

Wind Speed and Gusts: What Those Numbers Feel Like

By the rock. August 8, 2026. Grounded in National Weather Service definitions.

The short version

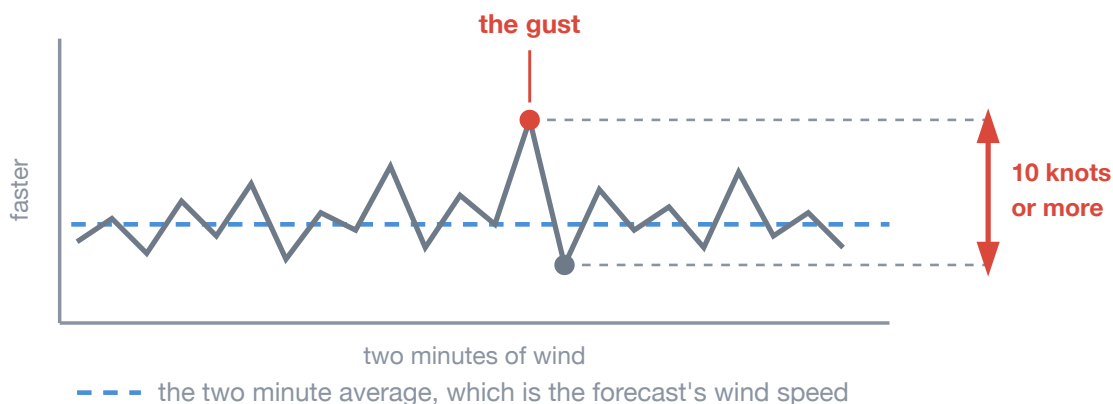
The wind speed in a forecast is the sustained wind, which the National Weather Service defines as the average of observed values over a two minute period. A gust is something more specific: rapid fluctuations in the wind speed with a variation of 10 knots or more between the peaks and the lulls, and the gust number itself is the maximum instantaneous speed. Both are measured about 10 meters (33 feet) above open ground, which is a large part of why the forecast disagrees with your back yard.

Two numbers doing two different jobs

The first number, the plain wind speed, is an average. The National Weather Service defines sustained wind as the wind speed determined by averaging observed values over a two minute period. Two minutes is long enough to smooth out the fidgeting and report what the air is broadly doing.

The second number is the opposite kind of measurement. A wind gust, in the Weather Service's own words, is rapid fluctuations in the wind speed with a variation of 10 knots or more between peaks and lulls, and the gust speed is the maximum instantaneous wind speed. Read that carefully, because it is the part people miss: a gust is not simply a windier moment. It is a specific amount of unsteadiness. If the air is briskly and evenly moving, with no real gap between its peaks and its lulls, nothing gets reported as a gust at all.

In the national forecast grids the pairing is spelled out even more plainly. Wind speed is the expected sustained wind at 10 meters for that hour. Wind gust is the maximum 3 second wind speed forecast to occur within a 2 minute interval at a height of 10 meters. An average across two minutes, and the worst three seconds inside it.



The grey line is what the anemometer actually did. The blue dashed line through it is the number the forecast calls wind speed. The single worst spike is the gust, and the drop from it to the neighboring lull is the part that has to reach 10 knots before anyone calls it one.

Ten meters up, standing in the open

Both numbers describe a standard place, not your place. The measurement height is 10 meters, which is about 33 feet, over open ground with nothing crowding it.

Your yard is not that. It has a fence, a house, a hedge, and a neighbor's garage, and every one of them slows the air down near the surface. So a forecast of 15 mph can read like almost nothing behind the house, and like 25 out on the ridge above it. The forecast is not lying to you. It is answering a question about a bare field 33 feet up, and you are asking a question about your patio.

Knots, briefly

Observations often come in knots. One knot is one nautical mile per hour, which works out to about 1.15 mph. So the 10 knot gust criterion is a swing of roughly 11 and a half mph between the lull and the peak. That is a real jolt, not a wobble, which is exactly why the threshold exists.

What each speed looks like outside

The Weather Service publishes a table of visual clues so that anyone can estimate wind without owning an instrument. A few anchors worth memorizing, straight off it:

- **4 to 7 mph.** Wind felt on the face. Leaves rustle and small twigs move.
- **13 to 18 mph.** Small branches move. Dust and loose paper get lifted and driven along the ground.
- **25 to 31 mph.** Large branches in continuous motion. Whistling in overhead wires. Umbrellas used with difficulty.
- **39 to 46 mph.** Twigs and small branches break off. Walking is generally impeded.
- **55 to 63 mph.** Considerable structural damage, especially to roofs. Small trees blown over and uprooted.

The slider below has the whole table in it. The rock recommends learning three or four of these by heart, because they work when the phone is dead.

