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UNIT 4:

CLIMATE & WEATHER

@rosaliarte

1. In this unit...

This unit is about weather and climate. Weather and climate both relate to things like temperature, precipitation, atmospheric pressure and wind, but:

- Weather looks at short-term changes
- Climate looks at long-term averages; to understand the climate of a place yo need to study the weather over a period of at least 30 years

The weather and climate are affected by:
- atmospheric pressure
- latitude
- altitude
- distance from the coast

1.1 Atmospheric pressure

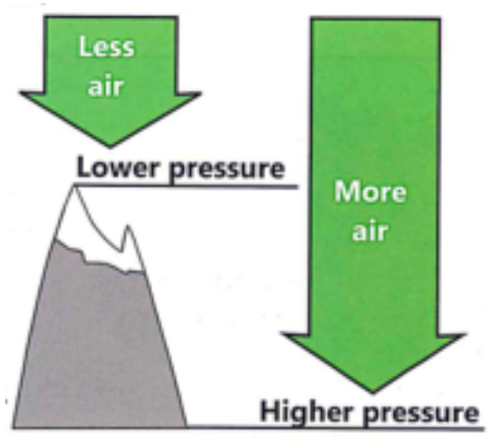
The atmosphere is a layer of gases (mainly nitrogen and oxygen) that surrounds the Earth. We call this mix of gases air.

<u>The atmosphere regulates the temperature:</u>

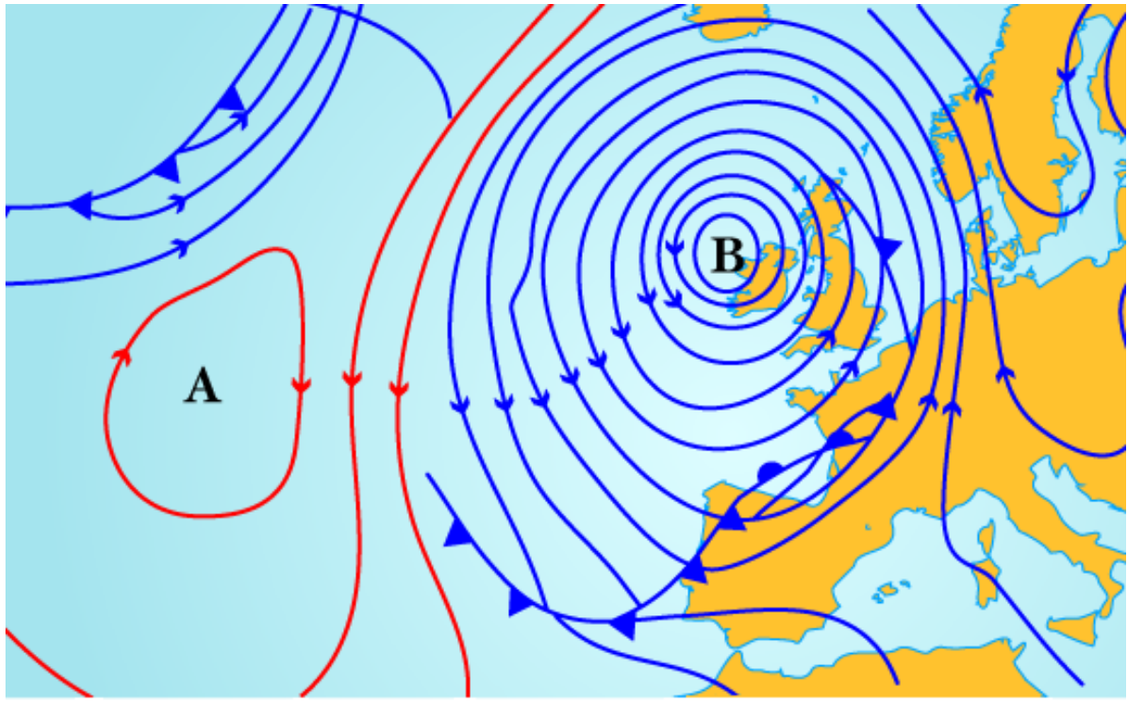
- it stops it getting too cold at night
- when air moves it spreads the heat from hot zones to colder parts of Earth

