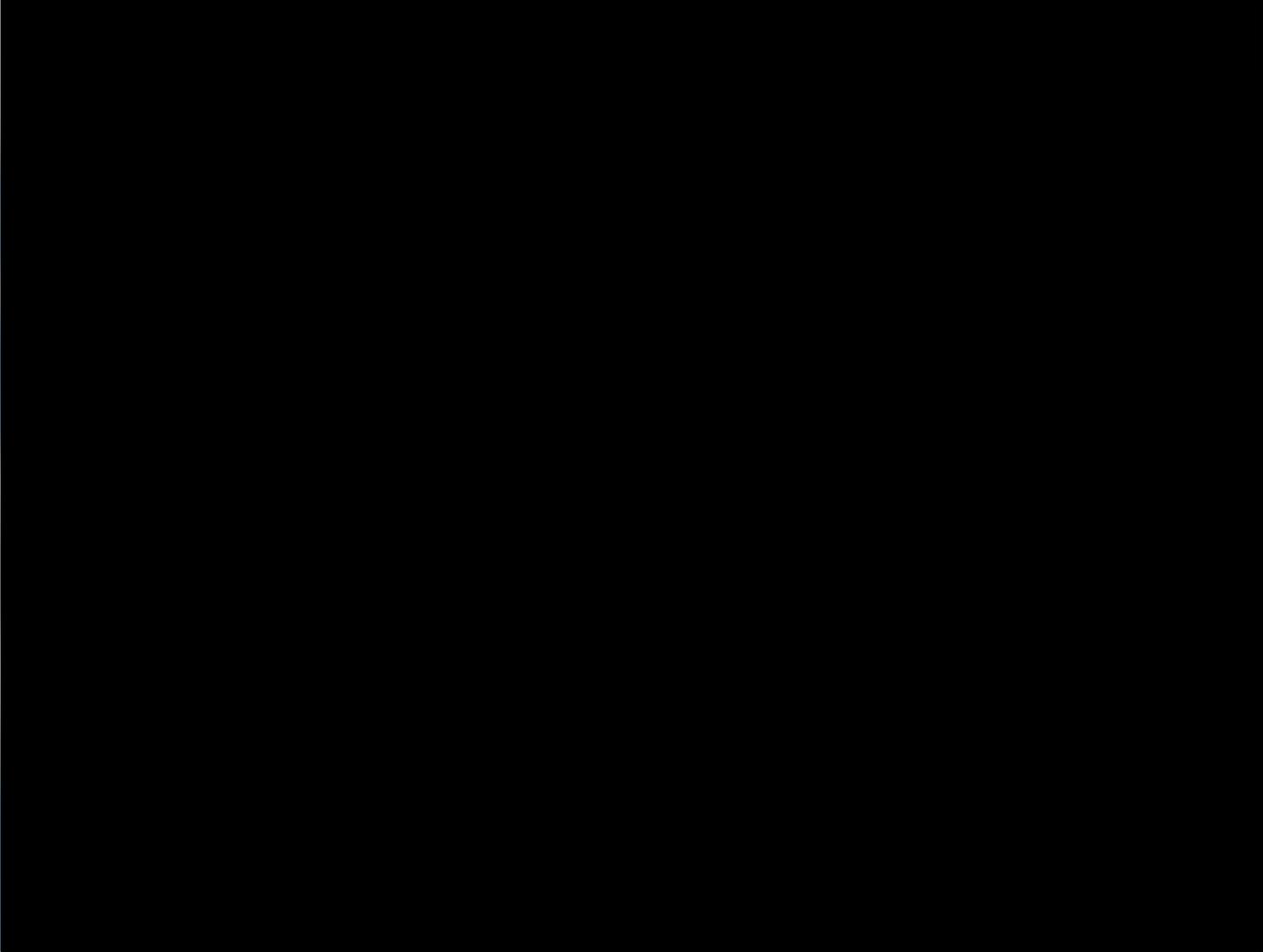




Gone with the Wind

Caitlyn Benton, Cassandra Brooks, Peyton Sanders, George Yates, Nathan Hoege



Windmill!



