

SS1 Geography – Week 2

Topic: Earth's Rotation

1. Meaning of Earth's Rotation

Earth's rotation refers to the spinning of the Earth around an imaginary line called its axis.

The axis of the Earth is tilted at an angle of $66\frac{1}{2}^{\circ}$ to the plane of its orbit and $23\frac{1}{2}^{\circ}$ to the vertical.

The Earth rotates from west to east (counterclockwise when viewed from above the North Pole).

It takes approximately 24 hours (precisely 23 hours, 56 minutes, and 4 seconds) to complete one full rotation.

This 24-hour cycle gives us day and night.

2. The Earth's Axis

The axis is the imaginary straight line that passes through the North Pole and the South Pole. It is tilted, and this tilt is responsible for several important geographic and astronomical phenomena.

The Earth's rotation on this axis is what causes alternating daylight and darkness.

The tilt also contributes to seasonal

variation (along with revolution, which is a separate topic).

3. Effects of Earth's Rotation

The rotation of the Earth has several observable and measurable effects on our daily lives and the physical environment:

A. Day and Night

As the Earth rotates, different parts of its surface move into and out of sunlight.

The side facing the sun experiences daytime, while the opposite side, which is

shielded from the sun, experiences night.

Because the Earth rotates consistently, this cycle of day and night occurs regularly every 24 hours.

This is why when it is day in Nigeria, it is night in countries like Australia or China.

> Example: The sun rises in the east and sets in the west because the Earth rotates from west to east.

B. Time Differences (Local Time and Time Zones)

Due to Earth's rotation, different places

experience different local times based on their position relative to the sun.

The Earth is divided into 360° of longitude.

It rotates 360° in 24 hours, meaning it rotates 15° per hour.

Therefore, every 15° of longitude represents a 1-hour time difference.

> Example: If it's 12 noon in Greenwich (0° longitude), then it is:

1:00 pm at 15°E

11:00 am at 15°W

Time zones are used to standardize time

across countries and regions. Each zone generally covers 15° of longitude.

C. Deflection of Winds (Coriolis Effect)

One major consequence of Earth's rotation is the Coriolis Effect, which causes moving objects such as winds and ocean currents to be deflected from a straight path.

In the Northern Hemisphere, winds are deflected to the right.

In the Southern Hemisphere, winds are deflected to the left.

This deflection shapes global wind patterns and ocean currents, influencing weather systems and climate.

> Example: The Trade Winds and Westerlies are a result of Earth's rotation and the Coriolis Effect.

D. Tides (Rise and Fall of Sea Levels)

While tides are primarily caused by the gravitational pull of the Moon (and to a lesser extent the Sun), the Earth's rotation determines when and where tides occur.

As Earth rotates, different parts of the ocean move into positions where the Moon's gravitational pull is stronger or weaker.

This results in high tides and low tides at regular intervals, typically twice each day.

> Note: Coastal regions rely on tidal information for fishing, shipping, and recreational activities.

E. Apparent Movement of the Sun

The rotation of the Earth causes the sun to appear to rise in the east and set in the west.

This is not due to the actual movement of the sun but rather Earth's own movement.

This apparent motion influences how we experience the passage of time throughout the day.

4. Summary of Key Points

Effect	Explanation
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Day and Night	Caused by Earth's rotation exposing parts of the globe to sunlight or darkness.
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Time Differences	Rotation creates varying local times based on longitude.
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Coriolis Effect	Deflects winds and currents due to Earth's spin.
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Tides	Earth's rotation and Moon's gravity cause tidal rise and fall.
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Apparent Movement of the Sun	Sun
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seems to move across the sky due to Earth's rotation.



Importance of Earth's Rotation

Establishes our daily rhythm (day and night)

Influences weather patterns and climate

Affects transport, communication, and timekeeping

Important for understanding astronomy and physical geography

