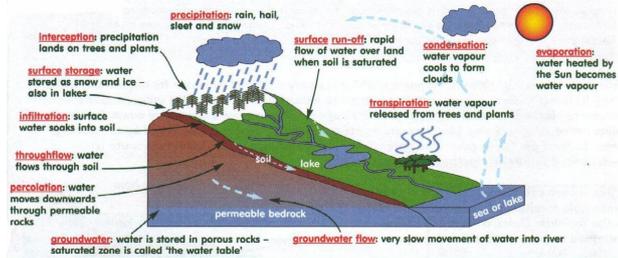


CE 3: WEATHER & CLIMATE (EVERYTHING YOU NEED TO KNOW!)

WEATHER means the atmospheric conditions at a certain place at a certain time

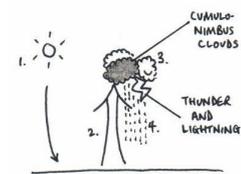
WATER CYCLE is the continuous circling of water between sea/land/atmosphere (CLOSED SYSTEM)



CONVECTIONAL RAINFALL

EQUATORIAL AREAS

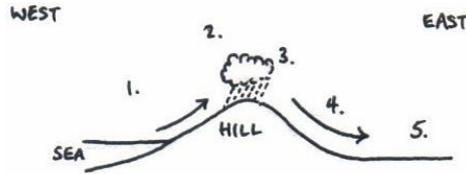
- Sun heats ground
- Warm air rises
- Air cools/WV condenses
- Storm clouds
- Heavy PPT



RELIEF RAINFALL

LAKE DISTRICT/PENNINES

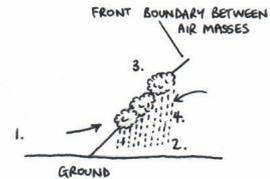
- W.W.W.W. reach mountain - air rises
- Air cools, condenses - clouds form
- PPT on hills/mountains
- Dry air descends, warms up, clouds evaporate
- Rain shadow



FRONTAL RAINFALL

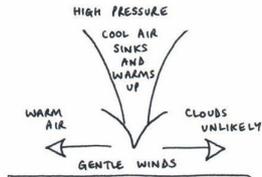
ACROSS GB (LOW PRESSURE SYSTEMS)

- Warm air mass less dense than cool air mass - rises over cool air mass
- Cool air mass undercuts warm
- Air cools/WV condenses - clouds form
- PPT occurs



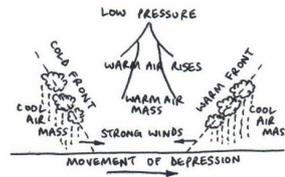
ANTICYCLONES (High Pressure Systems)

Light winds / Sunshine / High temps (in Summer)



DEPRESSIONS (Low Pressure Systems)

Rain / Lower the pressure-faster the winds



CLIMATE is the average weather of a place based on data recorded over a 30-year period

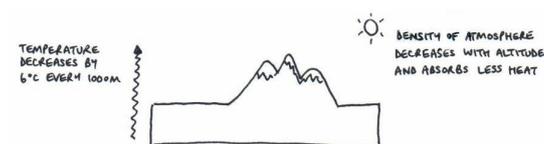
A **MICROCLIMATE** is where there are local differences in climatic features

Factors influencing Climate:

LATITUDE



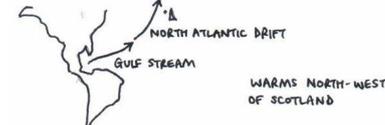
ALTITUDE



DISTANCE FROM SEA



OCEAN CURRENTS



ASPECT the direction a place faces - in GB south-facing places are warmest

PREVAILING WIND most frequent winds affecting an area (influences temp & ppt) e.g. Sea winds bring ppt, Polar winds bring cold weather

Aspect-direction a place faces
In UK south-facing = more sun & higher temps

Ground surface can influence the local climate
Dark surfaces like tarmac warm up faster



Trees provide shade and shelter
Water areas have a cooling effect
Hill tops are usually cool and windy

Buildings can change wind speed/direction-creating areas of calm + areas that are windy
On warm days buildings absorb heat-later give it off
Night-time temps in cities can be 2-3°C warmer

WEATHER WORDS!

