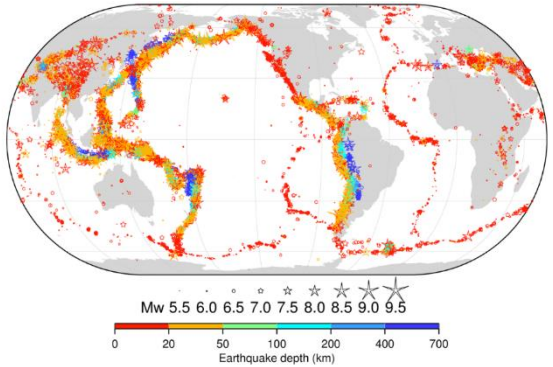
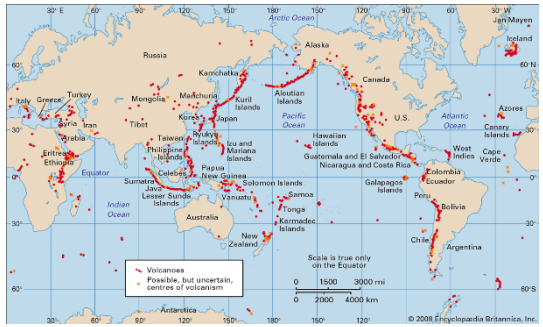
Key Terms:

Natural Hazards – An event of unusual size that threaten people and/or their activities.
Earthquake – a sudden and violent movement of the earth's crust.
Volcano – a cone shaped mountain that erupts lava and ash
Primary effect – a consequence of a natural disaster that occurs straight away.
Secondary effect – a consequence of a natural disaster that occurs in the days/weeks/months or years later

These maps show the distribution of earthquakes and active volcanoes. They are found along Plate boundaries, where large rafts of the earth's crust are either moving towards each other, pulling apart or sliding side by side.





Structure of the Earth:

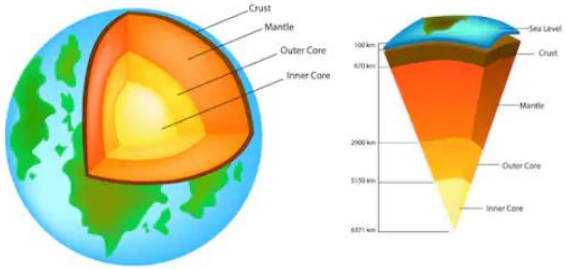
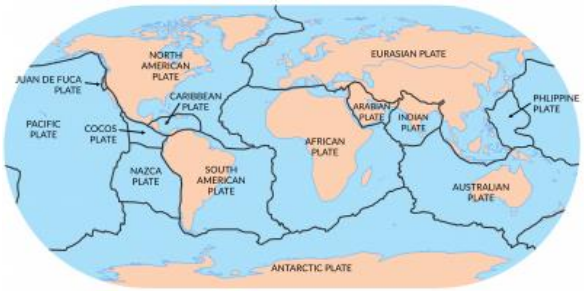
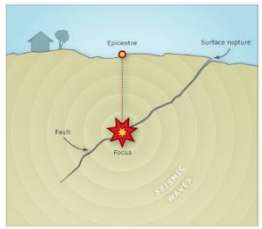


Plate names:



What is an Earthquake?

This is when pressure builds up in the earth's crust and gives way in a sudden and often violent movement.
It generates seismic waves that vibrate through the earth's crust.