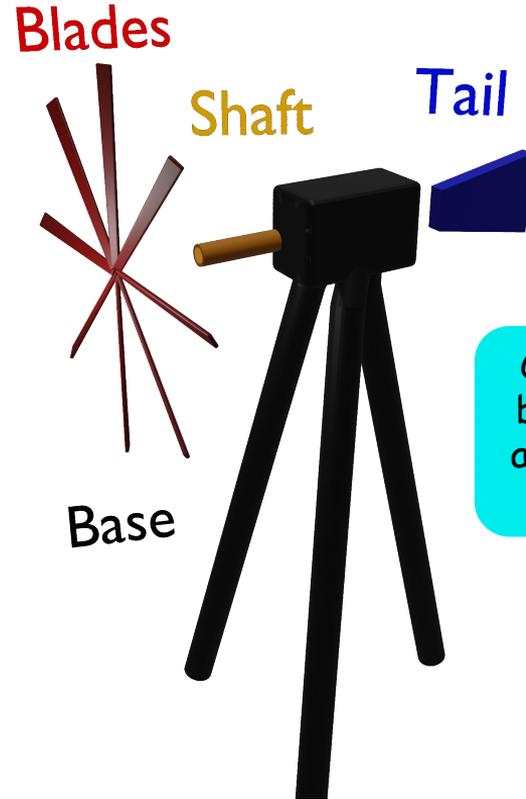
Here is a video of how modern windmills work!



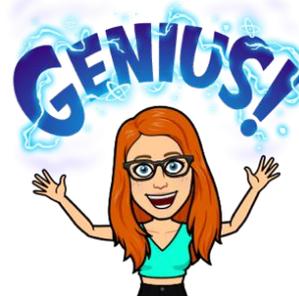
Parts of a Windmill!

- ★ **Blades:** angled in a way that can generate rotation in the shaft
- ★ **Shaft:** this part is what creates the energy
- ★ **Tail:** used to keep the windmill facing the direction of the wind
- ★ **Base:** supports the whole windmill and gives it the height it needs

Important Concept: Air Resistance
The ability of wind to push against a surface

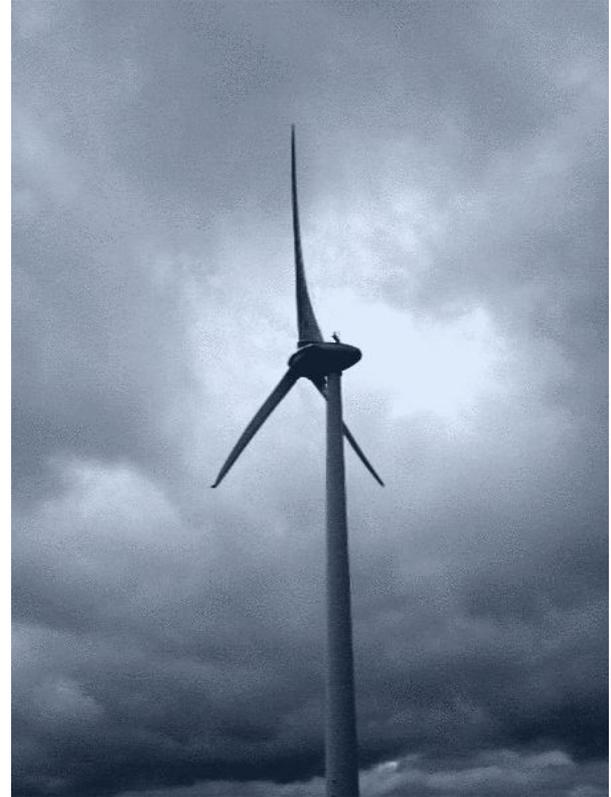


Click the audio button to learn about the parts of a windmill!



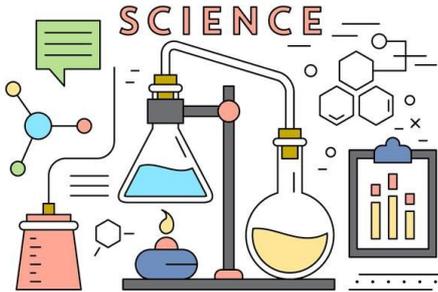
Why Windmills?

People use windmills to produce electricity, pump water, or lift objects because wind energy is renewable!



What is Engineering?

Engineering is the use of science and math to solve real world problems and to make people's lives better!



Who helps build a windmill?

Mechanical Engineers - Mechanical Engineers design the blades and make sure that the overall structure can withstand big gusts of wind.

Electrical Engineers - Electrical Engineers work to allow the windmill to produce electrical energy for homes and other places like factories.

Environmental Engineers - Environmental Engineers work to protect the environment and people by finding the best place to put the windmills.



