

Coastline Energy Story

Trace how solar energy, water, and air shape local weather and climate.

8.10.A “describe how energy from the Sun, hydrosphere, and atmosphere interact and influence weather and climate;”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each statement that tells how energy moves or changes form. Number 1, 2, and 3 beside one cause-and-effect chain that starts with sunlight and ends with a weather result.

Energy at the Coast

- ① On a clear summer morning in a coastal town, sunlight reaches both the beach and the nearby ocean. Land absorbs and releases solar energy faster than water does, so the sand and air above it warm quickly. The ocean changes temperature more slowly because water mixes and stores much of the incoming energy. As the land warms, water at the ocean surface also gains energy. Some surface water changes into water vapor, carrying energy upward into the atmosphere above the coast.
- ② By afternoon, the warmer air over land expands and rises. Cooler, denser air from above the ocean moves inland to replace it, producing a sea breeze. Rising air cools as pressure decreases higher in the atmosphere. If enough water vapor is present, it condenses into tiny droplets and may form clouds. Condensation releases energy to the surrounding air, which can help keep the air rising. This daily movement can bring cooler beach weather, clouds, or brief showers or rain nearby.
- ③ Over many years, the ocean also influences climate, the usual pattern of weather in a place. Large bodies of water warm and cool slowly, so coastal areas often have smaller temperature changes between seasons than inland areas. Ocean currents transport warm or cold water, redistributing solar energy around Earth. A warm current can add heat and moisture to air above it, making nearby land milder and sometimes wetter. Thus, the Sun supplies the energy, while water and moving air spread that energy and shape regional climate.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Why do the sand and air above the beach warm more quickly than the ocean water?

2 What can happen to water vapor as air rises, and what energy change occurs during this process?

3 Explain what causes a sea breeze to move from the ocean toward land in the afternoon.

4 Describe two ways the ocean can influence a region's climate over many years.

3 YOUR TURN _____ Your own words

Write exactly four sentences about a town beside a large lake on a sunny day. Explain how energy from the Sun, the lake, and the atmosphere could affect both that day's weather and the town's climate over many years.

PART 1 • READ AND MARK

Underline each statement that tells how energy moves or changes form. Number 1, 2, and 3 beside one cause-and-effect chain that starts with sunlight and ends with a weather result. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Why do the sand and air above the beach warm more quickly than the ocean water?	Land absorbs and releases solar energy faster than water, while ocean water mixes and stores much of the incoming energy.
2	What can happen to water vapor as air rises, and what energy change occurs during this process?	The water vapor can condense into tiny droplets and form clouds. Condensation releases energy to the surrounding air.
3	Explain what causes a sea breeze to move from the ocean toward land in the afternoon.	Air over the warmer land expands and rises. Cooler, denser air from above the ocean moves inland to replace it.
4	Describe two ways the ocean can influence a region's climate over many years.	Water warms and cools slowly, reducing seasonal temperature changes near coasts. Ocean currents redistribute heat and can add heat and moisture to nearby air, making land milder and sometimes wetter.

PART 3 • YOUR TURN (SAMPLE ANSWER)

In spring, the Sun warms the ground beside a large lake faster than it warms the lake. Air over the ground rises, and cooler air from over the lake moves toward shore. Water vapor from the lake can condense as rising air cools, forming clouds and perhaps rain. Because the lake changes temperature slowly, it can make nearby summers cooler and winters milder than places farther inland.

Accept equivalent descriptions of energy transfer and cause-and-effect relationships supported by the passage. For the open response, look for accurate links among solar heating, water, moving air, a weather effect, and a long-term climate effect.