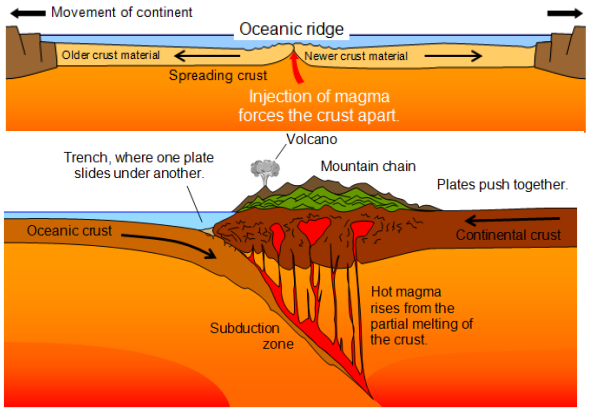
PPP

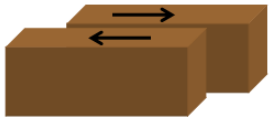
Prediction – Impossible with earthquakes, can be done with volcanoes – possible with historic data.
Planning – Having evacuation routes, grab bags with emergency kit and medicine.
Protection – Earthquake proof building, warning systems for Tsunamis
Monitoring – Volcanoes can have tilt meters and gas sensors, earthquakes are harder to monitor (maybe animal behavior and radon gas emission but these are VERY unreliable)

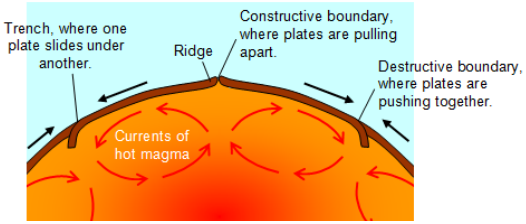
There are 2 types of crust:

Oceanic – Young (being created on earth right now), thinner (max 8km) and more dense (heavier)
Continental – Old (billions of years old), thick (30km+), less dense (lighter/more buoyant).

Plate names:







How are Earthquakes measured?

The **Richter Scale** is a logarithmic scale starting at 1. Each step up on the scale is 10x the power. The biggest ever recorded was in 1960 in Chile at 9.5.
The **Mercali Scale** is used to assess the damage of the earthquake. It ranges from I (no damage) to XII (total destruction) This is a subjective scale assigned by people observing the damage after the event.

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GEOGRAPHY | Year 9 | Half-term 1: Tectonic Hazards

Tohoku Earthquake, Japan, 2011 – HIC CASE STUDY

A mega earthquake occurred here in March 2011, measuring 9.0 on the Richter Scale. This earthquake triggered a tsunami on the destructive plate margin where the Pacific plate is being subducted beneath the North American plate. A 200km long segment of rock suddenly uplifted by between 5 -10m.

What were the primary effects?

1. Over 20,000 people were killed as the tsunami waves swept up to 10km onshore.
2. The high death toll was due to the power surge which overtopped tsunami defences and flooded areas thought to be safe from tsunami.
3. Some 500km2 of coastal plains were inundated, destroying farmland, settlements and communications.
4. A total of 200,000 buildings were damaged or destroyed by the earthquake and tsunami.

What were the secondary effects?

1. Ruptured gas pipes led to fires that raged for several days.
2. Explosions occurred at the Fukushima nuclear power plant as seawater over-topped flood defences. There were considerable concerns about nuclear contamination and the possibility of meltdown as the cooling systems failed to operate.
3. Electricity was cut off in almost six million homes and over one million people were left without running water.
4. Stock markets around the world fell over concerns about Japan's rising debts in the face of billions $US worth of damage.

Immediate responses

- People fled to higher ground.
- There was immeasurable emotional sadness for the loss of loved ones.
- Japan's government launched a massive rescue mission mobilising 100,000 troops, 300 planes and 40 ships. They distributed blankets, water and food to the people affected by the disaster.
- US military vessels and aircraft carriers were sent, along with relief teams from Australia, New Zealand and South Korea.
- Japan requested help from the UK and a team of UK search and rescue specialists and medics flew out.
- More than 215,000 people had to live in 1,350 temporary shelters.
- Around 170,000 people were evacuated from a 12-mile radius around the Fukushima number one nuclear plant.
- The Bank of Japan moved to stabilise markets by injecting a record 15 trillion yen (£114.4 billion) into money markets.