Atmospheric pressure is the weight of the air above the Earth's surface

At higher altitudes there is less air above us, so the pressure is lower

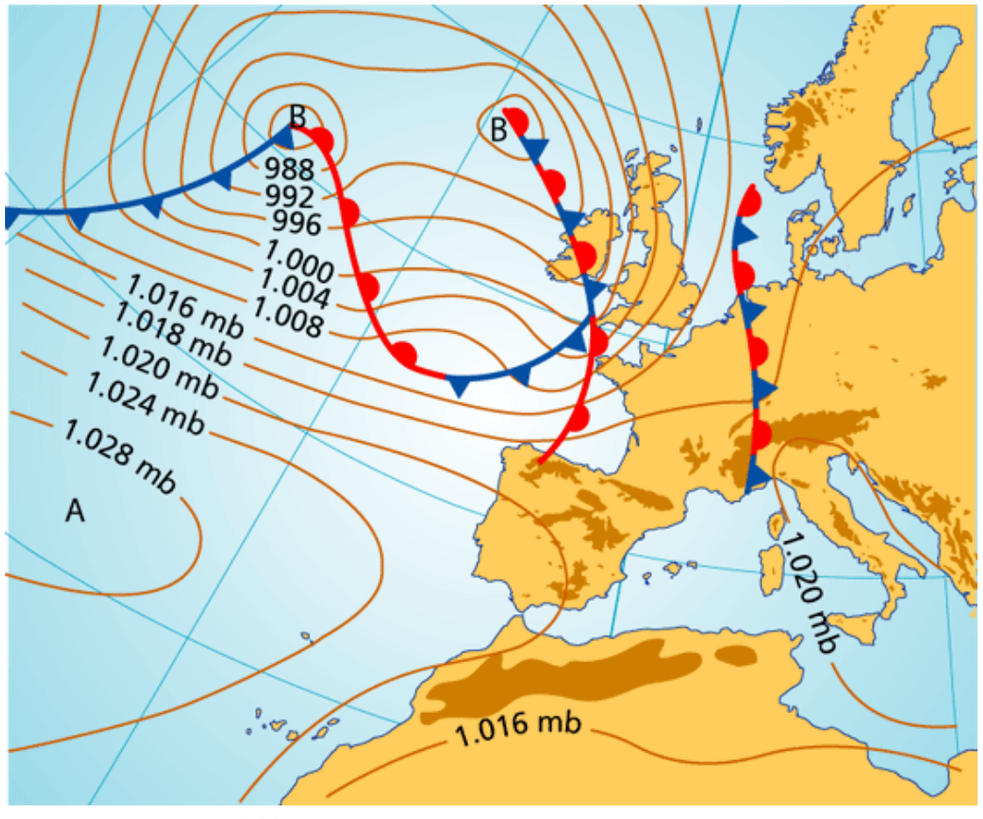


Warm air is lighter than cold air, so warm air always rises above cold air. Areas of high pressure are called anticyclones. They normally bring clear, stable weather.
Areas of low pressure are called depressions. They often bring unstable weather, like rain and storms. Pressure differences also cause wind.
Weather maps show areas of higher pressure and lower pressure. The lines on the map connect places with the same pressure - they are called isobars.
- We measure atmospheric pressure with a barometer
- The units of measurement are millibars (mb)



