Which Way Wind?

Use pressure data to explain wind direction and speed.

ESS.7.d "Use data to construct an explanation of the role of pressure differences in the development of wind systems."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the sentence that explains how pressure differences move air, then circle the higher pressure reading in each table row and write "equal" beside any row with matching readings.

Reading the Pressure

1. On a breezy afternoon, air over a dark parking lot warms faster than air over nearby grass. Warm air can rise, leaving lower pressure near the surface. Cooler, denser air nearby may have higher surface pressure. A pressure difference pushes air from higher toward lower pressure, creating wind. The direction of that push depends on which place has higher pressure.

2. Meteorologists compare air pressure at two places using hectopascals (hPa). If the places are equally far apart, a larger pressure difference usually means a stronger push on the air. The table shows simplified measurements along a straight west-to-east stretch of flat ground. Each pair of pressure readings was taken at the same time, with wind measured halfway between.

PRESSURE AND WIND ALONG THE SAME STRETCH OF GROUND

Reading	West pressure (hPa)	East pressure (hPa)	Wind halfway between
A	1020	1012	Eastward, 12 km/h
B	1016	1012	Eastward, 6 km/h
C	1012	1020	Westward, 12 km/h
D	1012	1012	Calm, 0 km/h

3. Treat these readings as a simple model of local wind, not a rule for every weather map. Earth's rotation, surface friction, and changing temperature can turn or slow real winds. In this model, assume the measurement sites stay the same distance apart and other influences stay similar. Use the pressure difference, not just one pressure reading, to explain each wind observation.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why is the wind faster in reading A than in reading B? Use both pressure differences in your explanation.

2. Readings A and C have winds of the same speed but in opposite directions. How do their pressure readings explain this?

3. Use readings B and D to explain why wind is recorded in one reading but not the other.

4. A student says the west pressure alone tells you whether wind will blow westward. Use readings C and D to test that claim.

3 YOUR TURN

Your own words

At a new site with the same distance between stations, west pressure is 1006 hPa and east pressure is 1018 hPa. Predict the wind direction and whether it would likely be faster or slower than in reading A, assuming similar conditions. Explain in two or three sentences.

Which Way Wind?

PART 1 · READ AND MARK

Underline the sentence that explains how pressure differences move air, then circle the higher pressure reading in each table row and write “equal” beside any row with matching readings. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why is the wind faster in reading A than in reading B? Use both pressure differences in your explanation.	**The west-to-east pressure difference is 8 hPa in A and 4 hPa in B. The larger difference in A produces a stronger push, matching its faster wind.**
2	Readings A and C have winds of the same speed but in opposite directions. How do their pressure readings explain this?	**Both readings have an 8 hPa difference. West pressure is higher in A, pushing air eastward, while east pressure is higher in C, pushing air westward.**
3	Use readings B and D to explain why wind is recorded in one reading but not the other.	**B has a 4 hPa difference, with higher pressure to the west, so wind moves eastward. D has equal pressures and no pressure difference between the sites, matching its calm reading.**
4	A student says the west pressure alone tells you whether wind will blow westward. Use readings C and D to test that claim.	**The west pressure is 1012 hPa in both readings, but C has westward wind and D is calm. The east pressure differs, so both pressure readings are needed to explain the wind.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

The new site's pressure difference is 12 hPa, with higher pressure to the east. Air should move westward toward the lower-pressure west side. Because 12 hPa exceeds reading A's 8 hPa difference over the same distance, the wind would likely be faster than in A.

Accept equivalent explanations that compare both pressure readings and connect the difference to wind direction or likely speed. Do not require an exact predicted speed for the new site.