

Weather in Motion

Trace how uneven heating moves air and changes weather.

6.7.d "there is a relationship between air movement, thermal energy, and weather conditions;"

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each description of thermal energy changing, circle each description of air moving, and number each weather result in order to trace cause and effect.

How Heating Changes the Air

- ① On a sunny afternoon, a field and the air above it gain thermal energy from the Sun. The warmed air spreads out and becomes less dense, so it rises. Cooler, denser air nearby moves in to take its place. This moving air is wind. As air rises, the pressure near the ground can become lower. Air tends to move from areas of higher pressure toward areas of lower pressure, creating a local breeze at times.
- ② Near a lake, land usually heats faster than water during a clear day. Air over the warm land gains more thermal energy and rises. Cooler air over the lake moves toward the land, producing a lake breeze. At night, the land loses thermal energy faster than the water. The air over the relatively warmer water rises, and cooler air from the land can move toward the lake. Changing heating patterns can therefore reverse the wind direction.
- ③ Rising air can cool as it expands higher in the atmosphere. If it cools enough, water vapor may condense into tiny droplets, forming clouds. Continued cooling and condensation can lead to precipitation. In contrast, sinking air is compressed and warms. Warmer sinking air can cause droplets to evaporate, which often leads to clearer, drier conditions. Weather forecasters study temperature differences, air pressure, and wind because these clues help them predict changing clouds, rain, and winds.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 How does thermal energy from the Sun help create a breeze over a field?

2 Why can the direction of a lake breeze reverse from day to night?

3 Describe how rising air can lead to precipitation.

4 What weather conditions often occur when air sinks, and why?

3 YOUR TURN _____ Your own words

Invent a weather situation involving two nearby surfaces that heat differently. In exactly three sentences, explain how uneven thermal energy causes air movement and predict one weather condition.

PART 1 • READ AND MARK

Underline each description of thermal energy changing, circle each description of air moving, and number each weather result in order to trace cause and effect. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	How does thermal energy from the Sun help create a breeze over a field?	The Sun warms the field and the air above it. The warmer, less dense air rises, lowering pressure near the ground. Cooler air moves toward the lower-pressure area, making a breeze.
2	Why can the direction of a lake breeze reverse from day to night?	During the day, land heats faster, so air rises over land and cooler lake air moves toward land. At night, land cools faster, so air rises over relatively warmer water and cooler land air moves toward the lake.
3	Describe how rising air can lead to precipitation.	Rising air expands and cools. Water vapor can condense into droplets that form clouds, and continued cooling and condensation can lead to precipitation.
4	What weather conditions often occur when air sinks, and why?	Sinking air is compressed and warms. The warmer air can make droplets evaporate, often leading to clearer, drier conditions.

PART 3 • YOUR TURN (SAMPLE ANSWER)

At midday, a dark parking lot heats faster than a nearby grassy field. Air above the lot gains thermal energy and rises, so cooler air moves from the field toward the lot. This movement can make a breeze blow toward the warmer parking lot.

Accept any accurate three-sentence cause-and-effect chain that includes unequal heating, resulting air movement, and a reasonable weather condition. Students may use different surfaces and may predict a breeze, cloud formation, precipitation, or clearer and drier conditions when their explanation supports it.