Year 7 Geography

RIVERSIDE SCHOOL
'EXCELLENCE FOR ALL'

Home Learning
Summer Term

Week 1: Plate tectonics

Task 1: Structure of the Earth recap

https://www.youtube.com/watch?v=RA2-Vc4PIOY

The Earth is made up of four distinct layers:

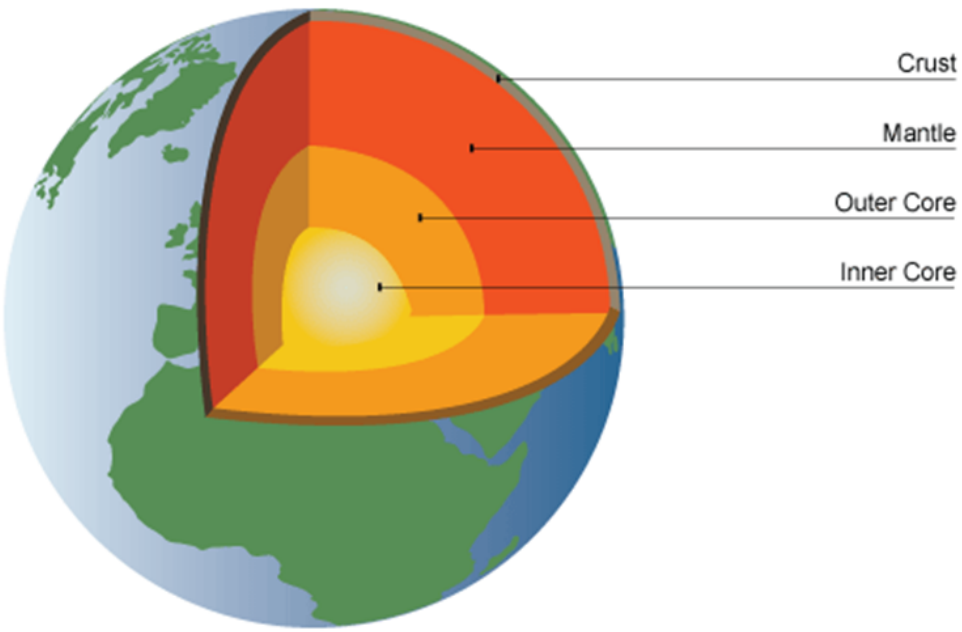
•The inner core is in the centre and is the hottest part of the Earth. It is solid and made up of iron and nickel with temperatures of up to 5,500°C. With its immense heat energy, the inner core is like the engine room of the Earth.

•The outer core is the layer surrounding the inner core. It is a liquid layer, also made up of iron and nickel. It is still extremely hot, with temperatures similar to the inner core.

•The mantle is the widest section of the Earth. It has a thickness of approximately 2,900 km. The mantle is made up of semi-molten rock called magma. In the upper parts of the mantle the rock is hard, but lower down the rock is soft and beginning to melt.

•The crust is the outer layer of the earth. It is the thinnest layer at between 0-60 km thick. The crust is the solid rock layer upon which we live. The crust is broken up into different pieces called tectonic plates – there are 7 major plates and are constantly moving.

a. Which layer of Earth is the hottest? _____
b. Which layer of Earth is the widest? _____
c. Which layer of Earth is the thinnest? _____
d. Which metals make up the hottest layer? How hot is this layer? _____
e. Is the inner core solid or liquid? _____
f. Which metals comprise the outer core? _____
g. What is the name of the rock in the mantle? _____
h. What does semi-molten mean? _____
i. How thick is the crust? _____
j. What is the crust broken into? _____

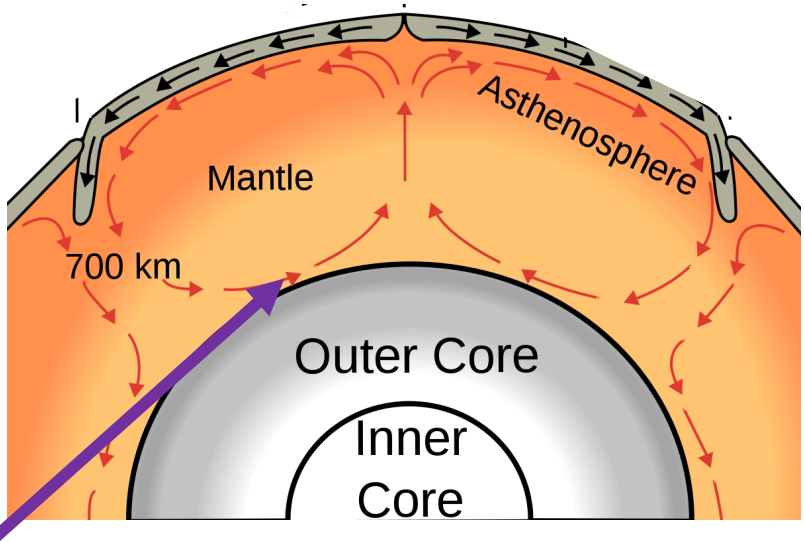


Task 2: Convection currents

Heat from the core causes **convection currents** in the mantle. This helps the tectonic plates move.

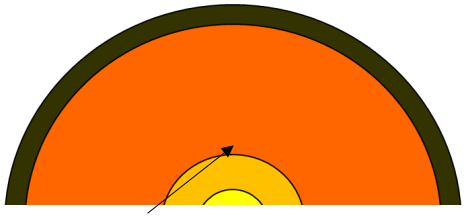
There are 4 rules you need to remember for convection:

1. Hot things (air, magma, water) are less dense.
2. Things which are less dense (hotter) rise.
3. Cooler things are more dense.
4. Things which are more dense (cooler) sink.

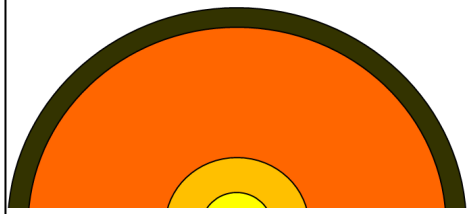


Here are the steps for convection. On the next page, you should draw arrows to where you think the magma is moving for the steps in RED. The first one is done for you.

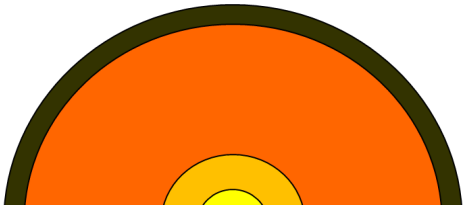
A. Magma (semi-molten rock) near the outer core is heated.
B. As the magma warms it expands and becomes less dense.
C. The less dense magma then starts to rise towards the crust.
D. When it reaches the crust, magma spreads out and moves the plate with it.
E. As the magma is near the cooler crust it begins to cool.
F. The cooling magma becomes denser and begins to sink to be reheated again when it reaches the core.
G. The rising and falling magma creates circular currents with the mantle.
H. This is known as convection currents.



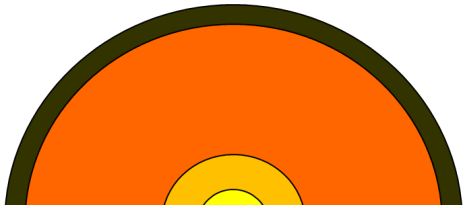
A. Magma (semi-molten rock) near the outer core is heated.



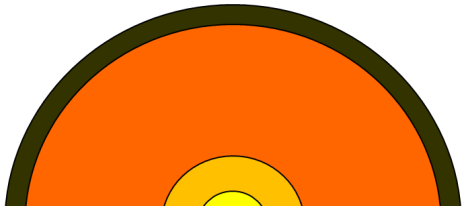
B. As the magma warms it expands and becomes less dense.



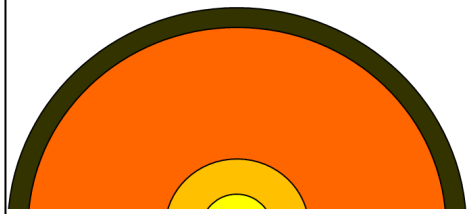
C. The less dense magma then starts to rise towards the crust.