Longer-term responses

- A huge re-building and reconstruction programme is planned involving houses, infrastructure and communications systems.
- Port facilities will need to be rebuilt.
- The system of tsunami defences will need to be reconsidered and may well be extended in height beyond the standard 12m that is currently the accepted level.

Haiti Earthquake, 2010 – LIC CASE STUDY

Causes: January 2010, Magnitude 7.0. Conservative plate margin between the Caribbean and North American plates. The epicentre was 15km WSW of the capital Port-u-Prince.

Primary effects:

1. 230,000 people died in the earthquake.
2. Over 2 million were affected
3. 1.5 million people were made homeless. It is estimated that 180,000 homes and 30,000 commercial buildings collapsed or were severely damaged.
4. Haiti only has one airport with one runway, and the control tower was badly damaged in the earthquake.
5. The port was also unusable due to damage.

Secondary effects:

1. Large areas were blacked out because electricity lines were cut.
2. 9 months after, following heavy tropical storms, cholera breaks out in the refugee camps which still accommodated 1 million people – 500 died due to poor sanitation conditions
3. 1 million refugees in tent cities had to be evacuated in November 2010 as Hurricane Tomas

Immediate responses

- The EU sent £100 million is AID, food, water and shelter.
- The red cross and Oxfam set up field hospitals to help the injured.
- People had to move to refugee camps.

Longer-term responses

- The UN provided $100 million in reconstruction aid.
- The USA send the army to keep the peace.
- The problem was that 5 years after the event, 500,000 were still living in refugee camps. The money was lost to corruption.

Factors affecting earthquake damage:

HIC – HIC's tend to have more damage in terms of money. Eg Japans total cost was $235 billion, whereas Haiti was 13.9 billion.

LIC's – LIC's tend to have a higher loss of life. Japan = 20,000, Haiti = 230,000.

Factors affecting this are: money, quality of emergency services, quality of buildings, readiness and level of response.

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GEOGRAPHY

Year 9 | Half-term 1: Tectonic Hazards

Urban—a built up area (town/city)

Rural—the countryside.

Migration—the movement of people

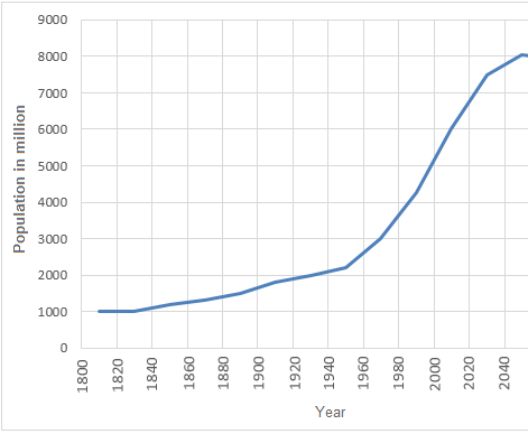
Formal sector—official work with a contract and taxes.

Informal sector—no contract or benefits.

Urbanisation—the proportion of people living in cities increasing.

As you can see the world URBAN population has been increasing since 1800 However between 1800 and 1950 the rise was very slow, between 1950 and 2040 it has been a rapid rise.

The major growth has been in LIC's rather than HIC's.



Magacities—a city with more than 10 million people living in it.

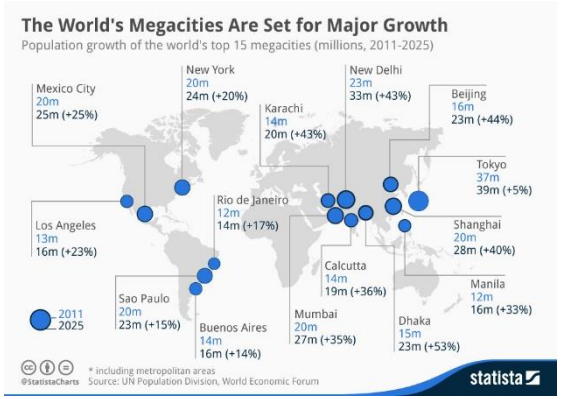
Most megacities are located in LIC's, with the majority currently found in Asia. Over the next 30 years. These cities are growing due to 2 main factors:

1. Rural-urban migration
2. Natural Change.

Migration is caused by Push and Pull factors: Push factors force people to leave, Pull factors attract people somewhere new.