Weather means the atmospheric conditions at a certain place at a certain time.

Precipitation any moisture which falls from clouds e.g. Rain, Hail, Sleet and Snow. Measured in mm.
Isohyet lines on a map linking places of equal rainfall

Temperature how hot or cold the air is. Measured with a thermometer and recorded in degrees Centigrade (°C)
Isotherm lines on a map linking places of equal temperature

Air Pressure weight of the atmosphere. Measured with a barometer, recorded in millibars (mb)
Isobar lines on a map linking places of equal pressure
Depression an area of Low Pressure (warm air rising)
Anticyclone an area of High Pressure (cool air sinking)

Wind horizontal movement of air. Wind blows from areas of high pressure to low pressure. Direction measured with a wind vane (described by direction wind is blowing from). Wind speed measured with anemometer - recorded in knots, km/hour and Beaufort scale.

Clouds water droplets or ice crystals held in the atmosphere. Measured by observation - recorded in oktas (eighths of sky).

Front where warm and cold air meet

WATER CYCLE

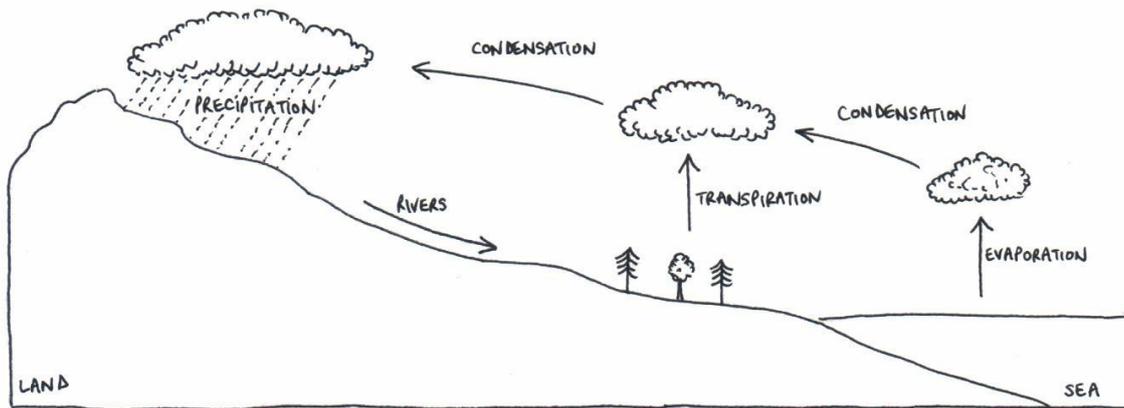
Hydrological (Water) cycle is the continuous circling of water between the sea, atmosphere and land.

- Evaporation water is heated by the atmosphere, becomes vapour and rises
- Transpiration water vapour is released by trees and plants through photosynthesis
- Condensation water vapour cools as it rises and forms clouds
- Precipitation clouds release water as rain, hail, snow and sleet

Rivers collect and transport much of the water back to the sea

This cycle is a closed system, no water is gained or lost.

See diagram below



TYPES OF RAINFALL

Precipitation (moisture that falls from clouds) occurs when water in the atmosphere cools.

1. Water vapour cools until it reaches saturation point, condensation point, or dew-point.
2. The air is saturated at dew-point and water vapour condenses to form the tiny droplets of water which make up the various types of cloud.
3. Within clouds, complex processes occur until the drops are so big they fall as precipitation.

