The Power of the Wind

Name_____

The mayor of a small town needs your help. The town will be growing quickly in the next few years. The city council would like to see this growing city use renewable energy as an energy source. Many on the city council would like to look into wind energy. Your job is to create a prototype using wind to generate electricity for the town. A "prototype" is a physical model of a machine that can be adjusted and changed to meet needs.

The mayor has assigned you and your partners to create an efficient windmill prototype to see if it can generate at least 1.0 volts of electricity.

Together with your group, discuss three main questions you will need to research before building.

1.

2.

3.

Research: Research is important to the engineering process. Watch the following videos and write down what you learned in them.

Energy 101: Wind Power (2:13 minutes)

What did you learn from the video?

Energy 101: wind turbines (3:16 minutes)

What did you learn from the video?

https://www.energy.gov/eere/wind/animation-how-wind-turbine-works

What does this animation show?

Criteria: Create a windmill that can generate at least 1.0 volts of electricity on a voltmeter.

Constraints: Limited supplies-- Craft Sticks, low-temperature glue gun, glue sticks, different types of paper, Time: You have 1 hour to construct the windmill
Blade Size

_____

_____

Windmill Height_____

Based on your research, draw a model of your windmill. Include dimensions of the blade, height of the windmill, location of the motor, and wires.

List of supplies your group chose.

Testing: Place your windmill in front of the fan. Record the number of volts created (the data) on the table below.

	Fan Test #1	Fan Test #2	Fan Test #3	Observations
Low-Speed				
Medium-Speed				
High-Speed				

Analysis: Answer the following questions.

1) How did your windmill perform? Give some examples from your observations.

2) What changes do you need to make to the windmill to make it more efficient or fix issues during testing?

Redesign: Redesign your windmill by making changes to improve or reach the criteria. Then retest your design and record the results in the table below.

	Fan Test #1	Fan Test #2	Fan Test #3	Observations
Low-Speed				
Medium-Speed				
High-Speed				

Analysis: Answer the questions below.

1) Did your redesign meet the criteria? Why or Why not? Describe your observations.

2) What changes do you need to make to the windmill to make it more efficient or fix issues during testing? Use the space below to show any redesigns.

Interpretation or Conclusion: Answer the following questions about your project.

1) Did your prototype meet the Criteria? Why or why not? Did your group succeed in creating wind power? How did the redesign changes help your project?

2) Did your group work together successfully? What is your evidence?

3) What other changes in the design could you make in the project?

4) What did you learn in the process of designing and testing your project?