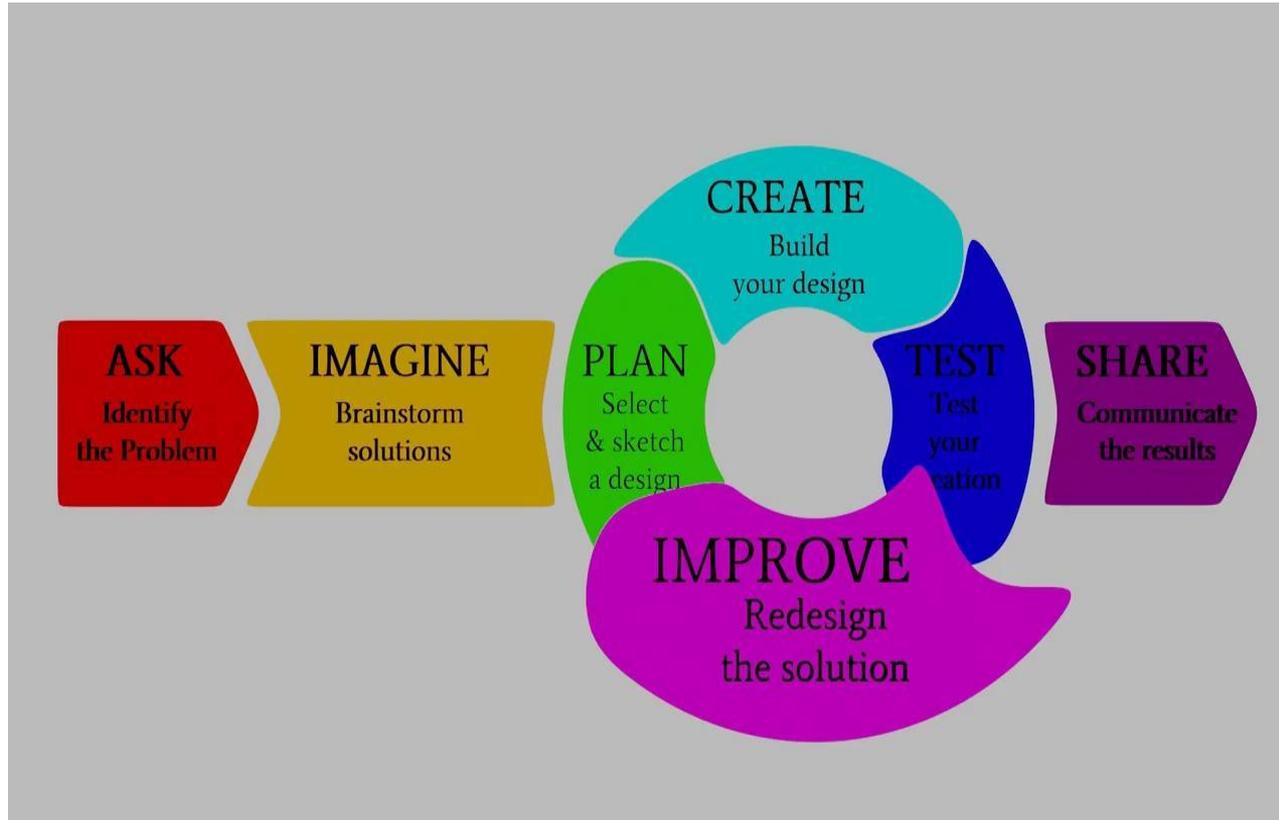
Meet an Engineer - William Kamkwamba



Click the audio button to learn about William Kamkwamba!



Engineering Design Process



Let's learn about the Engineering Design Process!



ASK

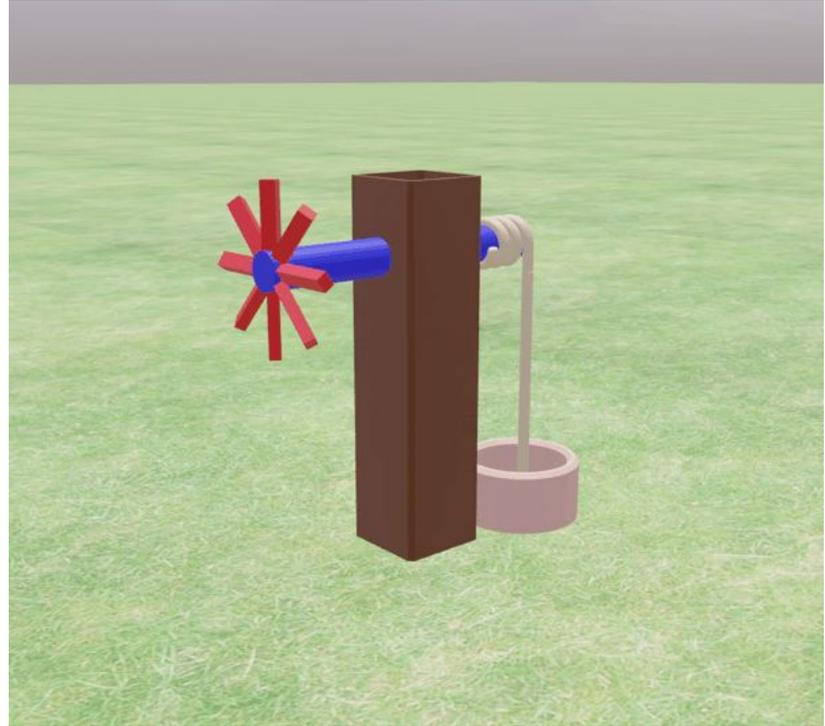
Problem:

