

Knowledge Organiser: What is weather and climate?

What is weather?

Weather is the state of the atmosphere at a particular place and time referring to precipitation, temperature, wind, humidity, sunshine and air pressure.

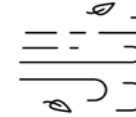
Elements of Weather and how we measure them



Precipitation: measured in mm by a rain gauge.



Temperature: measured by a thermometer in °C



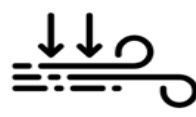
Wind
Speed/Direction: measured by an anemometer or vane – measured in knots/compass points.



Humidity – amount of water vapor in air.



Sunshine: measured by a Campbell Stokes Sunshine Recorder



Air Pressure: Measured by a barometer in millibars

How does weather impact us?

The weather has a direct impact on humans. This can be positive, such as more plant growth, increased sales and tourism, more energy production or water supply. But there can also be negative impacts such as travel disruption, medical issues and damage to land and crops. Areas impacted by weather are:

Health /Agriculture (Farming) /Transport /Retail (Shopping)/Tourism/Energy Supply and Water Supply.

Low and High Air Pressure

The earth surface is not heated by the sun equally, as a result there are parts of the earth that are warmer than others. The earth's surface warms the air above it. The temperature of the air changes the pressure (or weight).

Low pressure produces unsettled weather (rain and clouds)

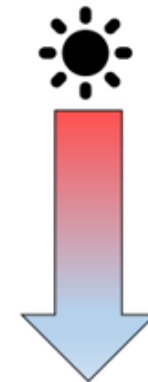
Warmer air is less dense and able to hold more water vapour.



LOW AIR PRESSURE (less than 1016mb)
Warm air near the ground is rising.

High pressure produces stable weather (sunshine and clear skies)

The cooler the air the denser it is and the less it can hold water vapour.



HIGH AIR PRESSURE (more than 1016mb)
Colder air high up in the troposphere is sinking towards the ground.

Scan the QR to read more about factors affecting global temperatures



Air Masses – large volumes of air that have the same temperature and moisture. Low wind means the air will take on the characteristics of the land they are over.

The UK is affected by 5 different air masses.

Scan the QR Code to do some reading on the types of air masses.



How do clouds form?

Warm air containing water vapour rises, expanding and cools as it rises. This causes condensation of the vapour into droplets which join together to form clouds. Eventually the rising air can no longer support the weight of the water droplets so they fall as precipitation.



Scan the QR Code to understand the different cloud types.

Mid-Latitude (such as the UK) weather systems.

Features of a depression: a low pressure weather system that forms when a warm air mass meets a cold air mass creating a front.

When they meet the warm air rises above the cold are and condenses to form rain.

Depressions can take up to 3 days to pass over an area and move anti-clockwise.

They bring wet and windy weather.

Anticyclones – when cooler air descends to the ground to form high pressure.

Light winds blow away from air pressure (wind blows from high to low!)

As the air is sinking, there is no condensation or cloud formation so clear conditions.



If the air mass has come over land it will be dry, if it has come over sea it will be wet. Air from the tropics is warm whilst air from the poles is cold.

Air Masses	Weather it brings
Arctic Maritime (mA)	Very cold
Polar Maritime (mP)	Cold and Wet
Polar Continental (cP)	Cold and Dry
Tropical Continental (cT)	Warm and Dry
Tropical Maritime (mT)	Warm and Wet

Types of Rainfall



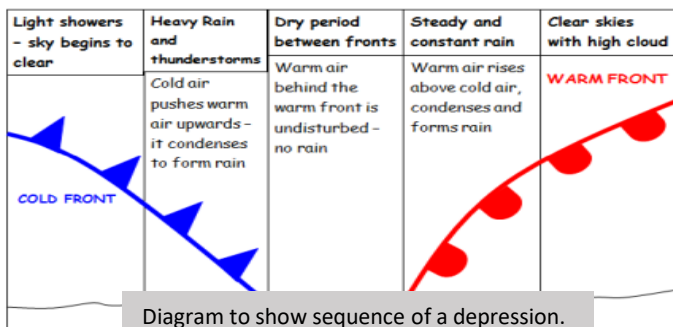
Relief Rainfall – when mountains forces warm air to rise forming clouds and rain.



Convectional Rainfall – when the sun heats the land causing warm air to rise and form clouds and rain.



Frontal Rainfall – when warm air meets cold air and the warm air is forced to rise, forming clouds and rain.



Anticyclones in winter: clear sunny weather, but low sun and short days mean temperatures are cold. Nights are extremely cold due to lack of cloud cover which leads to **fog** and **frost** the next day.

Anticyclones in summer: This brings the best UK summer weather which hot days, clear blue skies, no rain and light winds. Prolonged anticyclones lead to heatwaves in the UK.

CLIMATE is the average state of the atmosphere over 30 years.

CLIMATE CHANGE is the changing average state of the atmosphere over time. This can be due to natural or human causes.

GLOBAL WARMING is the increase in global temperatures linked to the increase concentration of greenhouse gases caused by human activity since the Industrial Revolution.

Human Causes of climate change – human activity increases the amount of greenhouse gases in the atmosphere. This leads to the **enhanced green house effect** where greenhouse gases trap in the earths heat causing it to warm further.

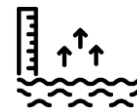
Human activity which emits greenhouse gases includes, deforestation, burning of fossil fuels in factories and transport, disposing of rubbish, spraying crops with fertiliser and grazing cattle for food.



Global Warming impacts on Weather.

Globally there will be a rise of extreme weather, more rainfall, flooding, heat waves, drought and potentially more hurricanes. This leads to water shortages and food price rises. Sea levels will also rise putting millions of people at risk.

In the UK extreme weather will become more common, but we will also be able to grow more crops.



KEY VOCABULARY

Air Pressure	The force or weight of the air above us.	Precipitation	Water droplets in clouds that become too heavy and fall as rain, snow, sleet or hail.
Enhanced Greenhouse Effect	The retaining of heat within the earth's atmosphere as a result of increased greenhouse emissions.	Temperature	How hot or cold the air is.
Front	The boundary between two air masses.	Water Vapour	Water held in the air as gas.
Humidity	The amount of water vapour in the air.	Wind	The motion/movement of air between places of different air pressure.



Natural Causes of climate change – these increase or decrease the amount of solar energy that reaches the earth.

This includes volcanic eruptions, orbital changes and solar output (flares).

Additional Reading QR codes:

Interactive tool to see how climate change will effect where you live.



Guide to what is being done to combat climate change.



Guide to COP26 – Global Climate Change Conference

