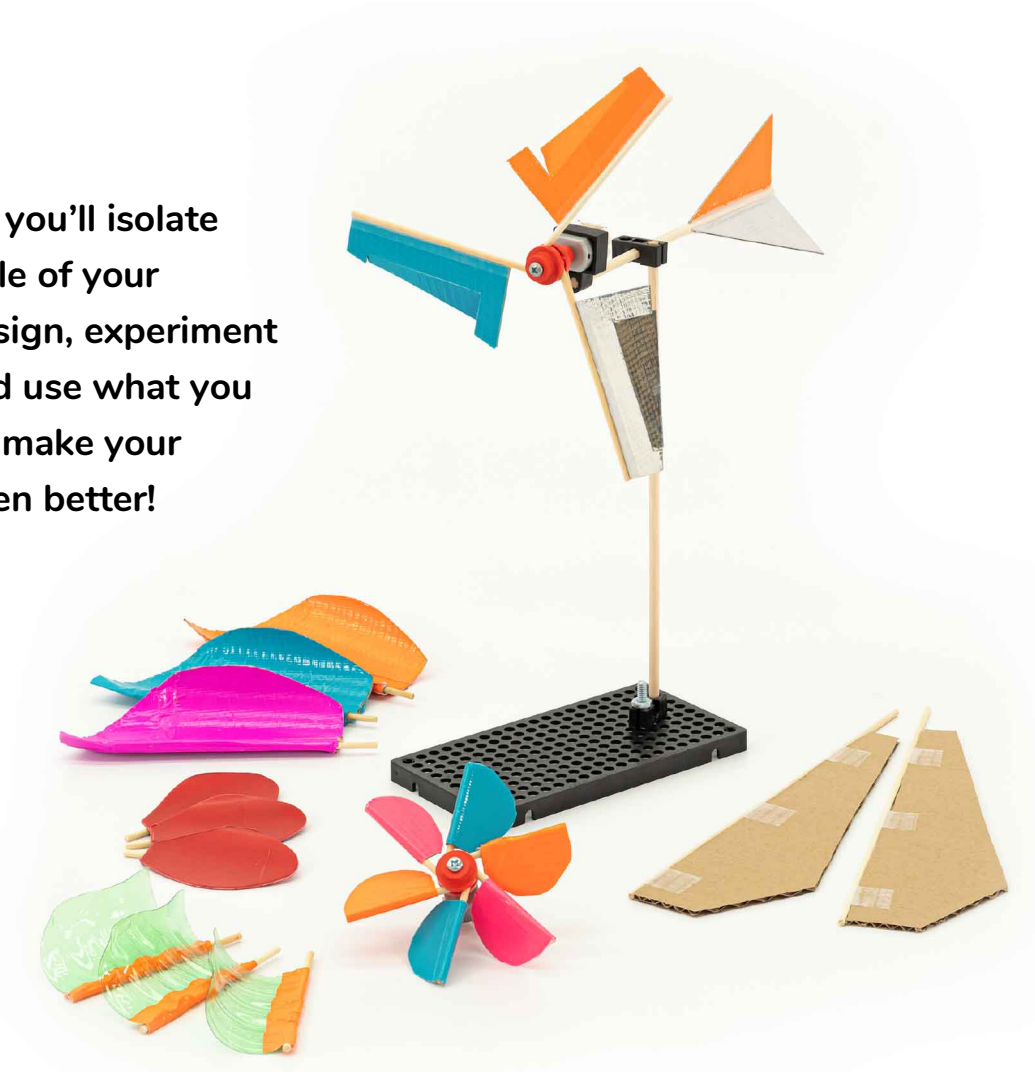
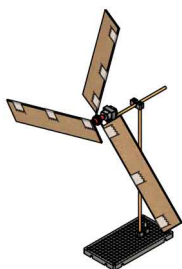




In this lab, you'll isolate one variable of your blade's design, experiment with it, and use what you learned to make your turbine even better!



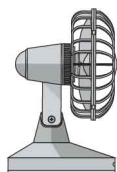
### Lab Supplies



**"Built" Mini Wind Turbine**

Need to build your turbine?

