What are Natural Hazards?

Natural hazards are physical events such as earthquakes and volcanoes that have the potential to do damage humans and property. Hazards include tectonic hazards, tropical storms and forest fires.

What affects hazard risk?

Population growth
Global climate change
Deforestation
Wealth - LICs are particularly at risk as they do not have the money to protect themselves

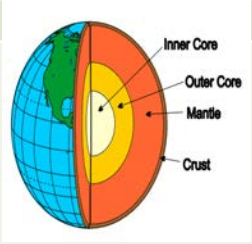
Structure of the Earth

The earth has 4 layers

The inner core
The outer core
The mantle
The crust

The crust is split into major fragments called tectonic plates. There are 2 types: Oceanic (thin and younger but dense) and Continental (old and thicker but less dense)

These plates move and where they meet you get tectonic activity (volcanoes and earthquakes).



There are 2 theories of why plates move: convection currents and ridge push, slab pull.

Plates either move against each other (destructive margin) away from each other (constructive) or next to each other (conservative)

Earthquakes and Volcanoes

Volcanoes	Earthquakes
• Constructive margins – Hot magma rises between the plates eg. Iceland. Forms Shield volcanoes • Destructive margins – an oceanic plate subducts under a continental plate. Friction causes oceanic plate to melt and pressure forces magma up to form composite volcanoes eg the Pacific Rim	• Constructive margins – usually small earthquakes as plates pull apart. • Destructive margins – violent earthquakes as pressure builds and is then released • Conservative margins – plates slide past each other. They catch and then as pressure builds it is released eg San Andreas fault. .

Effects of Tectonic Hazards

Primary effects happen immediately. Secondary effects happen as a result of the primary effects and are therefore often slightly later.

Primary - Earthquakes	Secondary - Earthquakes
• Property and buildings destroyed • People injured or killed • Ports, roads, railways damaged • Pipes (water and gas) and electricity cables broken	• Business reduced as money spent repairing property • Blocked transport hinders emergency services • Broken gas pipes cause fire • Broken water pipes lead to a lack of fresh water
Primary - Volcanoes	**Secondary - Volcanoes**
• Property and farm land destroyed • People and animals killed or injured • Air travel halted due to volcanic ash • Water supplies contaminated	• Economy slows down. Emergency services struggle to arrive • Possible flooding if ice melts Tourism can increase as people come to watch • Ash breaks down leading to fertile farm land

Responses to Tectonic Hazards

Immediate (short term)	Long-term
• Issue warnings if possible • Rescue teams search for survivors • Treat injured • Provide food and shelter, food and drink • Recover bodies • Extinguish fires	• Repair and re-build properties and infrastructure • Improve building regulations • Restore utilities • Resettle locals elsewhere • Develop opportunities for recovery of economy • Install monitoring technology

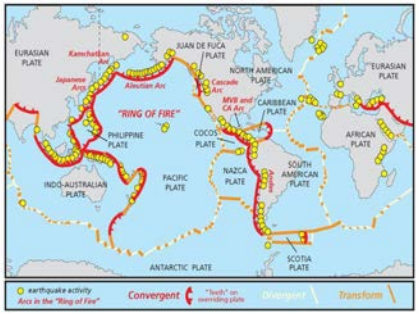
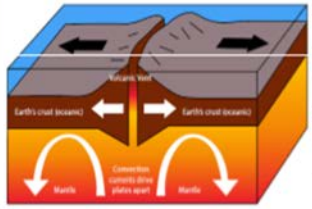


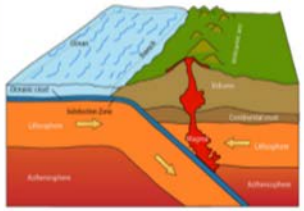
Plate Boundaries - *point where two tectonic plates meet*

Constructive



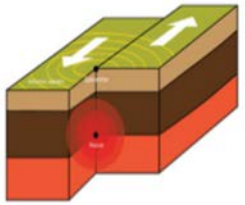
- Plates move apart, magma rises surface forming new crust
- Overproducing magma forms ridge either side of margin
- As plate move apart, crust thins leaving rift valley

Destructive



- More dense oceanic plates subducts under continental
- Oceanic crust melts, magma rises causing volcanic eruptions
- Continental crust compresses to form fold mountains
- Friction causes earthquakes

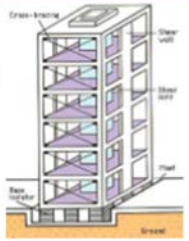
Conservative



- Plates slide past each other
- Plates may lock together, when the friction is released and plates slip free and cause an earthquake
- e.g San Andreas Fault, USA

