

Wind Power

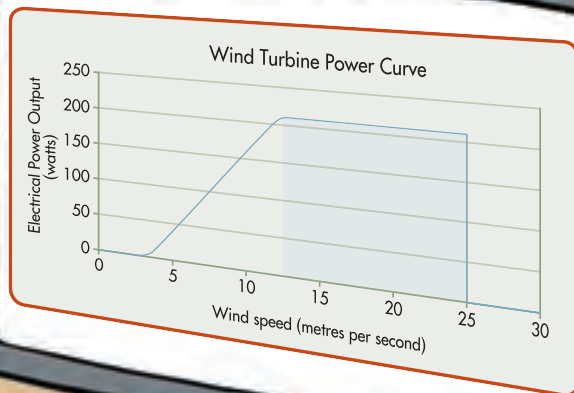
You need ★ a computer spreadsheet or graph paper

Activity One

The wind can be an important source of energy.

In 2007, wind provided 2.5 percent of New Zealand's electricity!

Alana found a diagram on the Internet of a wind turbine's power curve.



1.
 - a. At what wind speed will the wind turbine start generating power?
 - b. At what speed does the wind turbine produce the most power?
2. Wind speed is typically measured in kilometres per hour (km/h).
 - a. Convert 3 metres per second to km/h.
 - b. At about what speed in km/h does the turbine shut down to prevent damage from high winds?
 - c. What range of wind speed (in km/h) is best for power generation?

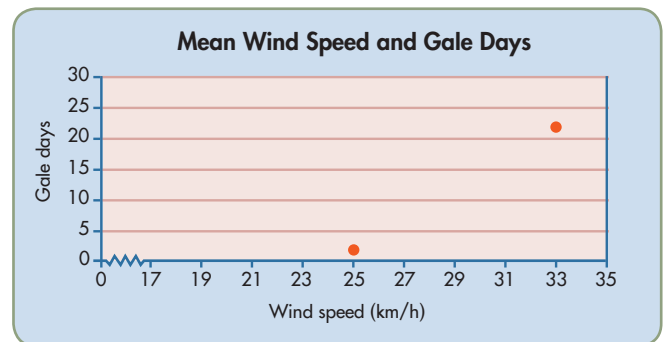
Activity Two

You have been asked to help choose a site for a new wind farm.



1. a. The scatter plot below shows the mean wind speed and number of gale days for 2 possible wind farm locations. Use the data from the table to identify them.

Location	Mean wind speed (in km/h)	Gale days	Transmission costs \$
Stormy Point	29	18	\$
Windy Haven	26	28	\$
Tornado Tip	25	2	\$
Blustery Peak	31	5	\$\$
Breezy Plain	28	3	\$\$
Hurricane Hill	33	22	\$\$\$
Typhoon Terrace	20	6	\$



- b. Recreate the graph so that it shows the mean wind speed and possible time lost (in gale days) for all the locations. Label each location.

2. a. Using the table, your scatter plot, and the power curve graph from Activity One, recommend 3 locations for a new wind farm.
- b. Compare your recommendations with a classmate's. Discuss the thinking that led you to eliminate the other locations.
- c. The transmission costs (access, power lines, losses due to distance, and so on) for a wind farm on Hurricane Hill are much more expensive (\$\$\$) than for other places (\$\$ or \$). How do the costs of accessing transmission affect your ranking?

3. a. What other data would help you make a good recommendation?
- b. What factors other than cost might rule out otherwise suitable sites?

Focus Using representations of data to make decisions