**Traffic Signs on a Blustery Day**

Begin with the End in Mind: The force of moving fluids can transfer great amounts of energy, as we see through the use of wind turbine and hydroelectric generation. In this activity, we will analyze the varying effect of changes in wind speed during a major storm.

1. Choose a historic storm (preferably a hurricane) and gather key facts (dates and locations).
2. Visit Plymouth State’s map page (<http://vortex.plymouth.edu/station_map.html>) and select the region your storm struck. Record an affected four-digit station code below.
3. On Plymouth State’s data page (<http://vortex.plymouth.edu/statlog-u.html>), enter the station code and date and run a Decoded Hourly report.
4. Locate times with wind gusts of approximately 15 knots, 30 knots, and 45 knots. Record them in the table below.
5. Calculate the force of this wind on a hypothetical stop sign (assume it is a flat plate). Show your work on the back of this paper.
6. Calculate the power of this wind on the stop sign.
7. Complete the items below.

Table

Storm: Station: Date:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time | Wind Speed (knots) | Wind Speed (m/s) | Drag Force (N) | Power (W) |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Questions

1. For how long did winds remain above 30 knots?
2. Provide a low-end estimate of the energy transferred during this time by using the power for 30-knot winds.
3. Is the relationship between power and wind speed linear? State your claim, evidence, and reasoning.
4. Based on your claim in the previous item, how much more damaging is a 150-mph wind than a 75-mph wind?