Ridge Weather Riddles

Use landforms to explain local weather.

E.7.9A.7 "Interpret topographic maps to predict how local and regional geography affect weather patterns and make them difficult to predict."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two different landform clues from the map description, circle a weather prediction linked to each clue, and give each matching clue and prediction the same number, 1 or 2.

A Forecast for Cedar Ridge

1 A weather crew studies a topographic map of Cedar Ridge before a fall storm. The map's contour lines join places at the same elevation. On the ridge's western face, the lines sit close together, showing a steep climb from the coast to a 1,200-meter crest. East of the crest, wider-spaced lines lead down to Mill Town, which sits in a sheltered valley. A narrow notch cuts through the southern end of the ridge. These details help the crew predict where air will rise, sink, or collect.

2 The forecast calls for moist west winds from the sea. As that air climbs the steep western face, it cools. Water vapor may condense into clouds and fall as rain there. Past the crest, sinking air warms, so Mill Town may get less rain than the coast-facing slope. The notch can let some windy, damp air reach the town, however. The crew does not assume every point east of the ridge will have the same weather, even during one storm.

3 After sunset, the map's valley shape matters again. Cool, dense air can slide downhill and pool around Mill Town, where fog may form if the air is moist enough. The exposed crest can stay windier and may not develop the same fog. A stronger wind could stir the valley air and prevent fog; a shift in wind direction could also send more damp air through the notch. Because hills, gaps, and changing winds interact, the crew gives a range of possible weather rather than one certain forecast.

2 ANSWER WITH EVIDENCE

Use the passage

1. With moist west winds, which is more likely to get rain, the western face or Mill Town? Explain using the ridge's shape.

2. How could the notch make Mill Town's weather different from other places east of the ridge?

3. On a calm, damp night, where is fog more likely, Mill Town or the crest? Use the land's shape to explain.

4. If the wind grows stronger after sunset, how might the fog forecast for Mill Town change? Why?

3 YOUR TURN

Your own words

Invent a coastal landscape with a ridge, a gap, and a valley arranged differently from those at Cedar Ridge. In 4 to 5 sentences, describe where a topographic map would show close or wide contour lines, predict rain and nighttime fog for a wind direction you choose, and explain why one prediction could change.

ANSWER KEY

Ridge Weather Riddles

GRADE 7 · E.7.9A.7

PART 1 · READ AND MARK

Underline two different landform clues from the map description, circle a weather prediction linked to each clue, and give each matching clue and prediction the same number, 1 or 2. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	With moist west winds, which is more likely to get rain, the western face or Mill Town? Explain using the ridge's shape.	**The western face is more likely to get rain because moist air rises and cools as it climbs the steep slope. Air sinking toward Mill Town warms, so the town may get less rain.**
2	How could the notch make Mill Town's weather different from other places east of the ridge?	**The notch could let windy, damp air reach Mill Town, even though the area east of the crest may generally get less rain.**
3	On a calm, damp night, where is fog more likely, Mill Town or the crest? Use the land's shape to explain.	**Fog is more likely in Mill Town because cool, dense air can slide downhill and pool in its valley. The exposed crest may stay windier.**
4	If the wind grows stronger after sunset, how might the fog forecast for Mill Town change? Why?	**Fog may be less likely because stronger wind could stir the cool air pooled in the valley.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

My coast is east of a ridge, and a valley lies west of the ridge, with a gap at the northern end. Close contour lines show a steep eastern slope, while wide lines show a gentle slope down toward the valley. Moist east winds would bring more rain to the eastern slope as air rises than to the valley beyond the crest. On a calm, damp night, cool air may settle in the valley and produce fog. Strong winds could mix the valley air and stop the fog from forming.

Accept predictions that correctly connect contour spacing and landform position to rising air, sinking air, or pooling cool air. Students may identify other reasonable effects of a gap or changing winds if they explain the connection.