

How Many Blades Are Best??

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­­­­­­­­­­­­­­­­­**Educational Goals:**

• Students will use the Scientific Process to perform the experiment.

• Students will collect and analyze data.

• Students will learn to use a model wind turbine that generates a safe level of DC electricity.

• Students will learn about how different numbers of blades produce different power outputs from the wind turbine.

• Students will use the Internet to research lesson related topics.

**Description:**

Students witness how two, three, four and six blades produce varying amounts of power for the same wind speed.

Students come to understand that:

1. Adding more blades may, or may not, generate more power.

2. Adding more blades creates more “drag” caused by increased wind resistance.

3. Reducing the number of blades may result in higher power output.

4. The wind turbine will run smoother with more blades

**Time:** about 1 hour

**Materials Needed:**

1 – WindPitch Wind Turbine

1- Table fan (20” diameter recommended)

1 - 100 ohm potentiometer

6 – Curved blades

2 – Red hookup lead

2 – Black hookup lead

1 – Circuit Board Module Base

**Directions:**

1. Adjust the potentiometer dial to 75 ohms.

2. Set the multimeter dial to Volts with a range of at least 10 volts.

3. Place the table fan in front of the wind turbine about 2 feet away from it and set it to its highest speed setting.

4. Measure the voltage.

5. Repeat step 4 with 3 blades

6. Repeat step 4 with 4 blades

7. Repeat step 4 with 6 blades

Have the students enter the voltage readings in the table below. Then have them compute the current and power based on the 75 ohm resistor load for each step.

Recall:

Ohm’s law: V=IR

Power: P=VI

|  |  |  |  |
| --- | --- | --- | --- |
| Number of Blades | Volts | Amps | Watts |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |
| 6 |  |  |  |

Interpret the table.

Conclude. Which blade combination produces the most power? Which combination produces the most speed? Which combination runs the smoothest? Which one has the most drag?

What would you say is the best combination for producing power at the best speed with the least drag?