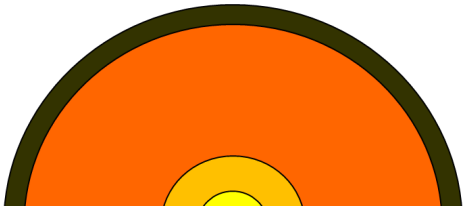
D. When it reaches the crust, magma spreads out and moves the plate with it.



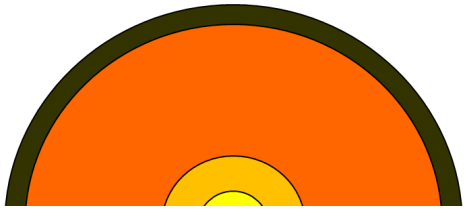
E. As the magma is near the cooler crust it begins to cool too.



F. The cooling magma becomes denser and begins to sink to be reheated again when it reaches the core.



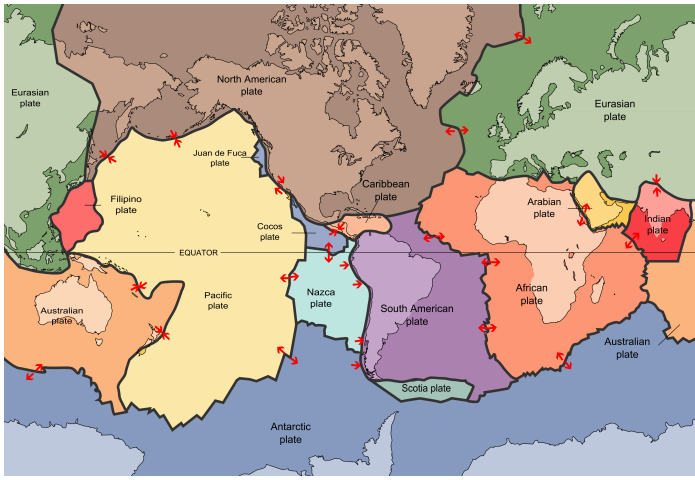
G. The rising and falling magma creates circular currents with the mantle.



H. This is known as convection currents.

Task 3: Types of crust

Tectonic plates are either oceanic or continental. As we can see on the map, some of these plates are mostly under ocean (oceanic) and some of them are mostly under land (continental).



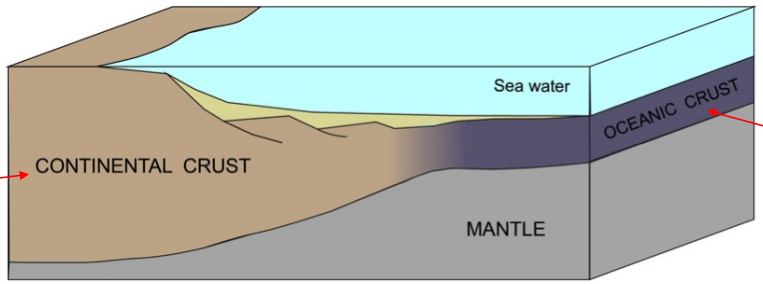
Look at the diagram which tells you about the continental crust and oceanic crust. Then, fit the words into the paragraph.

Less dense

Thicker: 30-40km deep

Older: up to 4 billion years old

Makes up the land (continents) and the seabed close to the coast.



Very dense

Thinner: 7-10km deep.

Younger: 300 million years old

Under water

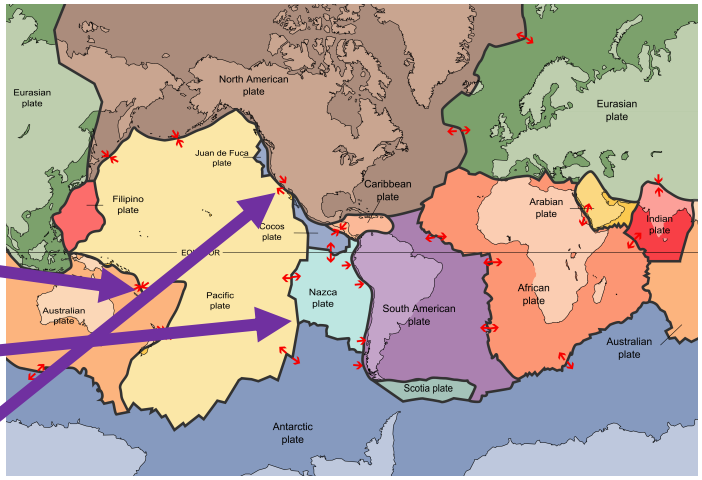
Continental and oceanic crust are very different from one another. Oceanic crust is _____ dense than continental crust which is _____ dense, however oceanic crust is much thinner than _____ crust which is _____. The two types of crust are also different _____, oceanic crust is much _____ at less than _____ million years old while continental crust can be up to _____ billion years old.

Thicker ages more younger 4 300 continental less

Task 4: Plate boundaries

The area where two plates meet is called a plate boundary.

If you look closely at the map you can see arrows. For example here you can see the Australian plate and Pacific plate moving towards each other.



Here you can see the Pacific plate moving away from the Antarctic plate.

Here you can see the Pacific plate moving alongside the North American plate.

Depending on how a plate is moving: towards another plate, away from another plate or alongside another plate and what crust they are made from will tell us whether we get earthquakes and / or volcanoes!

There are 4 different types of plate boundaries:

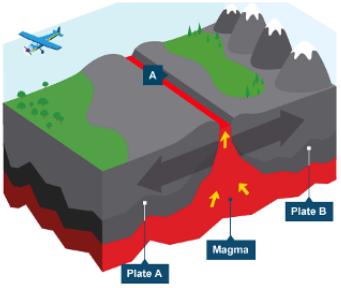
- Constructive
- Collision
- Conservative
- Destructive.

There is information on each of them. You must complete the table on page 8.

Constructive plate boundary

A constructive plate boundary occurs when two plates move away from each other in opposite directions. As the plates move apart, there is space for magma to rise up. As the magma wells up, it cools and new crust is formed. This is known as a shield volcano. As the magma fills the gap, very weak earthquakes can occur.

An example of a constructive plate boundary is the mid-Atlantic Ridge, near Iceland.



Collision plate boundary

A collision plate boundary occurs when two continental plates move towards each other. Since these are the same density, neither plate is able to be pushed underneath the other, so they are both forced upwards. As the two plates move upwards together, they create fold mountains.

Friction caused by the plates moving towards each other causes earthquakes.

The Himalayas in Nepal were created by a collision plate boundary.

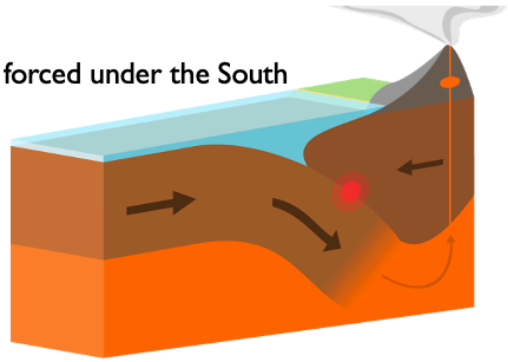
Destructive plate boundary

A destructive plate boundary occurs when oceanic and continental plates move towards each other. The oceanic plate is forced under the lighter continental plate (subduction). When the oceanic plate sinks into the mantle, an ocean trench (deep underwater valley) is formed.

Friction caused by the oceanic plate subducting (going under) underneath the continental plate causes earthquakes. These can be very strong.

The friction also creates enough heat to melt the oceanic plate. The molten oceanic plate (magma) rises up through cracks in the continental plate and erupts onto the surface. Over the years, this can create a composite volcano.

An example of a destructive plate boundary is where the Nazca plate is forced under the South American Plate.