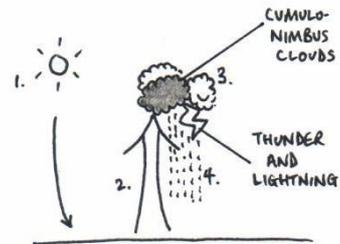
There are 3 main types of Rainfall formation:

CONVECTIONAL RAINFALL

e.g. EQUATORIAL AREAS

(only happens when it is hot)

1. Sun heats ground
2. Warm air rises
3. Air cools and water vapour condenses to form storm clouds
4. Heavy precipitation

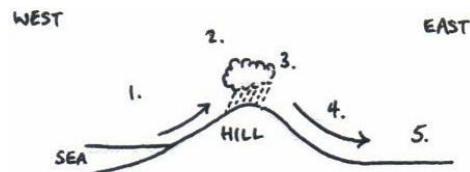


RELIEF RAINFALL

e.g. LAKE DISTRICT/PENNINES (York in Rainshadow)

(happens when moist air rises over hills and mountains)

1. Warm, wet, onshore winds reach a mountain barrier, air is forced to rise
2. Air cools and condenses to form clouds
3. Precipitation occurs on the hills/mountains
4. Dry air descends and warms up - clouds evaporate
5. Rain shadow - air is dry so very little rain falls

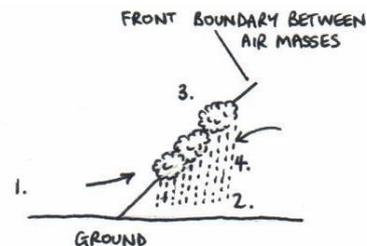


FRONTAL RAINFALL

e.g. ACROSS GB IN 'LOW PRESSURE SYSTEMS'

(happens when warm air and cool air meet)

1. Warm air mass is less dense than cool air - rises over cool air mass
2. Cool air mass undercuts warm air mass
3. Air cools and water vapour condenses to form clouds
4. Precipitation occurs



ANTICYCLONES and DEPRESSIONS

Weather components interact to produce weather systems called anticyclones and depressions.

ANTICYCLONES

Anticyclones are cool, dry air masses

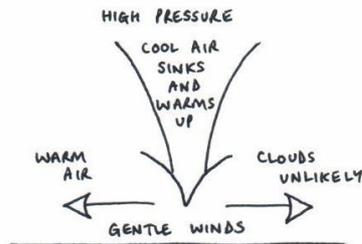
Because the air is cool, it slowly sinks creating high pressure.

Air sinks - as it sinks it warms - warm air holds more water vapour - clouds unlikely to form.

Summer Anticyclones - light winds, sunshine and high temperatures.

Winter Anticyclones - light winds, sunshine, low temperatures and frost.

Winds blow clockwise in Northern Hemisphere (anticlockwise in Southern).



DEPRESSIONS

Depressions are areas of low pressure formed when a warm air mass and cool air mass meet.

Warm air rises over cool air to form a warm front.

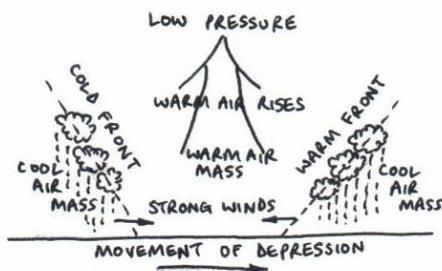
Cool air undercuts warm air from behind to form a cold front.

Warm air rises along both fronts, cools, condenses and forms rain.

An occluded front is formed when warm air is completely undercut by the cool air.

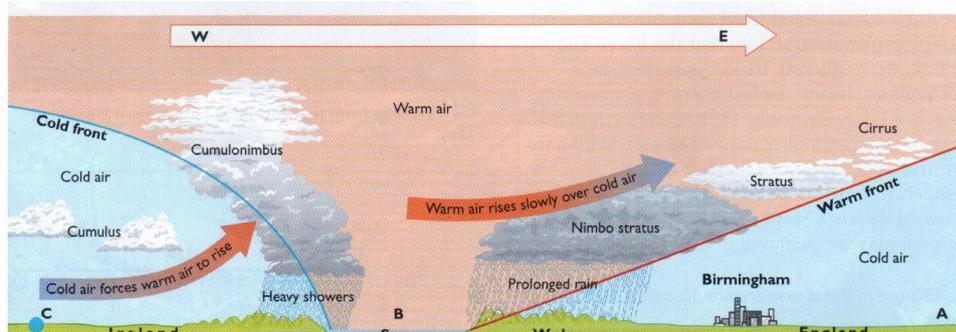
Air rises at the centre of a depression and draws in anticlockwise winds (in Northern Hemisphere).

