Wind Paths

Trace how heating and rotation move air and water

6.10.a "Develop models demonstrating how unequal heating and the rotation of the Earth cause local and global wind systems and oceanic currents."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline phrases that show unequal heating, circle phrases that show air or water moving, and put a star beside each place where Earth's rotation changes a path.

From Beach Breezes to Ocean Currents

1 On a sunny afternoon, a beach towel feels hot while the nearby sea stays cool. Land warms faster than water. Air above the land warms, spreads out, and rises. Cooler air above the sea moves toward the land to take its place. This moving air is a sea breeze. After sunset, land cools faster than water. Air above the warmer sea rises, and cooler air from the land moves out over the water. The breeze reverses. These short trips form local winds because nearby surfaces heat and cool at different rates.

2 Sunlight also heats Earth unevenly across the globe. Areas near the equator receive more direct sunlight than areas nearer the poles. Warm air rises in the tropics, while cooler air sinks farther from the equator. Near the surface, air moves from cooler areas toward warmer areas, replacing rising air. This helps make global wind belts. Earth spins as the air moves. Its rotation bends the paths of moving air to the right in the Northern Hemisphere and to the left in the Southern Hemisphere. These turns change wind directions across long distances.

3 Wind can also start ocean currents. As a steady wind blows across the sea, it drags the top layer of water along. That water can push other water, helping form a broad surface current. Unequal heating starts many winds, so the sun can affect the ocean through moving air. Earth's rotation also bends the paths of moving water, to the right in the Northern Hemisphere and to the left in the Southern Hemisphere. Continents can block or redirect currents, too. A model with arrows can show how heating, wind, rotation, and moving water connect.

2 ANSWER WITH EVIDENCE

Use the passage

1. On a sunny afternoon, which way should a sea-breeze arrow point? Explain what makes the air move.

2. After sunset, how should the breeze arrow change? Use heating and rising air to explain.

3. Why would a straight arrow from a cooler area toward a warmer area be an incomplete model of a global wind?

4. Add a surface-current arrow to a model of a steady wind over the ocean. What starts the water moving, and what could bend its path?

3 YOUR TURN

Your own words

Draw an arrow model of a Southern Hemisphere ocean with warmer water closer to the equator and cooler water farther south. Label rising air, sinking air, the surface wind, its turn, and a wind-driven surface current, then write two sentences explaining your arrows.

ANSWER KEY

Wind Paths

GRADE 6 · 6.10.a

PART 1 · READ AND MARK

Underline phrases that show unequal heating, circle phrases that show air or water moving, and put a star beside each place where Earth's rotation changes a path. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	On a sunny afternoon, which way should a sea-breeze arrow point? Explain what makes the air move.	**The arrow points from sea to land. Land warms faster, so air above it rises and cooler air from above the sea moves in.**
2	After sunset, how should the breeze arrow change? Use heating and rising air to explain.	**The arrow reverses and points from land to sea. Land cools faster, so air above the warmer sea rises and cooler air from the land moves toward it.**
3	Why would a straight arrow from a cooler area toward a warmer area be an incomplete model of a global wind?	**Earth's rotation bends moving air to the right in the Northern Hemisphere and to the left in the Southern Hemisphere.**
4	Add a surface-current arrow to a model of a steady wind over the ocean. What starts the water moving, and what could bend its path?	**The wind drags the top layer of water, starting a surface current. Earth's rotation can bend the water's path.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Sketch labels: warmer water north, cooler water south, rising air north, sinking air south, surface wind pointing north and turning left toward the west, surface current started by the wind and curving left. Unequal heating makes air rise over the warmer water, so surface air moves toward it from the cooler area. Earth's rotation turns the moving air and water to the left in the Southern Hemisphere, while the wind drags surface water into a current.

Accept arrows that show surface air moving from the cooler area toward the warmer area and turning left in the Southern Hemisphere. The current should be driven by wind, with rotation shown as a possible cause of its curved path.