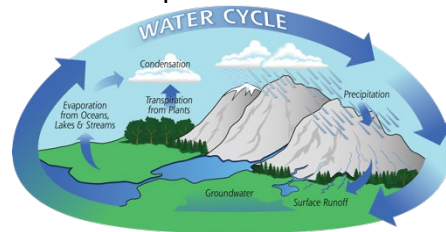


# Rivers Knowledge Organiser

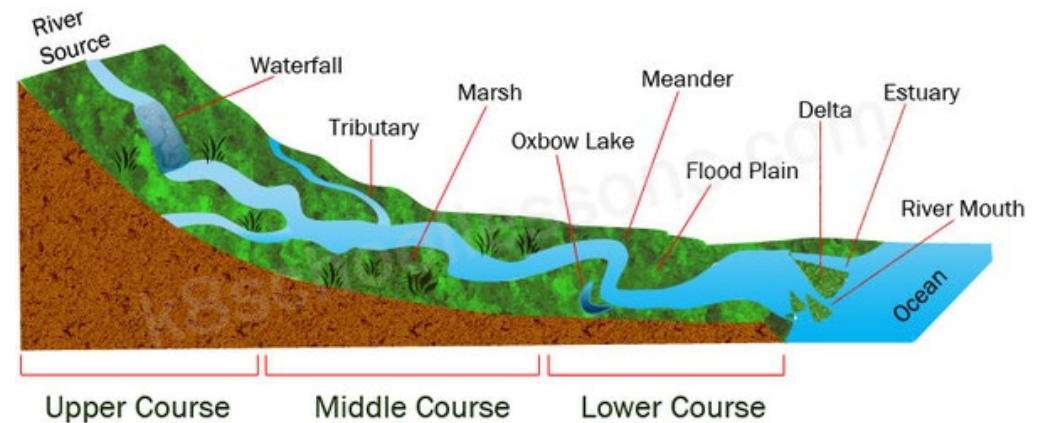
## Water cycle

- The water cycle is powered by changes in temperature from the sun, and fuels our entire planet
- The water cycle is made up of three main processes – evaporation, condensation, and precipitation
- **Evaporation** happens when the heat from the sun warms surface water – in the form of lakes, rivers, oceans, and runoff from rain – and turns it into water vapour
- **Transpiration** is when water inside plants is turned into water vapour through the same process
- **Condensation** is when the water vapour begins to cool as it rises. As this happens, tiny water droplets come together to form clouds
- **Precipitation** is the rain, snow, sleet, or hail that falls when these water droplets cool enough to turn back into a liquid or a solid
- Water then returns to the ocean as **throughflow** (water that has absorbed into and moves through the soil), **groundwater flow** (water that has soaked below the soil and deep into the earth), or **surface runoff** (water that runs over the top of soil and rocks).



## River features

- Source** – the place where a river begins, usually a marsh or bog
- Marsh** – an area that floods frequently, where the land is usually wet
- Tributary** – small rivers that join a larger river
- Confluence** – the point at which two rivers meet
- Floodplain** – the land where a river floods
- Mouth** – the point where a river meets the sea
- Estuary** – a point at the mouth of a river where it meets the tide from the ocean/ sea and the freshwater and saltwater mix



## River processes

### Erosion

- **Hydraulic action** – as water rushes by, it forces air into cracks in the rock, which continue to widen and break
- **Abrasion** – sand and rock are thrown against the riverbed and banks, wearing them away like sandpaper
- **Attrition** – pieces of rock are thrown against each other, causing sharp edges to break off and eventually becoming smaller and rounder
- **Corrosion** – weak acids in the water break down the rock in the riverbed and banks

### Transportation

- **Traction** – large stones are rolled along the riverbed
- **Saltation** – smaller stones bounce along the riverbed over one another
- **Suspension** – small particles of rock, dirt, and plants float in the water of a river, making it look cloudy
- **Solution** – particles of rock and chemicals are dissolved and carried along in the water unseen

### Deposition

- Rivers **deposit** (drop) eroded material as they lose speed when:
- the river becomes shallower
  - the amount of water is reduced
  - the amount of material being carried increases
  - the river reaches its mouth
- They do this because they no longer have the **energy** to carry it.

# Rivers Knowledge Organiser

## River landforms

### Upper course

**V-shaped valleys** – steep valleys that are formed as the river erodes the land it passes over; they are v-shaped because the land

**Waterfalls** – steep drops formed by uneven rates of erosion as rivers pass over differing bands of hard and soft rock

### Middle course

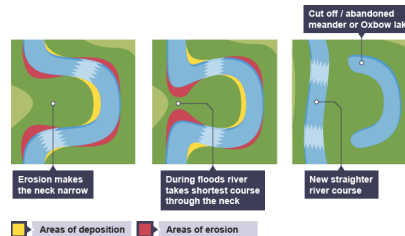
**Meanders** – bends in the river that are made more extreme as water flows more forcefully around the outside bend, eroding the riverbank further there and leading to deposition around the inside bend

**Ox-bow lakes** – when a meander bends so much that the river takes a short cut and leaves part of the meander cut off from the rest of the river