Conservative plate boundary

A conservative plate boundary occurs when two plates move past each other in the same direction at different speeds, or where two plates move past each other in different directions.

Friction caused by the plates moving towards each other causes earthquakes; very strong ones can be made here. No other hazards are found here. An example of this is at the San Andreas Fault in California.

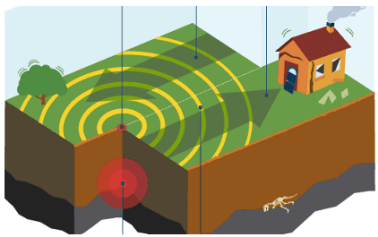
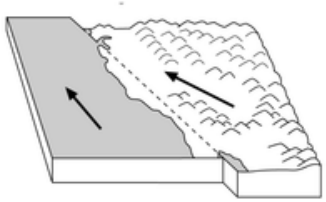
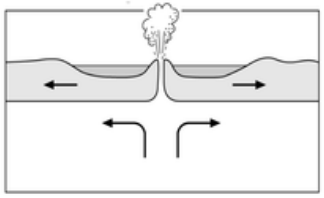
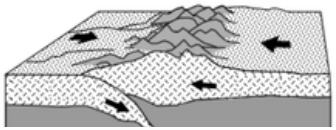
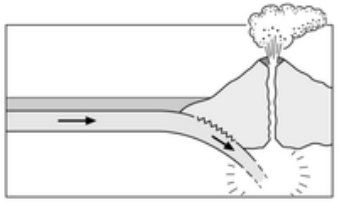


Plate boundary	Diagram	How does it work?	Do you find earthquakes, volcanoes or fold mountains?
Conservative			
Constructive			
Collision			
Destructive			

Week 2: Volcanoes

Task 1: Where do we find volcanoes?

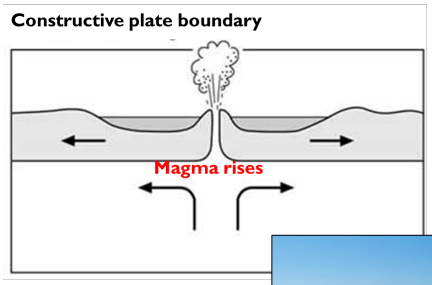
https://www.bbc.co.uk/bitesize/guides/zvnbkqt/revision/1

Use the map to fill in the gaps.

Active volcanoes are usually found along the lines of some plate _____. Some boundaries such as the one between the _____ plate and the Pacific Plate have lots of volcanoes. Some volcanoes are not found on plate boundaries such as the volcano in the middle of the _____ Ocean and the volcanoes in _____ Africa.

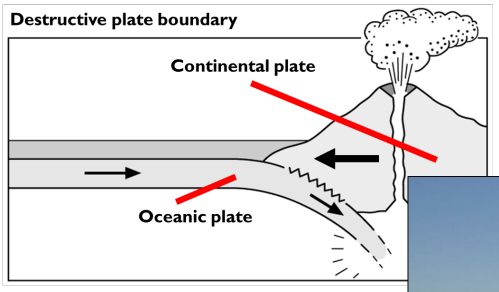
Indo-Australian / central / Boundaries / Pacific

Task 2: Types of volcano



This is a **shield** volcano. It is formed at constructive plate boundaries. The two plates move apart, a gap forms between them. This gap allows magma to rise and reaches the surface. When magma reaches the surface it is known as lava. The lava at a shield volcano is very runny so it makes big, wide volcanoes when it cools down.

This is a **composite** volcano. It is formed at destructive plate boundaries. The two plates towards each other – one is continental and one is oceanic. As they move towards each other, the oceanic plate subducts (goes underneath) under the continental plate because the oceanic plate is more dense.



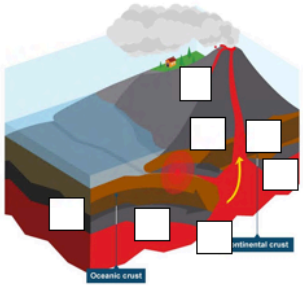
The oceanic plate goes into the mantle where it melts. The molten, hot magma then tries to rise through weaknesses in the continental plate. As it tries to rise, gas and pressure builds up and results in violent eruptions of ash and lava. The lava is very sticky so it makes tall, steep shaped volcanoes. They can also have pyroclastic flows which is a flow of hot ash, gas and lava.

1. Put the boxes in the right order. Number 1 has been done for both shield and composite.

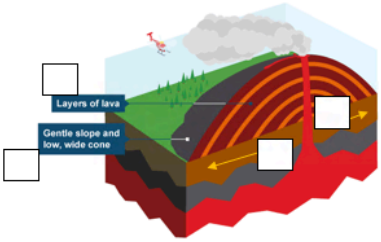
2. Put the letters in the right place on the diagrams.

	Shield	Composite
A	Thin runny lava erupts from this gap. It hardens and forms a layer of solid rock.	The subduction of the oceanic plate into the mantle causes the oceanic plate to melt due to higher temperature in the mantle and friction.
B	Two plates move apart from each other.	An oceanic and continental plate move towards one another.
C	Over time, layers of hardened lava build up to form a shield volcano. These volcanoes are very flat due to the fact the runny lava can flow easily.	The magma builds up in magma chambers.
D	This creates a gap for magma to rise up through.	This melted oceanic plate (magma) now begins to force its way through weaknesses in the continental crust.
E		The oceanic plate subducts under the continental plate as it is more dense.
F		Eventually magma pushes through vents (created when the plates move apart) in the Earth's surface causing a volcanic eruption.
G		Over time, layers of hardened magma and ash form a steep-sided composite volcano.

Composite



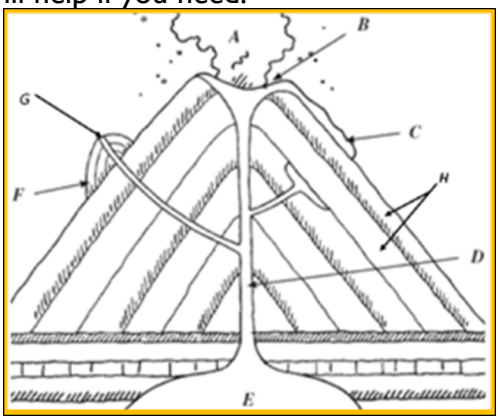
Shield



Task 3: Inside a volcano

Can you write the letters next to the matching label? This video will help if you need.

https://www.youtube.com/watch?v=IAmqsMQG3RM



___ Layers of lava and ash
___ Main vent
___ Magma chamber
___ Ash and gas cloud
___ Lava flow
___ Secondary vent
___ Secondary cone
___ Crater

Task 4: Shield or composite?

Write S for shield or C for composite in the table to show what type of volcano the statement is talking about.

	A pyroclastic flow can roll down the sides of a volcano at very high speeds and with temperatures of over 400°C.
	Usually found at constructive boundaries.
	They are low, with gently sloping sides.
	Usually found at destructive boundaries.
	They are formed by eruptions of thin, runny lava.
	They are formed by eruptions of thick, sticky lava.
	Eruptions tend to be frequent but relatively gentle.
	They are made up of alternating layers of lava and ash (other volcanoes just consist of lava).

Task 5: How does a composite volcano form?

In your own words, explain how a composite volcano is formed. You may use the booklet/bitesize website to help you.

