

STEM Lesson Plan
7th Grade
Tara Daniels

“Harnessing the Wind”

Science Standard

Standard 7.1.2

Apply Newton's Third Law to **design a solution** to a *problem involving the motion of two colliding objects in a system*. Examples could include collisions between two moving objects or between a moving object and a stationary object. (PS2.A, ETS1.A, ETS1.B, ETS1.C)

ELA Standard

Reading: Literature Standard 2

Determine a theme or central idea of a text and analyze its development over the course of the text; provide an objective summary of the text.

STEM Standard- Engineering Design Process

Supplies:

Half gallon cartons	Wooden Dowels	Popsicle Sticks	index cards
Cups	Plastic Spoons	Hot glue	String
Small AC motors	Coffee Filters	2” foam balls	straws
Blow Dryers	Pennies		

Day 1:

Students spend the day looking at how Newton’s third law applies to a windmill, specifically in its blade shape.

Videos:

https://www.ted.com/talks/rebecca_j_barthelmie_and_sara_c_pryor_how_do_wind_turbines_work?utm_campaign=tedsread&utm_medium=referral&utm_source=tedcomshare

Readings:

Student-directed research time, make a list of challenges and benefits of wind power.

Define the problem in the Engineering Design Process, a windmill will lift a small cup with as many pennies as it can hold.

(Students have been reading, “The Boy Who Harnessed the Wind,” in English class for usually three weeks before I introduce this assignment. There are many shorter articles you could incorporate about William Kamkwamba if they are not reading it in class.

Day 2: Brainstorm and begin building the design. (We work in partners)

<https://docs.google.com/document/d/1Tpt907pLWK3uaxGWjBsL4RggFQgWdmMKzMZtU3ByXkc/copy?usp=sharing>

Day 3: Continue building windmills. It usually takes a 50 minute class period for students to build a working design.

Day 4: Test and improve. Students use blow dryers to make wind. I have seen this done with room fans as well.

Day 5: Write a reflection about the building process and share a recording of your design in action. Students can put the blades on the motors and we test for amperage to see if they are generating power.