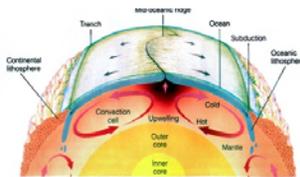


Convection currents move the tectonic plates in different directions



Hazardous Earth Memory Organiser

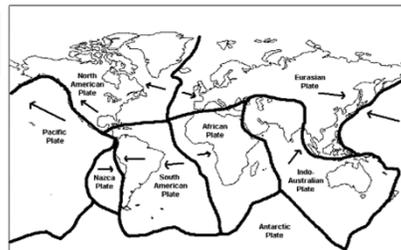
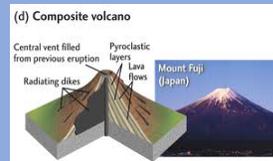
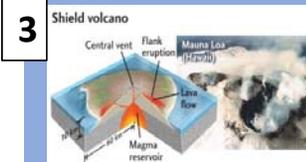


Plate boundary types:

- **Convergent**-coming together
- **Divergent**-moving apart
- **Conservative**-moving parallel to each other



- Shield volcano:-**
- Basaltic Lava
 - Less explosive eruptions
 - Lava flow

- Composite (cone shape) volcano:-**
- Andesitic Lava
 - Most explosive eruptions
 - Pyroclastic flow
 - Lava bombs
 - Ash clouds

- 4 Earthquake formation**
- Tension and friction occur at the boundary between two tectonic plates that are moving towards or alongside each other due to **convection** in the earth's mantle.
 - Tectonic plates are not smooth, therefore they catch on each other which increases tension.
 - The tectonic plates continue to be moved by convection, eventually the plates slip.
 - This releases huge amounts of energy in the form of **seismic waves** which then travel out from the **focus** through the **lithosphere** shaking everything in their path.
 - The **epicentre** is the term used for the location directly above the focus that is struck by the seismic waves first.

- 6 Tsunami formation:**
- At a **destructive plate boundary** a heavier **oceanic plate** is moving towards a lighter **continental plate** due to **convection currents in the mantle**
 - The heavier oceanic plate **subducts** under the continental plate, catching and dragging it as it goes
 - This builds up a huge amount of tension
 - Eventually the tension becomes too great and the oceanic plate slips, creating an **earthquake**. Which releases the continental plate causing it to spring upwards **displacing** the ocean above it
 - This creates a series of tsunami waves that move out from the **epicentre** in both directions

7 Earthquake case studies:

Kathmandu, Nepal 2015	Christchurch, New Zealand 2011
<ul style="list-style-type: none"> • 7.8 magnitude • Convergent boundary (continental and continental plates coming together) • Avalanches and landslides • 8,583 death toll • 18,000 injured • 2.8 million people displaced • 80% of structural buildings in some towns and villages collapsed. • Estimated cost was around US\$5-10 billion. 	<ul style="list-style-type: none"> • 6.3 magnitude • Convergent boundary (continental and oceanic plates coming together) • Aftershocks and liquefaction (solid ground turning to liquid due to the seismic shaking) • 181 killed • 2,000 injured • 60,000 displaced • \$40 billion economic impact

- 5 Primary impacts:**
- Impacts that occur as the hazard is happening e.g. as the ground shakes in an earthquake houses are destroyed.
- Secondary impacts:**
- Impacts that occur in the hours, days, weeks, months and even decades after the hazard has happened e.g. homelessness and the cost of rebuilding.

Heat rises from the **inner Core** which is **5500 degrees Celsius** due to **radioactive decay**. The heat rises up through the **mantle** until it reaches the **asthenosphere** which is in the **upper mantle**. From here the heat spreads in two directions as the **lithosphere (crust)** prevents it from escaping (unless there is a constructive or destructive boundary above it). This drags the lithosphere above it which moves the tectonic plates in different direction. Over millions of years this has resulted in **continental drift**. Our continents were once all joined together but they have been moved apart through **convection currents**.

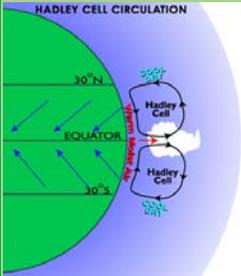
8 Management of earthquake hazards:

Short term response (S)	Help/response given in the immediate aftermath of a disaster to help minimise impacts – food and medical supplies are examples.
Long term response (L)	Projects involved over a longer time period to improve construction, rescue efforts and overall limit the impacts of natural disasters.
Preparedness (P)	The ability to forecast when a disaster will occur to therefore minimise damage.

Climate Hazards Memory Organiser

1 Global atmospheric circulation:

At the equator **solar radiation** is at its most direct. This leads to high temperatures and therefore causes huge amounts of **evaporation** to occur. Evaporation is rising warm moist air. This rising air causes a **low pressure system** to occur at the equator leading to **unsettled rainy conditions**. This is why rainforests thrive here.



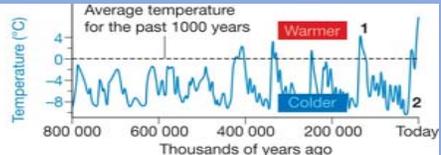
Once the warm moist air has risen, cooled and condensed and produced rain over the equator it splits and moves northwards and southwards. The now dry air cools further and is now more dense and therefore sinks at the **tropic of Cancer and Capricorn**. This creates a **high pressure system** at the tropics leading to **dry stable conditions**. This is why deserts are found here.