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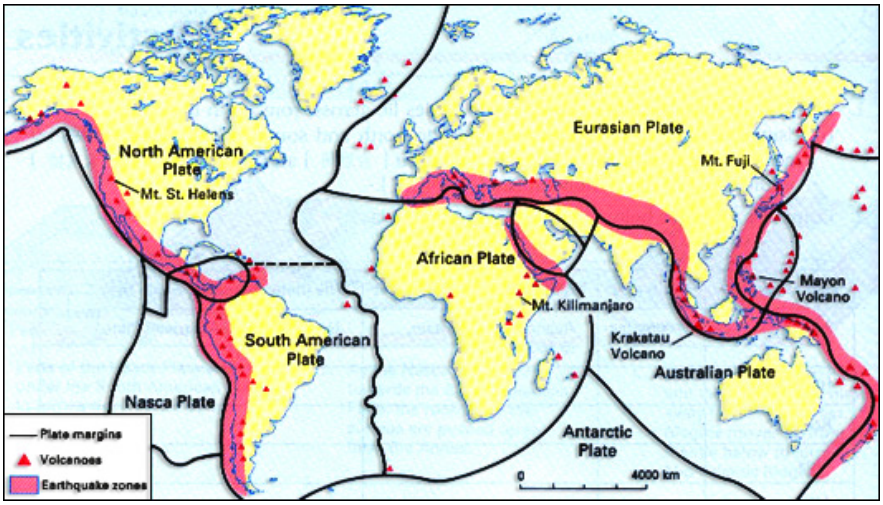
Week 3: Earthquakes

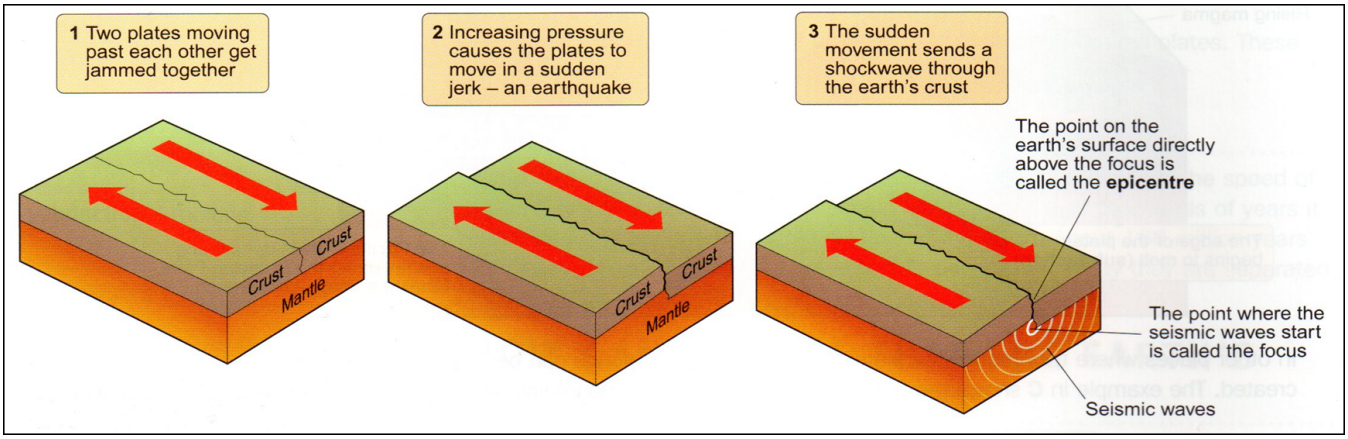
An earthquake is a sudden **release of energy** caused by rocks being under stress from the movements of plates at plate boundaries. Eventually the stress in the rock builds up enough to deform and reach breaking point. At that point, the stored up energy is released in the form of seismic waves.

Task 1: Describe the distribution of earthquake zones. Use task 1 from volcanoes to help you.



Task 2: How do we get earthquakes?

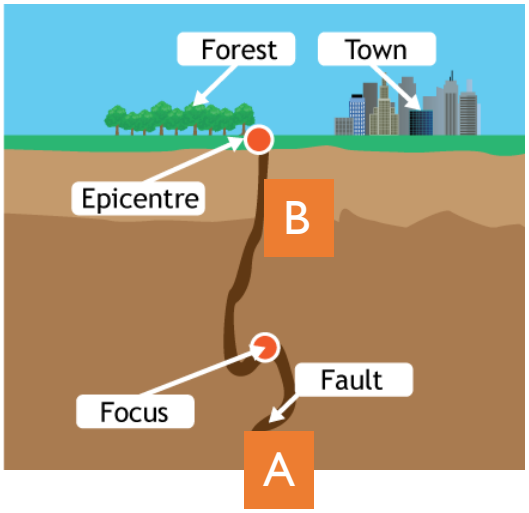
Look at the diagram below – it explains how earthquakes happen. An easy to remember is that tectonic plates **slide** past each other, they get **stuck** due to jagged edges, they suddenly **slip** due to pressure then they release **seismic waves** – try to remember the 4 S's!



	A. This pressure is suddenly released in a jerky movement as the plate suddenly slip apart.
I	**B.** Earthquakes occur at plate boundaries.
	C. The plates sometimes get stuck to each other, causing pressure and friction to build up.
	D. This release of pressure and energy is known as seismic waves.
	E. As the plates slide past each other at the plate boundaries the movement is not smooth because the plates have jagged edges.

Task 3: Deep and shallow focus

Look at the diagram below. The focus is where the seismic waves come from and the epicenter is the location of the focus on the surface. If the focus is closer to the surface, we say it is a shallow focus earthquake. These do more damage because the seismic waves have less rock to travel through so they reach the surface quickly and powerfully. If the focus is further underground, we say it is a deep focus earthquake. These do less damage because the seismic waves must travel through lots of rock to reach the surface and the energy gets spread out a lot .



Imagine there are two earthquakes and they release the same amount of energy. Which one out of A and B will cause the most damage to the town and why?

_____

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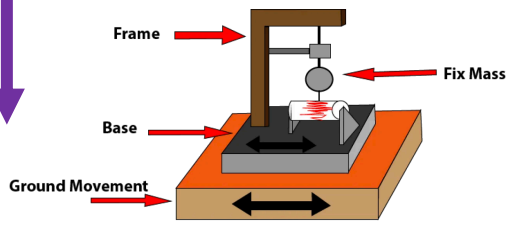
Task 4: Measuring earthquakes

We use the **Richter Scale** to measure the total amount of energy released in the earthquake.

It tells us **how strong** it was - **1** being weak and **10** being absolute devastation. Each increase of 1 on the Richter scale means the earthquake is actually 10 times more powerful (for example a 2.0 earthquake is 10 times stronger than a 1.0 earthquake—not twice as strong). As of 2019 the strongest earthquake ever recorded measured 9.5 on the Richter scale. We measure the energy using a seismometer – a device which measures the Earth's movements. It is a scientific measurement but it doesn't really tell us about what the earthquake did – for example an earthquake can release lots of energy but maybe it has a deep focus so not much energy reached the surface and didn't cause much damage.

We also use the Mercalli scale to measure how much **damage is caused** by the earthquake based on observations. It is measured on a scale between I and XII. This is less scientific as it is based on what people see and how much damage they think has happened.



I	Felt by almost no one.
II	Felt by very few people.
III	Tremor noticed by many, but they often do not realise it is an earthquake.
IV	Felt indoors by many. Feels like a truck has struck the building.
V	Felt by everyone; many people are awakened. Swaying trees and poles may be observed.
VI	Felt by all; many people run outdoors. Furniture is moved.
VII	Everyone runs outdoors. Poorly built structures considerably damaged. Slight damage elsewhere.
VIII	Specially designed structures damaged slightly, others collapsed.
IX	All buildings considerably damaged, many shift off foundations. Noticeable cracks in the ground.
X	Many structures destroyed. Ground badly cracked.
XI	Almost all structures fall. Bridges wrecked.
XII	Total destruction. Waves seen on ground surfaces, objects are tumbled and tossed.

Match up the key terms:

Richter Scale	An instrument to measure the strength of the earthquake
Magnitude	The place in the earth where rocks are moving
Focus	Smaller earthquakes after the main, large one
Epicentre	The point at the surface above the focus
After-shock	The scale on which the strength of the earthquake is measured
Seismometer	How strong an earthquake is

Task 5: Summary

In your own words: Explain what an earthquake is and how we measure them.

Success criteria:

- ✓ Explained what an earthquake is
- ✓ Explained what the Richter scale is.
- ✓ Explained what the Mercalli scale is.
- ✓ Gives an advantage and disadvantage is.
- ✓ *Challenge* explain what you think the best way to measure an earthquake is.

