

STRAND 2: PHYSICAL GEOGRAPHY

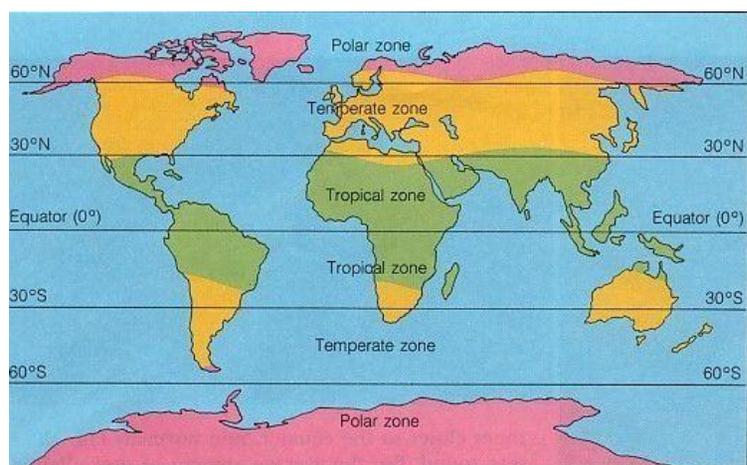
SUB-STRAND 1: PHYSICAL ELEMENTS OF NATURE

CLIMATE

Climate – the long-term average of weather. The average atmospheric conditions over a long period of time.

Weather – the day-to-day pattern of precipitation, temperature, winds and sunshine over a certain short period of time.

1. MAJOR CLIMATIC ZONE



i.) Tropical Zone

- Are regions of the Earth near to the Equator and between the Tropic of Cancer in the NH and the Tropic of Capricorn in the SH.
- **“Tropical”** specifically means places near the equator.

Features of Tropical Climate Zone

- **Temperature:** rainforests are warm with temperatures staying around 80° year around and fluctuating little during any given month or year.
- **Precipitation:** the high-year-round temperature cause intense heating of the surface of the earth.
- Marked by consistently warm temperature and frequent rainfall, resulting in abundant, diverse vegetation.
- Experiences hot and humid weather.

- There is abundant rainfall due to the active vertical uplift or convection of air that takes place there and during certain periods, thunderstorm can occur every day.

Countries – Brazil, PNG, India, Philippines, Fiji, Indonesia, Thailand, etc.

ii.) Temperate Zone Climate

- The part of the Earth’s surface between the Arctic circle and the Tropic of Cancer or between the Antarctic circle and the Tropic of Capricorn characterized by temperate climate.

Features of the Temperate Zone.

- They are without extremes of temperature and precipitation (rain & snow)
- The maritime climate is strongly influenced by the oceans.

Countries – New Zealand, UK, USA, Japan, Korea, China, Canada, etc.

iii.) Polar Zone

- Part of the Earth’s surface which fills the area within the Arctic and Antarctica circles.

Features of the polar Zone

- Characteristics by a short, cool summer and long bitterly cold winter.
- Frequent snowfall particularly during the winter months

Countries – Northern portion of Canada, Greenland, and Russia, fall within this climatic zone.

❖ Most Influential Factor on Climate

- Temperature
- Precipitation
- Latitude
- Altitude
- Pressure
- Winds
- Distance from the sea, ocean currents, relief features.

❖ **Different Elements of Weather & Climate**

- Temperature
- Atmospheric pressure
- Wind
- Solar irradiance
- Humidity
- Precipitation
- Topography

2. **TEMPERATURE**

- Amount of heat energy that is in the air

❖ **Instrument for measuring temperature**

- Thermometer

❖ **Unit used for measuring temperature**

- Degree Celsius (°C)

❖ **Factors that causes variation in temperature**

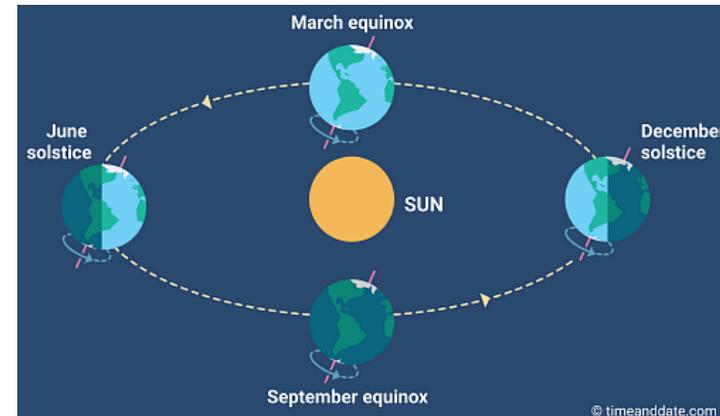
- Volcanic activity
- Solar variability
- Plate Tectonics
- Shift in the Earth's orbit

SEASONS

- A division of the year marked by changes in weather. Based on the differences in the length and intensity of sunlight.

