Sun's Moving Air

Trace how uneven solar heating moves air and changes temperatures.

SC.6.E.7.5 "Explain how energy provided by the sun influences global patterns of atmospheric movement and the temperature differences between air, water, and land."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each sentence that links solar energy to a temperature difference, then circle each phrase that tells how air moves because of that difference.

Energy Starts the Motion

1. Sunlight does not heat every part of Earth equally. Near the equator, the Sun's rays strike more directly, delivering more energy to a smaller area. Toward the poles, the same energy is spread over a larger area. This uneven heating creates temperature and air-pressure differences. Warm air expands, becomes less dense, and rises. Cooler, denser air sinks. Air moves from regions of higher pressure toward lower pressure, beginning large-scale patterns of atmospheric circulation around Earth.

2. Land and water respond to solar energy at different rates. Land warms quickly during the day and cools quickly after sunset. Water warms and cools more slowly because sunlight is mixed through a greater depth of water, and some energy is used in evaporation. Along a coast on a sunny day, land often becomes warmer than nearby water. Air above the warmer land rises. Cooler air over the water moves inland to replace it, producing a sea breeze.

3. These local movements connect to global circulation. Strong heating near the equator causes air to rise often, while cooler air tends to sink at higher latitudes. As Earth rotates, moving air is deflected, helping form broad wind belts instead of simple straight north-south winds. Uneven solar heating also drives ocean surface currents and weather patterns. Because land changes temperature faster than water, coastal places usually have smaller daily temperature changes than inland places at the same latitude.

2 ANSWER WITH EVIDENCE

Use the passage

1. How does the angle of the Sun's rays help create global patterns of moving air?

2. On a sunny day at a coast, explain the steps that produce a sea breeze.

3. Why does water change temperature more slowly than land?

4. Why do coastal places usually have smaller daily temperature changes than inland places at the same latitude?

3 YOUR TURN

Your own words

Use the two panels to sketch air movement at the same coastline. In Panel 1, show a sunny daytime sea breeze. In Panel 2, show nighttime conditions after the land has cooled faster than the water. Label the warmer surface, the cooler surface, rising air, sinking air, and the surface air arrow in each panel.

ANSWER KEY

Sun's Moving Air

GRADE 6 · SC.6.E.7.5

PART 1 · READ AND MARK

Underline each sentence that links solar energy to a temperature difference, then circle each phrase that tells how air moves because of that difference. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How does the angle of the Sun's rays help create global patterns of moving air?	**More direct rays near the equator heat air more than spread-out rays toward the poles. The resulting temperature and pressure differences make warm air rise, cool air sink, and air move.**
2	On a sunny day at a coast, explain the steps that produce a sea breeze.	**Land becomes warmer than water. Air over the warm land rises, and cooler air over the water moves inland to replace it.**
3	Why does water change temperature more slowly than land?	**Sunlight is mixed through a greater depth of water, and some energy is used in evaporation.**
4	Why do coastal places usually have smaller daily temperature changes than inland places at the same latitude?	**Water warms and cools more slowly than land, so nearby water reduces how quickly the coastal air temperature changes.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Panel 1: Land is labeled warmer and water cooler. Air rises over land, sinks over water, and the surface arrow points from water toward land. Panel 2: Land is labeled cooler and water warmer. Air rises over water, sinks over land, and the surface arrow points from land toward water.

Accept equivalent labels and arrows that show air rising over the warmer surface and sinking over the cooler surface. For the nighttime panel, accept a land-to-water surface flow because land cools faster than water.