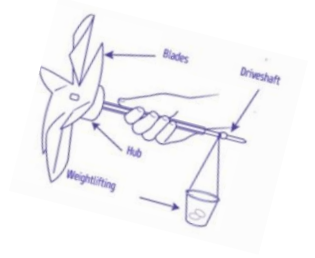


Student Worksheet: Mini Windmill Challenge



Name: _____

Date: _____

Part 1: Predict

1. What do you think will happen when we put your windmill in front of the fan?

2. How many washers do you predict your windmill will be able to lift?

☐ 0 ☐ 1 ☐ 2 ☐ 3 or more

Part 2: Build

- Follow the step-by-step instructions with your teacher to build your windmill.
 - **Fold Plate** – Fold in half, then the other way, to make 4 equal sections and find the center.
 - **Attach Hub** – Place tape roll on the center (back side). Stick foam cylinder on the tape.
 - **Secure Skewer** – Turn over the plate and skewer the plate to the foam cylinder. If plate is not secure, add tape to the skewer to secure it in place.
 - **Build Drive train** – Slide straw over skewer. Hold onto straw and spin plate — it should turn freely.
 - **Attach String** – Tie one end to skewer and secure. Tie the other end to paper cup.
 - **Make Blades** – Cut along fold lines, on plate, almost to the center.
 - **Bend Blades** – Angle blades so they catch the wind.
- Label these parts on your drawing below: **blades, hub, drive shaft, string, cup.**

Draw your windmill here:

A large, empty rectangular box with a blue border, intended for the student to draw their windmill.

Part 3: Test

Test your windmill three times. Record your results.

Trial	Did it Spin? (yes/no)	How many washers did it lift?	What did you change?

Part 4: Reflect

1. Did your windmill spin in the wind?

☐ Yes ☐ No

2. Did your windmill lift weight?

☐ Yes ☐ No If yes, how many washers? _____

3. What design change helped your windmill work better?

4. Why do you think the tilt (pitch) of the blades matters?

Vocabulary (Match the word to the definition)

1. **Blade Pitch** _____

2. **Drive Shaft** _____

3. **Bearing** _____

4. **Hub** _____

5. **Force** _____

Definitions

- A. The tilt or angle of the blades.
- B. The stick (skewer) that makes the cup go up and down.
- C. The part in the middle that connects blades to the shaft.
- D. A push or pull.
- E. The straw that helps the skewer spin smoothly.

Part 5: Connection to the Real World

1. How are real wind turbines similar to your Mini Windmill?



ENERGY EDUCATION RESOURCE from the Kansas Corporation Commission and K-State Engineering Extension. Made possible by a grant from the U.S. Department of Energy. Document last revised 9/9/2025.



2. How could windmills help us make clean energy?
