KidWind®
PROJECT

Please feel free to edit, delete or add to these slides as you see fit for your audience.

KidWind®

MacGyver

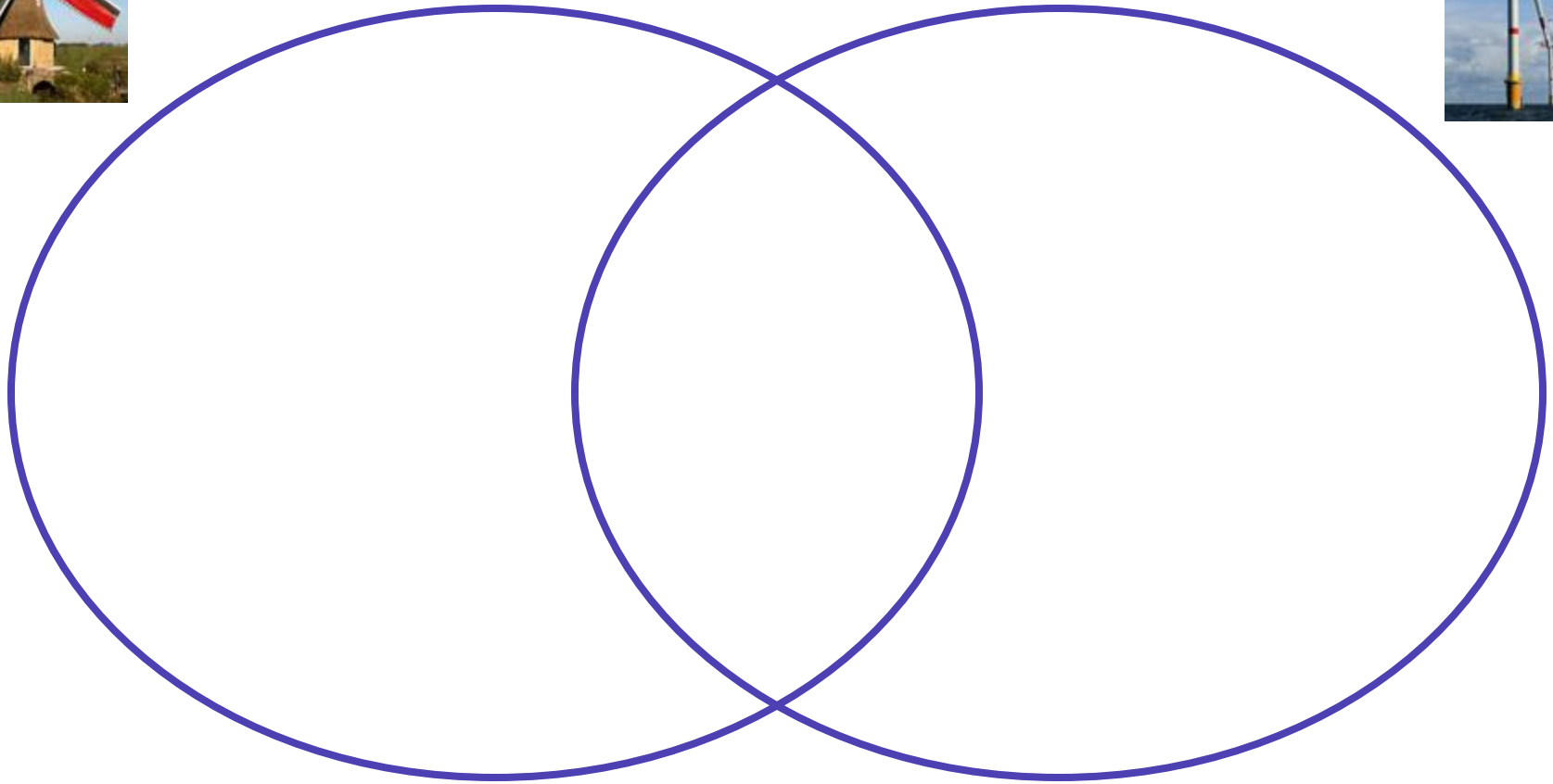
At the end of the lesson students will:

- Know the fundamental parts of a wind turbine
- Be able to use the engineering design process and the scientific method to isolate and adjust variables while designing and testing wind wheels
- Understand energy conversions and transfers, and how a wind turbine converts moving air into electrical energy
- Design a Wind Wheel for the firefly wind turbine that can light up an LED

windmill vs. wind turbine

windmill

wind turbine



Act this out together:

What if we move our hand flat, like it’s cutting through the wind?

Act this out together:

What happens if we tilt our hand, thumb pointing upward?