Push– Poor farming, lack of jobs, poor education

Pull-Better housing, more jobs, schools, more social opportunities.



Rio de Janeiro—Rio is the culture capital of Brazil (NOT THE MAIN CAPITAL) It has grown around a large bay called Guanabara Bay, it is a UNESCO World Heritage site and hosts one of the biggest music and dance celebrations every year. It staged the 2014 World Cup and Olympics.

Land use—North = Industry, airport, Soccer stadium.

South = Tourist are (hotels and beaches), Rochina (favela), Luxury Flats.

Centro = Oldest part of the city, historic buildings, financial centre.

West = Olympic stadiums, regenerated housing area, shopping malls, steelworks.

Challenges in Rio:

Healthcare- In 2013 only 55% of the city had access to a local clinic. Therefore life expectancy was very low	Mobile health centres—helped people in their homes.
Education—Education is compulsory for 6-14. but only half go to school. Many drop out into drug trafficking.	More teachers recruited/more volunteers. Grants to poorer families to encourage school attendance.
Water—12% no access to clean water. 37% lost through leaking pipes.	More taps installed and leaks fixed.
Energy—Suffers from major blackouts, most poor don't have electricity or steal it.	60km of new power lines, new nuclear power station.

Unemployment—Recession in 2015 caused high unemployment. High taxes and poor education has also contributed.

Formal work is hard to get without good qualifications. So most work in the **informal sector**, making a living however they can.

Crime is a big problem in Rio—Drugs and gang violence is rife. To combat this **Pacification** has occurred. This is where the police have reclaimed the favelas and made it safe for the residents. **Favela Barrio** is an example of this.

Environmental problems in Rio—Air pollution causes 5000 deaths per year, **Traffic congestion** is a major cause of this due to steep mountains and narrow roads. **Water pollution** from industry and favelas is a major problem, polluting drinking water.

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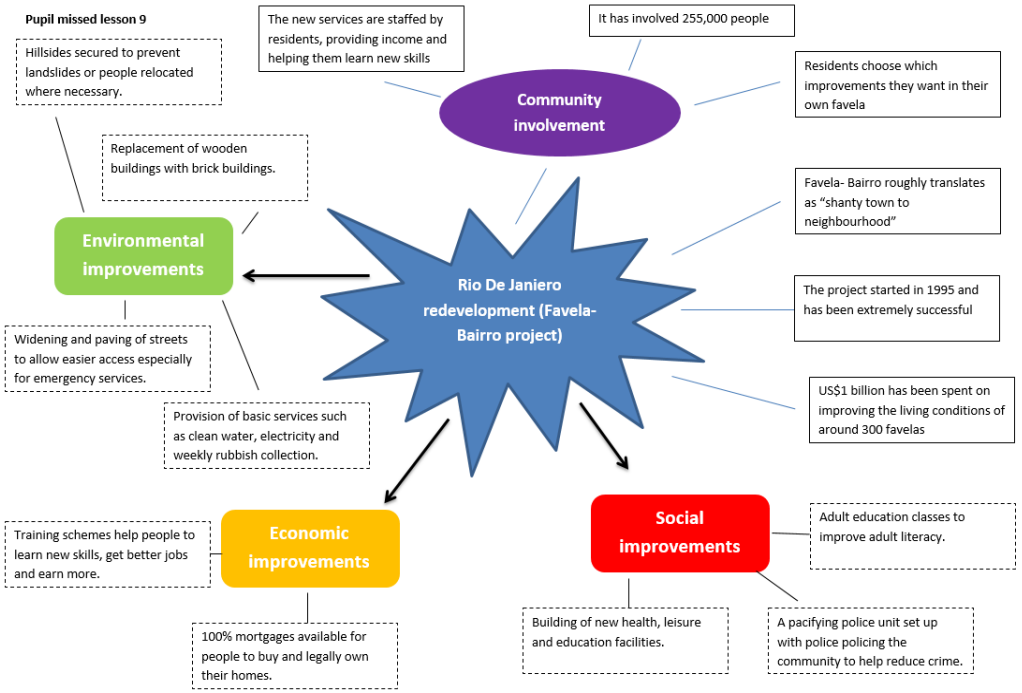
GEOGRAPHY