Anticiclón suave
Isobaras separadas

Borrasca profunda
Isobaras muy próximas entre si

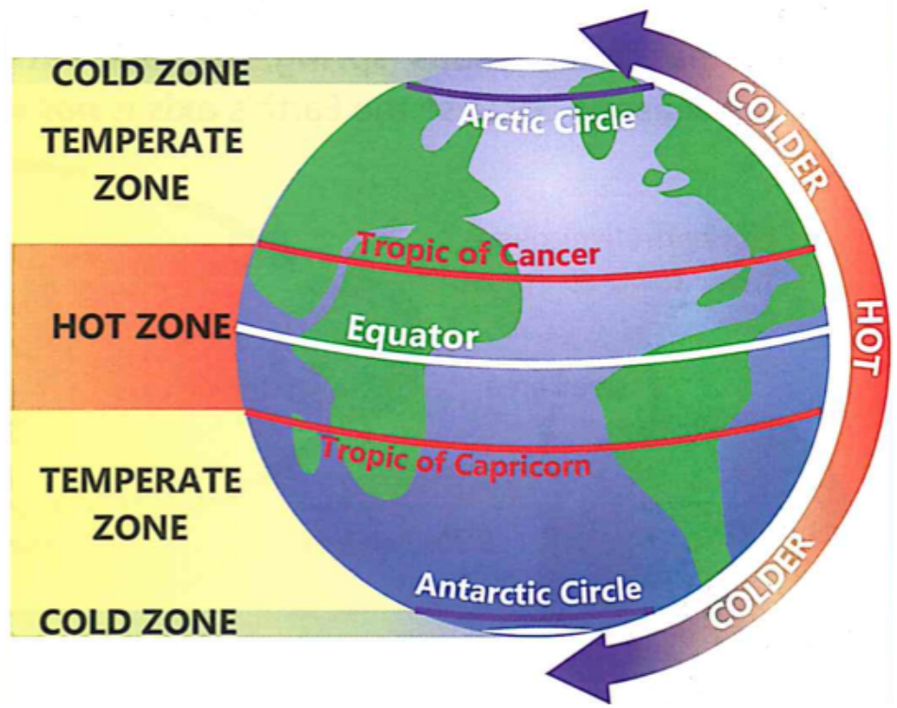


1.2 Temperature

- The temperature is the amount of heat in the atmosphere

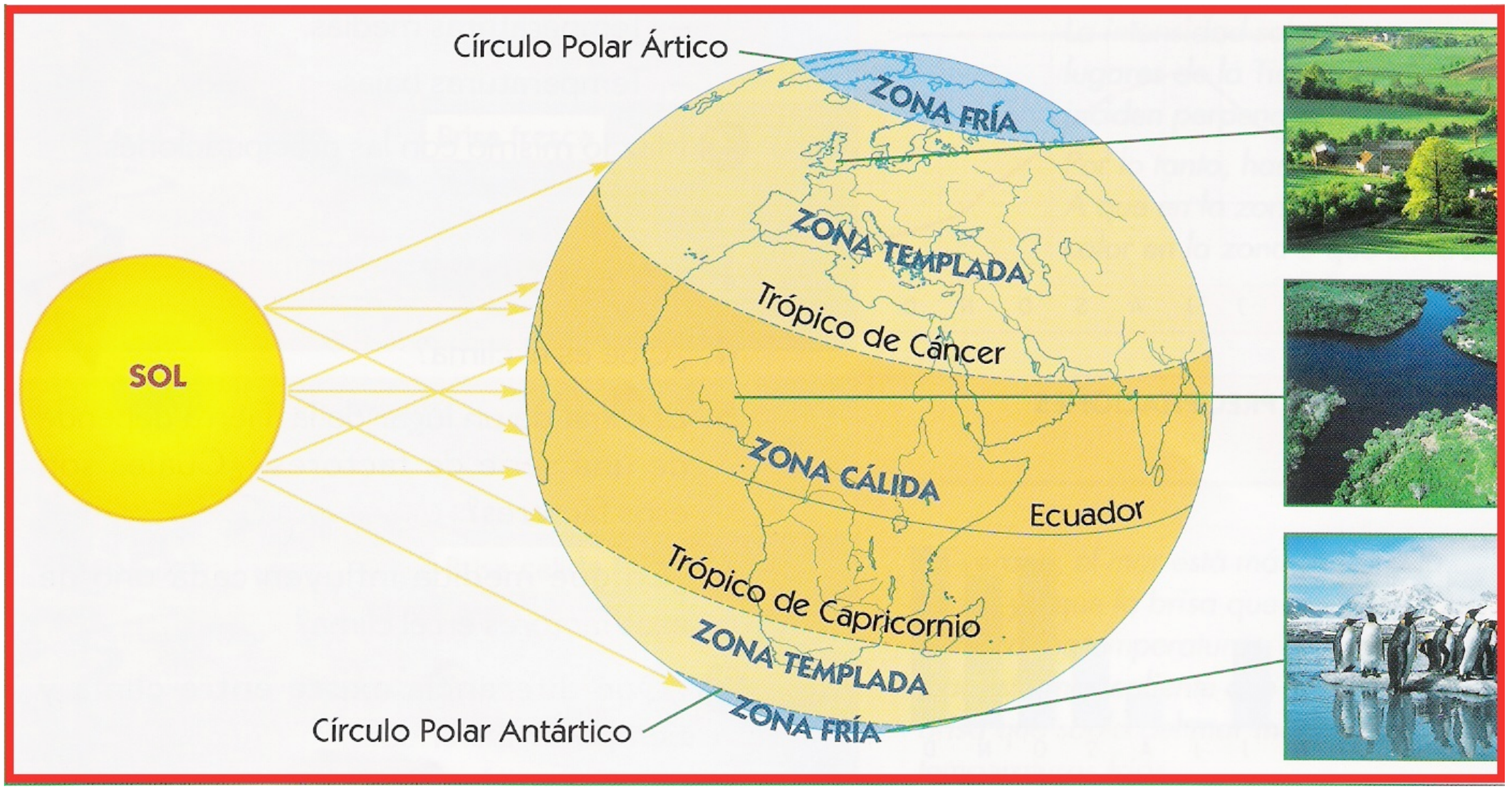
LATITUDE:

Temperatures vary with latitude: they are highest near the equator and lowest near the poles. The Earth is divided into five climatic zones.



THE HOT ZONE OR TROPICS

Between the Tropic of Cancer and the Tropic of Capricorn. The sun's rays cover a small area all year round, so the sun's heat is concentrated and it is always hot.

