KidWind®
PROJECT

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

KidWind®

Firefly

Imagine it's windy outside. Is the wind doing anything to you or the things around you?

Can you feel the wind?

What does it feel like?

What are pinwheels?

Have you seen a windmill before?

What are they used for?

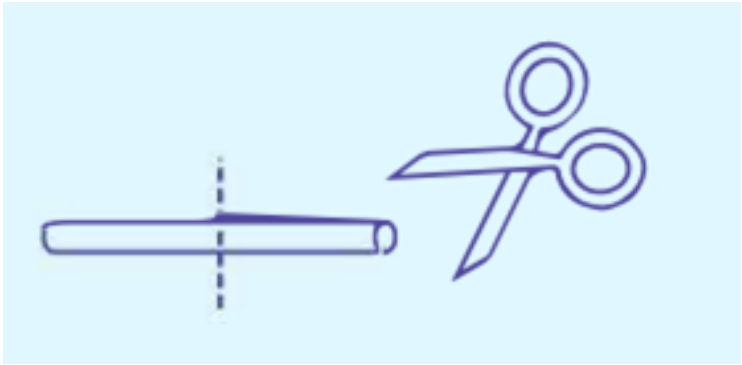
At the end of the lesson, students will be able to:

- Name the fundamental parts of a wind turbine
- 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

Part 1:
Assembling the Firefly

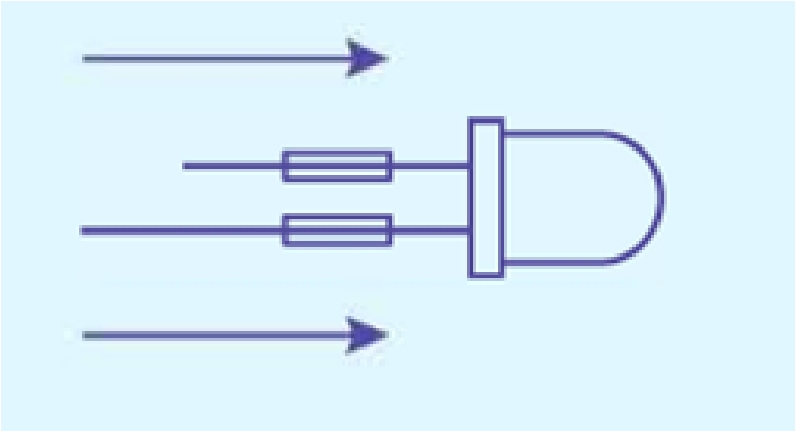
Assembling the Firefly

Cut off two pieces from the plastic tubing, one half inch each.



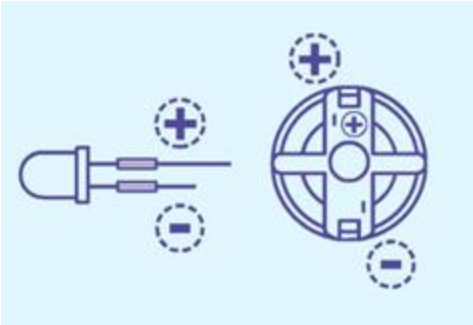
Assembling the Firefly

Slide a piece of tubing onto each LED leg.

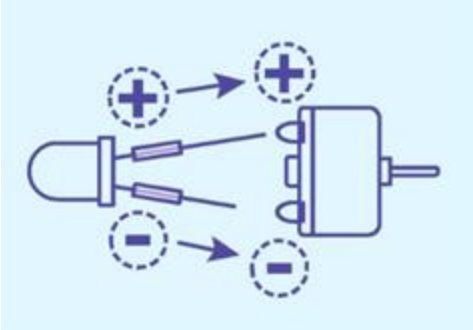


Assembling the Firefly

On the back of the generator, next to the two metal leads are a positive and negative sign.



On your LED, one leg is longer than the other. Thread the longer LED leg through the positive generator lead and the shorter LED leg into the negative generator lead.



Assembling the Firefly

Bend the LED legs so they hook onto the generator connections.

Slide the plastic tube pieces over the junctions.