Year 9 | Half-term 3: Urban Issues

Regeneration—the rebuilding or updating of existing buildings to improve an area.

Favela—a slum in Brazil

Favela Bairro Project:



Urban Planning—HIC's

Greenfield - These are areas of land that have never been built on, they are often "protected" from development.

Brownfield— These are areas of land that have previously been built on, usually derelict or run down.

Greenfield Site	Brownfield Site
Easier to build on as now clearing needed	Cheaper to buy, services in place
No services (water etc..) damages environment	Needs clearing first, land can be contaminated

Why did Leeds South Bank need regeneration?

The Leeds South Bank area was very run-down. It gave a bad impression to visitors as it was the first part of the city seen by visitors arriving by rail or from the M1 in the south of the city.

It was a collection of derelict factories, wasteland, a red-light area and crime zone. Many people did not wish to visit the area outside of daylight hours.

Yet it is very close to the city's vibrant CBD and offered a massive opportunity to expand business and recreation.

Why regenerate run down areas?

Run-down areas are known as brownfield sites. They are more expensive to build on than greenfield sites because the land and buildings often need to be cleared first. They may also be contaminated from previous industrial use. But there are advantages in developing sites like these.

Existing buildings can be put to a range of uses on any one site.

The land is often disused or in a state of dereliction.

The site has already been developed and so reduces urban sprawl.

Using unsightly areas for building developments improves the urban environment.

Sites are often in urban areas, so they may reduce car use.

Freiburg—a sustainable urban development. Here they prioritise people over cars, promote recycling and renewable energy generation. The main aspects of their sustainability are: An Integrated Transport System, Renewable energy, Green space and recycling.

Water conservation

Freiburg's waste water system allows rainwater to be retained, re-used or seep back into the ground. There are financial incentives for inhabitants to use water sparingly. The River Dreisam is managed using flood retention basins. These have been designed to reduce the danger of flooding by storing excess water, which can be used in the city.

How urban transport strategies are used to reduce traffic congestion

The city has an integrated transport system (ITS). The most important part is the tram network which provides efficient, cheap and accessible public transport.
Compared with other German cities, Freiburg has a low car density with less than 500 cars per 1000 residents.
As well as the integrated transport system, there are:

- 400km of cycle paths with 9000 parking spaces for bikes including 'bike and ride' facilities at railway and bus stations.
- Restrictions on car parking spaces; in Vauban district each one costs £20,000!

As a result of Freiburg's transport plan, tram journeys have increased by over 25,000 in one year, while car journeys reduced by nearly 30,000.

Waste recycling

Each household or apartment building is equipped with three bins: one for paper, one for organic food and garden waste, and one for non-recyclables. They also have a "yellow sack" for packaging, such as yogurt cups and tin cans.
Freiburg has reduced its annual waste disposal from 140,000 tons in 1988 to 50,000 tons in 2000. This is burned for energy at an incinerator 20 km from the city. The contents of the bio-bins are fed to a biogas digester.

Energy conservation

Freiburg has a strict energy policy based on energy saving, efficient technology and the use of renewable energy. The city plans to be 100% powered by renewable energy by 2050. There are about 400 solar panel installations in the city.

