



Name: _____

MacGyver Wind Lift Design Challenge Intermediate Student Datasheet

Engineering Process Steps

ASK:

How can we design a MacGyver Wind Lift that will capture the wind from a fan to lift a cup of pennies?

IMAGINE:

With your group, brainstorm a list of variables (things that can be changed) for your blade design. Record all your ideas below.

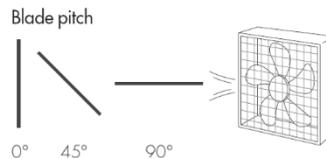
Number of Blades: _____

Blade Shape: _____

Blade Length: _____

Blade Material(s): _____

Blade Pitch/Angle: _____



<p><i>Draw your blade design</i></p>	<p><i>Blade Design #1 Specs</i></p> <p>Number: _____</p> <p>Shape: _____</p> <p>Length: _____</p> <p>Material: _____</p> <p>Pitch/Angle: _____</p> <p>Number of Pennies Lifted: _____</p>
--------------------------------------	---

CREATE:

Follow your plan to build your wind turbine.

TEST:

Test wind lift and record your results on the chart.

REDESIGN:

As a group, discuss possible changes you could make to your wind lift to increase the number of pennies it lifts. Record your new ideas on the chart.

<i>Draw your blade design</i>	<i>Blade Design #2 Specs</i> Number: _____ Shape: _____ Length: _____ Material: _____ Pitch/Angle: _____ Number of Pennies Lifted: _____
-------------------------------	--

FINAL RESULTS:

Test	Number of Pennies Lifted
Design #1	
Design #2	

CALCULATIONS:

Using your best turbine design, calculate the speed it can lift 10 pennies. Repeat with 20 pennies.

Trial	Number of Pennies	Weight 1 penny = 2 grams	Distance Length of string	Time Seconds	Speed $s = \frac{d}{t}$
Sample Trial 1	10	20 g	.5 m	12 sec.	.04 m/s
Sample Trial 2	20	40 g	.5 m	23 sec.	.02 m/s
Trial 1	10				
Trial 2	20				

CONCLUSION

Use your results and class results when answering these questions.

1. Explain which design had the best results. Why do you think this design worked the best?

The best design was _____.

This worked best because _____

_____.

2. If you had to do it all over again, describe how you would change your design? Why?

I would change my design by _____

_____.

3. How many blades worked the best for lifting weight? _____ blades

Did more blades mean you could lift more weight? _____

_____.

4. Pitch is _____.

Did flat or angled blades catch more wind? Circle one: Flat Angled

5. Compare how the weight impacted the speed of the lift.

The weight of the lift impacted the speed _____

_____.

6. Describe a challenge you faced in the engineering process. How did you problem solve to reach a solution?

A challenge I faced in the process was _____

_____.

I solved the problem by _____

_____.

7. Using the terms **kinetic** and **potential**, describe the energy found in the turbine blades held in front of the fan

With the fan turned on: _____

With the fan turned off: _____

8. You have learned many things while completing the MacGyver Challenge. Among them are the engineering design process, wind energy, and teamwork. Discuss one thing you learned and how you can use this new skill in real life.

I learned about _____.

I can use this _____.