

Blade Area Lab

Wind Lift



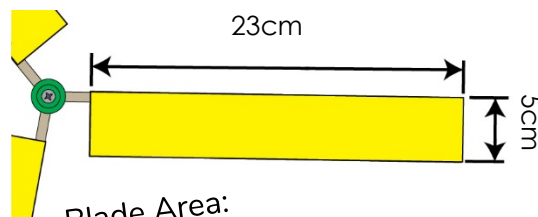
Name(s): _____

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?

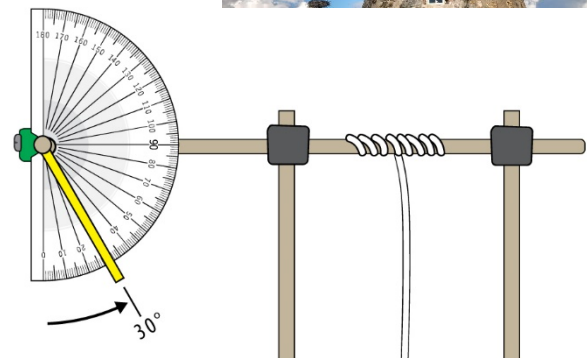
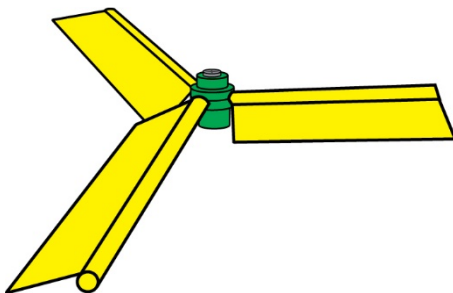
Get Ready

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

Set the angle of your blades to approximately 30°.



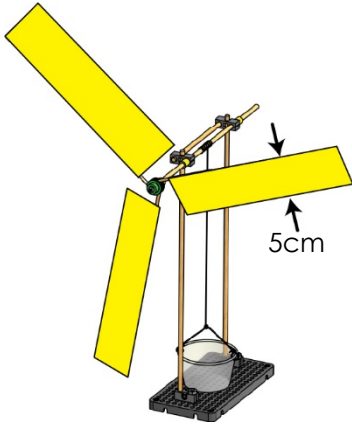
Change the blade angle by: 1. Loosening the hub screw a little bit; so the blades can turn, but do not fall out. 2. Changing the blade angle using a protractor. 3. Tightening the screw up again.

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



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

Use your 5cm wide blades.



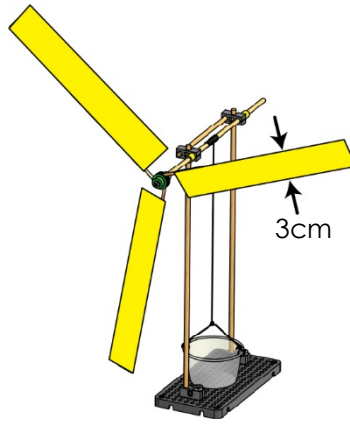
2. What is the combined area of all of the blades?

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

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

_____ seconds

Cut your blades to 3cm wide.



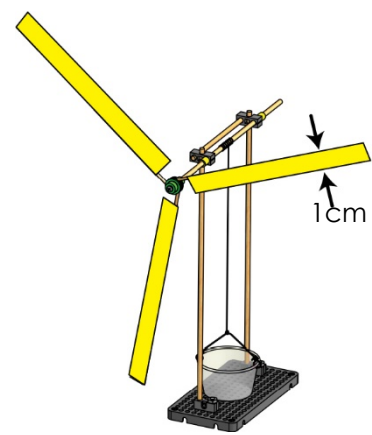
5. What is the combined area of all of the blades?

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

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?

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

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").