Creating green space

40% of the city is forested. 44% of wood from the city's forests is used for timber, but 75% grows back within a year.
44,000 trees have been planted in parks and streets. Only native trees and shrubs are planted in the 600 hectares of parks.
In the Rieselfeld District only 78 hectares are built on, leaving 240 hectares of open space.

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GEOGRAPHY

Year 9 | Half-term 3: Urban Issues

Key Terms:

Erosion: the break up and removal of rock involving transportation.

Weathering: The break up of rock in situ (in one place)

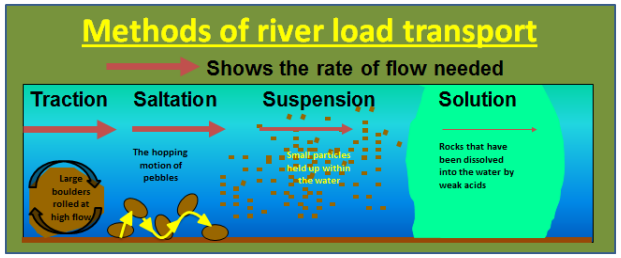
You need to know where the high and low land areas of the UK are. The map shows you the main ones. The main rivers are also labelled.

As you can see the **highland** areas of the UK are generally found in the **North** and the **West**. Whereas the **lowland** areas are further **South** and **East**.

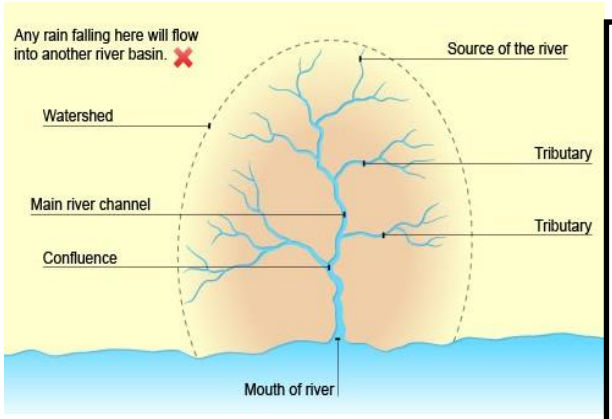
The UK landscape is constantly changing due to **erosion** and **weathering**.

We have studied **Coasts** and **Rivers**.

Rivers move material (sediment) through; Traction (rolling), Saltation (bouncing), Suspension (carrying) and Solution (dissolved)



A Drainage Basin – this is an area of land drained by a single river. The river flows downhill, under gravity, until it eventually reaches the sea.



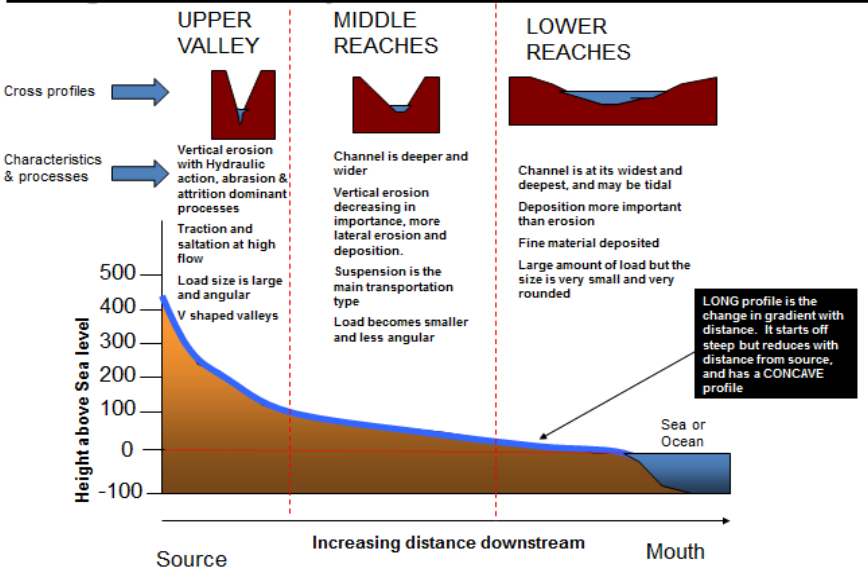
Landforms found in each course are: - Look back in your notes for how these are formed.