❖ **Four Seasons of the Year**

1. Winter
2. Summer/
3. Autumn (Fall)
4. Spring



When the Northern Hemisphere gets most sunlight (summer), the Southern Hemisphere gets least (winter).

❖ **Equinox (Vernal & Autumnal)**

- The only two time of the year when the Earth's axis tilted neither toward nor away from the sun, resulting in a nearly equal amount of daylight and darkness at all latitudes.

i) **March Equinox / Spring Equinox**

- Happens sometimes between March 19 and 21.

ii) **September Equinoxes / Fall Equinox**

- Happens between September 21 and 24.

❖ **Solstice (Summer & Winter)**

- Occurs at a moment the Earth's tilt toward from the sun is at a maximum
- The two moments of the year when one of the Earth's poles is tilted the most toward the sun, and the sun lies directly above one of the tropics.

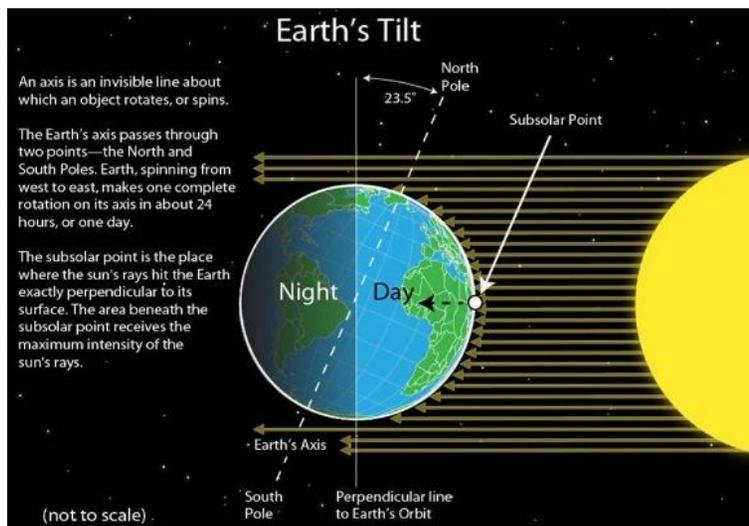
- i) **June Solstice / Summer Solstice**
 - Happen sometimes between June 20 and 22.
 - Day of the year with the day
- ii) **December Solstice / Winter Solstice**
 - Happen sometimes between December 20 and 23.
 - The day of the year with the shortest day and longest night.

Solstice are opposite on either of the equator, so the winter solstice in the Northern Hemisphere is the summer solstice in the Southern Hemisphere and vice versa.

❖ Month each seasons occurs both in the Southern Hemisphere (SH) & Northern Hemisphere (NH).

	Spring	Summer	Autumn	Winter
Northern Hemisphere (NH)	Start – Mar 1 End – May 31	Start – Jun 1 End – Aug 31	Start – Sep 1 End – Nov 30	Start – Dec 1 End – Feb 28 or 29(leap year)
Southern Hemisphere (SH)	Start – Sept 1 End – Nov 30	Start – Dec 1 End – Feb – 28 or 29 (leap year)	Start – Mar 1 End – May 31	Start – Jun 1 End – Aug 31

- ❖ Factors that cause seasons to occur
- Earth is tilted on its axis by 23.5°.
 - Tilt of the Sun on its axis
 - Position of the Earth in relation to the sun.



