TeachEngineering

Ignite STEM learning in K-12

Chasing the Sun

Pre-assesment

Word Bank:

Sunset
West
East
Sunrise
Noon
High in the sky

Directions: Write sentences to describe where the sun is in the sky at the beginning, middle and end of the day.

Sequence	Sentence
Beginning	_____ _____ _____
Middle	_____ _____ _____
End	_____ _____ _____

Review: Solar Patterns

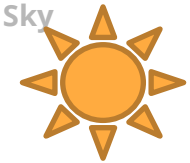
The sun moves across the sky throughout the day because earth is spinning.

In the morning the sun rises in the east.

Then, in the middle of the day the sun is high in the sky.

At the end of the day the sun sets in the west.

Suns Path Across the Sky

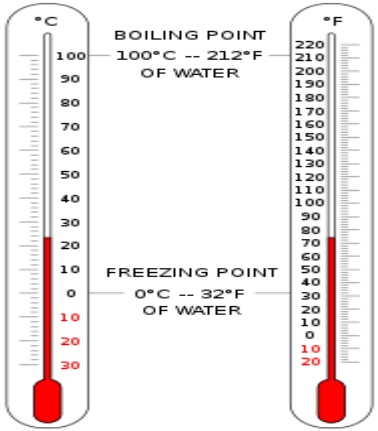


Review: Solar Energy

A combination of heat and light energy from the sun.

Review: How Does Solar Energy Affect You?

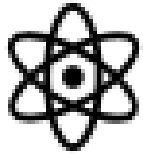
- Sun burns
- Shadows
- Helps plants grow
- Changes the temperature
-The sun can make electricity!



Review: What is Electricity

Let's Review.

Matter is anything that takes up space.



All matter is made of tiny particles you can not see with your naked eye, called atoms.

All atoms have even smaller particles called an electron.

When Electrons move the give off energy called electricity.

Phenomena

What do you think this is a picture of?
What properties of matter do you see?
What do you think it has to do with the sun?

How does the sun make electricity?

Solar Panels use the sun’s solar energy to create electricity.

They do this with solar panels.

<u>How do solar panels work?</u>

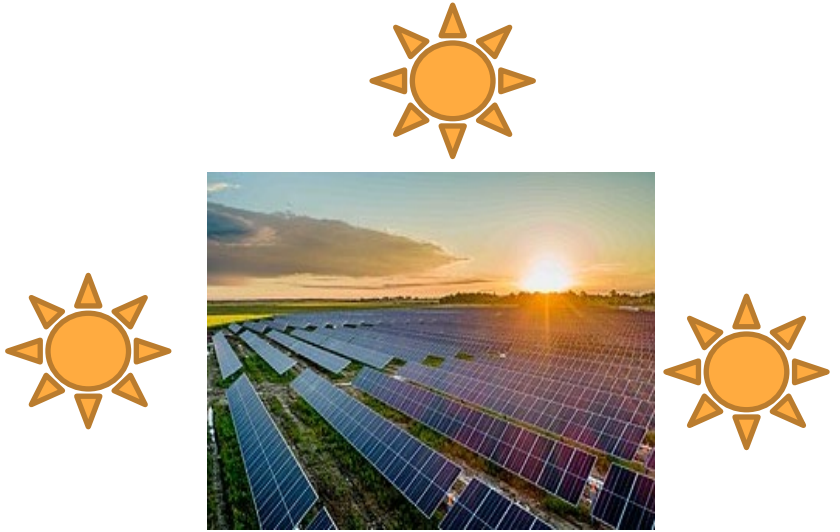
Engineers are trying to solve a problem

Engineers want their solar panels to be able to collect as much solar energy as possible .

This means they want the sun to shine on the panel a lot.

But the sun moves across the sky during the day.

Why would this be a problem?



What could we do to the solar panel to solve the problem?

Your ideas:

Research:

A good engineer will do research to see if something already exists in the world to fix a similar problem.

Can you think of another thing in the world that needs a lot of sunlight?

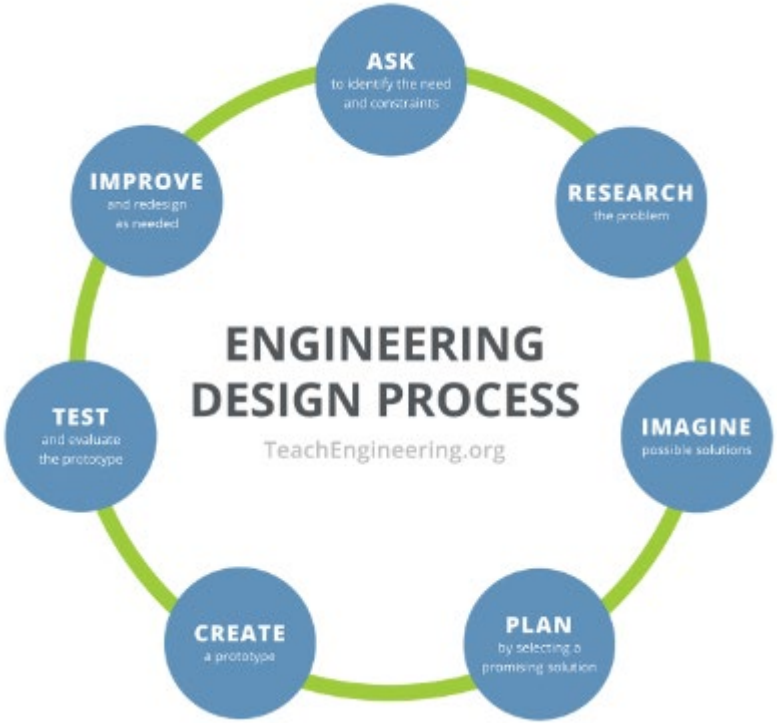
<u>Sunflower Solution</u>

Engineering Design Process

Problem: The stationary solar panel is not getting en sun exposure.