Upper– V-shaped valleys, Waterfalls, Interlocking Spurs.—VERTICAL EROSION

Middle—Meanders, Ox-bow Lakes. - SOME VERTICAL AND SOME LATERAL ERSOSION

Lower—Meanders, Flood Plains, Estuaries.—LATERAL EROSION

Long and cross profiles on a TYPICAL river



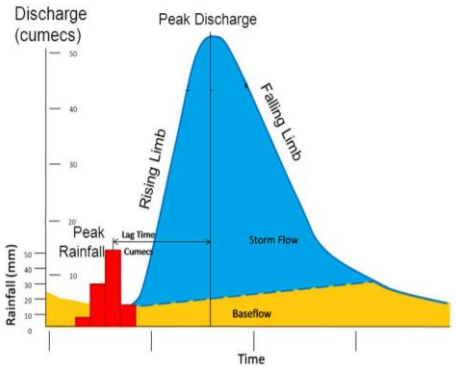
Erosion: Both Rivers and Coasts

Attrition—This is the smashing together of rocks. They break up into smaller rocks.

Abrasion—This is the rubbing and scrapping of rocks on the bed/banks. It results in rocks becoming smooth and less angular.

Hydraulic Action—This is the sheer force of the water breaks up rocks.

Corrosion/Solution—This is acid erosion where certain rocks are dissolved by water (chalk/Limestone etc…)



This is a Hydrograph—It shows how a river reacts to a rainfall event. The yellow area is the usual flow of the river. The blue area shows the River "rising" and "falling" after the rainfall event. The peak discharge is the highest point, measured in cubic metres per second. The Lag time is the gap between peak rainfall and peak discharge.

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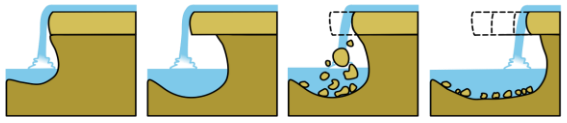
GEOGRAPHY | Year 11 | Term 2: Rivers

The Diagrams below show how the main landforms are formed by rivers. These are all formed by erosion and/or deposition. The most important thing to remember is the SEQUENCE of events. THIS HAPPENS, THEN THIS, THEN THIS, FINALLY THIS…

The formation of a waterfall



1. Waterfalls typically form in the upper stages of a river. They occur where a band of hard rock overlies a softer rock. Falling water and rock particles erode the soft rock below the waterfall, creating a plunge pool.

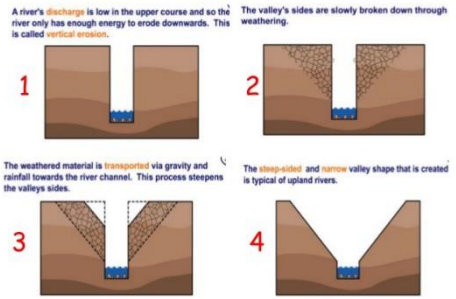
2. The soft rock is undercut by erosional processes such as hydraulic action and abrasion creating a plunge pool where water and debris swirl around eroding the rock through corraision further deepening it and creating an overhang.

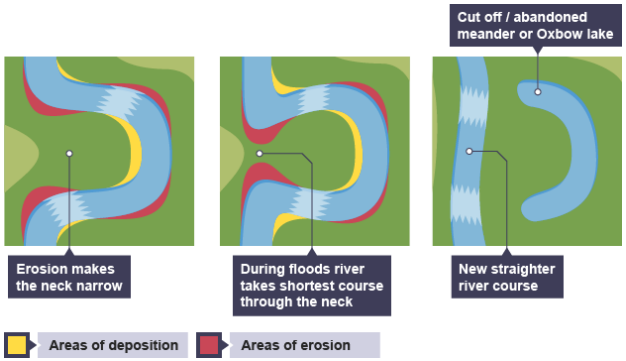
3. Hard rock overhang above the plunge pool collapses as its weight is no longer supported.

