WIND STUDY | Wind Study is intended for grades 5-8 and 8-11
Questions posted on: Monday   Answers posted on: Friday
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2023Q11   PERCENTAGES AND GRAPHING

Hello students! Today we will be talking about a great tool for visualizing wind direction over time: the wind rose. Wind roses are graphical representations of wind speed and wind direction distributions at a specific location over a given period of time. They are typically represented in a circular format.

Wind roses provide a visual summary of how often the wind blows from different directions, making it useful for various applications, including site selection for activities like wind energy generation, aviation, and environmental monitoring. In the wind energy industry, individuals can use the information contained within wind roses to make informed decisions about turbine positioning, thus enhancing the efficiency of energy production and increasing the overall sustainability of wind power generation. The figure below displays an example wind rose.
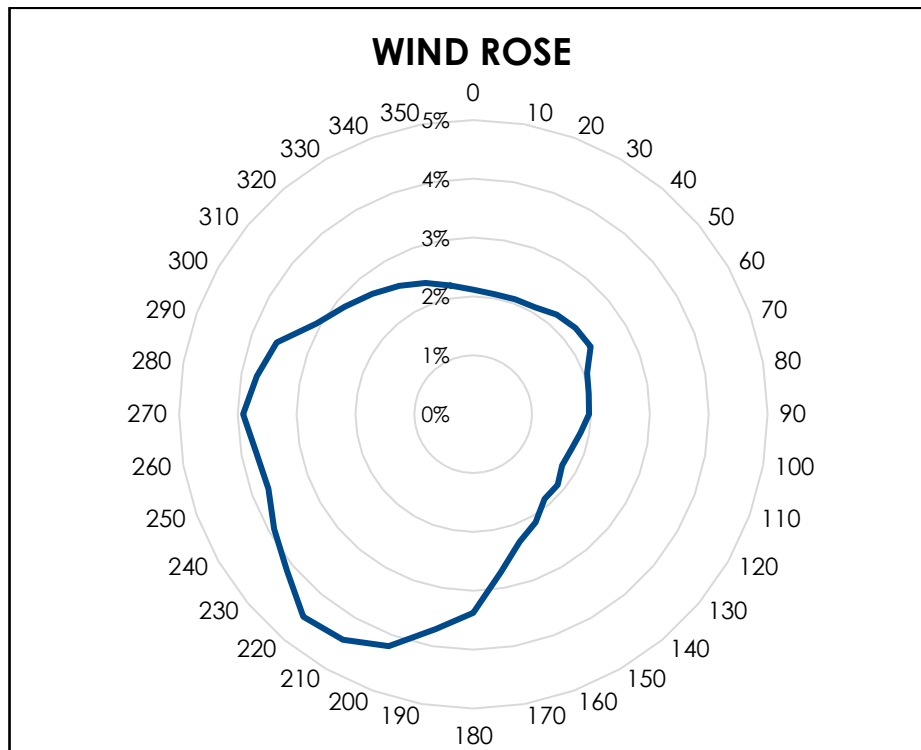
The percentage of wind from each direction is calculated by dividing the amount of wind (usually measured in hours per year or sample) by the total wind (total hours per year or sample).

$$\% \, N = \frac{Hours \; from \; direction}{Sum \; of \; all \; hours}$$

Now that we know a little bit more about our wind rose, let's dive into our questions!

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Level 1: You are provided with a sample of wind data for your local area. The data includes wind direction information. The dataset is as follows (where N is 0°, E is 90°, S is 180°, and W is 270°):

- 80 hours from the North
- 120 hours from the Northeast
- 45 hours from the Northwest
- 60 hours from the East
- 30 hours from the West
- 90 hours from the Southeast
- 50 hours from the Southwest
- 0 hours from the South

Calculate the distribution of wind for each wind direction.

Level 2: Use the table you created for the Level 1 question to make a wind rose. You can do this by plotting a radar map using Microsoft Excel or another software tool. You can also draw a circle and split it into sectors according to the directional degrees.