Download the [Go Guide](http://shop4-h.org) at [shop4-h.org](http://shop4-h.org)



**Fan**



**Scissors**



**Blade Materials**

Cardboard, recycling bin materials, tape, etc.



**Digital Multimeter**  
or Voltmeter



**4x Alligator Clip Leads**  
optional – for connecting the multimeter



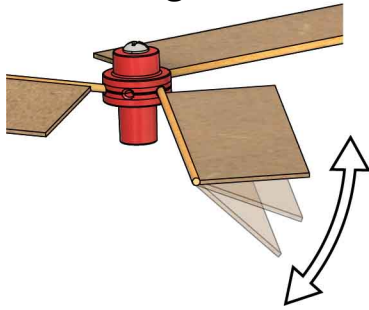
**2.7  $\Omega$  Resistor**  
optional – smooths voltage readings



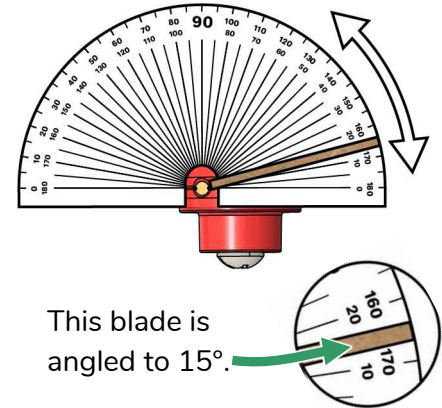
## Ask A Question

① Choose a variable to investigate:

### Blade Angle

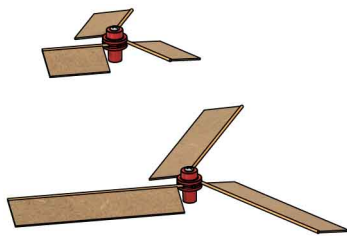


Blade angle is the most important variable, and it's also the easiest to change! **Try angles between 0° and 90°.** Use a protractor to measure your angles.

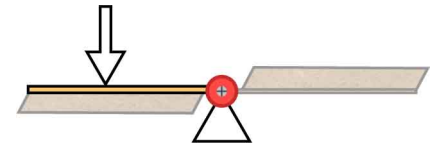


This blade is angled to 15°.

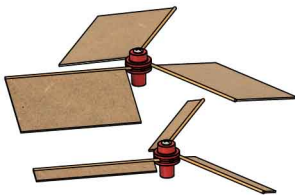
### Blade Length



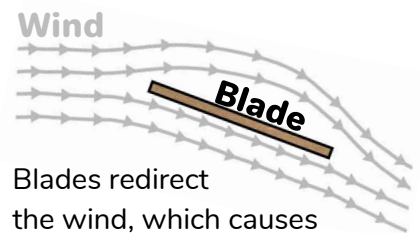
Each blade acts like a lever turning your generator. **What works better for speed – long or short blades/levers?** Test different lengths to find out!



### Blade Width

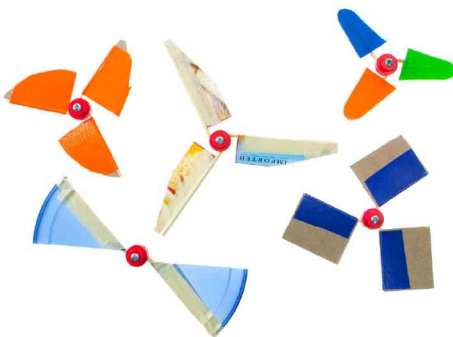


Wider blades catch more wind, but also have more friction. **What width works the best?** Design an experiment to find out!



Blades redirect the wind, which causes them to spin.

### Other Variables



Blade shape, blade materials, number of blades, ... the possibilities are endless! **What variable will you investigate?**

**APPROVED**

If doing this lab for school, make sure your teacher approves the variable you are testing.



### Plan Your Experiment

2 What variables do you need to keep track of?

Independent Variable(s)	Dependent Variable(s)	Control Variable(s)

3 Write a plan for your experiment, including a sketch of the setup. Make sure you provide enough information for others to repeat your experiment.

