Climate Clues

Trace how sunlight, air, land, and water shape climate

6.10 "Use observations and data from investigations to demonstrate how the sun, air, land, and water affect Earth's climate. a. Develop models demonstrating how unequal heating and the rotation of the Earth cause local and global wind systems..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline three causes of climate or air movement in the passage, then circle the effect of each cause. Write a matching number beside each cause and its effect.

From Beach Breeze to Climate

1. At a beach town in the Northern Hemisphere, a student notices that a noon shadow is shorter in June than in December. In June, that half of Earth tilts toward the Sun, so sunlight strikes it more directly and days last longer. Earth's curved surface also spreads sunlight over a larger area near the poles than near the equator. Together, tilt and curvature create patterns of unequal heating by season and latitude. Over many years, those patterns help make low latitudes generally warmer than high latitudes.

2. On a sunny afternoon, the beach sand warms faster than the nearby water. Air above the sand heats, rises, and leaves lower pressure near the ground. Cooler air from over the water moves toward land as a sea breeze. On a global scale, warmer air rises near the equator, while cooler air sinks farther north and south. Earth's rotation turns moving air to the right in the Northern Hemisphere and to the left in the Southern Hemisphere. These changes help organize global wind belts rather than one straight wind from pole to equator.

3. Steady winds can push surface ocean water, while Earth's rotation bends its path. Ocean currents then carry warm or cool water past coasts, changing nearby air temperatures. Far inland, that ocean effect is weaker. On a high mountain, air is usually cooler than at sea level because rising air expands and cools as pressure drops. Heat from inside Earth can warm the ground and water near hot springs, but its effect is usually local. To explain a region's climate, compare these causes with long-term temperature patterns, not one hot or cold day.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why is the student's noon shadow shorter in June than in December? Explain what this tells you about how sunlight heats the beach town.

2. Trace how a sunny afternoon creates a sea breeze. Where does air rise, and which way does cooler air move?

3. A wind moves across the Northern Hemisphere. How does Earth's rotation change its path, and how can winds help move heat through the ocean?

4. A mountain hot spring feels warm, but the surrounding high region is cool. Explain both observations. Why can't the hot spring alone describe the region's climate?

3 YOUR TURN

Your own words

Write four sentences comparing the typical climates of a high inland plateau and a low coast beside a warm ocean current at the same latitude. Explain what their shared latitude tells you, how altitude and ocean heat differ, and how wind can affect the coast.

ANSWER KEY

Climate Clues

GRADE 6 · 6.10

PART 1 · READ AND MARK

Underline three causes of climate or air movement in the passage, then circle the effect of each cause. Write a matching number beside each cause and its effect. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why is the student's noon shadow shorter in June than in December? Explain what this tells you about how sunlight heats the beach town.	**In June, the Northern Hemisphere tilts toward the Sun, so sunlight strikes the town more directly. This produces a shorter noon shadow and more heating.**
2	Trace how a sunny afternoon creates a sea breeze. Where does air rise, and which way does cooler air move?	**Sand warms faster than water, so air over the sand heats and rises. Cooler air moves from over the water toward land.**
3	A wind moves across the Northern Hemisphere. How does Earth's rotation change its path, and how can winds help move heat through the ocean?	**Earth's rotation turns the wind to the right. Steady winds push surface ocean water, and currents carry warm or cool water past coasts.**
4	A mountain hot spring feels warm, but the surrounding high region is cool. Explain both observations. Why can't the hot spring alone describe the region's climate?	**Rising air expands and cools at high altitude, while heat from inside Earth warms the ground and water near the spring. The spring's effect is local, but climate describes long-term patterns across a region.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

The plateau and coast receive similar sunlight because they are at the same latitude. The high plateau is usually cooler because air rising to its height expands and cools. The warm ocean current brings heat to water beside the low coast, which can warm nearby air. Winds blowing from the ocean toward land can carry that warmer air onto the coast, while the plateau has less ocean influence.

For the marking job, accept any three accurate cause-and-effect pairs from the passage. For the open response, accept other well-supported comparisons that account for shared latitude, altitude, ocean heat, and wind.