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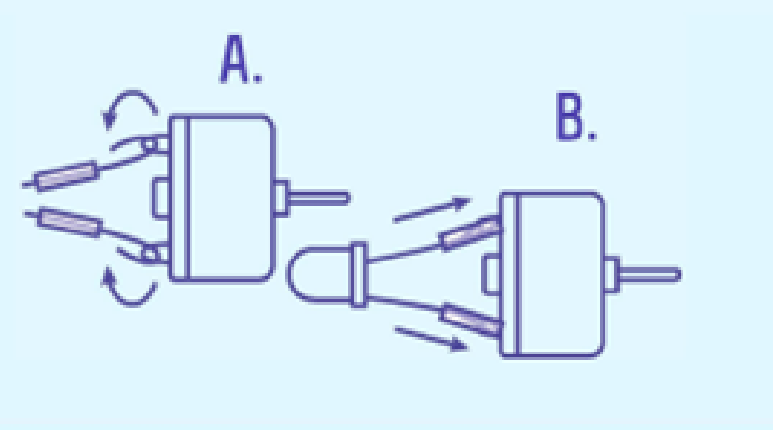
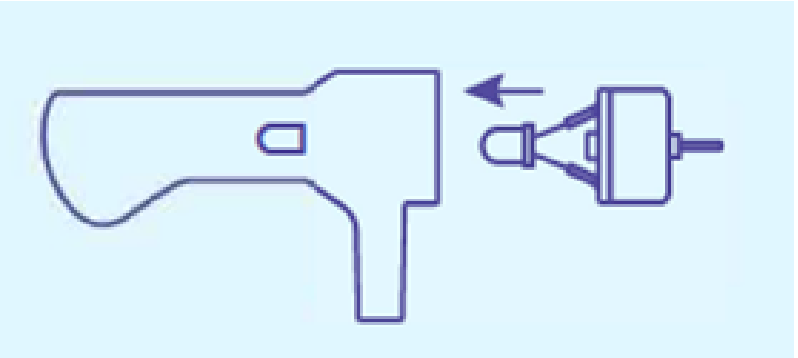


Assembling the Firefly

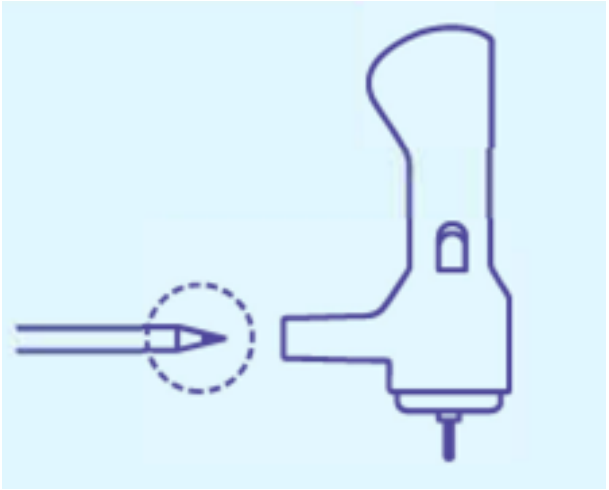
Push the generator into the firefly until it fits snugly and the LED peeks through the window.



Assembling the Firefly

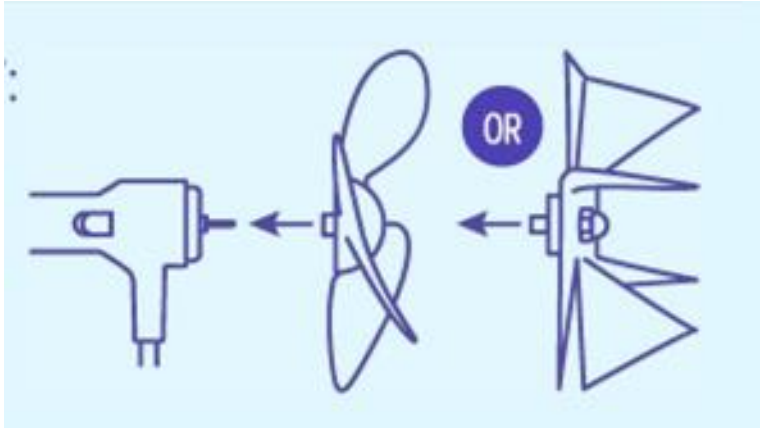
Sharpen the pencil before placing it into the holder to help the firefly pivot into the wind.

If pivoting is not required, use a piece of clear tape to secure the pencil to the firefly.



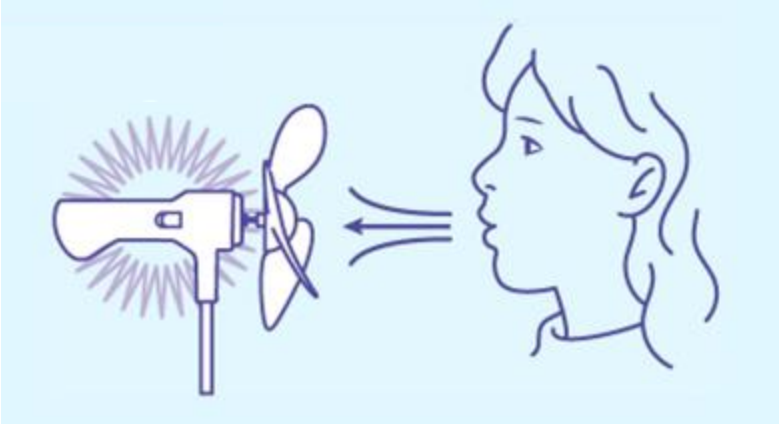
Assembling the Firefly

Push the included propeller onto the generator shaft.



