

Lake-Effect Snow: How a Lake Builds a Blizzard

Name: _____

Date: _____

Class: _____

Read the lesson at myweatherrock.com/journal/explainers/lake-effect-snow (or the printed copy), then answer below.

Remember

Lake-effect snow happens when very cold air blows across a relatively warm, unfrozen lake. The lake heats and moistens the bottom of the cold air, that air rises, and the moisture comes down as snow in narrow bands parked downwind of the shore. The classic forecasters' rule of thumb wants the lake surface about 13 degrees Celsius, roughly 23 degrees Fahrenheit, warmer than the air about a mile up. The longer the stretch of open water the wind crosses, called the fetch, the harder the machine runs, and the wind direction decides exactly which neighborhood gets buried.

Questions

1. What powers lake-effect snow?

- ☐ A. A storm system passing over a lake
- ☐ B. Very cold air crossing relatively warm, unfrozen water
- ☐ C. Moist air from the ocean

2. The classic rule of thumb says the lake surface should be about how much warmer than the air a mile up?

- ☐ A. 5 degrees Fahrenheit
- ☐ B. About 23 degrees Fahrenheit, which is 13 Celsius
- ☐ C. 50 degrees Fahrenheit

3. What is fetch?

- ☐ A. The speed of the wind over the lake
- ☐ B. The depth of the lake
- ☐ C. The distance of open water the wind crosses

4. Why does lake-effect snow peak in early winter?

- ☐ A. The lake is still warm from summer just as the first arctic air arrives
- ☐ B. Winds are strongest in December
- ☐ C. Lakes are deepest in early winter

5. One town is buried under three feet while ten miles away the sun is out. That pattern says:

- ☐ A. The forecast badly missed
- ☐ B. A narrow lake-effect band was parked over the town
- ☐ C. The town is at higher elevation

In your own words

A town on the east shore of a great lake gets three feet of snow while a town ten miles inland gets flurries. Using the ideas of instability and fetch, explain how the lake managed that.

Answer key (for the teacher)

1. What powers lake-effect snow?

B. Very cold air crossing relatively warm, unfrozen water — No storm system is required. The lake heats and moistens the bottom of a frigid airmass, that air convects, and the moisture falls out as snow downwind.

2. The classic rule of thumb says the lake surface should be about how much warmer than the air a mile up?

B. About 23 degrees Fahrenheit, which is 13 Celsius — The 13 C rule, about 23 F, is the forecasters' threshold for enough instability to organize real bands. Below it, the lake mostly just steams.

3. What is fetch?

C. The distance of open water the wind crosses — Fetch is the runway. The longer the run over open water, the more heat and moisture the air collects, and the heavier the band that comes ashore.

4. Why does lake-effect snow peak in early winter?

A. The lake is still warm from summer just as the first arctic air arrives — Early winter offers the best contrast: stored summer warmth below, the season's first brutally cold air above. As the lake spends its heat, and especially once it freezes, the machine winds down.

5. One town is buried under three feet while ten miles away the sun is out. That pattern says:

B. A narrow lake-effect band was parked over the town — Firehose behavior is the lake-effect signature. Bands are narrow and aimed by the wind, so the difference between buried and blue sky can be a short drive.