin that lead to earthquakes and volcanic activity.	a. constructive: sea floor spreading causes effusive volcanic activity and magmatic earthquakes. b. destructive: subduction causes explosive volcanic activity and tectonic earthquakes. c. conservative: strike-slip movement causes earthquakes.

The effects of & responses to, a tectonic hazard vary between areas of contrasting wealth (CGP: pages 3 & 6-7)

7. Primary and secondary effects of a tectonic hazard.	a. Primary effects: ST (first phase) impacts. b. Secondary effects: LT (second phase) impacts.
8. Immediate and long-term responses to a tectonic hazard.	a. Immediate responses: ST hazard management. b. Long-term responses: LT hazard management.
9. Use named examples to show how the effects and responses to a tectonic hazard vary between two areas of contrasting levels of wealth.	a. Nepal 2015 (LIC) – earthquake. b. Japan 2011 (HIC) – earthquake & tsunami 'excellent responses reduce the magnitude of effects' Eg excellence = technology, resources, education.

Management can reduce the effects of a tectonic hazard (CGP: page 8)

10. Reasons why people continue to live in areas at risk from a tectonic hazard.	Tourism, energy, agriculture, construction. →Iceland is an excellent case study.
11. How monitoring, prediction, protection and planning can reduce the risks from a tectonic hazard.	a. Monitoring: scientific research locates areas at risk while prediction identifies the type of hazard. b. Protection and planning: developments and / or actions designed to mitigate the impacts of hazards. →Nepal 2015/Japan 2011 are excellent case studies.

Global atmospheric circulation helps to determine patterns of weather and climate (CGP: page 9)

11. General atmospheric circulation model: pressure belts and surface winds.	a. Hot air rises over the equator in low air pressure, cooling, condensing, forming clouds & raining, before being directed towards 30°N/S by the Coriolis force. b. Cold dry air descends over the desert at 30°N/S in high pressure zones with trade winds returning the air to the equator.

Tropical storms (hurricanes, cyclones, typhoons) develop through particular physical conditions (CGP: page 10)

12. Global distribution of tropical storms (hurricanes, cyclones, typhoons).	Tropical storms propagate in the tropics over oceans and make landfall over continents.
13. An understanding of the relationship between **tropical storms & general atmospheric circulation**	The coriolis force causes tropical storms to spin in a western trajectory before making landfall.
14. Causes of tropical storms and the sequence of their formation and development.	Tropical storms form over sea water that's 26.5°C +, 5° - 30° N / S, with a depth of at least 70metres.
15. How **climate change** might affect the distribution, frequency and intensity of tropical storms.	Spatial distribution, frequency and magnitude / intensity are all increasing.

Tropical storms have significant effects on people and the environment (CGP: page 11 & 12).

16. Primary and secondary effects of tropical storms.	a. Primary effects: ST (first phase) impacts. b. Secondary effects: LT (second phase) impacts.
17. Immediate and long-term responses to tropical storms.	a. Immediate responses: ST hazard management. b. Long-term responses: LT hazard management.
18. Use a named example of a tropical storm to show its effects and responses.	'excellent responses reduce the magnitude of effects' Eg excellence = technology, resources, education. → Hurricane Katrina, 2005 is an excellent case study.
19. How monitoring, prediction, protection and planning can reduce the effects of tropical storms.	a. Monitoring & prediction: eg the National Hurricane Centre in Miami, USA – early warning systems! b. Protection & planning: modern flood defences costing $14.5 billion were constructed in 2013. → Hurricane Katrina, 2005 is an excellent case study.

The UK is affected by a number of weather hazards (CGP: page 13)

20. An overview of types of weather hazard experienced in the UK.	We are becoming a nation of extremes: → drought in hot, dry summers. → flash flooding in warm wet winters.

Extreme weather events in the UK have impacts on human activity (CGP: page 14)

21. An example of a recent extreme weather event in the UK to illustrate: • causes • social, economic and environmental impacts • how management strategies can reduce risk.	eg Flash flooding: eg Boscastle 2004 Physical causes: summer storms ensured soil had reached field capacity Human causes: deforestation / removing vegetation within the river catchment Socio-economic impacts: 58 homes and 4 businesses damaged destroyed: estimated £15 million costs Environmental impacts: 1000 trees destroyed & 20 years of bedload deposited in the village in a day. Management strategies reducing risk: the Environment Agency invested in hard / soft engineering techniques – widening & deepening the river channel in the village/upstream river restoration.

22. Evidence that weather is becoming more extreme in the UK.	1. Flash flooding: eg Boscastle 2004 1 in 400yr flood à58 homes & 4 businesses damaged - estimated £15 million costs and 1000 trees destroyed. 2.Coastal erosion: eg Holderness coast, sea level rise and increased frequency / magnitude of storms increasing the rate of coastal erosion, 10 metres/yr à 200 homes abandoned to the sea in the next 100 years & 80000 m^2 of farmland lost to the sea/year.

Climate change is the result of natural and human factors, and has a range of effects (CGP: pages 15-17)

23. Evidence for climate change from the beginning of the Quaternary period to the present day.	1.Dendrochronology: tree rings, wide rings show a warm, wet year, narrow rings show a cold dry year 2.Ice cores: every year a new layer of ice forms in Antarctica which contains greenhouse gases which can be used to calculate ancient temperatures
24. Possible **causes of climate change**	1.Natural factors: a. orbital changes - elliptical orbit leads to an ice age b.volcanic activity - SO_2 reflects & CO_2 traps radiation c. solar output - storms on the surface of the sun 2.Human factors: a. use of fossil fuels – ↑global population, ↑energy b. agriculture – cattle ranching releases CH_4 c. deforestation – stores of carbon are destroyed
25. Overview of the **effects of climate change** on **people** and the **environment.**	1. Flash flooding: eg Boscastle 2004 1 in 400yr flood à increased frequency and magnitude of floods 2.Coastal erosion: eg Holderness coast, sea level rise à high energy waves increase rate of coastal erosion

Managing climate change involves both mitigation (reducing causes) and adaptation (responding to change) (CGP: page 18)

26. Managing climate change involves both **mitigation** (reducing causes) and **adaptation** (responding to change).	1.Mitigation: alternative energy production, carbon capture, planting trees, international agreements 2.Adaptation: change in agricultural systems, managing water supply, reducing risk from rising sea levels.