

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



### Lab Supplies



**"Built" Boat**

Need to build your boat?

Download the [Go Guide](https://teachergeek.com/boat) at [teachergeek.com/boat](https://teachergeek.com/boat)



**Fan**



**Scissors**



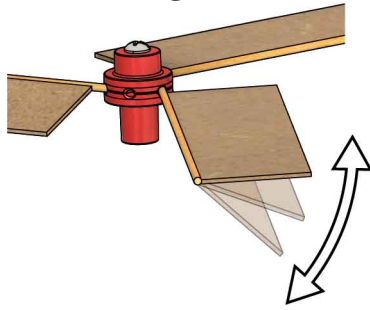
**Blade Materials**

Cardboard, recycling bin materials, tape, etc.

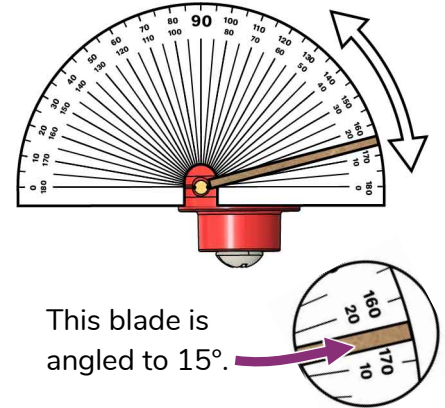
### Ask A Question

① Choose a variable to investigate:

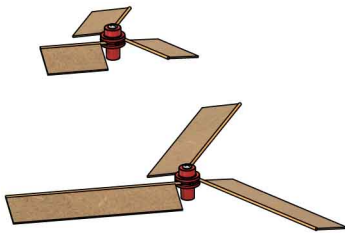
#### Blade Angle



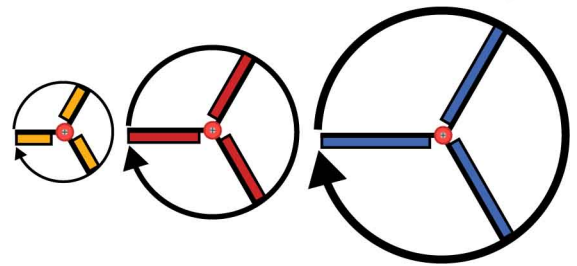
Blade angle is the most important variable, and it's also the easiest to change! **Try angles between 0° and 90°.** Use a protractor to measure your angles.



#### Blade Length

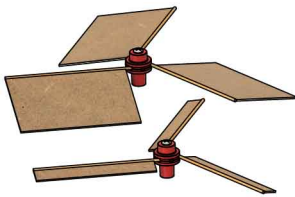


Longer blades move faster than shorter blades, if your motor is strong enough to push them. **Test different lengths to see which works the best!**

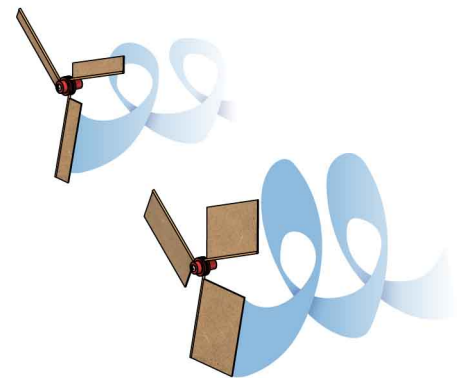


If the motor spins each propeller 50 rotations per minute, the big blades go a greater distance, so they must move faster.

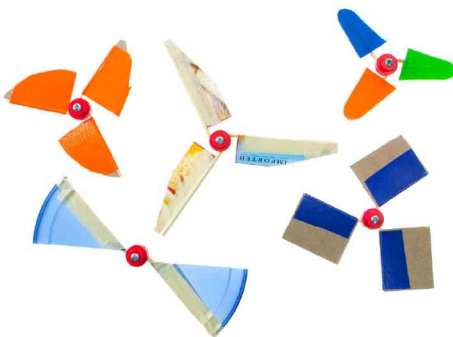
#### Blade Width



Wider blades push more air by taking bigger “bites,” but they also have more friction with the air. **What width works the best?**



