Currents and Clouds

Trace how moving air and water shape coastal climates.

6.ESS2.6 "Develop or modify a model to describe how unequal heating and rotation of the Earth causes patterns of atmospheric and oceanic circulation that determine regional climates."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline where uneven heating starts air moving, circle where rotation affects winds and winds move ocean water, and write 1, 2, and 3 beside a chain from warm water to moisture to rain.

Two Pacific Coasts

1 Imagine standing on a beach in Peru, then traveling across the Pacific to an island near Indonesia. Many Indonesian islands receive heavy rain, while much of Peru's coast is dry. The Sun heats Earth unevenly: sunlight is strongest near the equator, so warm air rises there. As rising air cools, its water vapor can form clouds and rain. Higher in the atmosphere, some air moves away from the equator and sinks around 30 degrees latitude. Sinking air often keeps skies clear.

2 Earth's rotation bends the paths of moving air. Near the equator, this helps produce trade winds that blow from east to west across the Pacific. The winds push warm surface water toward Indonesia, where warm water adds moisture to the air. The rising, moist air can bring frequent rain. Wind also helps move ocean water in large currents. When winds and currents shift, the location of warm water can shift too, changing where the air gains the most moisture.

3 Off Peru, a current carries cooler water northward along the coast. Winds can also draw deeper, colder water up to the surface. Cool water adds less moisture to the air than warm water does, which helps limit rain along much of the coast. The Andes Mountains block some moist air arriving from the east, adding to the dryness. A useful climate model shows more than the Sun: it shows rising or sinking air, rotation-bent winds, moving ocean water, and the moisture each region receives.

2 ANSWER WITH EVIDENCE

Use the passage

1. In a model of air near the equator, which way should a warm-air arrow point? What can happen as that air cools?

2. A model shows east-to-west trade winds but leaves out Earth's rotation. What would you add to explain the winds' paths?

3. Where should a Pacific model show warm surface water gathering, near Peru or Indonesia? Show how that water connects to rainfall.

4. Suppose weaker trade winds push less warm water toward Indonesia. How might rainfall there change? Use the passage to trace why.

3 YOUR TURN

Your own words

Draw two panels of a made-up coast near 30 degrees latitude, one with a cool current offshore and one with a warm current offshore. In each panel, label stronger sunlight at the equator, rising air there, sinking air near the coast, rotation-bent winds, ocean-current direction, and moisture from the sea; write one sentence comparing the chance of rain.

ANSWER KEY

Currents and Clouds

GRADE 6 · 6.ESS2.6

PART 1 · READ AND MARK

Underline where uneven heating starts air moving, circle where rotation affects winds and winds move ocean water, and write 1, 2, and 3 beside a chain from warm water to moisture to rain. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	In a model of air near the equator, which way should a warm-air arrow point? What can happen as that air cools?	**Point the arrow upward. As the air cools, water vapor can form clouds and rain.**
2	A model shows east-to-west trade winds but leaves out Earth's rotation. What would you add to explain the winds' paths?	**Add a label showing that Earth's rotation bends moving air, helping produce the trade winds.**
3	Where should a Pacific model show warm surface water gathering, near Peru or Indonesia? Show how that water connects to rainfall.	**Near Indonesia. Trade winds push warm water there; it adds moisture to rising air, which can bring rain.**
4	Suppose weaker trade winds push less warm water toward Indonesia. How might rainfall there change? Use the passage to trace why.	**Rainfall might decrease because less warm water near Indonesia could add less moisture to the air.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Panel 1: Stronger sunlight at equator → rising air; air sinks near coast; Earth's rotation bends wind; cool current → along coast; less moisture rises from sea. Panel 2: Stronger sunlight at equator → rising air; air sinks near coast; Earth's rotation bends wind; warm current → along coast; more moisture rises from sea. The warm-current coast is more likely to get rain because its water adds more moisture to the air, although sinking air can limit rain at both coasts.

Accept different arrow directions for the coastal currents if the labels and explanation remain consistent. Students should treat the warm current as increasing the chance of rain, not as guaranteeing rain.