Act this out together:

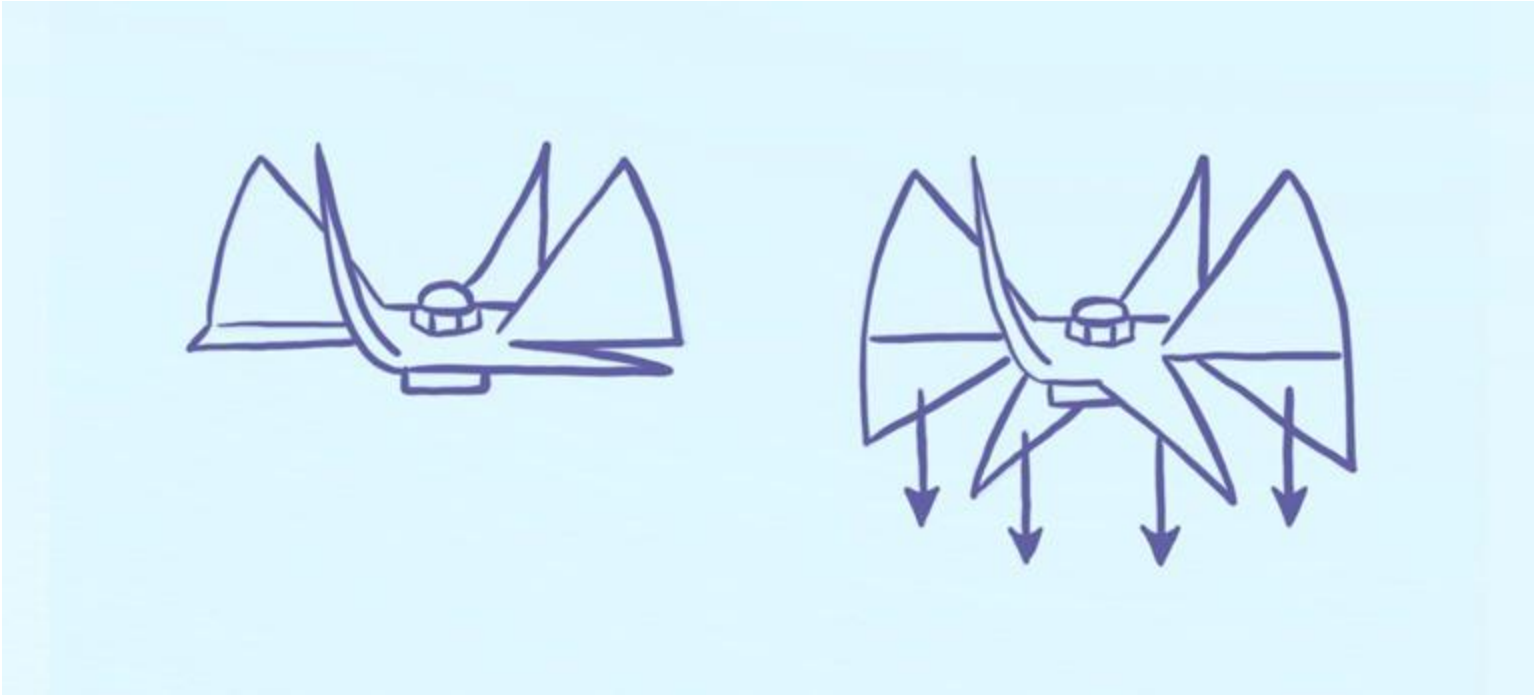
What happens if we tilt our hand, thumb pointing downward?

Act this out together:

Now our hand is out, fingers together, like we're making a wall. What happens to our hand?

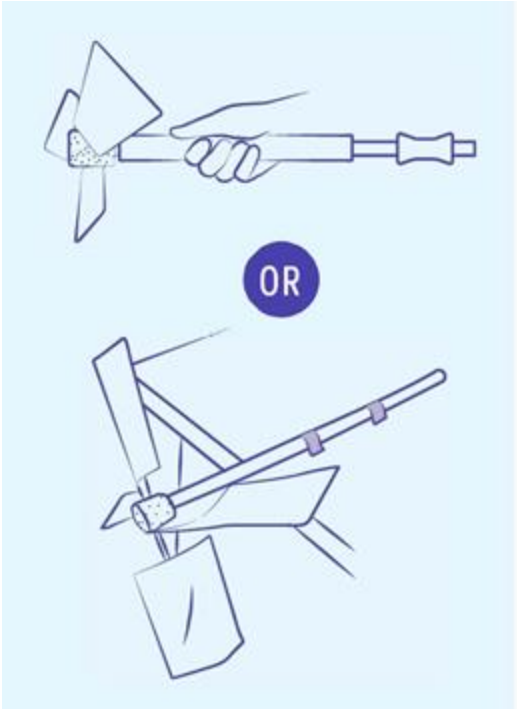
Designing the Wheel

To add more area to catch the wind, fold each left corner down



Part 1: Designing the Wheel

Create a blade design that you think creates the most energy.



Class discussion

- ➔ What is holding it back/preventing spin?
- ➔ What parts were most difficult to design and make functional?
- ➔ How did you attach your blades?
- ➔ Where is there friction in your design?
- ➔ How did you reduce friction in your windmill?
- ➔ How did you pitch or angle the blades?
- ➔ Were your blades changing pitch frequently?
- ➔ Did the fan work better from the front of the blades or the side?