Preparing for Earthquakes

Education	Training people e.g "California Shake Out"
Aid Kits	Emergency Kits for essentials - tinned food, blankets etc
Infrastructure	Roads/Bridges designed to withstand earthquakes
Communicate	Use technology to send messages e.g Japan
Buildings	➢ Shock absorbers at base absorb tremors of quake ➢ Cross bracing reinforces walls using steel beams ➢ Shear walls reduce rocking movements

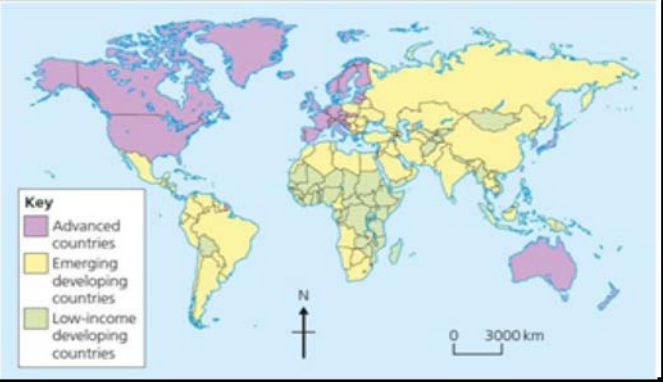


Monitoring	Prediction
Seismometers measure earth movement. Volcanoes give off gases	By observing monitoring data, this can allow evacuation before event
Protection	**Planning**
Reinforced buildings and making building foundations that absorb movement Automatic shut offs for gas and electricity	Avoid building in at risk areas Training for emergency services and planned evacuation routes and drills.

Year 9 knowledge organiser
Globalisation

Variations in the level of development

LICs	Poorest countries in the world. GNI per capita is low and most citizens have a low standard of living.
NEEs	These countries are getting richer as their economy is progressing from the primary industry to the secondary industry. Greater exports leads to better wages.
HICs	These countries are wealthy with a high GNI per capita and standards of living. These countries can spend money on services.



We have traditionally divide the world into MEDCs and LEDCs

BUT…

- Countries have now changed - out of date
- Not all parts of countries are poor or affluent - there can be wide variations within countries
- It des not take into account countries in the middle
- What about the BRIC (Brazil, Russia, India, China) countries and Newly Industrialising Countries (NICs) such as Thailand and Vietnam

Measuring development

These are used to compare and understand a country's level of development.

Economic indictors examples	
Employment type	The proportion of the population working in primary, secondary, tertiary and quaternary industries.
Gross Domestic Product per capita	This is the total value of goods and services produced in a country per person, per year.
Gross National Income per capita	An average of gross national income per person, per year in US dollars.

Social indicators examples	
Infant mortality	The number of children who die before reaching 1 per 1000 babies born.
Literacy rate	The percentage of population over the age of 15 who can read and write.
Life expectancy	The average lifespan of someone born in that country.
	Mixed indicators
Human Development Index (HDI)	A number that uses life expectancy, education level and income per person.

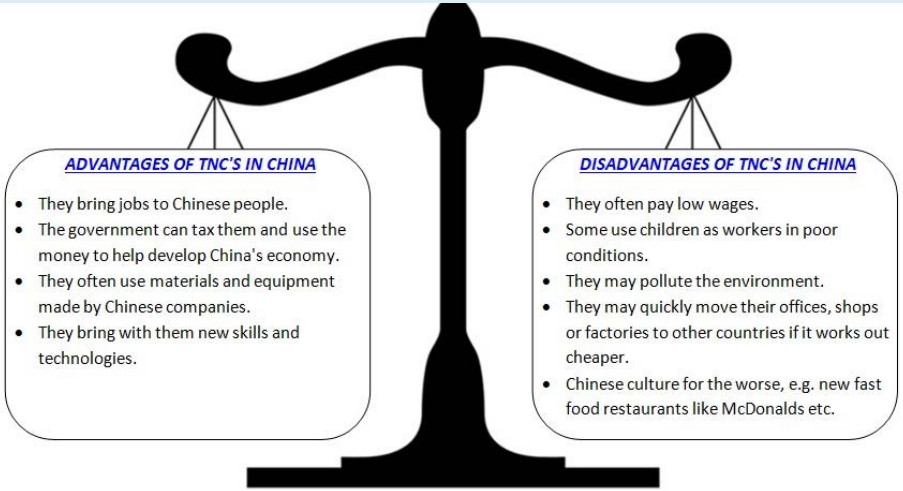
Factors leading to Globalisation

Increase in the flow of goods, services, people and capital across national borders to create a more interdependent world economy.

