

GEOGRAPHY – GCSE – THE CHALLENGE OF NATURAL HAZARDS (TECTONICS)

A NATURAL HAZARDS AND RISK		
1	Natural hazard	An natural event that had a social impact
2	Hazard risk	The chance of being affected by a natural event
3	FACTORS AFFECTING RISK <ul style="list-style-type: none"> Population growth Climate change Wealth Urbanisation 	

B PLATE TECTONICS		
1	Constructive margin	Plates move apart
2	Destructive margin	Plates move towards each other
3	Conservative margin	Plates slide past each other
4	Volcanoes	Earthquakes
	<ul style="list-style-type: none"> Constructive margins – Hot magma rises between the plates e.g. Iceland. Destructive margins – an oceanic plate subducts under a continental plate. Friction causes oceanic plate to melt and pressure forces magma up to form volcanoes. 	<ul style="list-style-type: none"> Constructive margins – usually small earthquakes as plates pull apart. Destructive margins – violent earthquakes as pressure builds and is then released as the plate fractures the earth's crust Conservative margins – plates sliding past each other causing friction. Plate jerks forward and pressure is released an earthquake.

C PLATE TECTONIC THEORY		
1	Convection currents	The circular movement of magma within the mantle
2	Slab pull	At destructive plate margins the denser, oceanic plate sinks into the mantle under the influence of gravity, which pulls the rest of the plate along with it.
3	Ridge push	At constructive margins, magma rises and as it cools it expands. This will then push the plates apart.

D CASE STUDIES		
	Amatrice, Italy 2016 (HIC)	Nepal, 2015 (LIC)
1	Primary effects – damage caused directly by the hazard	
	<ul style="list-style-type: none"> 299 killed 400 injured 4 500 homeless 50% of buildings in Amatrice were destroyed 80% of the historic old town was destroyed (293 buildings) Happened during summer holidays so population was higher than normal \$US 21.9 billion worth of damage 	<ul style="list-style-type: none"> 9 000 killed 20 000 injured 3 million homeless 8 million affected 1.4 million needed food, water and shelter 7 000 schools destroyed 50% of shops destroyed \$US 5 billion worth of damage
2	Secondary effects - a result of the primary effect. (Tsunami, fires and landslides)	
	<ul style="list-style-type: none"> Landslides blocked roads and reduced access The CBD was cordoned off due to unsafe buildings 'Red zones' were made which reduced business and tourism No income for farmers as 90% of cattle barns were destroyed Residents suffered emotional damage People were arrested for looting 	<ul style="list-style-type: none"> Landslides blocked roads and stopped aid getting through Avalanche on Mt. Everest killed 19 people Landslide blocked the Kali river and people were evacuated in case of flooding Rice seeds destroyed in the rubble led to food shortages
3	Immediate responses - search and rescue. Keeping people alive.	
	<ul style="list-style-type: none"> 58 tent camps set up for the homeless 5 000 soldiers and emergency service crew helped in the rescues 1000 meals a day served to survivors for 1 week Jamie Oliver donated money for every dish of Amatrician pasta sold in his restaurants Locals removed Wi-Fi passwords so rescue teams could talk to each other Italian Prime Minister gave 50 millions euros for emergency response Taxes cancelled for residents Facebook allowed people to 'check in' as safe 	<ul style="list-style-type: none"> Search and rescue teams, water and medical supplies arrived quickly from UK, India and China Red Cross provided 500 000 tents 300 000 people left Kathmandu to live with family and friends UK's DEC raised \$US126 million by September 2015 Facebook launched a safety feature so people could say they were 'safe' Companies did not charge for phone calls
4	Long-term responses – re-building with the aim of returning lives back to normal and reducing future risk	
	<ul style="list-style-type: none"> Students went to nearby schools whilst rebuilding was taking place A grant of 42m euros was used to rebuild villages in the traditional style but making them earthquake proof. Government promised to move survivors from temporary camps into wooden houses within 6 months 2.4 tonnes of rubble still in the area after 1 year 50-year vision for rebuilding. Locals given tax breaks to make buildings earthquake proof by law. 	<ul style="list-style-type: none"> Stricter controls on building codes In June 2015, Nepal asked for financial and technical advice from other countries By July 2015 some tourist sites re-opened and visitors started to return 8 months after the earthquake, \$US274 million of aid had been given

E BENEFITS OF LIVING IN AREAS OF RISK		
1	Fertile soil	<ul style="list-style-type: none"> Broken down lava puts minerals in the soil
2	Geothermal energy	<ul style="list-style-type: none"> Provides 90% of buildings in Iceland with hot water Provides 25% of Iceland's electricity
3	Tourism	<ul style="list-style-type: none"> More than 100 million people visit volcanic sites every year
4	Minerals	<ul style="list-style-type: none"> People live where minerals are found as jobs are made in mining
5	Family and friends	<ul style="list-style-type: none"> People don't want to leave family and friends Residents in denial Don't see the risk as dangerous enough

F REDUCING THE RISK		
	Earthquakes	Volcanoes
1	Monitoring – collecting data	
	<ul style="list-style-type: none"> Seismometers used to measure foreshocks Evidence of change in water pressure Yet to discover reliable ways to monitor earthquakes 	<ul style="list-style-type: none"> Satellites show changes in volcano size and shape Ground deformation Increase temperature of water in rivers Measure amount of sulphur and radon released
2	Prediction – using the data to predict hazards	
	<ul style="list-style-type: none"> Historical records of earthquake location have identified areas most at risk Impossible to make accurate predictions 	<ul style="list-style-type: none"> Easier to predict volcanic eruptions than earthquakes due to monitoring
3	Protection – buildings or structures that withstand tectonic hazards. This is also caused MITIGATION.	
	<ul style="list-style-type: none"> X – Bracing Rubber shock absorbers Base isolators (rollers) Deep foundations Open space around the building 	<ul style="list-style-type: none"> Difficult to 'protect' against a volcanic eruption Buildings cannot be designed to withstand an eruption However, lava can be diverted using earth embankments
4	Planning - Avoiding places of most risk. Knowing what to do before, during and after a tectonic hazard	
	<ul style="list-style-type: none"> Fasten down furniture Prepare an emergency supply kit Earthquake drills in Japan 	<ul style="list-style-type: none"> Evacuation plans Preparation of emergency shelters Exclusion zones