Part 2: Weight lifting challenge

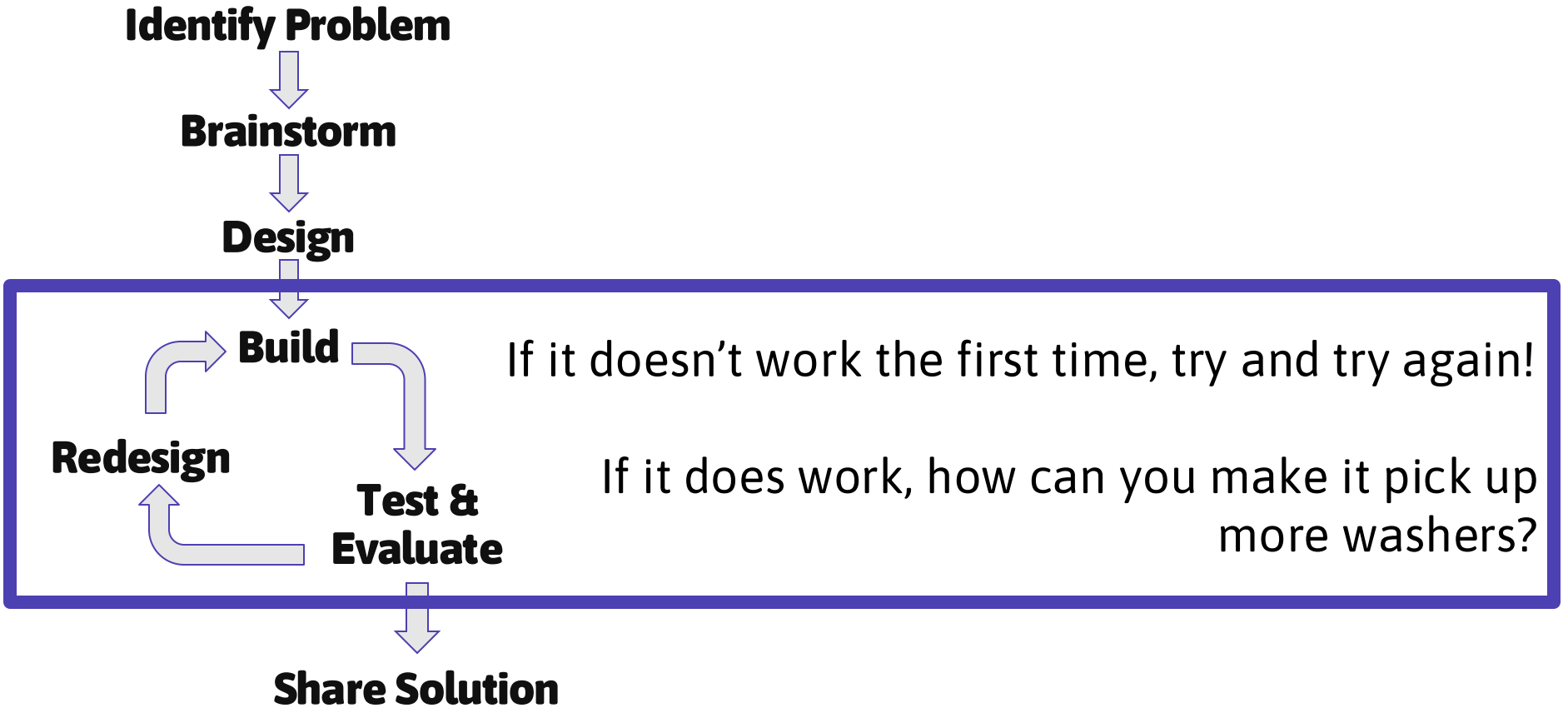
MacGyver Activity

MacGyver Activity

Goal: to lift as many washers as you can

We are going to measure the wind wheel design by how many washers it can pick up.

The Design Process



Let's remember our variables

Independent Variable
(what is changed)

Dependent Variable
(what is measured)

Control Variable
(what conditions are kept the same)

Designing the Wind Wheel

Test in the fan to see if it spins. Let's come up with some class rules for testing so that everyone has a chance to test and look at others' designs.

1.
2.
3.
4.

Vocabulary

wind turbine

A human-made device engineered to spin in the wind in order to generate electricity

Our Firefly is a small wind turbine that spins in the wind and lights up an LED!

LED

LED stands for light emitting diode, which means it lights up like a light bulb. It uses electricity to light.

electricity

a form of energy used to light lights, turn on pumps, blow air and so much more

generato
r

A generator is made of magnets connected to a shaft and conductive wire (meaning electricity can move through the wire). When magnets are moved next to wire quickly, an electrical charge is generated that can power lights or motors.

blades

the parts of the wind turbine that spin in the wind because of the way they catch the wind

Calculate how much energy is required to lift the washers!

Measure:

-mass (kilograms) of the washers

- height of the washers being lifted (meters)

Energy (J) = Mass (kg) x Acceleration of Gravity (9.8 m/s^2) x Height (m)

Here are some other ways to provide background information needed for the MacGyver lesson!

Feel free to keep what you like and delete what doesn't work for you.

What is polarity?


ENERGY


Wind turbine
?


HOW DO WIND TURBINES WORK?
KINETIC ENERGY / WIND ENERGY


CAITIE'S
CLASS
ROOM
FIELD TRIP