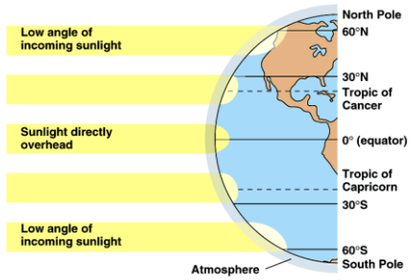
Year 8 Geography: Weather and Climate

Week 1

There are 4 main factors which affect weather and climate

1. **Latitude** (how far north or south of the equator a place is): The **higher the latitude**, the **colder** it gets. As the sun is at a lower angle in the sky, meaning its heat energy is spread over more of the Earth's surface. Southern parts of the UK are warmer than northern parts because they are at a lower latitude.



2. **Winds:** In the UK the wind direction mainly comes from the south-west, this brings warm, moist air which makes the UK warm and wet. The UK would be much colder if the wind direction did not come from the south.
3. **Distance from the sea:** Areas **near the sea** are **warmer** than inland places during the **winter**, because the sea stores up heat, and any wind that blows across it will warm the land. However, areas near the sea are **cooler** in the **summer,** because the sea takes a long time to heat up; so, wind that blows across the sea in the summer cools the land at the coast.
4. **Altitude:** (how high the land is): The **higher up** you are the **colder** it gets because the air is thinner, so less heat energy is trapped. Also, higher areas get more rainfall as air is forced upwards and the water vapour condenses into rain clouds.

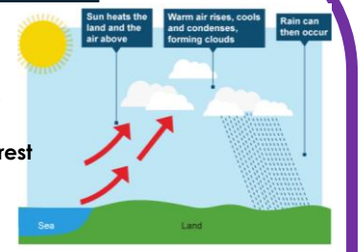
Local factors affect the weather too:

1. **Urban areas** are normally **warmer** than rural areas as concrete absorbs heat in the summer and buildings give off heat in the winter. On average urban areas are 2-3 degrees warmer than rural areas.

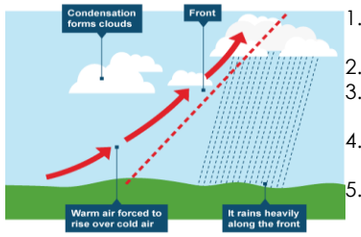
Week 2

Convectional rainfall

1. The **sun heats** the land and the air above.
2. The **warm air rises**.
3. It **cools** and **condenses** forming clouds.
4. When the clouds become **cold** enough, it begins to **rain**.
5. This kind of rainfall is common in the **rainforest** where the sun is always overhead. In the summer in the UK this process is often associated with thunderstorms.



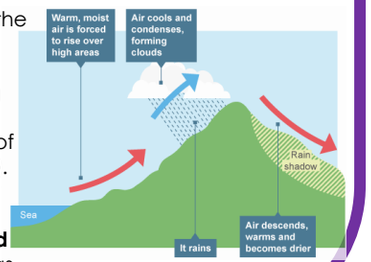
Frontal rainfall



1. This happens when a **cold front** (cold air) meets a **warm front** (warm air).
2. The **cold air** is **denser** than the warm air.
3. This means that the **warmer air** is forced to **rise** above the colder air.
4. As it rises it **cools** and **condenses** forming clouds along the frontal system.
5. Eventually this produces rainfall. In winter this is the cause of heavy snow in the UK.

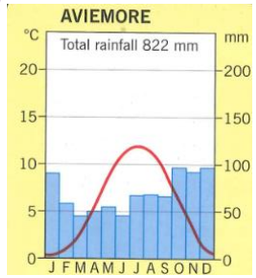
Relief Rainfall

1. **Air** has blown **across the sea, a**s it meets the coast it is **forced to rise** due to the mountains/rising relief of land.
2. As it rises, it **cools** and **condenses** forming clouds.
3. This causes **rainfall** on the **windward side** of the hill (the side where the air was blown).
4. As the air reaches the other side it sinks, it has no moisture left, so no rain falls.
5. This creates a **rain shadow** on the **leeward side**, this can result in desert areas, such as Death Valley in the USA.

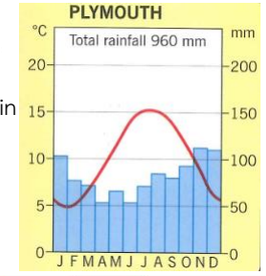


Week 3

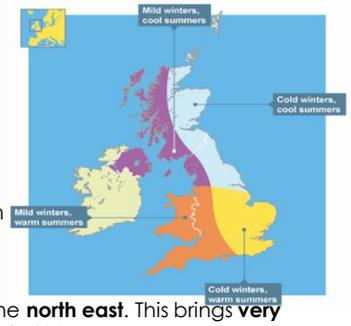
Climate Graphs



Climate graphs are two graphs layered on top of each other: they show annual rainfall by month in mm using the blue bar graph and the average temperature (degrees Celsius) in each month using the red line graph.