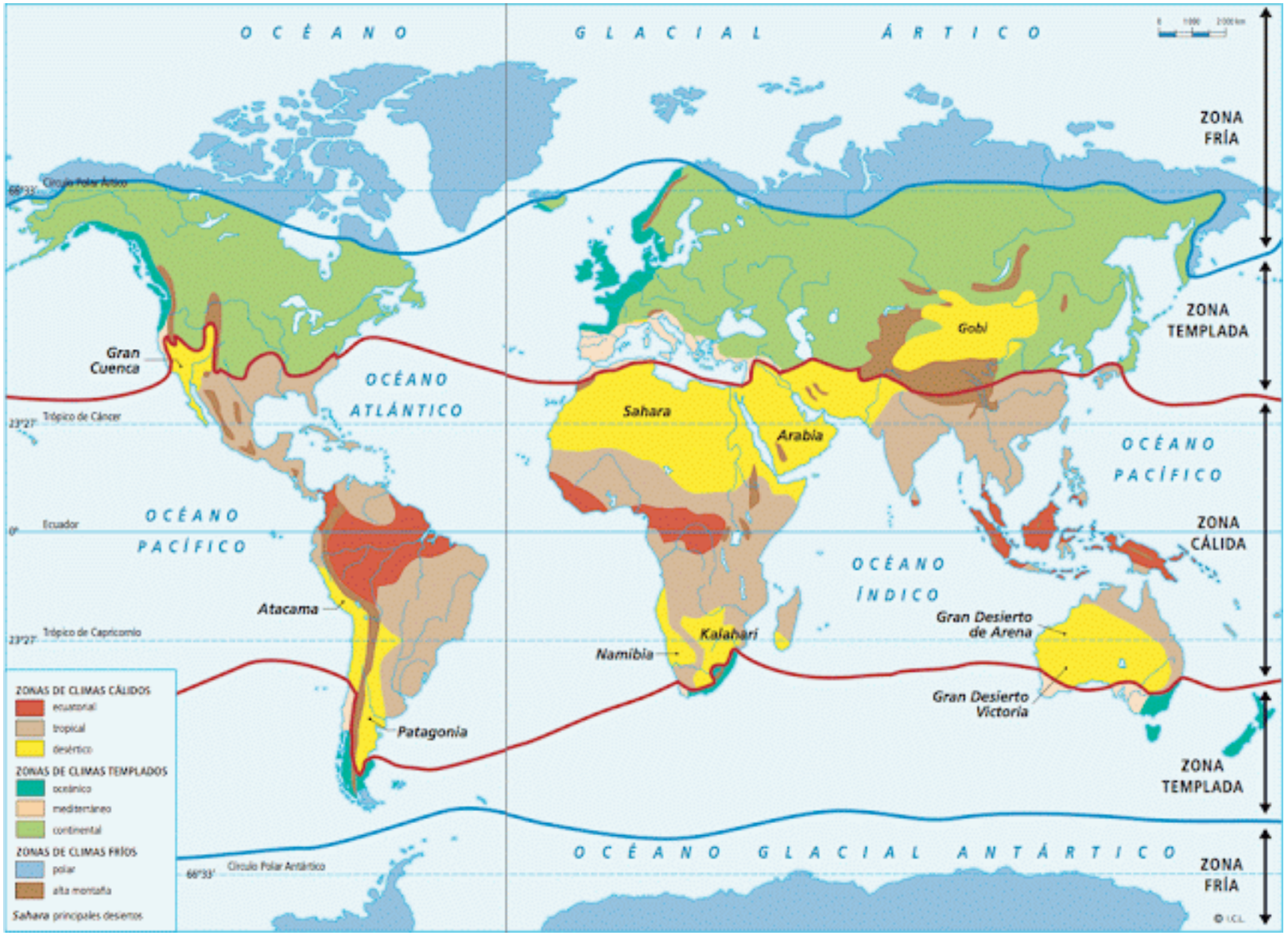


TWO TEMPERATE ZONES:

Between the Tropic of Cancer and the Arctic Circle and between the Tropic of Capricorn and the Antarctic Circle. The sun's rays are spread over a larger area, so it is not as hot as the hot zone. There are seasons: it is warmer in the summer than in the winter.

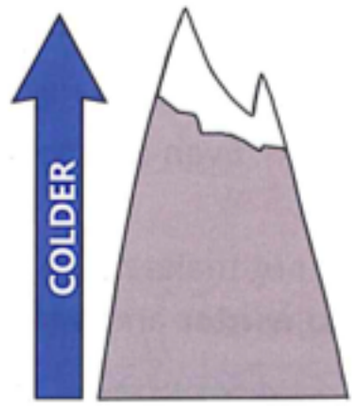
TWO COLD ZONES:

Inside the Arctic and Antarctic Circles. The sun's rays are spread over a very large area, so they don't give much heat. It is always cold here.