Assembling the Firefly

Test your firefly! If it lights, the assembly was perfect. If it doesn't light, try stronger wind, or make sure the LED has been properly connected.

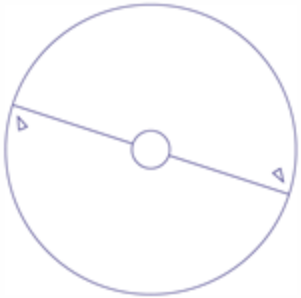


Part 2: Designing the wind wheel

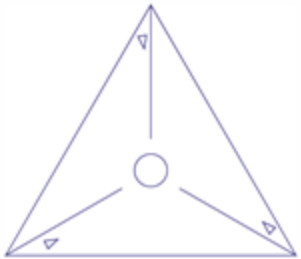
Designing the Wind Wheel

Choose a Wind Wheel pattern.

2 Blade

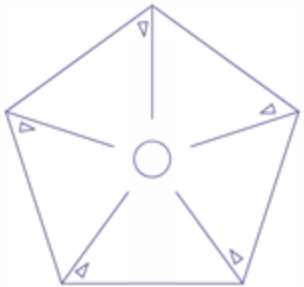


3 Blade



4 Blade

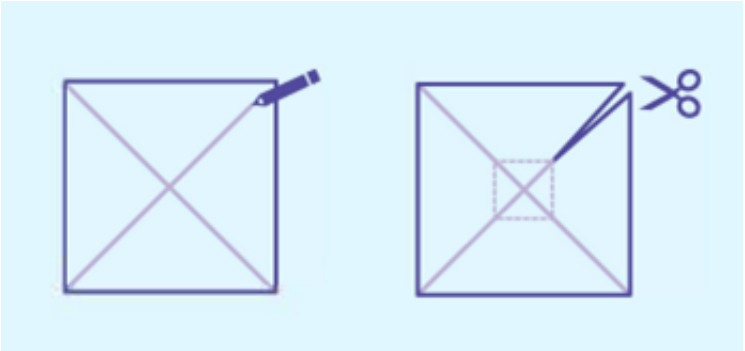
5 Blade



Designing the Wind Wheel

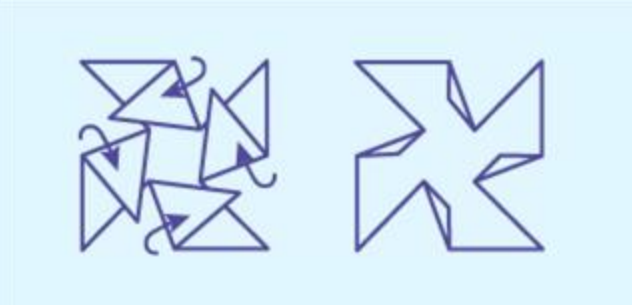
Find the solid lines, we are only cutting solid lines

Cut down from the corner to the dotted box, NOT all the way



Designing the Wind Wheel

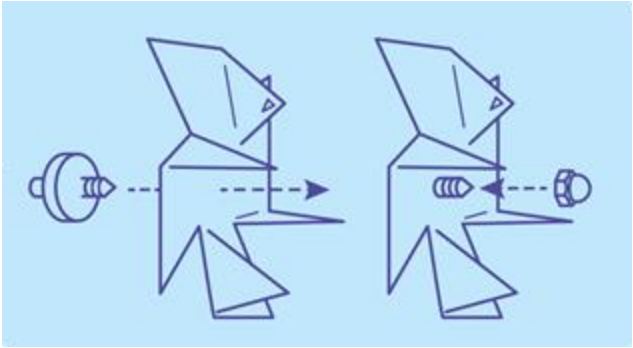
Fold down the corners according to the diagram. There is an arrow symbol in the corner of each section indicating which corner to fold inwards.