The UK is affected by 4 air masses.



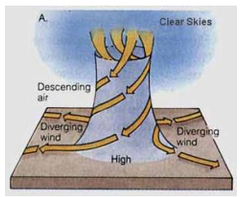
1. **Tropical maritime** (orange area) affects the **south west** bringing **wet weather** as it has travelled across the Atlantic. **Mild summers** (due to the impact of the sea) and **mild winters.**
2. **Tropical continental** (yellow area) affects the **south east**. The air has blown across Europe, bringing **very warm summers**, but **cold winters** (as the land cools down quickly). **Little rain** occurs.
3. **Polar continental** (light blue) affects the **north east**. This brings **very cold winters** and **cool summers,** as the wind blows across northern Europe. **Little rainfall** occurs.
4. **Polar maritime** (purple) affects the **north west**. This brings **cool summers** and **milder winters** (due to the slow cooling effect of the sea). **Rainfall** is common as the air has blown across the North Atlantic.

Week 4

High Pressure

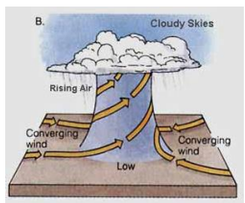
Cause

1. These form as **air sinks**.
2. Falling air gets **warmer** so **no clouds** form.
3. This creates **high pressure**.
4. Light winds blow outwards from the area of sinking air.



- Sunny weather means **more day trips**, this is a **boost to the economy** as people spend more, for example shops at the seaside.
- **Good** for those growing plants and for **farmers**.
- Increase in summer **clothing sales**, shops make more money.
- Could lead to **drought**, which leads to **hose pipe bans** and crop failure.
- **Heat stroke**, especially in the elderly.
- In some places it could lead to **forest fires.**
- **Icy roads** in the **winter**, can lead to accidents.

Low Pressure



Cause

1. They happen where a **cold** and **warm front meet** (see frontal rainfall).
2. As the warm air rises above the cold air, **low pressure** forms **below** the air.
3. **Air rushes** into the **low-pressure zone** causing high winds.

- The heavy rainfall can **replenish the reservoirs** and is a key factor as to why droughts are rare in the UK.
- Can be beneficial for some activities such as **fishing**, **surfing** etc.
- All the UK's big **storms** are caused by these systems, such as storm Doris, Caroline and Desmond.
- **Damage to property** due to high winds.
- **Fallen trees** block roads.
- Flooding, high bridges closed, **disrupts travel**.
- Can lead to a **decline in business** during **summer**.

Week 5

Case Study: Hurricane Katrina

Hurricane Katrina hit New Orleans in **Louisiana** on the **29th August 2005**. New Orleans is **2m below sea level** and is protected by a **levee system**.

Cause

- The **ocean** gets to **26.5 degrees**.
- Where the ocean is **60m deep** or more, **rapid evaporation** begins.
- This air rises, **cools** and **condenses** and forms a **tropical depression**.
- Below the tropical depression **low pressure** forms.
- The **Coriolis effect** causes the tropical depression to spin.
- **Air rushes** in to fill the area of **low pressure**.
- This causes the cloud mass to **spin** and leads to high winds.
- Once the wind speeds get to **75mp/h** or more, a tropical storm is born.
- The low pressure and wind **draw the ocean up** causing a **storm surge**.
- Hurricane Katrina started over the **Atlantic Ocean** in early August 2005. However, it became a **category 5** storm over the very warm waters of the **Gulf of Mexico**.

Effect

- **1836 dead,** many died due to drowning in the storm surge.
- The **levees broke** in 53 different places causing the city to flood, in some places up to 3m deep.
- **10,000 homeless** as homes were destroyed by the 200km/h winds, destroying many homes in the Lower Ninth Ward.
- **Looting** took place in the **French Quarter** as there was a lack of police to control the city.

Response

- In the run up to the event, **evacuation** took place, however there was not enough fuel for everyone to leave.
- **10,000 people** made their way to the **Superdome** to stay in a safe and sturdy building.
- After the event, aid e.g. water, was slow to get to those left behind but it did make it eventually.
- **$105 billion spent** on repairing damaged buildings to get businesses and homes back to normal.