ALTITUDE:

Temperatures are usually warmest at low altitudes and get colder as we go higher



DISTANCE FROM THE SEA

The sea moderates temperatures:

- In summer, the sea takes longer to heat up than the land. This means that coastal areas are less hot in summer than places further from the sea. In winter the sea takes longer to cool down than the land. This means that coastal areas are less cold in winter than places further from the sea.

We measure temperatures with a thermometer. The unit of measurement is degrees Celsius (°C). Some people say degrees centigrade, but is the same as degrees Celsius

Ejercicios en la libreta:

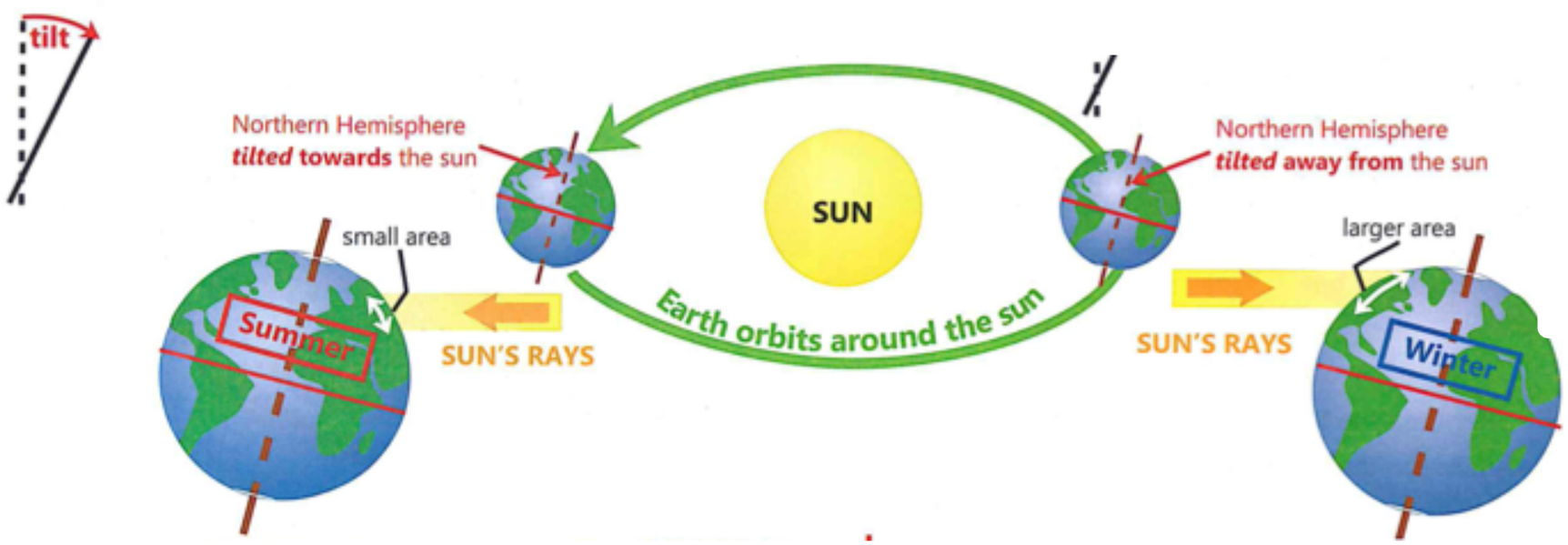
Para el próximo día tienes que tener los apuntes de esta parte en tu libreta y realiza en tu libreta un dibujo del globo terráqueo señalando las diferentes zonas climáticas de la Tierra.

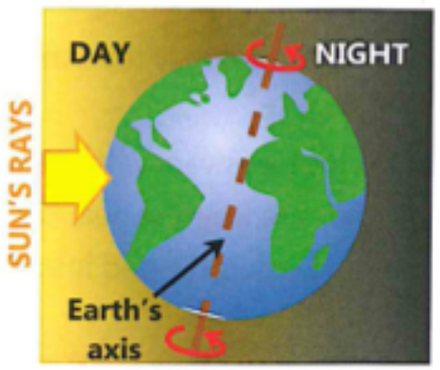
2. Movement of the Earth

The Earth rotates on its axis once a day, so it does one complete rotation every 24 hours. As the Earth rotates, places on the surface sometimes face the sun - this is day. When they face away from the sun, it is night.

The Earth orbits around the sun every 365 1/4 days, or once a year. Each year has four seasons (spring, summer, autumn and winter).

There are seasons because the Earth's axis is not vertical. It is tilted.





NORTHERN HEMISPHERE SUMMER

In summer, the Northern Hemisphere is tilted towards the sun. The northern temperate zone spends more time facing the sun than facing away from the sun, so days are longer than nights. The sun's rays cover a small area, so the sun's energy is concentrated and it is warm.

