When Air Rises

Climate patterns and spring storm risks in Alabama

ESS.8 "Obtain and communicate information to explain different climate regions and their impact on patterns of severe weather. a. Analyze temperature and precipitation patterns related to factors that influence climate..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline factors that affect Alabama's climate, circle the temperature or rainfall patterns they help explain, and draw arrows to connect each factor to a pattern.

From Gulf Air to Ridge Rain

1 Alabama's climate shifts from the Gulf Coast to the northern hills. Water warms and cools more slowly than land, so Mobile Bay moderates nearby temperatures. Moist Gulf air also supplies rain. Farther north, higher latitude means less intense sunlight on average; higher elevation cools ridges further. Compare the annual averages in the table.

ILLUSTRATIVE ALABAMA CLIMATE PROFILES, APPROXIMATE ANNUAL AVERAGES

Location	Temperature (°F)	Precipitation (inches)
Mobile Bay shore	68	66
Central inland plain	66	52
North inland valley	61	54
Northeast ridge	59	64

2 When moist air rises over a ridge, it cools, and water vapor condenses into clouds and rain. This orographic effect can make a windward slope wetter than a nearby valley. The table's ridge and valley profiles illustrate this difference. Air descending the opposite, lee slope can dry out. Climate averages do not describe any single day's weather.

3 On a spring afternoon, Mobile is 78°F with a 70°F dew point, which signals moist air, and a cold front approaches from central Alabama. Rising, humid air along the front could form thunderstorms, especially if winds change with height. Heavy rain could flood Mobile streets, disrupt travel across Alabama, and threaten families in low-lying homes.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why is the Mobile Bay shore warmer and wetter on average than the north inland valley? Use the table and passage.

2. What two processes help explain why the northeast ridge is cooler and wetter than the north inland valley?

3. Predict a weather event that could form as the cold front moves toward Mobile. Which two reported conditions support your prediction?

4. If the predicted storm brings heavy rain, identify one personal, one local, and one statewide effect described in the passage.

3 YOUR TURN

Your own words

A town on the northeast ridge is preparing for spring storms. Write a 70 to 95 word weather briefing that compares its climate with the north inland valley using table evidence, predicts what could happen when humid Gulf air meets a cold front, and recommends one specific action to reduce risk. Make clear how climate averages differ from today's weather.

When Air Rises

PART 1 · READ AND MARK

Underline factors that affect Alabama's climate, circle the temperature or rainfall patterns they help explain, and draw arrows to connect each factor to a pattern. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why is the Mobile Bay shore warmer and wetter on average than the north inland valley? Use the table and passage.	**The shore averages 68°F and 66 inches of precipitation, compared with 61°F and 54 inches in the north inland valley. Bay water moderates nearby temperatures, moist Gulf air supplies rain, and the shore is at a lower latitude.**
2	What two processes help explain why the northeast ridge is cooler and wetter than the north inland valley?	**Higher elevation helps cool the ridge. Moist air rising over it cools and condenses, producing orographic rain.**
3	Predict a weather event that could form as the cold front moves toward Mobile. Which two reported conditions support your prediction?	**Thunderstorms could form. Mobile's 70°F dew point indicates moist air, and the approaching cold front could force that air upward.**
4	If the predicted storm brings heavy rain, identify one personal, one local, and one statewide effect described in the passage.	**Personal: families in low-lying homes could be threatened. Local: Mobile streets could flood. Statewide: travel across Alabama could be disrupted.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

The northeast ridge averages 59°F and 64 inches of precipitation each year, while the north inland valley averages 61°F and 54 inches. Higher elevation cools the ridge, and rising moist air can produce more rain there. These long-term averages do not predict today's storm by themselves. If humid Gulf air rises along the approaching cold front, thunderstorms and heavy rain could develop. Families in low-lying homes should check flood alerts and plan a route to higher ground before roads flood.

Accept other supported explanations of the climate patterns and plausible storm predictions. The briefing should use accurate table values, distinguish annual averages from current conditions, and name a specific protective action.