_____

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Week 4: What is weather and how do we measure it?

Weather refers to **short-term** changes in the atmosphere in a specific area (for example rain, wind, snow). The atmosphere is the layer of gases that surrounds our Earth. This is where weather happens.

Task 1: Match up the key terms with the definitions.

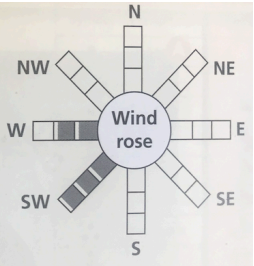
Skip ones you don't know and come back to them.

Rainfall	The force of air pushing down on the Earth. Low air pressure = air rising (windy and wet weather). High pressure = air sinking and pushing down on us (calm and dry weather).
Temperature	Where the wind is coming from
Air pressure	The speed that the wind is blowing
Wind speed	The share of the sky which is covered by clouds in a particular place.
Wind direction	How hot or cold somewhere is
Humidity	the quantity of rain falling within a particular area for a particular time
Cloud cover	How moist air is

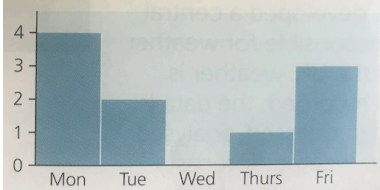
Task 2: Measuring weather

People have been collecting and recording weather for thousands of years. We take readings so we can identify patterns in the weather and to help us with planning (if there's going to be a storm or a heatwave we need to be prepared). To do this, we must use weather instruments to record the things you matched up in task 1.

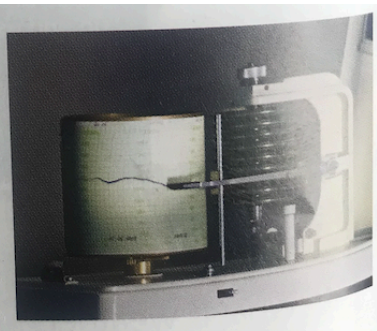
Wind speed and direction – Wind is measured in two ways: wind speed is recorded on an anemometer. The faster the wind blows the faster the cups on the anemometer turn. Wind speed is measured in knots. Wind direction is shown by a wind vane. The arrow points in the direction the wind is coming from. The wind directions for a week can be recorded on a wind rose by shading a square for each day that there was wind from that direction



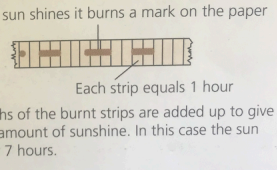
Rainfall – Rain gauge: a metal cylinder is sunk part way into the ground. The funnel catches the rain, which collects in a container, placed inside it. The rain is emptied into a measuring cylinder and the amount recorded in millimetres



Air pressure: this is measured by a barometer. The barometer traces out a record of the weekly air pressure on graph paper which is attached to a rotating drum. Air pressure is measured in millibars



Campbell Stokes Sunshine recorder: this was designed in 1879. The glass sphere concentrates the rays of the Sun onto a card which is scorched by the Sun. The card is marked off in hourly intervals. As the Sun travels across the sky, the rays scorch different sections of the card



Temperature – Maximum/minimum thermometer: the liquid inside the thermometer pushes and pulls small indicators inside a glass tube. Even when the temperature changes these stay at the lowest and highest temperatures. Temperature is measured in degrees centigrade (°C)

The Stevenson Screen has louvred (slatted) sides to encourage the free passage of air, and is painted white to reflect heat radiation. This ensures that what is measured is the temperature of the air in the shade, not in the sunshine

What is being measured?	**Name of instrument**	**How does it work?**	**What is it measured in (the unit)?**
Temperature	Thermometer	Liquid in a glass tube rises when temperatures and falls when temperatures fall.	Degrees centigrade
Temperature			
Wind speed			
Wind direction			
Rainfall			
Air pressure			
Sunshine			

Task 3:Recording weather

Keep a weather diary for the whole week. You will need to use your own observation as well as the Met Office website (BBC Weather is also a very useful website)

You can find all of this on a phone as well!

Met Office

Weekly weather diary

	Date	Time	Weather	Temperature °C	Rainfall cm	Air pressure	Wind direction
Monday							
Tuesday							
Wednesday							
Thursday							
Friday							
Saturday							
Sunday							

Key to weather symbols

Sunshine and showers

Sunny

Cloud and rain

Cloudy and snow

Cloudy

Thunder and lightning

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Week 5: What is climate?

Weather refers to **short-term** changes in the atmosphere in a specific area (for example is there rain, wind, snow?), whereas climate describes what the weather is like over a **long period of time** in a specific area. A climate is the weather of a place averaged over a period of time, usually 30 years. Precipitation and temperature are the things

Task 1: Weather or climate?

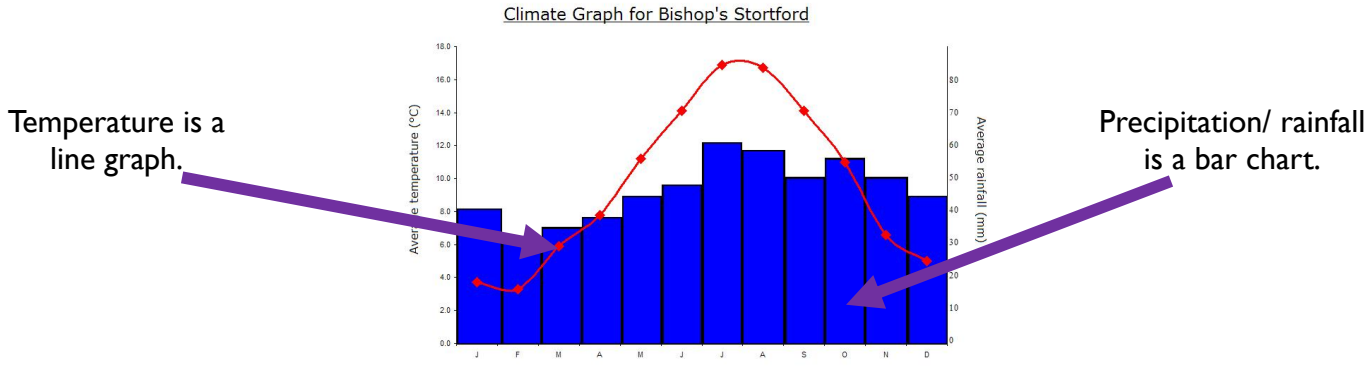
Decide whether the statements are to do with weather and climate. Use the paragraph above to help you to decide. Write W for weather and C for climate – the first one has been done for you.

C	July is a good time of the year to visit London as it usually less rainy then.
	Fog made driving difficult last week.
	A blizzard closed the M25 last year due to all the snow.
	The monsoon rains (heavy rainy season) flood parts of India each year.
	Not many plants grow in the desert due to the amount of rain there.
	Hurricane Katrina caused lots of damage to New Orleans in 2005.