**Levees** – steep banks built up along a river intentionally or as a result of material being deposited on the banks during flooding

### Lower course

**Deltas** – material that is deposited and builds up at the mouth of a river



## Factors affecting flooding

### Natural

**Heavy rain** – when it rains very heavily the water doesn't have time to soak into the soil, so it runs over the ground, causing flooding

**Soggy soil** – when soil is already holding a lot of water, it can't absorb any more

**Tributaries** – the more a river has, the higher the risk of flooding due to all the extra water

**Steep slopes** – water flows faster down steep slopes, meaning it doesn't have time to soak into the soil

**Impermeable rock** – some areas have **impermeable** rock (water cannot pass through) just below the soil, so water can't soak down

### Human

**Deforestation** – leaves can catch rainwater (called **interception**) and tree roots take up a lot of water from soil; when there aren't any trees in an area this cannot happen

**Built-up areas** – rain can't soak through concrete, so it is carried away by drains and quickly returns to the river; if drains are blocked street can flood quickly even if they are not near a river

## River management

Rivers are constantly changing. For humans to live near and utilize rivers they must be managed. Ways of managing rivers can use **hard engineering** (using man-made structures) or **soft engineering** (using parts of the environment in a more natural approach).

### Hard engineering

- Dams
- River barriers
- Levees/ embankments
- Overflow channels

### Soft engineering

- Afforestation (planting trees)
- Dredging
- Managed flooding

## Case Study: Flood management on The River Thames

Almost every year, there is flooding somewhere along the River Thames. The source of this river is in the Cotswolds, and it runs 346km to its mouth at Southend-on-Sea where it meets the North Sea. As it passes through London the flooding is managed by long and short term solutions as outlined below.

### Short Term Solutions

- **Put up portable flood barriers:** These are temporary due to flood warnings and stored when not needed. The Thames Barrier is permanent barrier which raise when the risk for flooding London is high.
- **Put anti-flood shutters on homes:** Metal shutters to stop water entering buildings through the windows and doors.

### Long Term Solutions

- **Build Embankments (high banks):** The Thames embankments were underground sewage systems and tube lines, but they are now used for flood protection.
- **Dig new river channels:** These divert water from the Thames.
- **Let nature help:** Use flood plains, Plant trees and do not build on flood risk areas.

# Weather Knowledge Organiser

## Weather & Climate

**Weather:** describes the **current condition** of the atmosphere.

*e.g. the weather today in London is sunny and warm.*

**Climate:** means the **average weather** conditions in a particular location.

*e.g. the Mediterranean has warm, wet winters and hot dry summers*

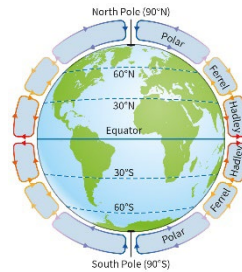
## How is heat carried around the Earth?

Global Atmospheric Circulation – air does not flow straight from the Equator to the cold poles. It circulates in bands called cells that curve around the Earth:

**Hadley** – warm air rises and cools around the Equator.

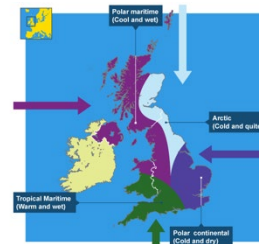
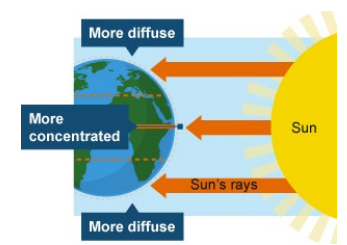
**Polar** – cold air sinks at the poles – pushing surface air towards the Equator to warm.

**Ferrel** – mixing cells – warm air and cold air get whisked together by **depressions**.



## Factors affecting the climate:

**Latitude** - Locations that are further north receive less concentrated energy from the Sun. The equator lies directly underneath the Sun and so countries that fall on the equator receive the strongest solar energy.



**Air masses** - A large body of air with similar characteristics is called an air mass. The temperature of the air and the amount of rainfall partly depend on where the air has come from. Looking at where the air has come from helps to explain the characteristics of the weather.

## What Causes Cloud and Rain – the Water cycle

The water cycle is powered by changes in temperature from the sun and fuels our entire planet. It is made up of three main processes – evaporation, condensation, and precipitation:

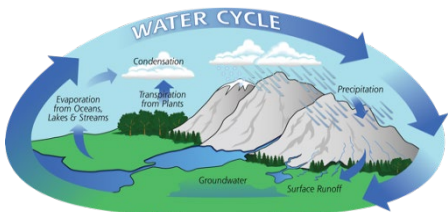
**Evaporation** happens when heat from the sun warms surface water – in the form of lakes, rivers, oceans, and runoff from rain – and turns it into **water vapour**.

**Transpiration** is when water inside plants is turned into water vapour.

**Condensation** is when the water vapour begins to cool as it rises. As this happens, tiny water droplets come together to **form clouds**.