Transport	**People and goods can be moved quicker around the world e.g low cost airlines**
Technology	**Real time communication helps businesses and use of the internet allows instant money transfers**
Mass Media	**Information is shared easier, more global adverts**

Transnational corporations

TNCs or multinational corporations (MNCs) are companies that operate in more than one country. They often have factories in countries that are not as economically developed because labour is cheaper. Offices and headquarters tend to be located in the more developed world. Unilever, McDonalds and Apple are all examples of TNCs.

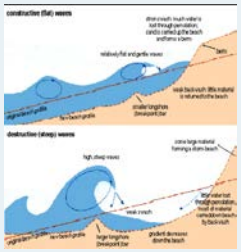


Coastal Processes

Waves are formed by wind blowing over the sea. The size of wave is determined by the strength of the wind, the duration of the wind and the distance the wind blows over (fetch).

Constructive waves are low with long wavelengths. The swash is stronger than the backwash. They build beaches

Destructive waves are higher with shorter wavelengths. The backwash is stronger than the swash eroding the coast.



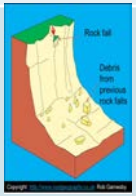
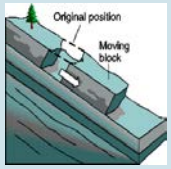
Weathering

Weathering is the decomposition or disintegration of rock in its original place (erosion involves moving rock)

Chemical	Mechanical
• Carbonation. Carbon dioxide dissolved in rainwater forms a weak acid. Reacts with limestone and chalk to form a solution • Hydrolysis – acidic rainwater reacts with minerals in granite • Oxidation – oxygen in rain reacts with iron	• Freeze thaw.  • Salt weathering – salt in sea water expands to form cracks.

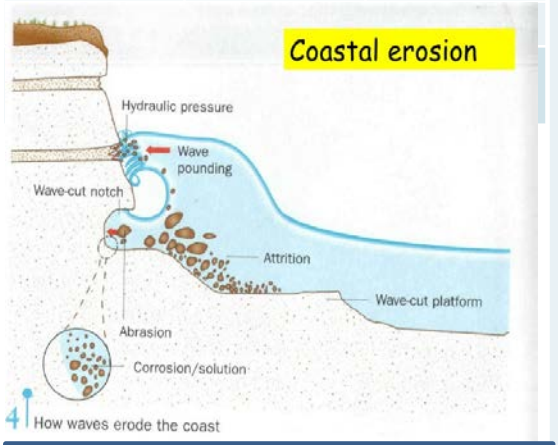
Mass Movement

Mass movement is the movement of material downslope under the influence of gravity. It is the falling, sliding or flowing of rock, sediment or soil most often along a slip plane (line of weakness). Different types of mass movement can include rockfall, landslides and rotational slumping.

Rockfall	Landslide	Slumping
 Individual fragments of rock fall off cliff usually due to freeze thaw	 Rocks fall in a linear fashion along fault lines	 Occurs on a curved surface lubricated by water

Coastal Erosion

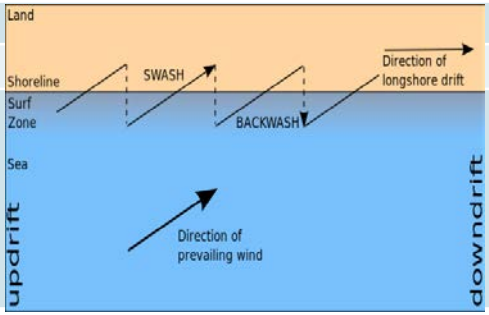
Erosion is the removal of material and sculpting of landforms



Deposition: Sediment dropped by the waves. Creates beach. The beach is made of material transported by longshore drift.

Year 9 Coasts KO

Coastal Transportation

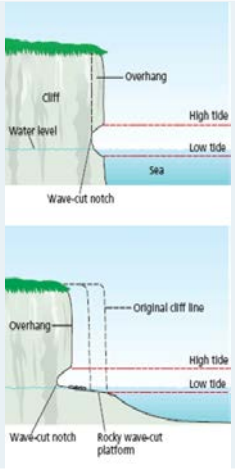


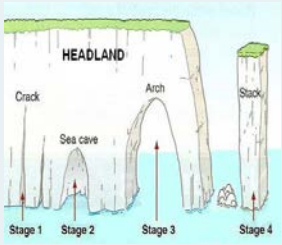
The shape of the coast is determined by **geology**. Hard rocks (chalk, granite) erode slowly. Clay and sandstone are softer and erode faster