Task 2: Climate graph of London

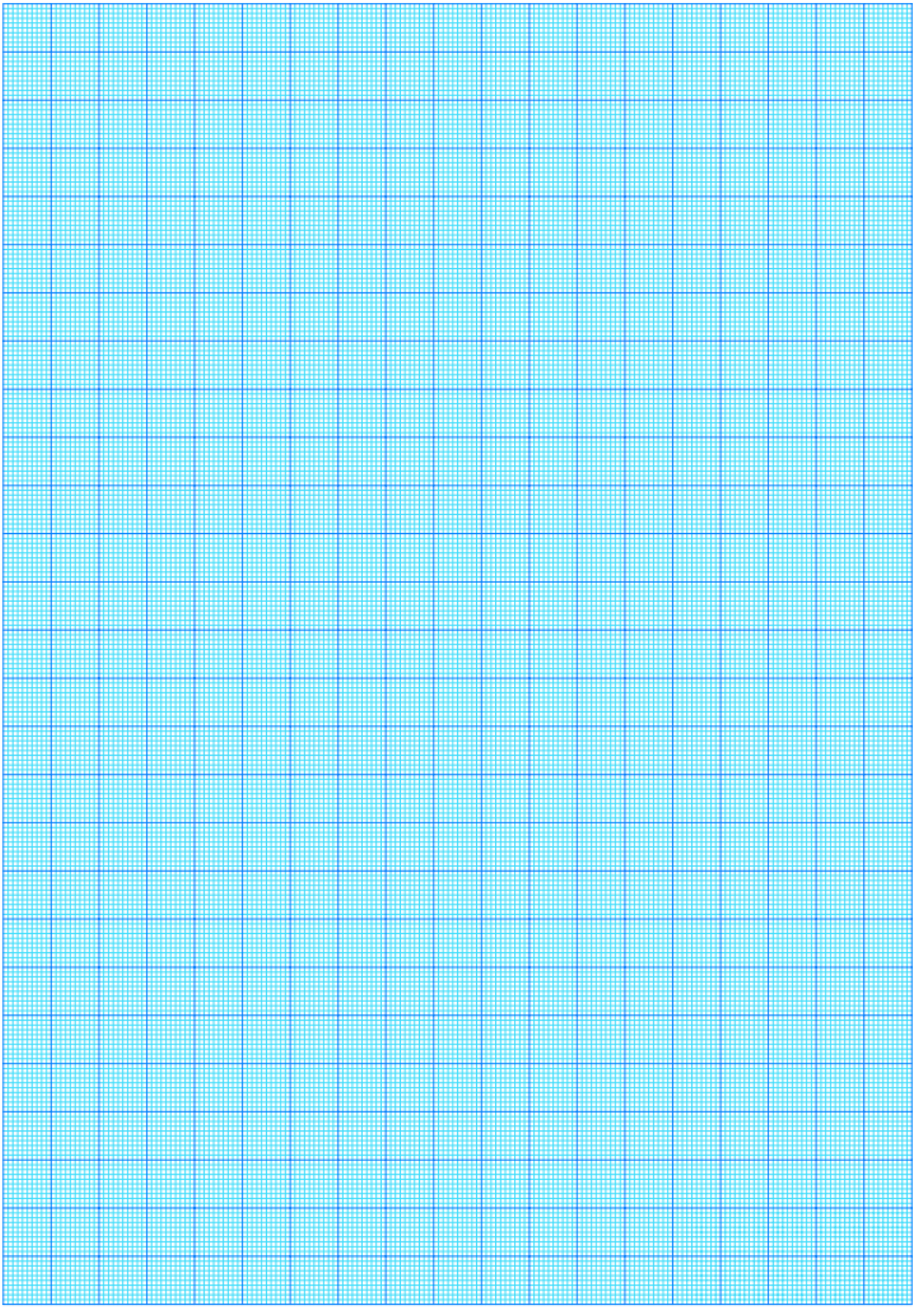
Month	January	February	March	April	May	June	July	August	September	October	November	December
Temperature in °C	4.9	5	7.2	9.7	13.1	16.6	18.7	18.2	15.5	11.6	7.7	5.6
Precipitation in mm.	56	39	46	45	49	50	48	53	56	60	61	58

You are going to create a climate graph of London. You did this before in the Amazing Places unit.



Steps:

1. Draw the x axis along the bottom. You need 12 squares – one for each of the months of the year.
2. Draw the first Y axis up the side. This will be temperature. The numbers in the table go up to 18.7 so I suggest you do a scale which goes up in 2s.
3. Draw the second Y axis up the oter side. This will be precipitation. The numbers in the table go up to 61 so you could go up in 5s or 10s depending on how much space you have.
4. Plot the points – line graph for temperature and bar chart for precipitation.
5. Give your graph a title and label your axis like the one on this page!



Task 3: Interpreting your climate graph.

Answer the questions – use the table to help you.

Month	January	February	March	April	May	June	July	August	September	October	November	December
Temperature in °C	4.9	5	7.2	9.7	13.1	16.6	18.7	18.2	15.5	11.6	7.7	5.6
Precipitation in mm.	56	39	46	45	49	50	48	53	56	60	61	58

1. Which month is the warmest in London? What is the temperatures?

_____

2. Which month is the coldest in London? What is the temperatures?

_____

3. What is the mean temperature for London? (add all temperatures together and divide by 12)

_____

4. What is the range of rainfall?(Largest value – smallest value)

_____

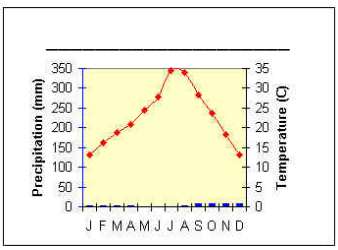
5. What is the wettest month in London? What is the amount of rainfall?

_____

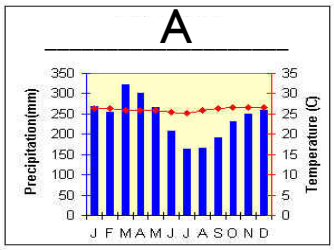
Task 4: Climates around the world

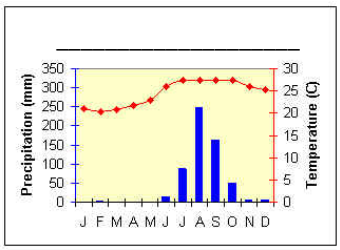
Match the descriptions to the climate graphs. One has been done for you/

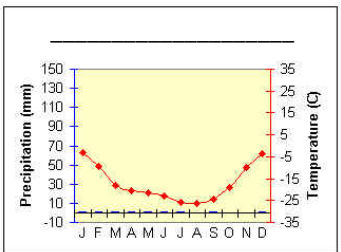
A. Tropical Rainforest: high temperatures and high precipitation.	**B. Savannah Grassland:** consistently warm temperatures with high precipitation in a rainy season.	**C. Cold Desert:** low temperatures and low precipitation.
D. London: consistent year-round precipitation with warmer summers.	**E. Hot Desert:** high temperatures (especially in the summer) and low precipitation.	**F. Mediterranean**: average temperatures with dry summers.

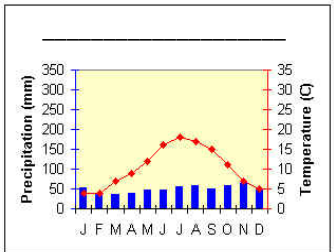


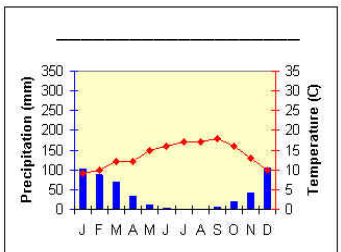
A











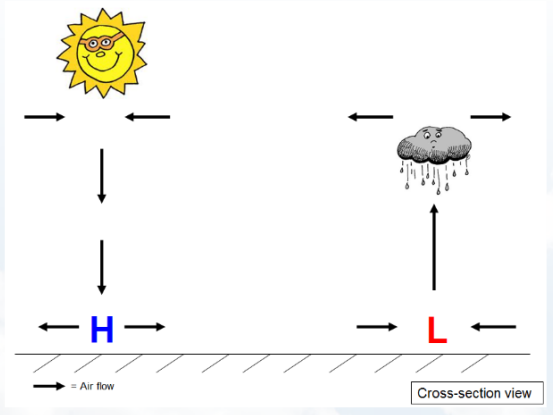
Week 6: Air pressure. air masses and rainfall.

Although we can't feel it, all the air above us is pressing down on us.

When the air pressure is HIGH, it means the air is sinking down and pressing down.

If the air pressure is LOW, it means air is rising up.

When air pressure is high, the air does not rise up and make clouds this means that the weather is generally clear and calm.



When air pressure is low, the air does rise. When air rises, it becomes cooler as the higher up in the atmosphere you go, the colder it is. The water vapour in the air condenses and tiny water droplets come together to make clouds. So at low air pressure you get cloudy weather.

