**Wind Turbine Design Post-Test Answer Key**

1. **How are a wind turbine and a fan similar or different?**
2. They are the same. They both turn wind into energy.
3. They are the same. They both turn energy into wind.
4. They are opposites. A wind turbine converts kinetic energy into electrical energy, and a fan converts electrical energy into kinetic energy.
5. They are opposites. A wind turbine converts electrical energy into kinetic energy, and a fan converts kinetic energy into electrical energy.
6. **Which of the following *increases* the power generated by a wind turbine?
Circle all answers that apply.**
7. Increasing wind speed
8. Decreasing air density
9. Decreasing sunlight
10. Increasing blade size
11. Increasing rainfall
12. **What happens to the power produced by a wind turbine if the blades are placed at each of the three angles below? Explain.**

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**0°:** At 0°, the wind will push directly into all of the blades and they will not be able to spin. Thus, the power output will be zero.

**90°:** At 90°, the wind will slide right over and under the blades, not transferring any of its kinetic energy. Thus, the power output will be zero.

**45°:** At 45°, the wind will push into the blades and slide upwards, causing the blades to spin counter-clockwise. This will cause the turbine to generate electricity and produce some amount of power.

1. **How would you design a wind turbine to collect the most energy?
Draw an example and explain below.**

Expect student drawings to be reflect what was observed and discussed in class as the best prototype design(s) based on the evaluated results.

Expect student explanations to reflect evidence-based reasoning for why the drawn design performed best, for example, “the chosen design collected and produced the most energy (in x amount of watts) because it had the largest blades, the most blades, or was placed at the optimum angle.”