Rain or Snow: the Line

By the rock. August 29, 2026. Grounded in National Weather Service definitions.

The short version

What reaches the ground, rain, snow, sleet, or freezing rain, is decided by the temperature of the whole column of air the precipitation falls through, not just the reading at your porch. Everything starts as snow aloft in winter storms. A column below freezing top to bottom delivers it as snow. A warm layer partway down, the warm nose, melts it: refreeze the drops in a deep cold layer beneath and you get sleet; keep the cold layer shallow and the drops arrive still liquid, freezing on contact with everything, and that is freezing rain, the dangerous one. The four outcomes can be separated by a hundred miles or a few hours in the same storm.

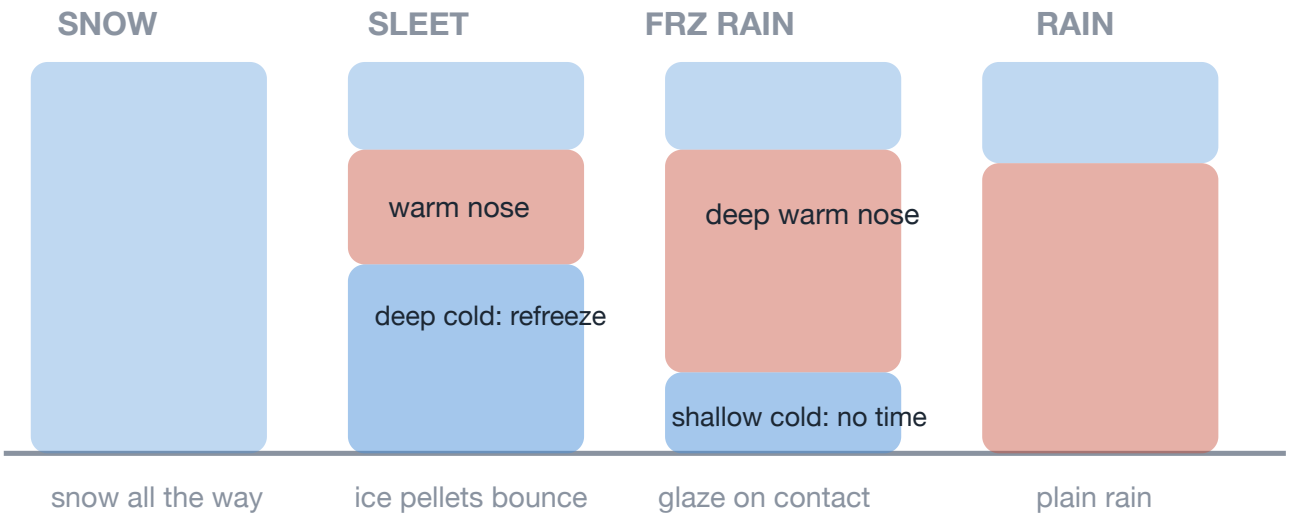
The column decides, not the porch

In a winter storm, almost everything leaves the cloud as snow. The question the forecast is actually answering is what happens on the way down, through ten or twenty thousand feet of air whose temperature changes with height, and not always in one direction. Your thermometer samples the last six feet of that trip. The precipitation type was mostly settled before the flake or drop got anywhere near it, which is why the rain-or-snow call is a forecast about air you cannot see, made with balloon soundings and model profiles of the column overhead.

The warm nose

The mischief-maker is a layer of above-freezing air sandwiched into an otherwise cold column, usually between a few thousand and ten thousand feet up. Forecasters call it the warm nose, because on a temperature-versus-height chart it bulges out warm and then tucks back cold below. It is most often warm air riding up the long shallow ramp of a warm front, gliding over cold surface air that is too dense and too stubborn to leave. North of a winter warm front is exactly where the atmosphere builds this sandwich, which is why the nastiest ice events live on the cold side of a storm track, not the cold-est side.

Whether the snow survives the nose, and what happens to whatever melts, comes down to two numbers: how warm and deep the nose is, and how cold and deep the layer under it is. Four combinations, four kinds of precipitation.



Blue is below freezing, red above. All four columns start with the same snow at the top; the layering writes four different endings. The middle two differ only in how deep the cold basement runs.

The four endings

- **Snow.** The column stays at or below freezing the whole way down, or close enough that flakes survive. Silent on arrival, as its own lesson explains, and honest about accumulating.
- **Sleet.** The flakes melt partly or fully in the warm nose, then fall through a cold layer thousands of feet deep, long enough to refreeze into ice pellets. Sleet bounces off the car hood and taps on the windows. Miserable, noisy, and structurally harmless compared with what is next.
- **Freezing rain.** The flakes melt completely, and the cold layer under the nose is too shallow to refreeze them. The drops arrive as liquid a few degrees below freezing, supercooled, and freeze on contact with every surface at or under 32: roads, lines, branches, windshields. It looks exactly like rain while it falls. That is the trap.
- **Rain.** The lower column is simply warm. The storm is a storm, but it is water, and water drains.

Freezing rain is the dangerous one

Say it plainly, because this is the sentence the lesson exists for: of the four, freezing rain is the one that hurts people. Glaze ice is heavy, and it accumulates on exactly the infrastructure that holds weight worst: a coating on spans of power line and tree limbs adds up to tons across a neighborhood, and the lines and limbs come down together. On pavement it is nearly invisible, black ice that looks wet rather than frozen, and it turns roads and front steps into surfaces no tread grips. Ice Storm Warnings are typically issued when accretion is expected to reach around a quarter of an inch, with the threshold set by your local office; what a warning versus a watch versus an advisory obliges you to do is that lesson's whole subject. During the event itself, the observation protocol is one word long: indoors. Every fact in this lesson is checkable through a window, and in an ice storm the window is where the science stops.