We get wind because air always moves from places with HIGH pressure to areas with LOW pressure.

Task 1: High or low?

Decide whether the statements are to do with high or low air pressure.. Use the paragraph above to help you to decide. Write H for high and L for low – the first one has been done for you.

L	It is extremely windy.
	The weather is very dry.
	There could be a drought (very little or no rainfall).
	There could be a storm.
	The area is a desert.
	There is very little wind.
	The area is a rainforest.

Task 2: Complete the paragraph

In a high pressure area the air is _____. This means there will be very few _____ as the air **cannot** rise, cool and condense. High pressure brings _____ and calm weather.

In a low pressure area the air is _____. This means there will be lots of _____ as the air **can** rise, cool and condense. High pressure brings wet and _____ weather.

Rising, falling, clouds, clear, rain, windy

Air masses

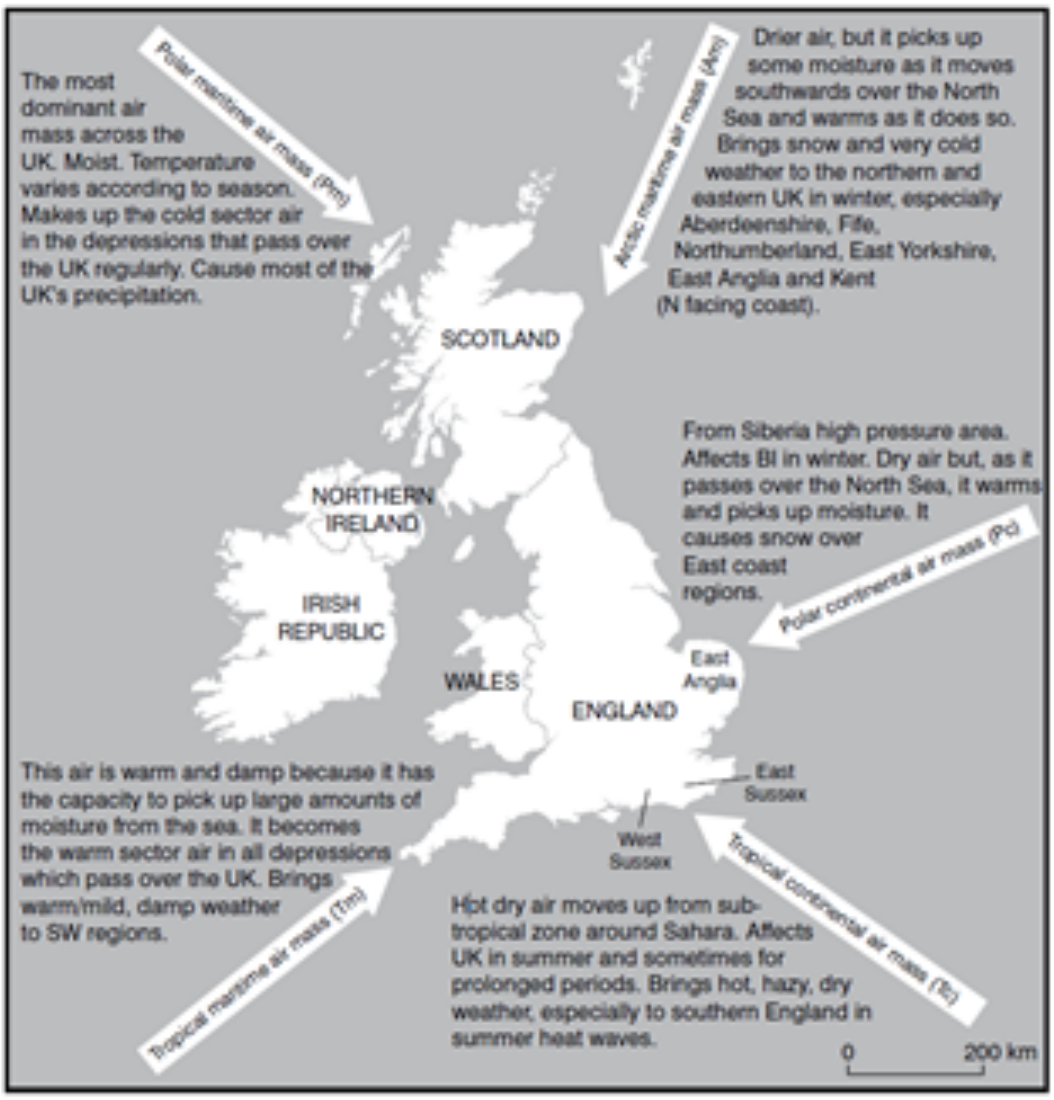
The weather we get in the UK depends where the air is coming from. Air usually travels in air masses. An air mass is a huge area of air with the same level of pressure, temperature and humidity.

Key terms:

- Polar air: brings cold weather
- Arctic air: brings very cold weather in winter
- Tropical air: brings warm weather
- Maritime air: brings wet weather from the ocean
- Continental air: brings dry weather from the land

Task 3: Use Figure 1 to complete the table on the next page.

Figure 1: The five main air masses affecting the British Isles



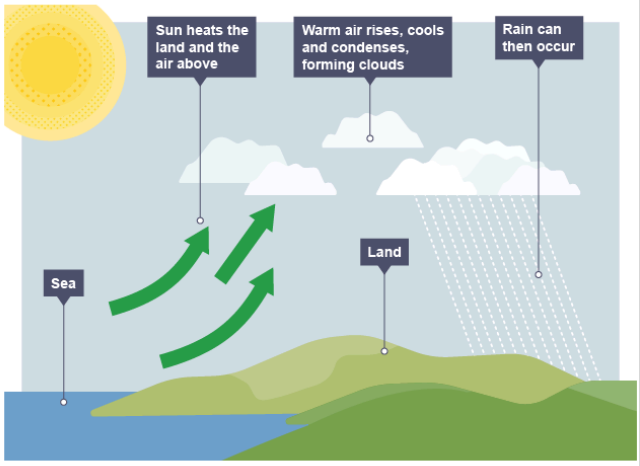
Air mass	Where does it come from?	What weather does it bring?
Tropical Maritime		
Tropical continental		
Polar maritime		
Polar continental		
Arctic maritime		

Types of rainfall

In geography, we have 3 types of rainfall:

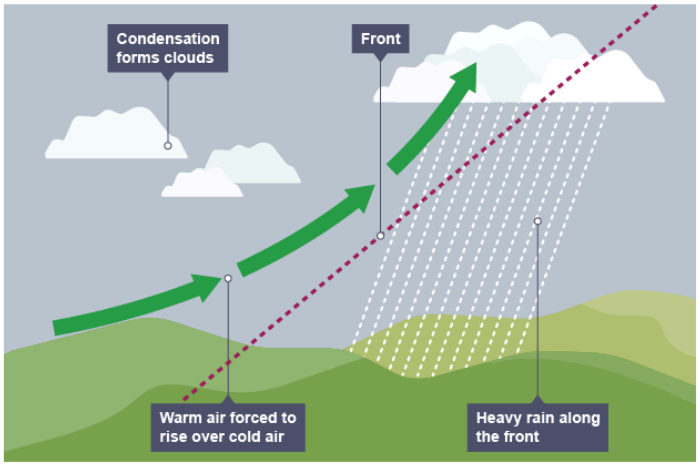
- Convectional rainfall
- Frontal rainfall
- Relief rainfall

