

Polar Power

Antarctic Ice Sheet



Why Are Earth's Polar Regions Important?

While you're walking down the hallway at school or down main street, you might not think much about the cold, snowy areas near Earth's poles. But they affect your life every day. Even though they are far away, Earth's polar regions play a crucial role in the Global Heat Engine.

Global Heat Engine Turns Atmospheric "Wheels"

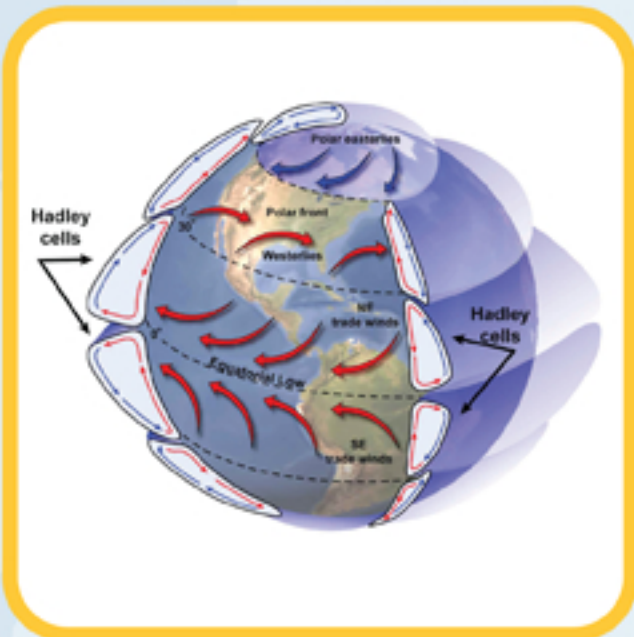


Photo Credit: NASA

What's a Global Heat Engine?

You probably know the Sun heats our planet unevenly. Because Earth is a sphere, it's hotter at the equator than the poles. But, did you also know different parts of Earth absorb the Sun's energy at different rates? For example, oceans absorb more heat than rocky land. All this creates temperature imbalances.

The Global Heat Engine tries to equalize these imbalances. Cold air and ocean currents from the poles move toward the tropics and warm air and water from the tropics move toward the poles. This hot-cold balancing act is always going on and keeps most of Earth comfy for us all. Without the icy polar regions, our planet would be much hotter.

Earth's Global Heat Engine begins with the Sun. Equatorial regions absorb much more solar energy than polar regions do. Warm air rises and cooler air rushes in to replace it in ongoing atmospheric cycles, called "cells." This atmospheric circulation transports energy polewards and back towards the equator.

The Hadley cell, named after George Hadley who first identified this atmospheric phenomenon, dominates the tropical atmosphere. Jet streams, the occurrence of deserts in the subtropics and rainbelts in the tropics, and the trade winds are all related to this circulation. Other mid-latitude and polar cells also help distribute the Sun's energy across Earth's surface.



Gray Whale

Photo Credit: Christopher Michel

Gray Whales migrate thousands of miles to survive. They travel from their low latitude breeding grounds where the water is warm to the cool summer feeding areas in the north polar region. Their journey of 12,400 miles round trip makes them one of the animal kingdom's greatest migrators.