Fronts on the Highway

Use station data to locate fronts and explain changing weather.

ESS.3.5 "Analyze and interpret weather data using maps and global weather systems to explain and communicate the relationships among air masses, pressure systems, and frontal boundaries."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two temperature changes and circle the lowest pressure reading. Number the clues you use to locate each front.

A Noon Weather Snapshot

1. At noon, four weather stations line a west-to-east highway across the Great Plains. Each station reports air temperature, sea-level air pressure, wind direction, and sky conditions. The readings are a snapshot, not a forecast. Because fronts can be narrow, a sharp change between neighboring stations can be more informative than a reading at one station alone.

NOON STATION REPORTS, LISTED WEST TO EAST

Station	Temperature (°C)	Pressure (hPa)	Wind from	Conditions
A	12	1012	NW	Clearing
B	27	1002	SW	Showers
C	14	1006	E	Steady rain
D	12	1014	E	Overcast

2. A cold front forms where advancing cold air lifts warmer air, sometimes producing brief showers. A warm front forms where advancing warm air glides over cooler air, often producing widespread clouds and longer-lasting rain. Pressure usually decreases toward a low-pressure center. Winds can change direction across fronts because air flows around the low and meets along boundaries.

3. Midlatitude weather systems often move west to east, though paths vary. If a cold front advances, a station's warm air can give way to cooler air. Falling pressure may signal an approaching low; pressure often rises after it passes. Use temperature, pressure, wind, and precipitation together, since no single measurement proves a front's location.

2 ANSWER WITH EVIDENCE

Use the passage

1. Between which two stations is a cold front most likely? Use two readings to explain.

2. Between which two stations is a warm front most likely? Use the readings and conditions to explain.

3. Which station is closest to the low-pressure center? How do its pressure and weather support your choice?

4. Why do the reports suggest that C is nearer the warm front than D is?

3 YOUR TURN

Your own words

Imagine the cold front moves east past Station B by evening. Predict two changes in B's weather, and explain how the passing front would cause them.

ANSWER KEY

Fronts on the Highway

HIGH SCHOOL · ESS.3.5

PART 1 · READ AND MARK

Underline two temperature changes and circle the lowest pressure reading. Number the clues you use to locate each front. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Between which two stations is a cold front most likely? Use two readings to explain.	**Between A and B. A is much cooler than B, 12°C versus 27°C, and their winds differ, NW versus SW.**
2	Between which two stations is a warm front most likely? Use the readings and conditions to explain.	**Between B and C. C is cooler than B, 14°C versus 27°C, and C has steady rain, which is common near a warm front.**
3	Which station is closest to the low-pressure center? How do its pressure and weather support your choice?	**B has the lowest pressure, 1002 hPa, and showers, which are consistent with rising air near a low.**
4	Why do the reports suggest that C is nearer the warm front than D is?	**C is closer to warm station B, has steady rain rather than overcast skies, and has lower pressure than D.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Station B's temperature would fall as advancing cold air replaces its warm air. Its wind could shift from southwest to northwest as the front passes.

Accept front locations between adjacent stations when students support them with multiple consistent clues. Forecasts may vary, but the explanation must connect changes at B to the passing cold front.