Convectional rainfall



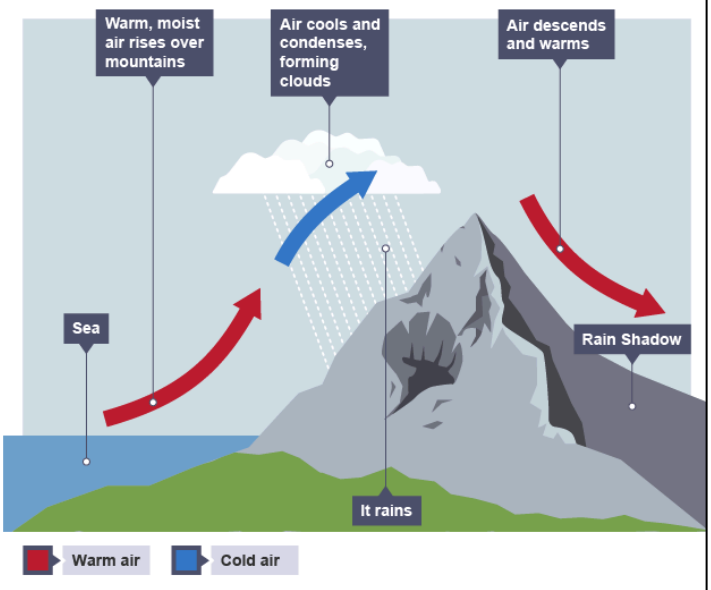
1. **Convectional rainfall** usually occurs during the summer in the UK, when the sun heats the land.
2. This creates rising pockets of warm air, known as convection currents.
3. Warm air rises rapidly, where it starts to cool and condenses to form clouds.
4. These clouds can be large cumulonimbus clouds.
5. The clouds can produce heavy rainfall and thunderstorms.

Frontal rainfall



1. **Frontal rainfall** occurs when a warm front meets a cold front. The heavier cold air sinks to the ground and the warm air rises above it.
2. When the warm air rises, it cools.
3. The cooler air condenses and form clouds.
4. The clouds bring heavy rain.

Relief rainfall



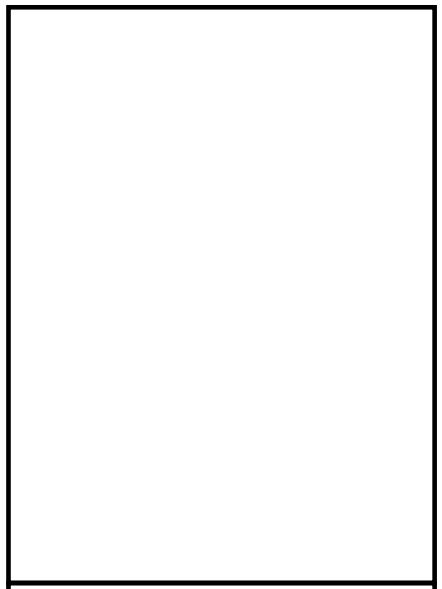
1. **Relief rainfall** occurs when warm moist air from the Atlantic Ocean rises up over mountains.
2. When the warm air rises, it cools and condenses to form clouds, which bring rain.
3. Once the air has passed over the mountains, it descends and warms.
4. This creates drier conditions known as a **rain shadow**.

Task 4: Using the diagrams, draw pictures to match the text on the storyboards on the next few pages.

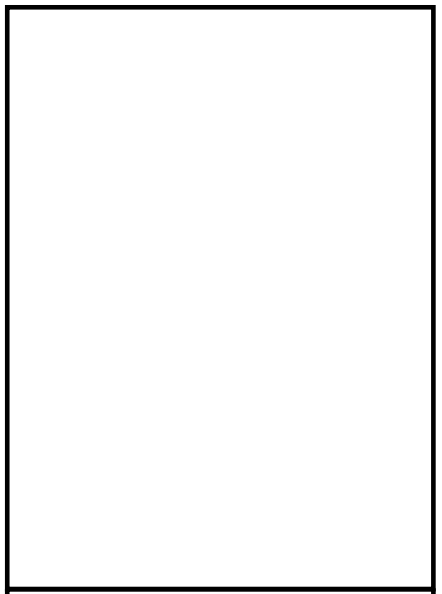
Convectional rainfall

The sun's heat warms the ground and the air above it	This causes the air to rise upwards as it is warm and less dense	As it rises, it begins to cool and condense creating clouds.	Inside the clouds, droplets join together to make large drops that fall as rain.

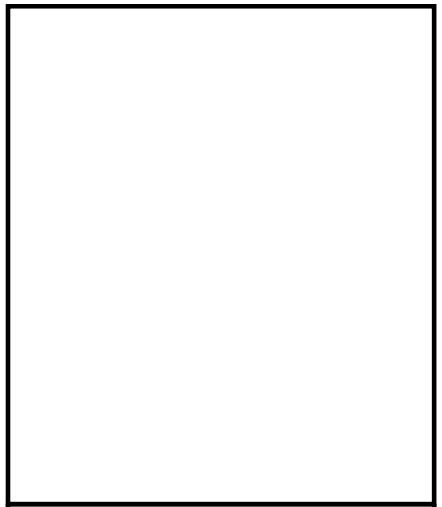
Relief rainfall



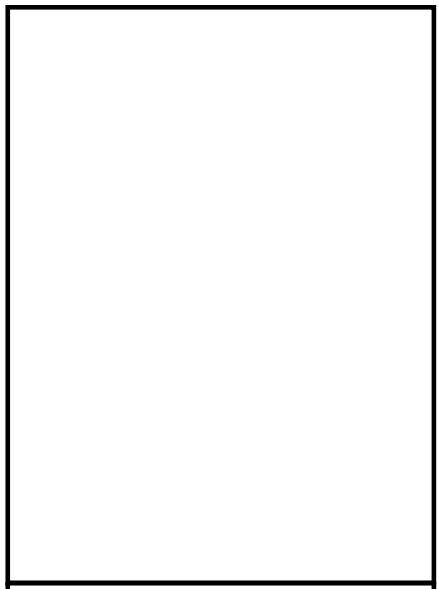
Winds blow warm air containing evaporated moisture.



Air is forced to rise as it meets the high-relief areas causing it to cool and condense.



Cool air can hold less water and we get condensation. This causes water droplets to form and relief rainfall on the west side of the mountain.

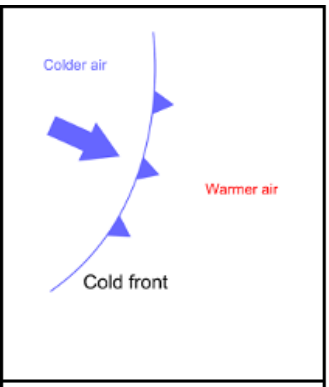


Air descends, warms and produces drier conditions in the east. This is called a rain shadow.

Frontal rainfall

A front is the boundary between two air masses.

Match the boxes to the image. Number 1 is done for you.



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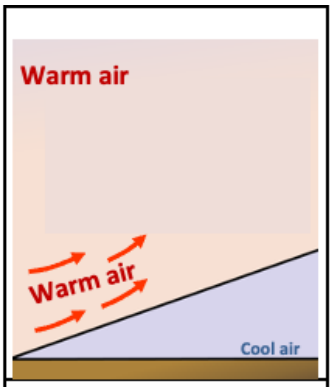

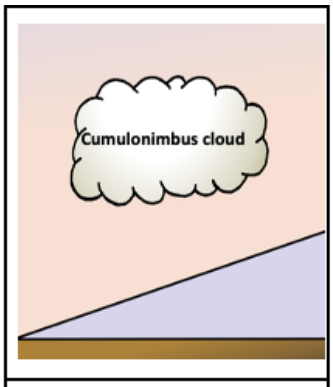

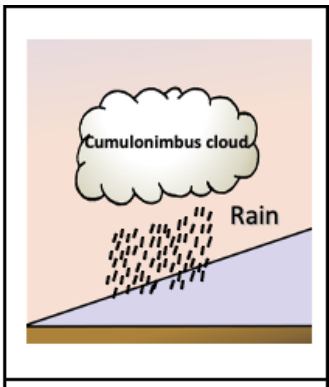

A. As the warm air rises it **cools** and **condenses** creating dark grey cumulonimbus clouds.

C. The cloud releases **FRONTAL** rainfall

B. Warm air (*less* dense) is forced to rise over the cold air (*more* dense)

D. A mass of cold air meets a mass of warm air at a **front** (junction)