

# Blade Area Lab

## Wind Lift



Name(s): \_\_\_\_\_

Make sure you have a built TeacherGeek Wind Lift, before starting this lab.

**1. Hypothesis:** How do you think the Wind Lift blade area affects the number of pennies that can be lifted?

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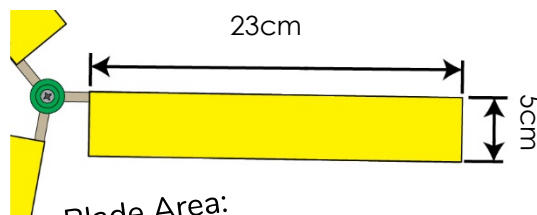
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### Get Ready

Make sure that your blades are 23cm x 5cm. If they are not, cut new blades and tape them on. They should be like this.

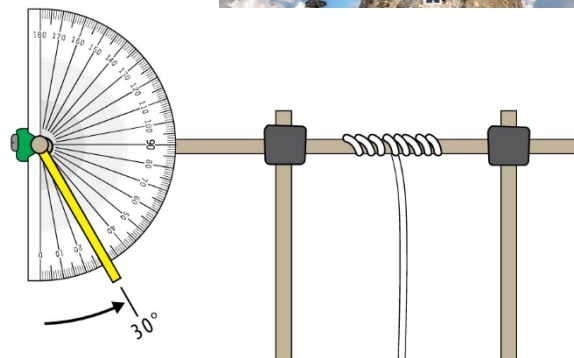
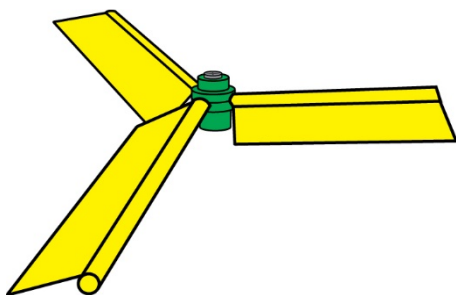


Blade Area:  
 $23 \times 5 = 115\text{cm}^2$   
 $115\text{cm}^2 \times 3 = 345\text{cm}^2$   
Blade Area x # of blades = total area

Some wind turbines/windmills have blades with a lot of area, while others have blades with very little area.



Set the angle of your blades to approximately 30°.

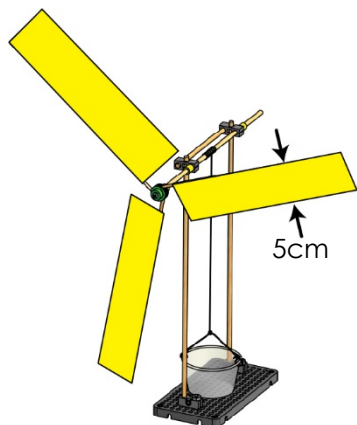


**Change the blade angle by:** 1. Loosening the hub screw a little bit; so the blades can turn, but do not fall out. 2. Changing the blade angle using a protractor. 3. Tightening the screw up again.



**Test your Hypothesis:** How does blade area affects the number of pennies that can be lifted?

**Use your 5cm wide blades.**



**2.** What is the combined area of all of the blades?

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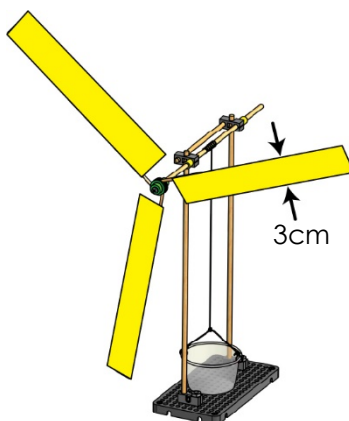
**3.** What is the maximum number of pennies that can be lifted?

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**4.** How long does it take to lift the bucket?

\_\_\_\_\_ seconds

**Cut your blades to 3cm wide.**



**5.** What is the combined area of all of the blades?

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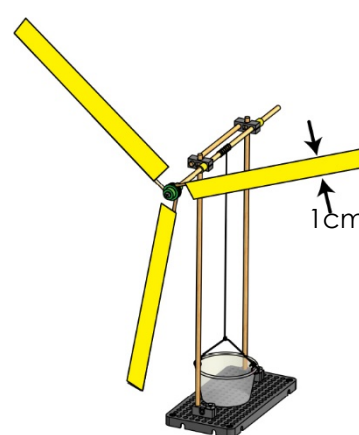
**6.** What is the maximum number of pennies that can be lifted?

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**7.** How long does it take to lift the bucket?

\_\_\_\_\_ seconds

**Cut your blades to 1 cm wide.**



**8.** What is the combined area of all of the blades?

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**9.** What is the maximum number of pennies that can be lifted?

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**10.** How long does it take to lift the bucket?

\_\_\_\_\_ seconds

**11.** Was your hypothesis correct? Please explain why, or why not (don't just write "yes" or "no").

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