

Wind Speed and Gusts: What Those Numbers Feel Like

Name: _____

Date: _____

Class: _____

Read the lesson at myweatherrock.com/journal/explainers/wind-speed-and-gusts (or the printed copy), then answer below.

Remember

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.

Questions

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

In your own words

A forecast says wind 12 mph, gusting 30. Explain what each of those two numbers is measuring, and which one you would plan an outdoor event around.

Answer key (for the teacher)

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.