NORTHERN HEMISPHERE WINTER

In winter, the Northern Hemisphere is tilted away from the Sun. The northern temperate zone spends more time facing away from the sun than facing the sun, so nights are longer than days. The sun's rays are spread out over a larger area, so the sun's energy is less concentrated and it is cold.

In the cold zones, there is a bigger difference between summer and winter: in the middle of winter, the night lasts for 24 hours (so it is always night), and it is very cold. In the middle of summer it is always day, so it is less cold. Even so, the sun's rays are still spread out, and it is colder than in other areas.

In the hot zone, near the equator, the tilt of the Earth does not make much difference. The sun's rays always cover a small area and it is always hot. There is no winter and summer.

3. PRECIPITATION

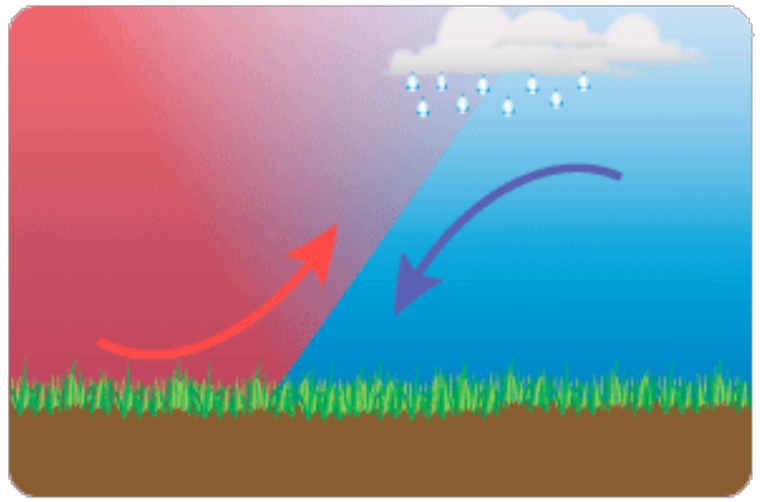
Precipitation can be rain, snow, sleet or hail. What happens when it rains? There are actually three types of rainfall.

CONVECTIONAL RAINFALL

This is common in hot, humid places, especially in the tropics. The sun heats the ground, and water evaporates to form water vapour. The warm air rises, taking the water vapor with it. When it rises, the pressure falls. As the air rises, it cools, and the water vapor condenses (this means it turns into small droplets of water). The droplets of water form clouds. The water droplets grow until they become so heavy that they fall as rain.

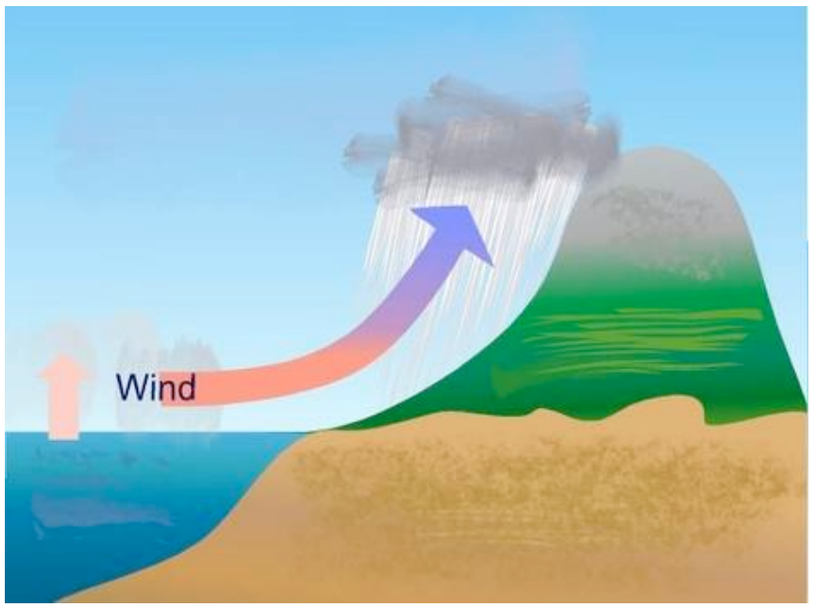
FRONTAL RAINFALL

A front is a boundary between masses of warm, humid air and cold air. Frontal rainfall occurs where warm air meets cold air. The warm air rises, and is pushed above the cold air. When the air rises it cools, the water vapor condenses, and it rains



RELIEF RAINFALL

This is common in areas with hills and mountains. The wind blows warm, humid air in from the sea. The air has to rise to get over the mountain. The air cools, so the water vapor condenses, and it rains. Usually, all the rain falls on the side facing the sea. Much less rain falls on the far side