The lower the air pressure, the faster the winds.



LOWS BRING A DEFINITE SERIES OF WEATHER CONDITIONS

1. As a low approaches, it starts to drizzle and then rains more heavily as the warm front approaches.
2. When the warm front passes, the rain stops, the weather becomes brighter, the clouds disappear and the temperature rises, due to being in the warm sector. The cold air behind the cold front moves faster than the warm air, and often overtakes and undercuts the warm sector, giving an occluded front - no warm sector but a longer period of continuous rainfall.
3. About 12 hours on, it gets windier and colder and clouds build up as the cold front moves in.
4. Heavy rain starts to fall and there's cold, and windy weather for the next few hours.
5. After the rain, conditions may settle for a short while before the next low or high-as the cold front passes the wind changes direction (veers) from warm southerly to cool north-westerly.

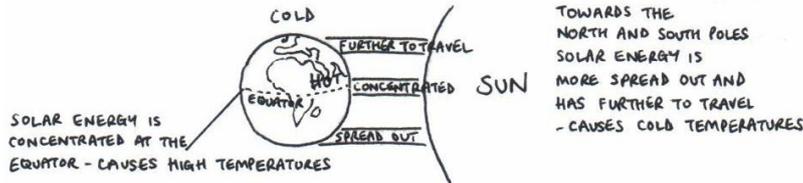


FACTORS AFFECTING CLIMATE

Climate is the average weather of a place based on data recorded over a 30-year period.

LATITUDE

is how far north or south a place is from the equator - a major influence on temperature and precipitation.



ALTITUDE

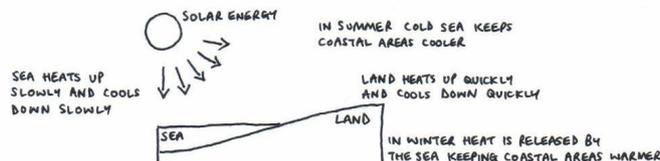
is the height above sea level - the higher a place is the colder and wetter it will be.



DISTANCE FROM SEA

Places that are influenced by sea temperatures have a maritime climate - wet with a small temperature range.

Places inland that are not influenced by sea temperatures have a continental climate - dry with a large temperature range.



PREVAILING WIND

are the most frequent winds affecting an area - they influence temperature and precipitation.

Sea Winds bring precipitation

Land Winds bring dry weather

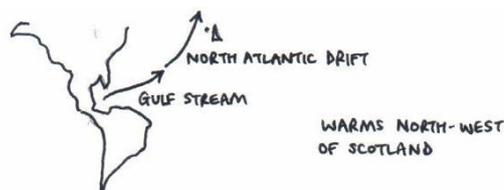
Polar Winds bring cold weather

Tropical Winds bring warm/wet weather and precipitation

OCEAN CURRENTS

Warm Ocean Currents flowing from the tropics towards the poles warm the surrounding area, especially in winter (see below)

Cold Ocean Currents usually have less effect, but may lower temperatures and cause fog.