We have a village full of **STINKY** people that need to take showers! The only water in the village is in a well in the ground. So, how do we get the water out of the ground so the village people can take a shower? Go to the next slide to find out the answer!



IMAGINE

Now it's your turn! Just like William Kamkwamba, think of ways you can solve the problem of the **STINKY** villagers using a windmill!



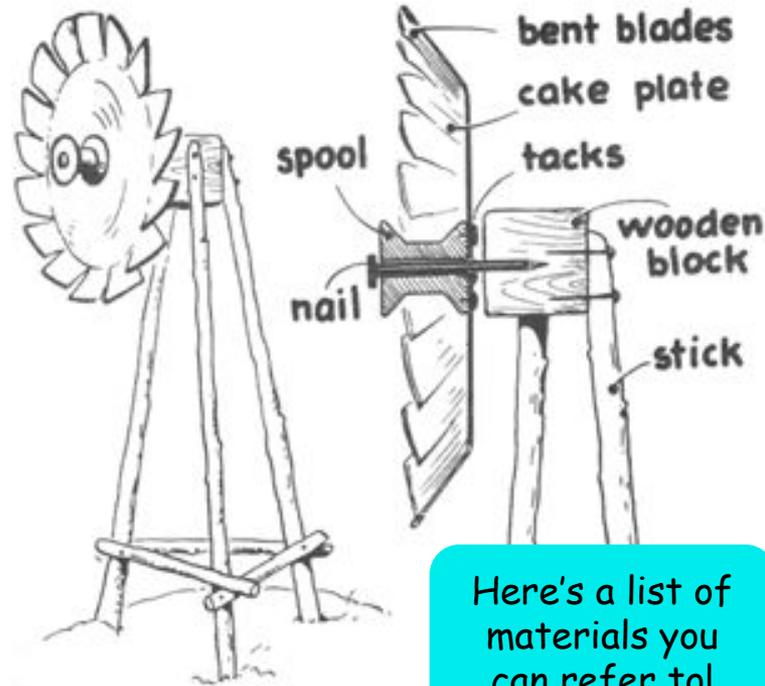
PLAN

- ★ Think of what materials you could use around the house, then draw a design for the windmill!
- ★ Think of how you will test the windmill. You could possibly use a fan or a hair dryer!
- ★ Make sure the base is sturdy and flat to the ground (milk carton, water jug, orange juice bottle)
- ★ Find materials in the house you can use to test how much your windmill can carry. (Batteries, marbles, LEGO pieces, rocks, etc.)



PLAN

- ★ Rubberband
- ★ Toothpicks/paperclips
- ★ Printer/lined paper
- ★ Tape
- ★ Foil/wax paper
- ★ Old t-shirt
- ★ Floss/ribbon/string
- ★ Markers/crayons/pencils/pens
- ★ Cotton balls
- ★ Marshmallows
- ★ Glue
- ★ Scissors



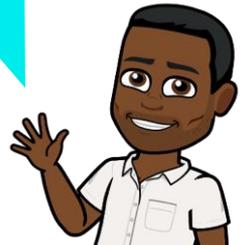
Here's a list of materials you can refer to!



CREATE



Before you build, if you need a few ideas of how to create a setup, or what materials you might use for blades, check out these videos!



CREATE

Now that you have gathered your materials and have a design in place it's time to create your **STINKY** village saving windmills!

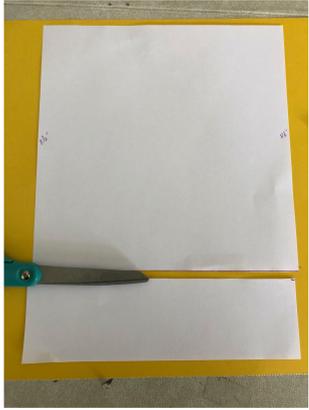
Give yourself 30 minutes to create and build your windmill. Click on the video when you are ready.

