Storm Paths

Trace how moving air can build different storms

E.7.9A.6 "Research and use models to explain what type of weather (thunderstorms, hurricanes, and tornadoes) results from the movement and interactions of air masses, high- and low-pressure systems, and frontal boundaries."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline where air moves or rises, circle each storm it may produce, and number the steps that connect the air movement to each storm.

Three Ways Storms Grow

1. On a summer afternoon, a weather observer watches a line of clouds grow over the plains. A cold, dense air mass is pushing under a warm, humid air mass at a cold front. The warm air rises, cools, and its water vapor condenses into tall storm clouds. Near a low-pressure area, surface winds move inward and help feed rising air. A thunderstorm may bring lightning, heavy rain, and strong gusts. Under a nearby high-pressure area, air generally sinks, making tall storm clouds less likely.

2. The observer also checks wind reports from different heights. Along some fronts, winds at different heights blow in different directions or at different speeds. This wind shear can help a thunderstorm's rising air begin to rotate. If the rotating updraft grows strong enough, the storm may produce a tornado, a spinning column of air that reaches the ground. A cold front alone does not guarantee a tornado. Without a powerful thunderstorm and the right wind conditions, the same meeting of air masses may bring only rain or an ordinary thunderstorm.

3. Farther south, a low-pressure center moves over very warm ocean water. Warm, moist air flows inward from surrounding areas and rises. As water vapor condenses, it releases heat that helps the storm grow. With enough warm water and little wind shear, thunderstorms can organize around the center into a hurricane. Unlike the plains storms, a hurricane does not need a cold front to form. Winds around a high-pressure area can steer the hurricane's path, but the storm gets its energy mainly from the warm ocean, not from the high pressure.

2 ANSWER WITH EVIDENCE

Use the passage

1. How can the movement of two air masses at the cold front produce a thunderstorm?

2. Why might one thunderstorm near the front produce a tornado while another does not?

3. How can a hurricane grow without a cold front?

4. How does air move differently near the high- and low-pressure areas in the passage, and what does that mean for storms?

3 YOUR TURN

Your own words

Imagine a warm, humid fishing port as a cold front approaches, while a low-pressure center moves over very warm water offshore. In five sentences, write a word model that traces air movement and predicts weather at both places, including why a tornado or hurricane is possible but not certain.

ANSWER KEY # Storm Paths

GRADE 7 · E.7.9A.6

PART 1 · READ AND MARK

Underline where air moves or rises, circle each storm it may produce, and number the steps that connect the air movement to each storm. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How can the movement of two air masses at the cold front produce a thunderstorm?	**Cold air pushes beneath warm, humid air, forcing it upward. The rising air cools, and water vapor condenses into tall storm clouds.**
2	Why might one thunderstorm near the front produce a tornado while another does not?	**Wind shear can help a strong thunderstorm's updraft rotate. A tornado is possible if the rotating updraft grows strong enough, but a front alone is not enough.**
3	How can a hurricane grow without a cold front?	**Moist air flows toward a low-pressure center over very warm ocean water and rises. Condensation releases heat, and with little wind shear, thunderstorms can organize into a hurricane.**
4	How does air move differently near the high- and low-pressure areas in the passage, and what does that mean for storms?	**Near low pressure, surface winds move inward and air rises, helping feed storms. Under high pressure, air generally sinks, making tall storm clouds less likely.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

At the port, advancing cold air slides beneath the warm, humid air. The warm air rises and cools, so a thunderstorm may form near the front. If wind shear helps a strong storm rotate, a tornado might form, but the front alone is not enough. Offshore, moist air flows toward the low-pressure center and rises over warm water, feeding thunderstorms. If the water stays warm and wind shear remains low, the storms may organize into a hurricane, but that outcome is not certain.

Accept models that show cold air lifting warm air at the port and moist air moving toward rising air at the offshore low. Predictions should treat tornadoes and hurricanes as possibilities that require additional conditions, not as certain results.