The circulation of rising warm moist air and sinking cool dry air is known as a **HADLEY CELL** (See diagram)

2 Theories of the causes of long term natural climate change

- Volcanic eruptions –Climate cooling
- Sunspots-Climate warming and cooling
- Orbital changes/ Milankovitch cycles-Climate warming and cooling
- Asteroid collisions-Climate cooling

3 Evidence for natural long term climate change (nothing to do with human activity):



Ice Cores:- These contain a year by year record of atmospheric conditions through air bubbles trapped in each layer which can then be used to establish temperature records. 800,000yrs of data in Antarctica

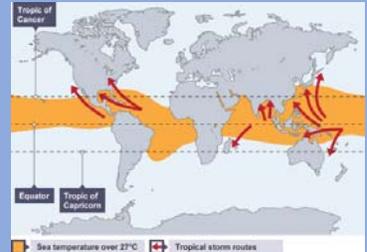
Tree Rings:-The thickness of these layers relate fairly accurately to temperature and rainfall conditions during the years growth (warmer & wetter = more growth = thicker)

Historical Records:-Pictures, diaries and records of random events such as skating on the Thames during the Little Ice Age and wine making pictures from Roman Times can be used to infer temperature changes

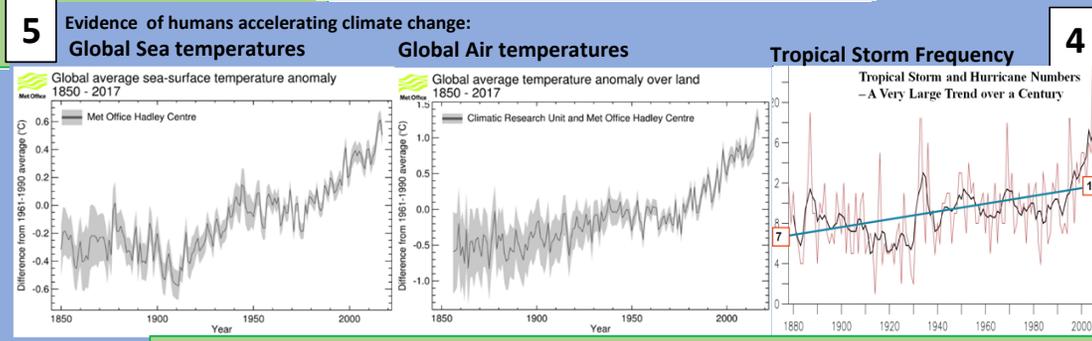
5 Evidence of humans accelerating climate change:

6 Tropical storms formation and location:

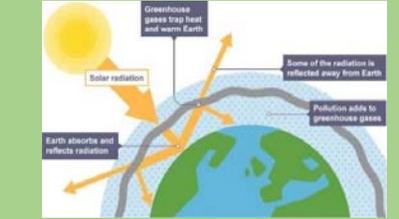
Typhoons: North West Pacific
Hurricanes: Atlantic and North East Pacific
Cyclones: Indian Ocean and South Pacific



Hurricanes occur between the Tropic of Cancer and the Tropic of Capricorn N and S of the equator in tropical waters of over 26 degrees Celsius. This creates intense evaporation of warm moist air. As this warm moist air rises it starts to cool, condense and form a cluster of thunderstorms. These storms then join together due to the rotation of the earth (Coriolis Effect) and start to spin. Cold air from high up in the atmosphere is dragged down through the centre of the rotating storm creating a calm (high pressure) eye. Shortly (within a day or so at worst) after the storm makes landfall its energy is dissipated (released) and the storm stops.



4 Human causes of climate change-The Enhanced Greenhouse Effect



Greenhouse gases= Carbon Dioxide (burning fossil fuels), Methane (cattle ranching), Nitrous Oxide (burning fossil fuels and artificial fertilisers)

7 Why are some places more vulnerable to tropical storms? How do different countries manage tropical storms? What impacts occur from tropical storms in differing locations?

Hurricane Katrina, USA, 2005 Saffir-Simpson Category 5 storm

VULNERABILITY? The USA is a developed country
New Orleans has an average population density of 1,965 people per square mile
The coastline where Katrina struck is on average only 1-2 feet above sea level

IMPACTS? 1,833 deaths
800,000 homes were destroyed. The worse hit areas were those in poorer neighbourhoods
11,600 homeless
The economic damage of Hurricane Katrina reached \$125 billion USD

MANAGEMENT? The population of New Orleans knew about the severity of Hurricane Katrina in advance due to sophisticated satellite technology. They therefore evacuated quickly.
Despite evacuations to the New Orleans Superdome many were left trapped in squalid conditions for days after the hurricane had passed

Typhoon Haiyan, Philippines, 2013 Saffir-Simpson Category 5 storm

VULNERABILITY? The Philippines is a developing country
The Philippines has a very high average population density of 115,124 people per square mile.
Some of the islands in the Philippines are only 3 feet above sea level.

IMPACTS? 10,000 deaths
1.2 million homes were damaged or destroyed.
4 million homeless
The economic damage of Typhoon Haiyan reached \$14 Billion USD

MANAGEMENT? Evacuation centres
Extra planes scheduled to evacuate survivors to the capital Manila
Hourly updates on the radio-although many ignored this
NO storm surge barriers
Foreign aid and donations from charities such as The Red Cross

The Enhanced Greenhouse Effect is increasing the severity and frequency of tropical storms as oceans are warmer for longer periods of time