Ready, Set, GO!!!



CANTWAIT

CREATE

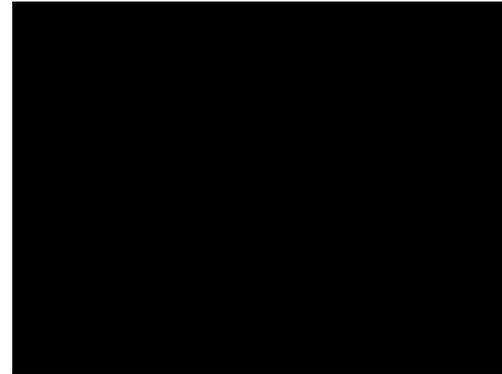


Check out
this windmill
I created!



TEST

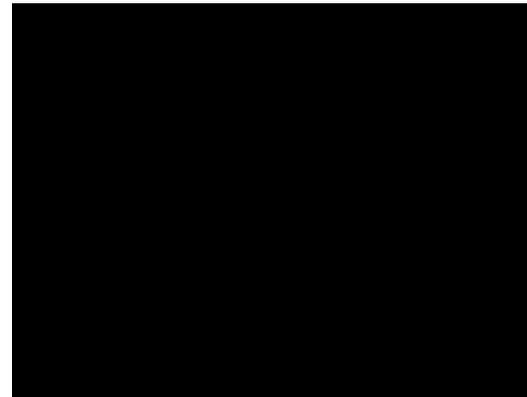
- ★ Now that you have created your windmill it is time to test your design!
- ★ Try using a fan or a hair dryer in your home! If you can not use  either, try using mother nature outside!



IMPROVE

What do you think you could do to improve upon your design? Whether its making the blades wider, lighter, sturdier...

Check out These videos to see how you might improve your windmill!



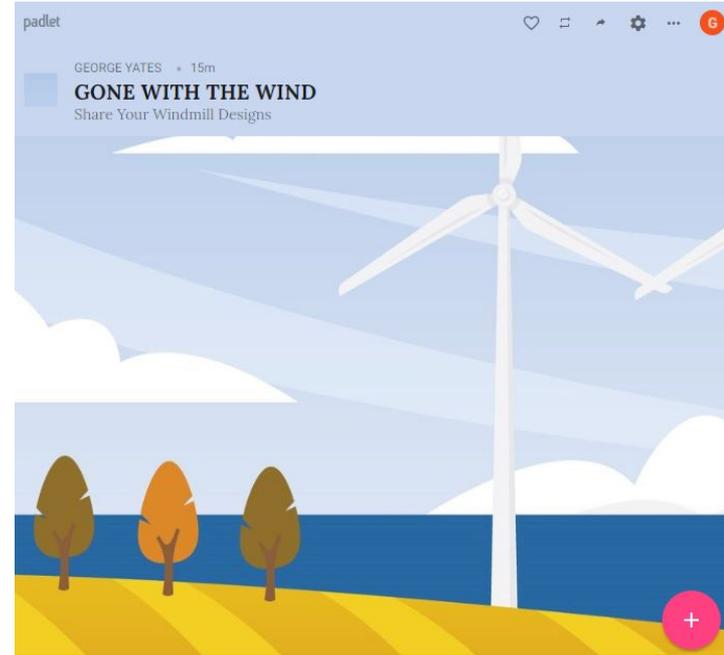
? ? ?
THOUGHTS?
? ? ?



SHARE

What did you learn? Show us your creation! Click the image and follow the link to the page!

Once you get to that page hit that **pink** plus sign in the lower right hand corner!



QUIZ!

Before you go, take this short and fun [QUIZ](#) to see what you learned today!



Submit your engineered solution. Win a Prize!

You have completed the lesson from TEAM 11!

Click [HERE](#) to share your solution and enter our raffle & competition (make sure you have parental permission to enter!).

We will randomly select 10 winners from all entries. Everyone who enters is eligible to win! Choose from 5 different prizes.

We will also award a few prizes

for really creative solutions!

Entries must be posted by 11:59pm

On May 31st!



For more information...

- If you need help interacting with our slides, taking the quiz, or entering the contest, please contact [Ms. Noginova](#).
- If you have questions about the Ed+gineering projects that sponsored the development of this lesson, please contact [Dr. Kidd](#) and/or [Dr. Ringleb](#)
- To follow us on social media, visit us on [Facebook](#) or Twitter (@edgineering_ODU)

Thank you, you did an awesome job!