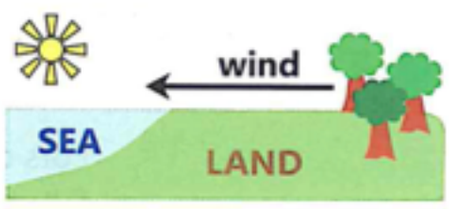


We measure the amount of rain using a rain gauge (mm) or litres per square metre (l/m2)

4. WIND

- Wind is the movement of air. It always goes from areas of higher pressure to areas of lower pressure.
- **PREVAILING WINDS:** Some winds always blow in the same direction. These are called prevailing winds. For example, the trade winds always blow from the tropics towards the equator.
- **SEASONAL WINDS:** Monsoons in Asia are seasonal winds. That means they change direction at different times of year.

Summer Monsoon
Wind blows from the sea and brings rainy weather

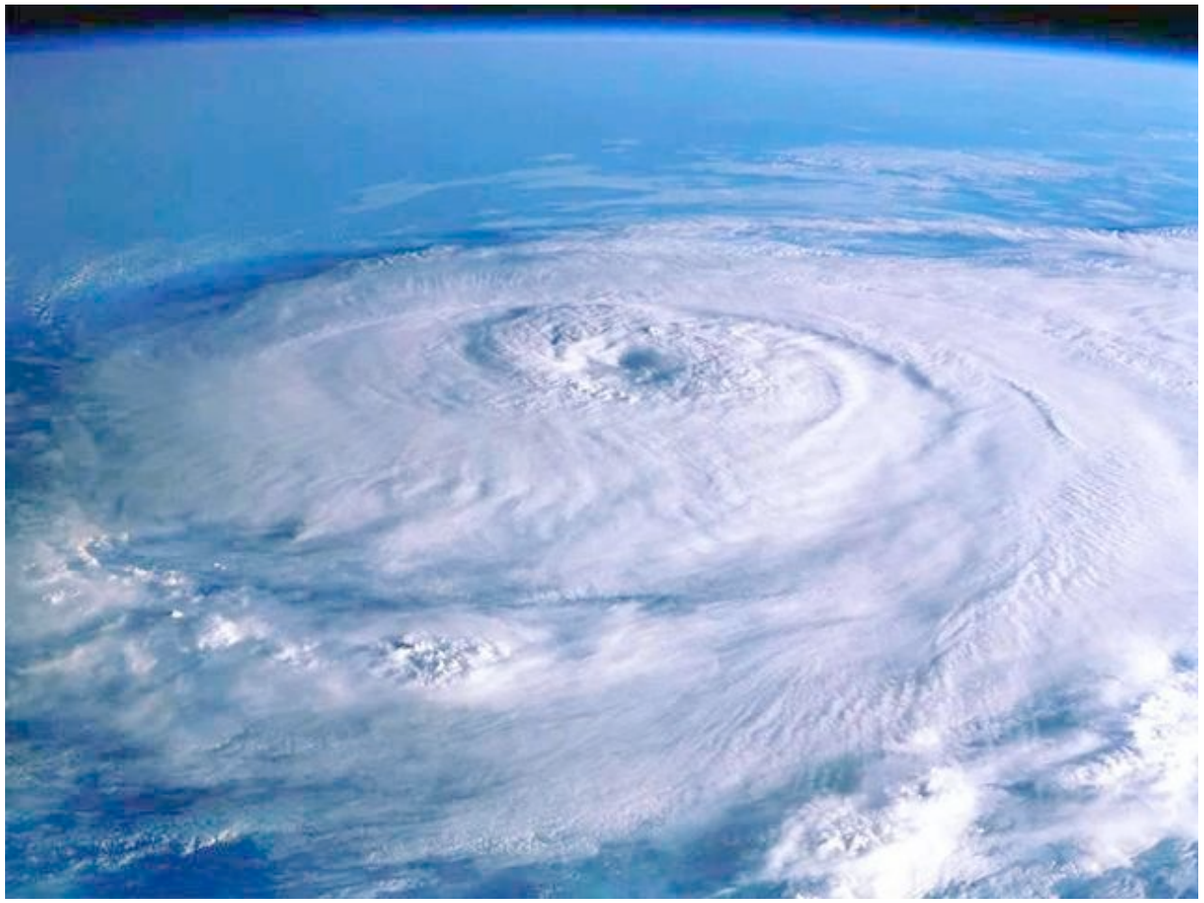


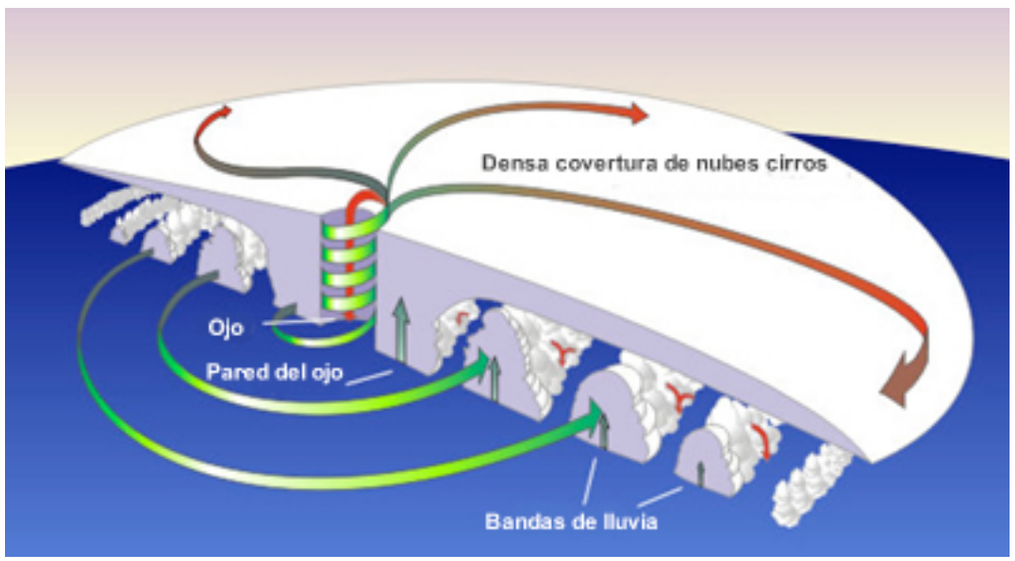
Winter Monsoon
Wind blows from the land and brings dry weather

- DAILY PATTERN**:** Some winds change direction on a daily basis. A sea breeze blows from the sea to the land during the day and then the direction changes and a land breeze blows from the land to the sea at night.
- LOCAL WINDS**: Other winds don't have a regular pattern. These are called local winds. One example is the levante in the Mediterranean.**
- Wind speed is measured with an anemometer. The unit of measurement is kilometres per hour (Km/h). Wind direction is measured using a weather vane.

4.1 Tropical Cyclones

- In a storm there are strong winds, heavy rain and sometimes thunder and lightning.
- Tropical cyclones are very big storms that form in the tropics. Hurricanes and typhoons are two alternative names for very powerful tropical cyclones
- Tropical cyclones have a spiral shape and can be hundreds of kilometres wide
- The centre of the cyclone is called the eye, and it is typically about 50 km wide. In the eye there are no clouds and there is not much wind
- Tropical cyclones form over warm seas (more than 26°C) where there is a lot of evaporation. When the water vapor condenses, it releases huge amounts of energy. This is why tropical cyclones are so powerful and destructive.
- They lose strength when they move over land, so they are mainly a problem in coastal areas.