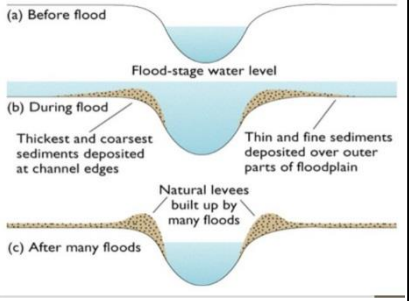
4. Erosion continues and the waterfall retreats upstream leaving behind a gorge.

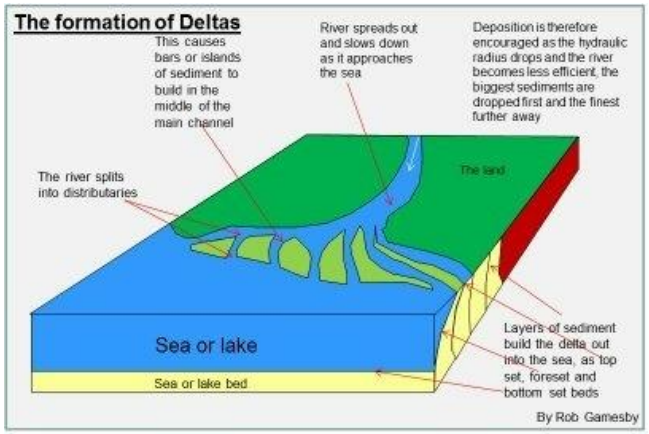
www.internetgeography.net

How do V shaped valleys form?









Causes of Flooding:

Physical:

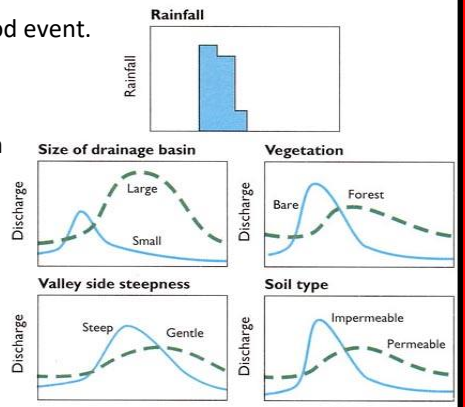
Heavy Rain, prolonged rain, impermeable rock, small drainage basin.

Human:

Urbanisation, Altering the river, building on the floodplain, dam failure.

Flood Hydrograph.

This shows how a river reacts to a flood event. The diagram on the right shows the factors that affect the rivers response to rainfall. The size, relief, vegetation cover and soil type all affect how a river reacts to a storm event.



River Management—

Hard and Soft Engineering:

Hard Engineering—This involves building a physical barrier or structure to stop erosion/flooding.

Dams		1. Can be used to produce electricity by passing the water through a turbine within the dam. 2. Reservoirs can attract tourists.	1. Very Expensive 2. Habitats destroyed 3. Settlements lost
River Straightening		1.More water held in the channel 2. Reduces flood risk	1. Speeds up the river, increasing flooding down stream
Embankments		1. Cheap one off cost 2. Reduces flood risk	1.Looks unnatural 2.Water speeds up, increasing flooding risk downstream
Flood Relief Channels		1. Removes excess water from the river—reducing flooding	1. Expensive to build 2. Doesn't stop flooding only delays it.

Soft Engineering—This involves managing the conditions and doesn't involve building.

Flood Warnings		1.Gives people time to protect their houses. 2.Lower insurance claims	1. Warnings might not get to everyone. 2. Flash Floods can be too quick
Floodplain Zonation		1. Reduces effects of flooding as expensive buildings are lees likely	1. Not always possible to do as most places are already built.

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GEOGRAPHY | Year 11 | Term 2: Rivers