Why the gust is the number that matters

Damage comes from the peak, not the mean. The push that moving air exerts rises with the square of its speed, so doubling the wind roughly quadruples the force. A 50 mph gust does not hit twice as hard as a 25 mph wind. It hits about four times as hard.

There is a second reason, and it is about you rather than physics. A steady wind is something you can lean into and plan around. A gust arrives before you can do either. It is what takes down the tree limb that was managing fine, tips the high sided truck, flips the trampoline, and gets the patio umbrella into the neighbor's pool. The rock has never once been blown over and still watches every one of these events with interest.

When wind is expected to become a genuine hazard, the Weather Service says so with a headline, and the thresholds for those headlines are set locally rather than nationally. Which headline means prepare and which one means act is covered in [watch, warning, advisory](#).

Direction, one more time

Wind is named for the direction it comes from. A north wind at 20 mph is arriving out of the north. If you want the machinery behind that arrow, [why the wind blows](#) covers the push, the bend, and the drag.

Check your understanding

1. The forecast says wind 12 mph, gusts to 30 mph. What is the 12?

- ☐ A. The lowest speed of the hour
- ☐ B. The wind averaged over a two minute period
- ☐ C. Half of the gust, by convention

2. According to the National Weather Service, what makes a gust a gust?

- ☐ A. Any moment the wind is above average
- ☐ B. A variation of 10 knots or more between the peaks and the lulls
- ☐ C. Any wind over 30 mph

3. The forecast says 15 mph but it feels dead calm behind your house. What is going on?

- ☐ A. The forecast is wrong
- ☐ B. The number describes 10 meters up over open ground, and your house is blocking the wind
- ☐ C. Wind speed always drops in the afternoon

4. Whole trees are in motion and you notice it is hard to walk into the wind. Roughly how fast is it?

- ☐ A. 8 to 12 mph
- ☐ B. 32 to 38 mph
- ☐ C. 55 to 63 mph

5. Why does a 50 mph gust do so much more damage than a steady 25 mph wind?

- ☐ A. It lasts longer
- ☐ B. The force rises with the square of the speed, so doubling the wind roughly quadruples the push
- ☐ C. Gusts are colder

Answer key

1. The forecast says wind 12 mph, gusts to 30 mph. What is the 12?

B. The wind averaged over a two minute period — Sustained wind is the average of observed values over two minutes. The gust is a separate measurement: the maximum instantaneous speed.

2. According to the National Weather Service, what makes a gust a gust?

B. A variation of 10 knots or more between the peaks and the lulls — The definition is about unsteadiness, not raw speed: rapid fluctuations with a variation of 10 knots or more between peaks and lulls, with the gust being the maximum instantaneous speed.

3. The forecast says 15 mph but it feels dead calm behind your house. What is going on?

B. The number describes 10 meters up over open ground, and your house is blocking the wind — Wind measurements are standardized at about 10 meters, or 33 feet, over open ground. Fences, buildings, and trees slow the air near the surface, which is why a sheltered yard reads much lower.

4. Whole trees are in motion and you notice it is hard to walk into the wind. Roughly how fast is it?

B. 32 to 38 mph — That is the Near Gale band, 32 to 38 mph on the Weather Service's visual clue table. At 55 to 63 you would be seeing structural damage and uprooted small trees.

5. Why does a 50 mph gust do so much more damage than a steady 25 mph wind?

B. The force rises with the square of the speed, so doubling the wind roughly quadruples the push — Force goes up with the square of speed, so twice the wind is about four times the push. A gust also arrives with no warning, which removes any chance to brace or plan.

Questions people actually ask

What is the difference between wind speed and a wind gust?

Wind speed in a forecast is the sustained wind, defined by the National Weather Service as the average of observed values over a two minute period. A gust is the maximum instantaneous speed, reported when the wind fluctuates rapidly with a variation of 10 knots or more between its peaks and lulls.

How high up is wind measured?

About 10 meters, or 33 feet, above open ground. The national forecast grids state it directly: wind speed is the expected sustained wind at 10 meters, and gusts are the maximum 3 second wind speed forecast within a 2 minute interval at that same height.

What is a knot?

One nautical mile per hour, which is about 1.15 mph. A 10 knot variation between lull and peak, the threshold in the gust definition, is a swing of roughly 11 and a half mph.

Can I tell the wind speed without an instrument?

Close enough for most purposes. The Weather Service publishes a table of visual clues: leaves rustling puts you around 4 to 7 mph, small branches moving and paper blowing along the ground is 13 to 18, large branches in continuous motion with wires whistling is 25 to 31, and broken twigs with walking made difficult is 39 to 46.

Why does the forecast sometimes give no gust at all?

Because a gust is defined by unsteadiness, not by speed. If the wind is moving along without a wide enough gap between its peaks and lulls, there is no gust to report, however brisk it happens to be.

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