Ejercicios en la libreta:

Para el próximo día tienes que tener los apuntes de esta parte en tu libreta.

5. Floods

If it rains a lot in a short time, the ground cannot absorb all the water, and we get flooding. Floods can wash away people and things, damage or destroy houses and other buildings, destroy crops, spread diseases like cholera and typhus.

Humans often make the effects of flooding worse:

- they build towns too close to rivers
- roads and buildings are impermeable so they stop the ground absorbing the water
- they cut down trees (trees take water out of the ground so cutting them down reduces the amount of water that it can absorb)

6. Drought

A drought is a long period with less rain than usual for the area. The definition of a drought therefore varies from country to country. Some effects of droughts are:

- low water supplies
- crop failure
- vegetation gries out, making wildfires more likely.

Woldfires are fires that are out of control

soil erosion, because there is less vegetation to hold the soil together

Drought is usually more serious in poorer countries. If people don't have enough money to buy food when their crops fail, they may die.

MAPA CONCEPTUAL DE LA UNIDAD

Ejercicio en el blog:

Para la fecha que indique la profesora, hay que realizar el siguiente ejercicio en el blog:

- Investiga en internet y publica una entrada hablando sobre algún ciclón o huracán que haya ocurrido y los desastres que hizo (Máximo 10 líneas)

Recuerda: Adjunta imágenes para que quede el blog completo y elegante.

Glossary

http://www.students.linguaframe.com/gh1-audio-glossary

Temperature, Hot, Cold, Temperate, Cool, Mild, Humid, Cloud, Precipitation, Rain, Snow, Hail, Wind, Breeze, Storm, Hurricane, Tropical cyclone, Eye, High Pressure, Low Pressure, Anticyclone, Depression, Climate, Weather, Evaporation / evaporate, Condensation / condense, Day, Night, Season, Summer, Autumn, Winter, Spring, Year, Water vapour, Flood, Drought

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