The surface temperature is still lying to you

Two porch-thermometer traps remain even after you respect the column. First, snow does not require a freezing thermometer: flakes falling from a cold column survive a while in surface air in the mid 30s, which is why fat flakes can fall at 35 with nothing sticking. Second, the column can cool itself mid-storm. When precipitation falls into dry air, evaporation collects its heat tax and drags the air toward its wet-bulb temperature, so a storm that begins as chilly rain can turn itself to snow in an hour without any cold front arriving; the precipitation did the cooling. Forecasters watch wet-bulb profiles for exactly this reason. And the ground votes last: pavement holding warmth from yesterday melts the first inch of anything, while a subfreezing bridge deck, cooled from both sides, ices first, which is why the sign says so.

None of this involves a lake, by the way; the machine that buries one shoreline town under feet of snow while the sun shines inland is its own lesson. This one is about layered storms, and the line they draw.

Watch the line move, from inside

The next time precipitation is due with the temperature within a few degrees of freezing, run the changeover watch, entirely from indoors. Each hour, predict first: given the current temperature, what type falls next hour? Then verify without opening the door, because the evidence carries: snow is silent and softens the streetlight cone, rain patters, sleet ticks against the glass like thrown sand. Log the type, the temperature, and the time. If you catch a changeover, note how far the thermometer was from 32 when it happened; it is rarely where a porch-only theory would put it. You will have observed the warm nose doing its work miles overhead, from an armchair, which is the correct furniture for an ice storm.

Check your understanding

1. What actually decides whether you get rain, snow, sleet, or freezing rain?

- □ A. The surface temperature alone
- □ B. The temperature layering of the whole column the precipitation falls through
- □ C. How heavy the precipitation is

2. What is the warm nose?

- □ A. The mild edge of a cold front
- □ B. An above-freezing layer sandwiched into a cold column, often warm-front air riding over cold surface air
- □ C. The warmest hour of a winter day

3. Sleet and freezing rain share the same warm nose. What separates them?

- □ A. The depth of the cold layer beneath it
- □ B. The size of the original snowflakes
- □ C. Wind speed at the ground

4. Which precipitation type is the dangerous one, and why?

- □ A. Sleet, because the pellets strike hard
- □ B. Freezing rain, because it glazes roads and loads power lines and trees with ice
- □ C. Snow, because it accumulates deepest

5. It is 35 degrees and steadily raining into fairly dry air. An hour later it is snowing, with no front having passed. What most likely happened?

- □ A. The forecast changed
- □ B. Evaporation cooled the column toward its wet-bulb temperature and the profile flipped
- □ C. Snow cannot fall at 35 degrees, so it must be sleet

Answer key

1. What actually decides whether you get rain, snow, sleet, or freezing rain?

B. The temperature layering of the whole column the precipitation falls through — Nearly everything starts as snow aloft; the layers below write the ending. Your porch thermometer reads only the last six feet of a twenty thousand foot trip.

2. What is the warm nose?

B. An above-freezing layer sandwiched into a cold column, often warm-front air riding over cold surface air — On a temperature-height chart it bulges warm partway up and tucks back cold below, the signature of warm air gliding up a front's shallow ramp over entrenched cold air.

3. Sleet and freezing rain share the same warm nose. What separates them?

A. The depth of the cold layer beneath it — A deep cold basement refreezes the melted drops into pellets: sleet. A shallow one leaves them liquid and supercooled, freezing on contact instead: freezing rain.

4. Which precipitation type is the dangerous one, and why?

B. Freezing rain, because it glazes roads and loads power lines and trees with ice — Glaze looks like wet pavement, grips like nothing, and its weight across line spans and limbs takes the grid down with the trees. Ice Storm Warnings commonly key on around a quarter inch of accretion.

5. It is 35 degrees and steadily raining into fairly dry air. An hour later it is snowing, with no front having passed. What most likely happened?

B. Evaporation cooled the column toward its wet-bulb temperature and the profile flipped — Precipitation falling into dry air spends heat on evaporation, dragging the air toward the wet-bulb reading. Storms routinely cool themselves across the line, which is why forecasters watch wet-bulb profiles.

Questions people actually ask

Can it snow when the temperature is above freezing?

Yes, routinely. Flakes leaving a cold column survive for a while in surface air in the mid 30s, especially when the air is dry and evaporation is cooling them as they fall. Accumulation is a different question; that depends on the ground.

How do forecasters know the temperature of air miles overhead?

Twice-daily balloon soundings measure the column directly, and model profiles fill the hours between. The rain-snow-sleet call is read off those temperature-versus-height curves, warm nose and all, not off surface maps.

Why is freezing rain worse than an equal amount of snow?

Weight and grip. Glaze bonds to whatever it lands on, so power lines and branches carry the load directly, and a quarter inch across a span adds up to breaking weight. On pavement it is nearly invisible. Snow is lighter per storm and announces itself; glaze looks like rain right up until nothing holds.

What should I do when freezing rain is in the forecast?

Treat the headline seriously: watch, warning, and advisory each oblige something different, and the watch-warning-advisory lesson sorts them. Charge what needs charging while the ice is still a forecast, then stay off the roads and observe from indoors. Ice storms are the one weather this site tells you not to go out and watch.

Why does the bridge ice before the road does?

A road sits on ground that stores yesterday's warmth and feeds it upward. A bridge deck hangs in cold air on both faces and loses heat from both, so it reaches freezing first. The sign is not a suggestion; it is a two-line lesson in heat storage.

Is the rain-snow line a real line?

It is real and it moves. In a layered storm the boundary between rain and snow, with sleet and freezing rain banded between, can shift tens of miles in hours as the warm nose strengthens or the cold deepens, which is why neighboring towns can have entirely different storms and both match the forecast.
