Name_____ Period _____ Date _____

Wind Power

STEM Sims

Lesson 1: What is the Relationship Between Turbine Blade Length and Energy Generated?
Wind power has been touted as a possible alternative energy source to reduce pollution and the high costs associated with fossil fuel-based power generation. One question regarding wind turbine efficiency is how long should turbine blades be to best convert wind to electrical power?

Doing the Science

1. Start the Wind Power Simulation by clicking on the "Sim" tab.
2. Select the "Make Turbine" button.
3. Set the "Number of Wind Turbines on Farm" to 3 and hit enter on your keyboard.
4. Select Turbine 1 and choose a Tower Height of 100 m and Blade Radius of 40 m.
5. Select Turbine 2 and choose a Tower Height of 100 m and Blade Radius of 50 m.
6. Select Turbine 3 and choose a Tower Height of 100 m and Blade Radius of 60 m.
7. Click on the "Submit" button.
8. Choose "December" from the Calendar menu.
9. Select the "Start" button.
10. After the completion of the run, click on the "Energy Generated" button at the bottom of the screen.
11. View the graph and estimate the average energy generated for each of the three wind turbines. Record these values in Table 1 below.

Table 1.

Turbine #	Tower Height (m)	Blade Radius (m)	Energy Generated (kWh)
1	**100**	**40**	
2	**100**	**50**	
3	**100**	**60**	

Do You Understand?

1. How was blade radius related to the amount of energy generated by the wind turbine?

2. Could a blade with a 60 meter radius operate on a wind turbine with a tower height of 100 meters? Please explain why or why not.