Fold them in the SAME direction

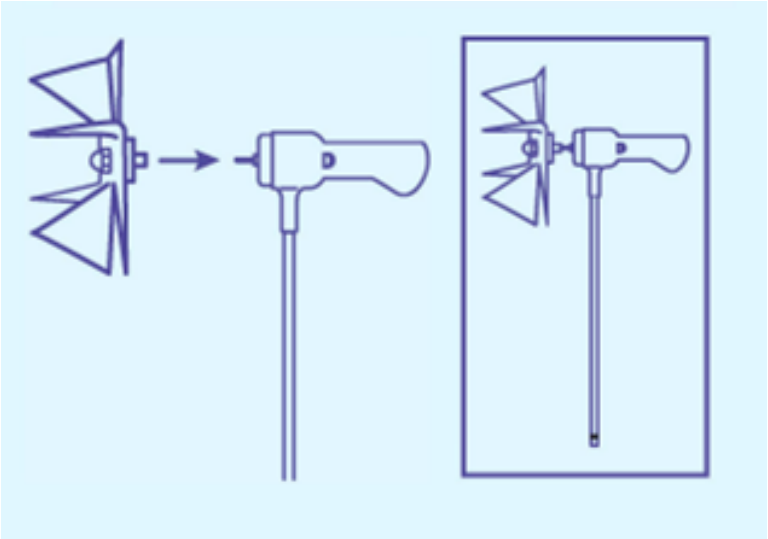
Designing the Wind Wheel

Push the screw hub point through the center of the Wind Wheel from the back. Twist the acorn hex nut onto the screw hub, securing the Wind Wheel to the hub.



Designing the Wind Wheel

Now attach the Wind Wheel with hub to the firefly.



But what if mine doesn't work!

What should we tell our classmates when their design doesn't work the first time?

Do engineers only try things one time?

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.

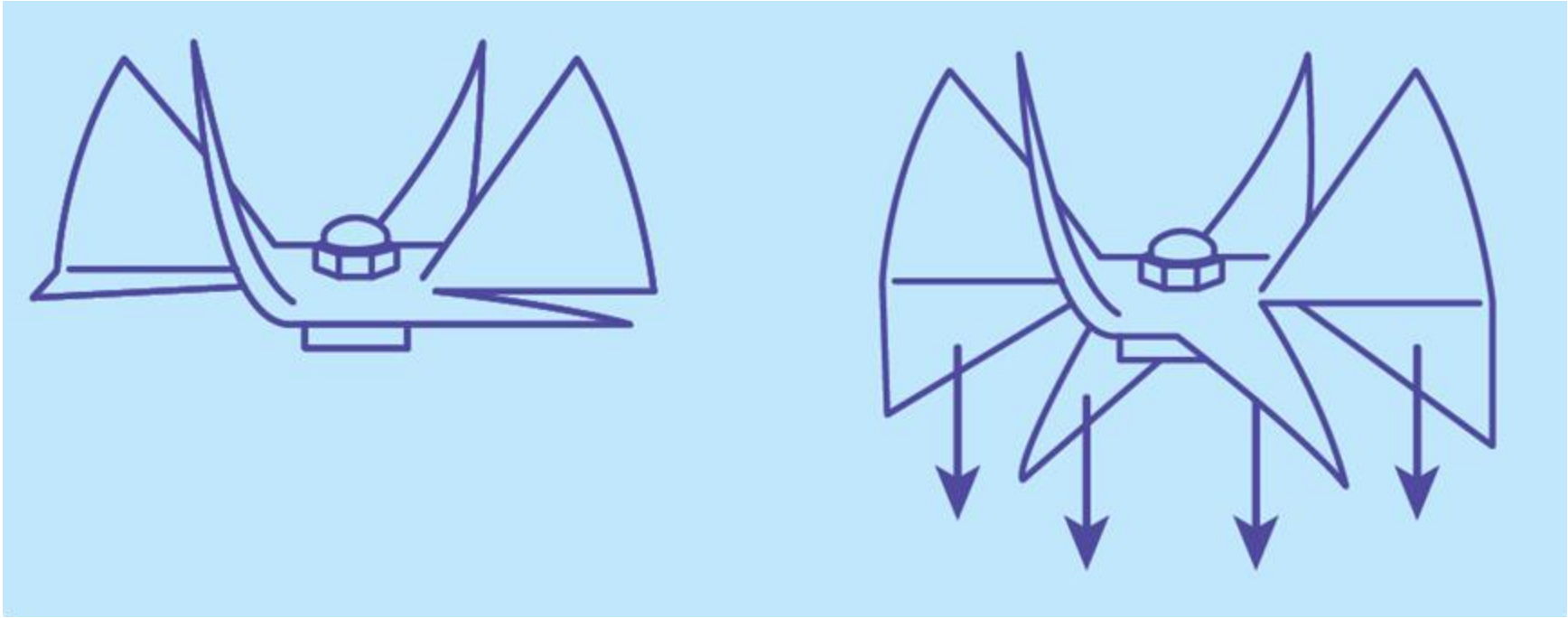
2.

3.

4.

Designing the Wind Wheel

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



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?

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


ENERGY


Wind turbine
?


HOW DO WIND TURBINES WORK?
KINETIC ENERGY / WIND ENERGY


CAITIE'S
CLASS
ROOM
FIELD TRIP

What causes wind?