Research: The Sun moves across the sky throughout the day. Sunflowers will bend and turn to follow the s

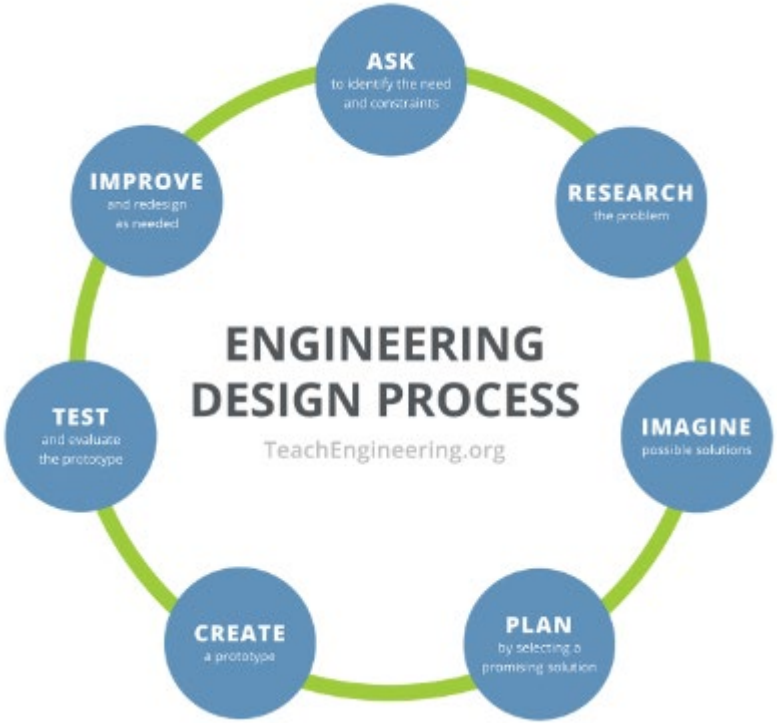
Imagine: How could a solar panel follow the sun?



Engineering Design Process

Plan
Your materials are:
- solar panel
- pipe cleaners
Your goal is:
Create a stand for the solar panel that will allow it to follow the sun across the sky.
Remember:
The sun goes from East to West
Your Solar panel needs to be securely held in the stand.

Draw your designs and Discuss with your team!



Engineering Design Process

Create:
You have 10 minutes to build with your group. Remember to record your data.

Test:
Let’s walk around and test out everyone's designs.

Reiterate:
What worked? What did not? Why?
What could you do to improve it?

Redesign:
You have 5 minutes to redesign. Remember to record your data.

Retest:
Let’s walk around and test out everyone's designs.

Engineering Design Process

Prepare to Present
Let's look at the rubric

Use rubric to set student presentation expectations. Observe student presentations and assign each student points accordingly. Alter as desired.

Student:	3pts: Presentation included summary of their engineer design process: 1pt: Supplies used and why. 1pt: Ideas tried. 1pt: Choices made and why.	2pts: Presentation included overview of possible iterations: 1pt: explanation of iterations tried. 1pt: explanation of what would do in future.	1 pt: Presentation included summary of why their final design maximized sun exposure: 1pt: it moves to follow the path of the sun Or 1pt: It did not because it can not follow the path of the sun.	3pt: Presentation included a demonstration of how their final Solar Stand works	1pt Participation in Presentation	Total Points Earned:
	/3pts	/2pts	/1pts	/3pts	/1pts	/10pts
	/3pts	/2pts	/1pts	/3pts	/1pts	/10pts
	/3pts	/2pts	/1pts	/3pts	/1pts	/10pts
	/3pts	/2pts	/1pts	/3pts	/1pts	/10pts
	/3pts	/2pts	/1pts	/3pts	/1pts	/10pts
	/3pts	/2pts	/1pts	/3pts	/1pts	/10pts

Engineering Design Process

Prepare to present:

Finalize your notes and drawings.
Discuss who will do what part of the presentation.

If desired…
The teacher will call each team in small group to make their prestation script.

Present!

How we went through the Engineering design process…

Directions: Write to describe what your group built, how you built it and what happened when you tested it.

Sequence	Sentence
First	We planned to… _____ _____
Next	We used _____ to build _____by _____
Then	We tested our design by… _____ _____ It _____maximize sun exposure because _____
Finally	We reiterated by… _____ _____ When we retested it _____maximize sun exposure because _____