ASPECT

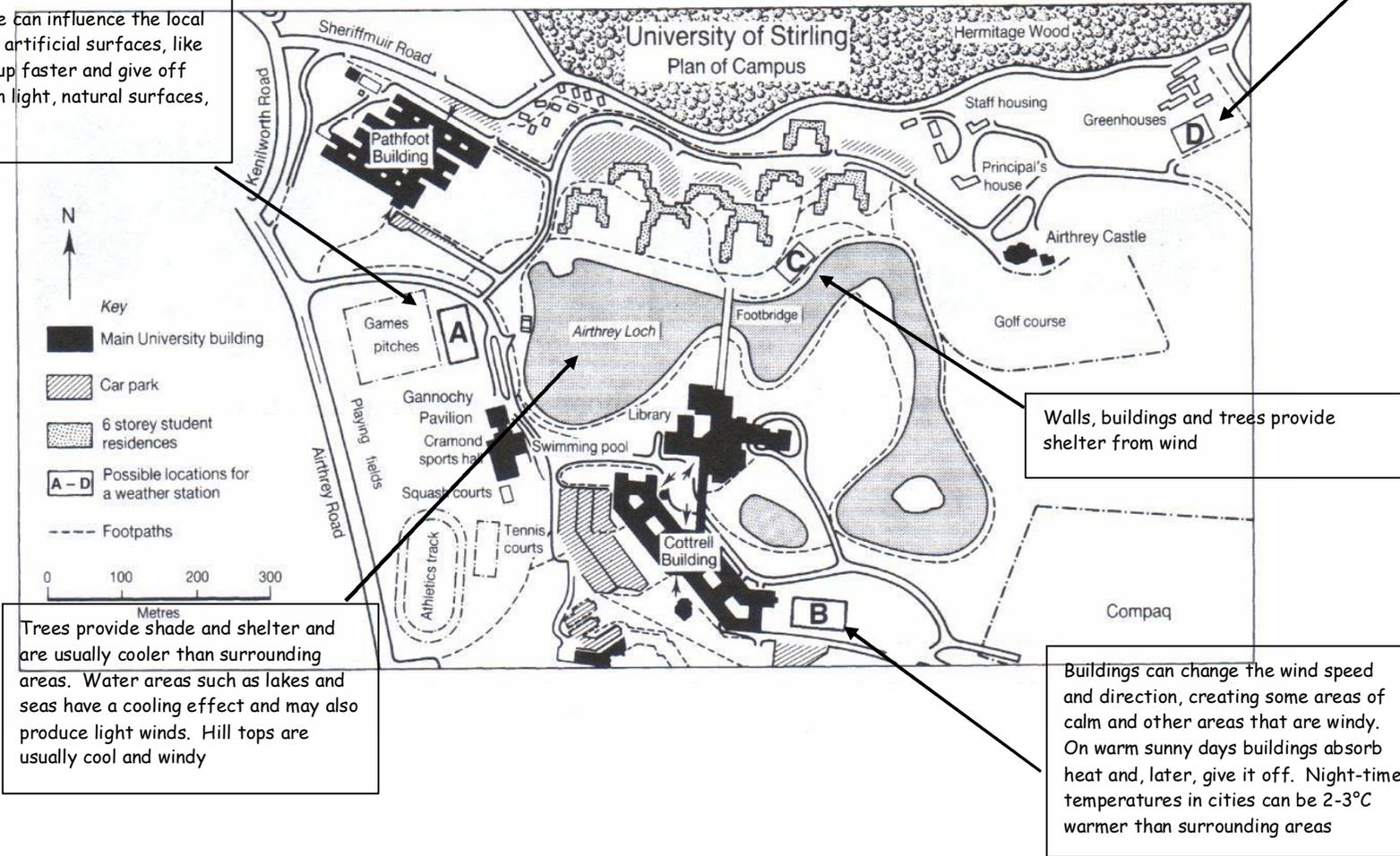
is the direction a place faces. On a local scale aspect is very important. In the British Isles south facing places are warmer than north and east facing places.

MICROCLIMATES

A Microclimate is where there are local differences in climatic features

Aspect is the direction in which a place faces. Places that face the sun are warmer than those in shadow. In the UK places with a south-facing aspect get more sun and higher temperatures

Ground surface can influence the local climate. Dark, artificial surfaces, like tarmac, warm up faster and give off more heat than light, natural surfaces, like grass



Trees provide shade and shelter and are usually cooler than surrounding areas. Water areas such as lakes and seas have a cooling effect and may also produce light winds. Hill tops are usually cool and windy

Buildings can change the wind speed and direction, creating some areas of calm and other areas that are windy. On warm sunny days buildings absorb heat and, later, give it off. Night-time temperatures in cities can be 2-3°C warmer than surrounding areas