**Precipitation** is the **rain, snow, sleet, or hail** that falls when these water droplets cool enough to turn back into a liquid or a solid

Water then returns to the ocean as **throughflow** (water that has absorbed into and moves through the soil), **groundwater flow** (water that has soaked below the soil and deep into the earth), or **surface runoff** (water that runs over the top of soil and rocks).



**Altitude** - Temperatures decrease with altitude. There is a 1°C drop in temperature for every increase of 100 m in height. This is because the air is less dense in higher altitudes.

**Distance from the sea** - Coastal areas are most affected by the sea. The sea takes longer to heat up and cool down than land. So, in the winter the sea keeps coastal areas warm and in summer, it cools them down.

**Ocean currents** - The effect that **ocean currents** have on the temperature depends on whether the ocean current is hot or cold.

Britain is on the same latitude as Siberia and parts of Russia, yet it does not suffer the same long, harsh winters. Britain's mild climate is partly due to the Gulf Stream, a large Atlantic Ocean current of warm water from the Gulf of Mexico.

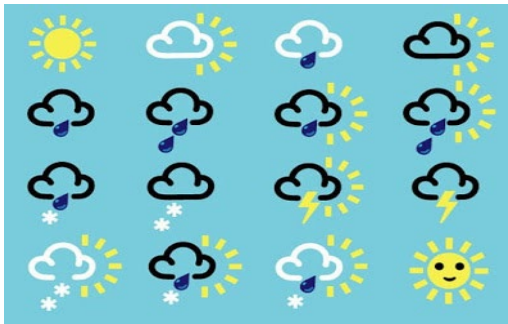


# Weather Knowledge Organiser

## Weather symbols

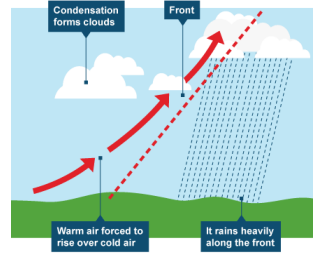
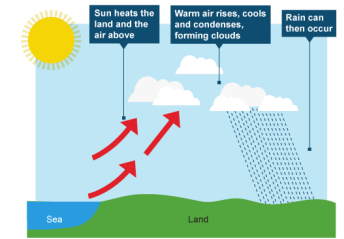
**Meteorologists** measure weather conditions in different places and use this information to report and make forecasts about future weather conditions. This is useful because people can be warned about hazardous weather conditions such as storms and floods.

Weather forecasts use symbols to show what the weather is like in certain areas across the country.



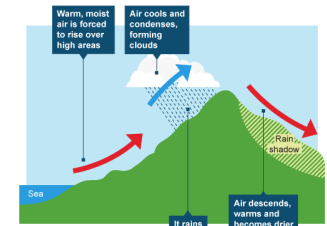
## Types of rain

**Convictional rainfall** – when the land warms up, it heats the air above it. This causes the air to expand and rise. As the air rises, it cools and condenses. If this continues, clouds will form & rain will fall.



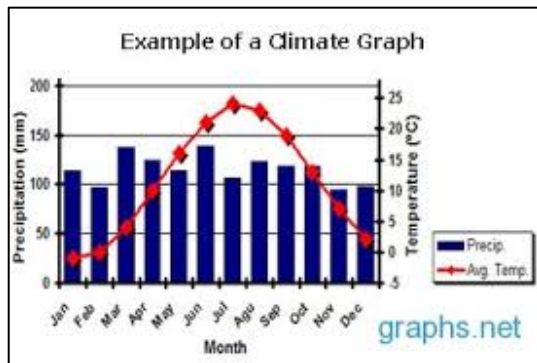
**Frontal rain** - When a cold polar air mass meets a warm tropical air mass they do not mix - they form fronts. The colder air mass is heavier than the warmer air mass, therefore the lighter, warmer air rises over the top of the heavier, colder air. As the warm air is forced to rise it cools. Also, the warm air is in contact with the cold air along the fronts, and this also cools. Condensation occurs and clouds form. Rain occurs along the front.

**Relief rainfall** - Prevailing winds bring warm, moist air to the western British Isles. Air is forced to rise over high areas. As air rises, it cools and condenses. Clouds form and it rains. Air descends on the other side of the mountains. This air is dry and a rain shadow is created this side of the mountains.



## Climate graphs

Climate graphs show the average **temperature** and **precipitation** (rainfall) in a place/country over a year.



**Temperature = line graph**

**Precipitation = bar graph**

## Depressions and anticyclones

**Air Pressure** – is the force of the air pressing down on us due to the weight of the atmosphere. When air is rising, air pressure falls and when this air is sinking air pressure rises. This can impact our weather.

**Depressions** – are areas of **low pressure**. Their main features are – rising air so clouds form, **unsettled weather**, strong winds (blowing anticlockwise), precipitation and storms.

**Anticyclones** – are areas of high pressure. Their main features are sinking air so few clouds, fine settled weather, light winds (blowing clockwise), lasts several days, **summers** – hot and sunny (heatwave conditions), winters – clear skies, very cold, frost and fog – no precipitation.