❖ Nature of each Seasons



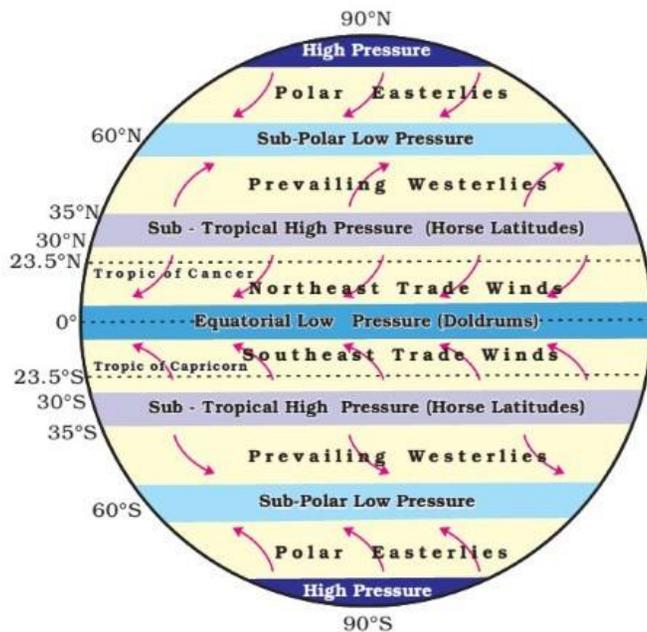
1. Summer
 - Hottest season of the year and has long, usually sunny days.
 - Trees keep growing and most plants produce flowers
 - Many trees bear fruits such as apples and cherries
 2. Autumn / Fall
 - Weather becomes mild
 - Leaves start falling from many type of trees
 3. Winter
 - Is the coldest season with short days
 - Limited plant growth
 - Some animals enter a deep sleep called hibernation. They do this to save energy until spring when it will be easier to find food.
 4. Spring
 - The weather begins to get warmer
 - Trees start growing again sprout new leaves.
- ❖ How the Sun causes the seasons to occur.
- Earth has seasons because its axis is tilted. Throughout the year, different parts of Earth receive the Sun's most direct rays. So, when the North Pole tilts toward the Sun, it's summer in the Northern Hemisphere. And when the South Pole tilts toward the Sun, its winter in the Northern Hemisphere.

3. AIR PRESSURE & WIND

- ❖ Air Pressure
 - Weight of all the air above us.
- ❖ Instrument for measuring air pressure
 - Barometer
- ❖ Unit for measuring air pressure
 - Millibars (mb)

Normal air pressure is 1,000mb; High Pressure is above 1,000mb and Low Pressure is below 1,000mb.

❖ Major Pressure Belts and Wind Systems of the World

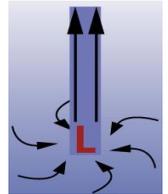


- ❖ Inter-Tropical Convergence Zone (ITCZ)
 - A belt of low pressure along the equator where the trade winds of the northern and the Southern Hemisphere come together.
- ❖ Major factor that causes air pressure to occur
 - Temperature
 - Altitude/ elevation
 - Moisture or Water Vapour

- ❖ How air pressure occurs in an area
 - Caused by the weight of the air molecules above. This pressure causes air molecules at the Earth's surface to be more tightly packed together than those that are high in the atmosphere.
- ❖ Effects of air pressure on an area
 - As air moves around the globe, pockets of high pressure and low pressure build up
 - The areas of high pressure will rush into areas of low pressure, causing winds as the air moves.

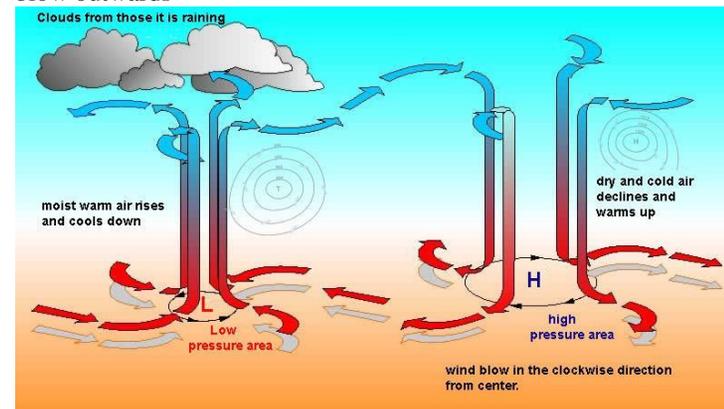
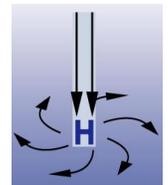
❖ Features of a Low Pressure area

- Has lower pressure at its centre than the areas around it.
- Wind moves counter clockwise and in
- Area of depression of cyclone
- These areas experiences strong winds, heavy rain and warm temperature
- Is labelled with red **L** on a weather map
- Wind blows towards the low pressure, warm moist air rises in the atmosphere where they meet. As the warm moist air rises, the water vapour within it condenses and forming clouds and often precipitation.



❖ Features of a High Pressure area

- Has higher pressure at its centre than the areas around it
- Wind moves clockwise and out
- Area of anticyclone
- These areas experiences light wind, little rain and cool temperature.
- Labelled with a blue **H** on the weather map.
- Air from higher in the atmosphere sink down to fill the space left as air is blow outwards



❖ **WINDS**

- Movement of air caused by the uneven heating of the Earth by the sun.

❖ **TRADE WINDS**

- Trade winds are winds that reliably blow east to west just North and South of the equator. The wind help ships travel west, and they can also steer storms such as hurricanes too.