#### Other Variables



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



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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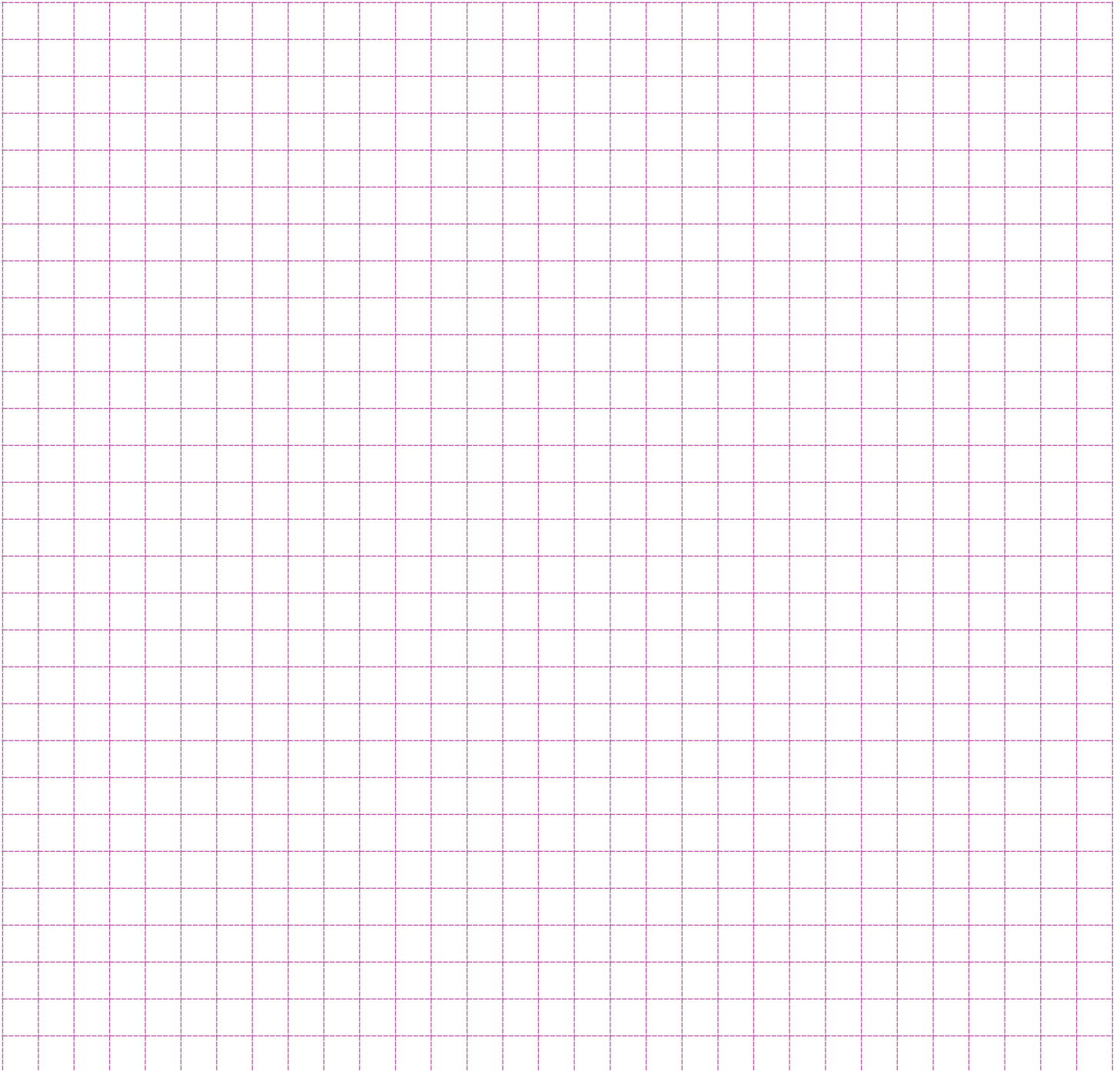
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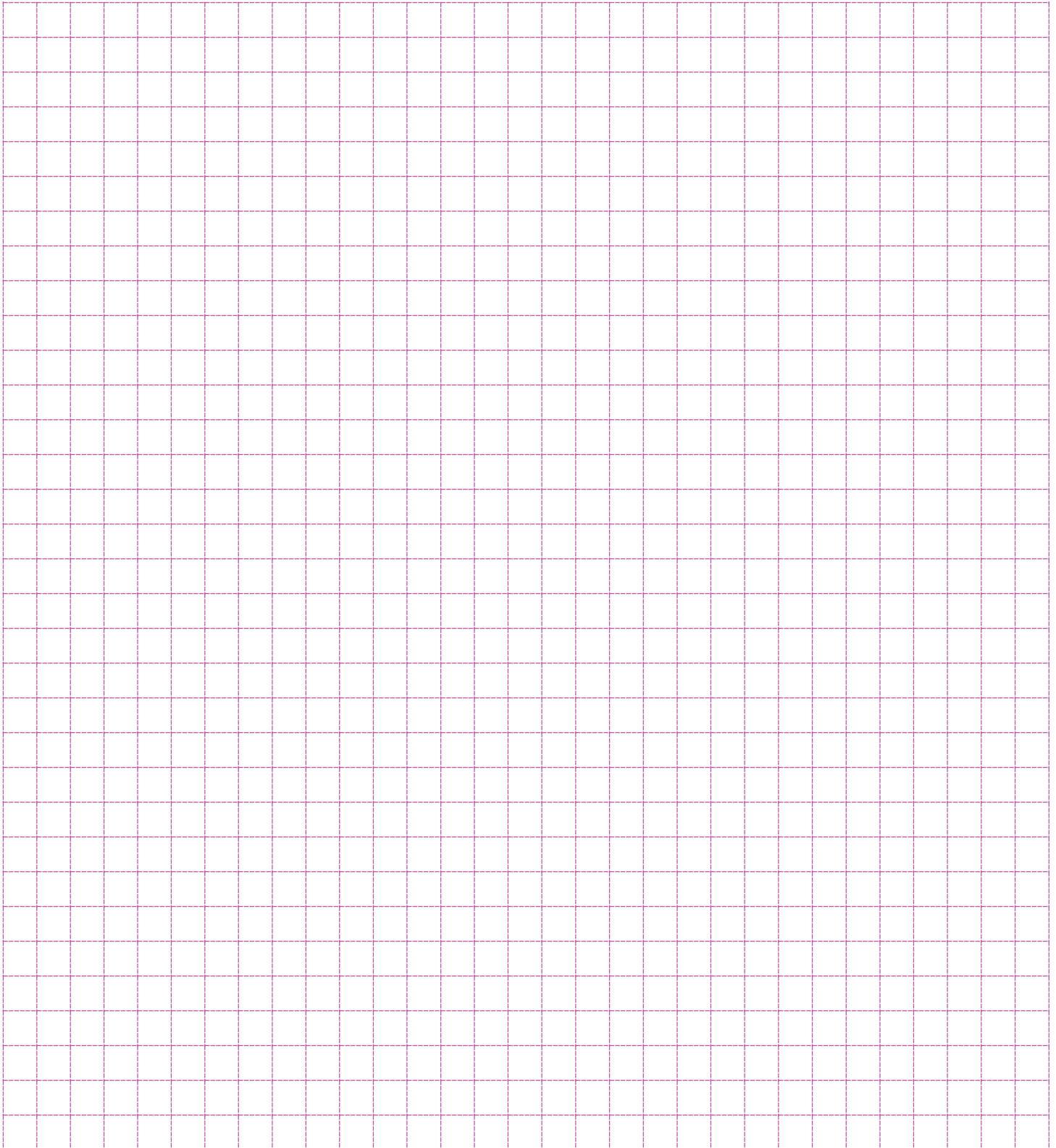
**Sketch:**

### Collect Data

- 4 Do your experiment! Record your data on these pages in lists or tables. Then graph it to look for patterns.



### Collect Data (continued)



A large grid of graph paper for data collection, consisting of 20 columns and 30 rows of small squares.

### 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 propeller?

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