Week 6:

Revision and assessment

- Students will be provided with revision materials and assessed on a piece of extended writing.

Key words:

1. **Weather** – Describes the day-to-day conditions of the atmosphere. Weather can change quickly.
2. **Climate -** Describes average weather conditions over longer periods and over large areas.
3. **Precipitation** - Any form of water, liquid or solid, falling from the sky.
4. **Humidity** – The amount of moisture in the air.
5. **Air pressure** – The force exerted onto the Earth's surface by the weight of the air.
6. **Latitude:** Higher latitudes are colder. Lower latitudes (nearer the equator) are hotter
7. **Altitude**: Height above sea level: Higher areas get more rainfall and are colder than low land.
8. **Urban Areas:** Cities/built up areas: Can be 2.2°C warmer than the surrounding rural areas.
9. **High Pressure Systems:** Areas where air is sinking, this air has little moisture.
10. **Low Pressure Systems:** Air is rising, it cools and condenses causing high levels of precipitation.

Year 8 Geography: Weather and Climate

Week 1

Questions	Answers
Define weather.	Weather is the day-to-day conditions experienced in an area; they can be described as sunny, rainy, windy.
Define climate.	Climate is the average weather conditions of a larger area of a longer period of time, e.g. temperate or polar climate.
What are the four factors that affect weather and climate?	The four factors affecting weather and climate are; latitude, winds, distance from the sea and altitude.
Why are urban areas generally warmer than surrounding rural areas?	Urban areas generally have more heat absorbing concrete which will hold heat for longer and buildings are often heated, additionally increasing temperatures.
How dangerous can weather and climate be?	Weather and climate can be dangerous in its unpredictability. Although there are general patterns in climate, any changes to them can have huge effects on both humans and the environment.

Week 2

Questions	Answers
Why does water vapour condense at higher altitudes?	The water vapour in the air condenses as it is pushed up to higher altitudes because the temperature drops as altitude increases.
Which type of rainfall is responsible for heavy snow in the UK?	In winter, frontal rainfall is responsible for heavy snowfall in the UK.
What causes warm, moist air to rise?	The sun's heat evaporates water and causes the warm air to rise.
Which side of a hill/mountain does rain fall in relief rainfall?	Rain falls on the windward side of a hill/mountain in relief rainfall because the wind forces the air up this side and it condenses here forming clouds.
How dangerous can weather and climate be?	Heavy and prolonged rainfall can put areas at risk of flooding which can threaten life and property.

Week 3

Questions	Answers
What do climate graphs show?	Climate graphs are a bar graph, and a line graph layered on each other. The blue bars show rainfall, and the red line shows temperature.
What unit of measurements are used for rainfall and temperature?	Rainfall is measured in millimetres (mm) and temperature is measured in degrees Celsius (°C).
What are the 4 air masses that affect the UK?	The 4 air masses that affect the UK are; Tropical maritime, tropical continental, polar maritime and polar continental.
Why does southern England generally have warmer summers?	Southern England generally has a warmer climate as it is shielded from both polar air masses that decrease the temperature in the north.
How dangerous can weather and climate be?	The polar air masses can bring with them icy conditions which cause potential risks to people.

Week 4

Questions	Answers
During periods of high pressure, what would the weather look like?	In periods of high pressure, there will be cloudless skies and no rain. This is because the air is falling and will not condense.
Define drought.	Droughts are long periods with a lack of rainfall. They can negatively affect the environment and cause water shortages. In the UK, droughts sometimes occur in the summer and hosepipe bans are enforced.
Name one benefit of low pressure systems.	Low pressure systems often cause rain which can replenish water supplies.
What pressure systems create storms?	Low pressure systems create all storms including tropical storms (hurricanes).
How dangerous can weather and climate be?	Low pressure storms bring heavy rainfall and high winds which can cause death or injury as well as destruction of property.

Week 5

Questions	Answers
Which pressure system caused hurricane Katrina?	Hurricane Katrina was caused by a low pressure system, as all storms are.
Why does the UK not suffer with hurricanes?	Hurricanes travel east to west and are formed over warm water. The Atlantic Ocean is to the west of the UK so hurricanes cannot form and move east over it.
Name 2 effects of the storm.	Hurricane Katrina caused death and damage to property in Louisiana.
Nome 2 responses to the storm.	In the lead up to the event, a mass evacuation was undertaken. Following the Hurricane, over $100 billion was spent to rebuild infrastructure.
How dangerous can weather and climate be?	Hurricanes cause damage and death around the world every year. LICs often struggle to deal with the effects and the aftermath of disasters.

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