❖ **How wind moves/ travel**

- It is caused by differences in the atmospheric pressure. When a difference in atmospheric pressure exists air moves from the higher to lower pressure area resulting in winds of various speeds. On a rotating planet, air will also be deflected by the Coriolis Effect, except exactly on the equator.

❖ **Different stages of wind force**

- Spatial scale
- Speed
- Types of forces that causes them
- The regions in which they occur and their effects

❖ **TROPICAL CYCLONE**

Tropical cyclone cause considerable loss of life and damage to property, vegetation and economic activities, mostly along the coasts of continents.



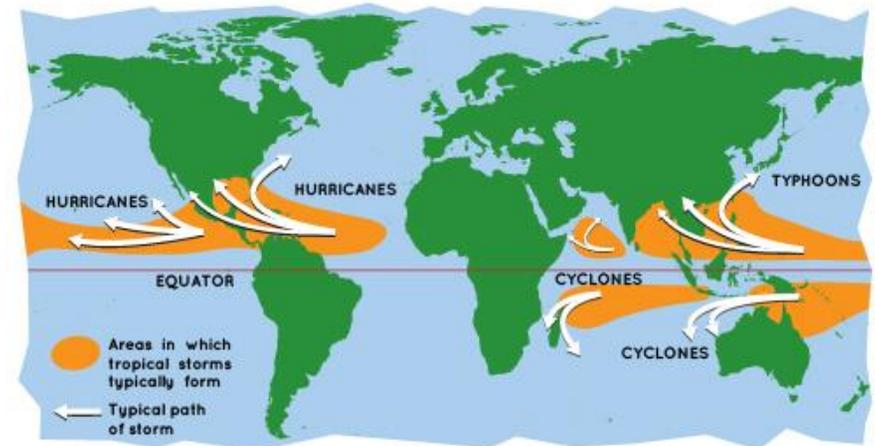
- Tropical cyclone are intense low pressure systems
- They accompanied by heavy rain, thunder, lightning, storm surges and high winds.
- As low pressure areas, their rotation is clockwise in the SH and anti-clockwise in the NH.

❖ **Factors that helps creates a tropical cyclone**

- Heat from the sun (sun radiation/sun rays)
- Vast ocean (suppling moist)
- Trade winds (blowing wind from the tropics)
- ITCZ (Inter Tropical Convergence Zone) – drawn in North-easterly winds and South-easterly winds
- Coriolis force (spinning effects)
- Jet stream (speed/ fast moving air)

❖ **Cyclone Seasons**

- **Northern Hemisphere** – June – October
- **Southern Hemisphere** – December – April

❖ **Where do tropical cyclones form**

- * Hurricanes – used in the US
- * Cyclones – used in the South Pacific
- * Typhoons – used in Asia

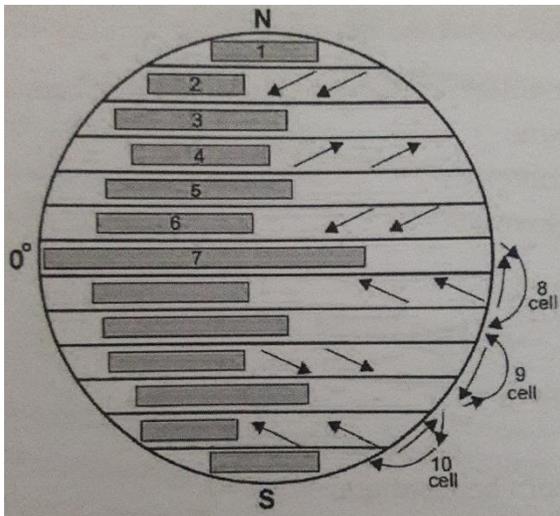
❖ **Factors that cause a tropical cyclone to move**

- Rotation of the Earth
- Winds

3. State if the descriptions below indicates high or low pressure
 - a. Warm, light air _____
 - b. Lifting air _____
 - c. Sinking air _____
 - d. Clear, sunny weather _____
 - e. Depression _____
 - f. Anticyclone _____
 - g. Cloudy with chance of a rain _____
 - h. Clockwise circulation in the southern hemisphere _____
 - i. Anticlockwise circulation in the northern hemisphere _____

- r. Name the cell at 9. _____
- s. Name the cell at 10. _____

4. Pressure Belts



- j. What pressure is found at 1? _____
- k. What pressure is found at 3? _____
- l. What pressure is found at 5? _____
- m. What pressure is found at 7? _____
- n. Name the winds at 2 _____
- o. Name the winds at 4 _____
- p. Name the winds at 6. _____
- q. Name the cell at 8. _____