Hard rocks will form headlands and erode slowly. Soft rocks will form bays and erode quickly

Landforms of erosion

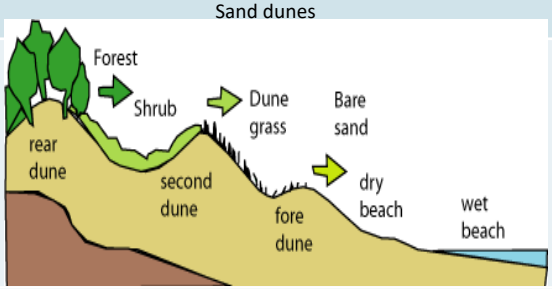
Wave cut platforms	Caves, arches and stacks



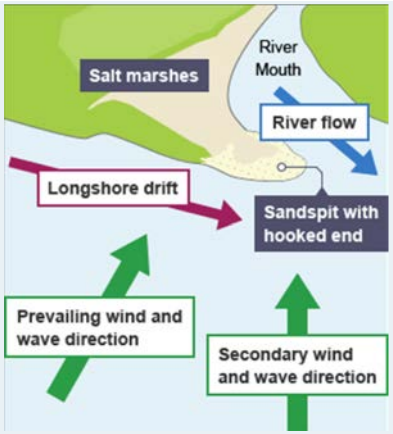


Landforms of deposition

Sand dunes



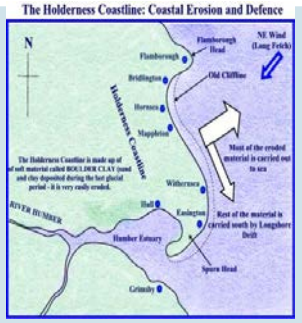
Spits



Coastal Management Strategies

Strategy		Benefits	Costs
Hard Engineering			
Sea wall – concrete structure at top of beach acts as a barrier to sea		• V effective • Can develop top for walking, stalls etc	• £5000 - £10000 / metre • V expensive • Ugly
Rock Armour – large boulders at foot of cliff to reduce force of waves		• Relatively effective at reducing force of waves • Relatively cheap	• £2000 000 / 100 metres • Ugly • Can be dangerous to public
Gabions – wire cages filled with rocks. Permeable so improve cliff drainage		• Flexible • Cheaper £50 000 / 100 metres • Quick to construct	• Not attractive • Cages can break • Need replacing every 10 years
Groynes – wooden or stone fences built at right angles to coast to stop longshore drift		• Create wider beaches • Cheap	• Starve beaches further down the coast making them narrower and so more likely to erode • Need some maintenance
Soft Engineering			
Beach nourishment / reprofiling. Adding sand to a beach or changing its shape eg high ridges		• Looks natural • Creates amenity for tourism • Cheap	• £50 000 / 100 metres but can vary • Needs constant maintenance • Less effective than hard engineering
Dune Regeneration		• Considered natural • Creates area for picnics etc • May increase biodiversity	• £2000 per 100 metres. Time consuming to plant and maintain • Easily damaged by storms • Not particularly effective.
Managed Retreat			
Doing nothing. Allow sea to move into area		• Long term solution with low maintenance • A natural buffer • New ecosystem created • Biodiversity improves, eg bird watching • More attractive	• Low value land is lost to sea • Local people have to move so need to be compensated • Some ecosystems may be lost

Coastal Management example - Holderness



What is the problem?

- Erosion is causing cliffs to collapse. Cliffs are made of soft, easily eroded boulder clay
- Prevailing winds mean material is moved south through LSD
- About 1.8m of land is lost each year. Farms and businesses are threatened
- Over 11km of coast is managed suing hard engineering to protect the towns of Hornsea, Withernsea and Mappleton as well as roads and the gas terminal at Easington that supplies 25% of the UIK's gas and is right on the cliff.

Management strategies	Problems
• Rock armour used. 450 m of coast line protected by 61 000 tonnes of rocks at a coast of £2million. • Rocks absorb the power of the waves • 2 rock groynes trap sand and create a beach to protect the cliffs • Hornsea has a sea wall and some groynes and at Withernsea there is a sea wall, groynes and rock armour	• Mappleton is protected but groynes prevent sediment moving south leading to increased erosion south of Mappleton • Farms and a caravan park have been lost south of Mappleton • The Lifeguard station at Great Cowden is under threat as the spit does not get sediment • Spurn Head spit is being washed away • Protecting the gas terminal at Easington cost £6.6 million