

Wired for Wind – Wind Physics (Activity Sheet)

Radius (meters) =

Area (square meters) = $\pi r^2 =$

Velocity Wind Speed (meters/second) =

Voltage (volts) =

Resistance (ohms) =

Air Density - ρ (rho)(kg/m³) \approx **1.0**

$$Energy_{in} = \frac{1}{2} \times \rho \times A \times V(\text{wind speed})^3$$

$$E_{in} \quad \boxed{} = \frac{1}{2} \times \overset{\rho \text{ (air density)}}{\boxed{1.0}} \times \overset{A \text{ (area)}}{\boxed{}} \times \overset{V_{\text{(wind speed)}}}{\boxed{}} \times \overset{V_{\text{(wind speed)}}}{\boxed{}} \times \overset{V_{\text{(wind speed)}}}{\boxed{}}$$

$$Energy_{out} \text{ (Watts)} = \frac{(\text{Volts})^2}{\text{Resistance}}$$

$$E_{out} \quad \boxed{} = \frac{\overset{V \text{ (volts)}}{\boxed{}} \times \overset{V \text{ (volts)}}{\boxed{}}}{\underset{R \text{ (Resistance)}}{\boxed{}}}$$

$$Efficiency = \frac{\overset{E_{out}}{\boxed{}}}{\underset{E_{in}}{\boxed{}}} \times 100 = \boxed{} \%$$

Power Curve:

1. Wind Speed (m/s)
 - a. Fan speed 1 _____
 - b. Fan speed 2 _____
 - c. Fan speed 3 _____
2. Energy Out (Watts)
 - a. E_{out} at fan speed 1 _____
 - b. E_{out} at fan speed 2 _____
 - c. E_{out} at fan speed 3 _____
3. Graph Energy out (y axis) by Wind Speed (x axis)

