What Causes Different Weather Patterns

KS3 Ages 11-14 ⏰ 3 min read

The Sun Is the Engine

Everything about weather starts with the **Sun**. The Sun heats the Earth's surface unevenly — the **equator** gets much more direct sunlight than the **poles**, which is why it's hotter near the middle of the planet and colder at the top and bottom.

This uneven heating creates temperature differences in the **atmosphere** (the air around Earth). When air gets warm, it rises. When it cools, it sinks. This movement of air creates **wind**.

Think of it like a pot of water on the stove — when the bottom heats up, the hot water rises to the top while cooler water sinks down, creating currents.

Water on the Move

The Sun also drives the **water cycle**. Heat makes water from oceans, lakes, and rivers evaporate and turn into invisible water vapour in the air. As this air rises and cools, the water vapour condenses into tiny water droplets, forming **clouds**. When these droplets get heavy enough, they fall as **rain** or **snow**.

The ocean is like a massive heater and water storage tank. **Ocean currents** — rivers of warm or cold water flowing through the sea — transport heat around the world. A warm current flowing north can make a coastline mild and wet, while a cold current can make nearby land freezing and dry.

How Earth's Spin Makes Weather Complex

Here's where it gets interesting: the Earth is **rotating**. This spin, combined with moving air, creates the **Coriolis Effect**. This invisible force curves wind patterns, which is why hurricanes and cyclones spin in circles instead of blowing straight.

Think of it like throwing a ball across a spinning merry-go-round — the ball doesn't go where you aimed because the ground beneath it is moving.

Putting It Together

Weather happens where all these forces meet. Warm air rising here, cold air sinking there, oceans warming or cooling different regions, the Earth spinning, mountains blocking wind — all these things create the **weather patterns** we experience. A rainy region might stay rainy because an ocean current keeps it warm and wet. A desert stays dry because cold ocean currents pull moisture away. High mountains create rain on one side and dry valleys on the other.

Understanding these patterns helps scientists predict weather and warn us about dangerous storms.

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