**Plan:**

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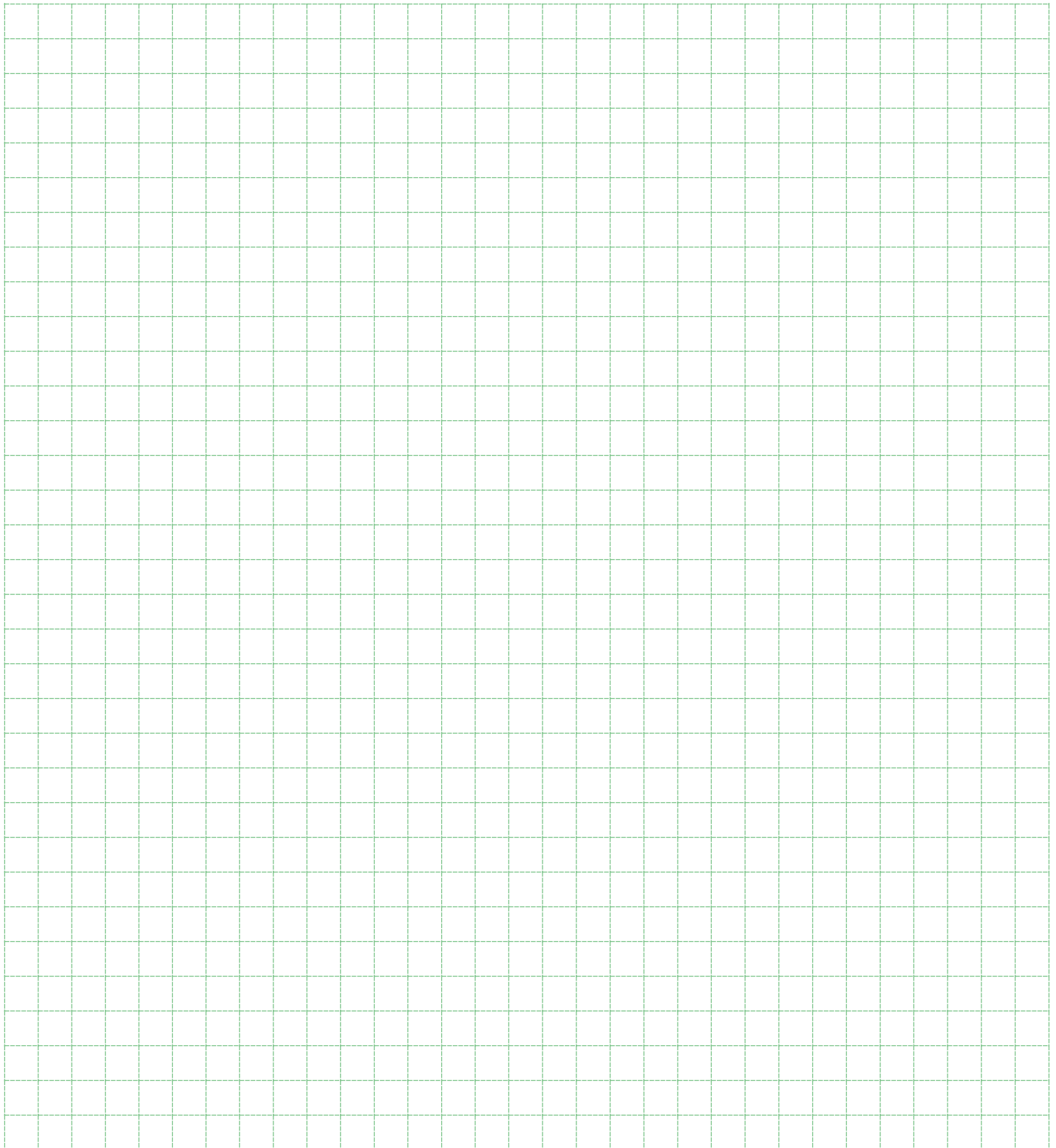
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**Sketch:**





## Collect Data (continued)





### Interpret Data

- 5 Examine your graphs and tables. How are the independent and dependent variables related (e.g. proportional, linear, exponential, inverse, ...)? How do you know?

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### Construct an Explanation

- 6 What do you think is going on? Why did you observe what you did?

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- 7 What did you learn, and how will you use it to make a better turbine?

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