ENGINEERING WITH ODU!

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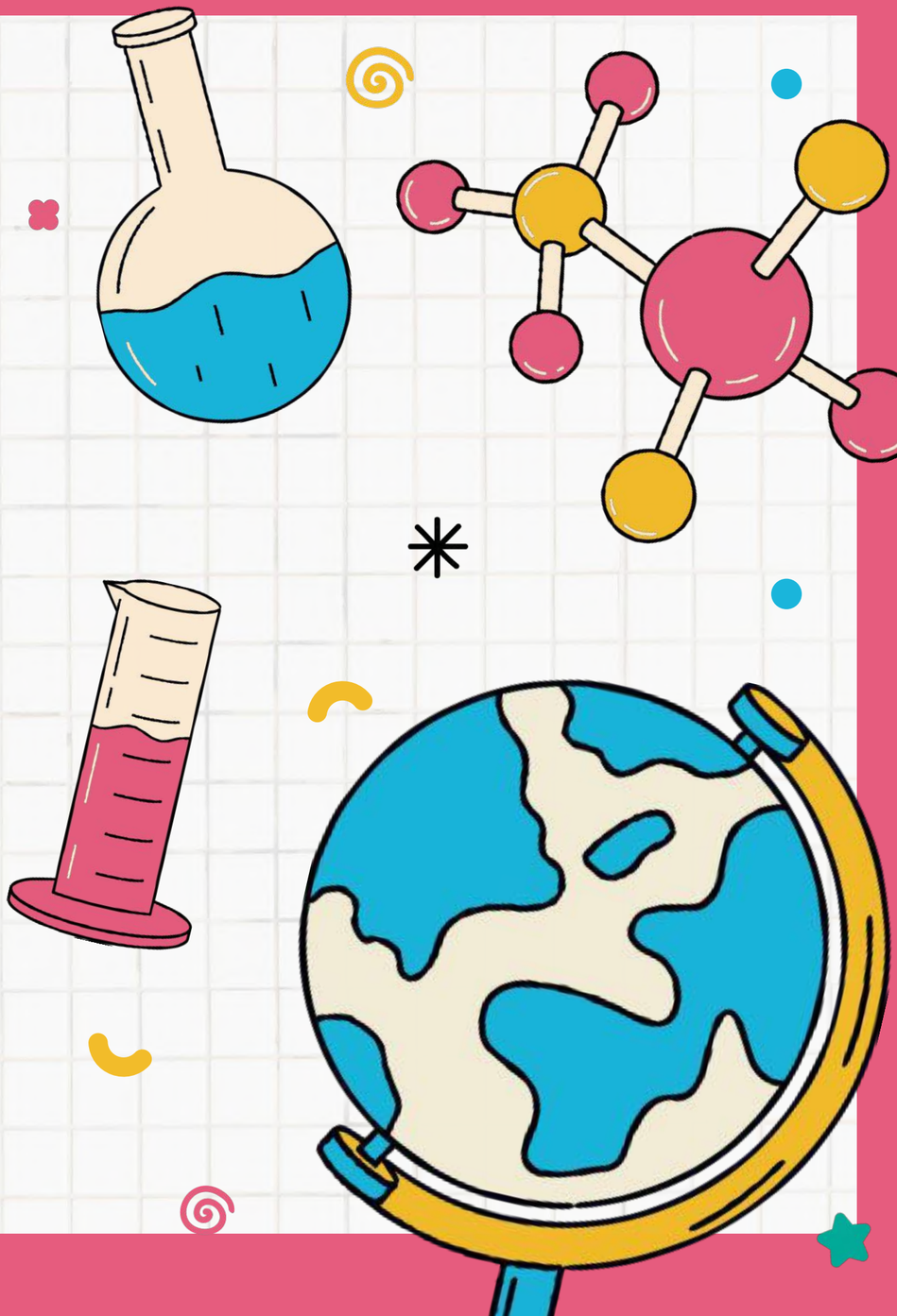
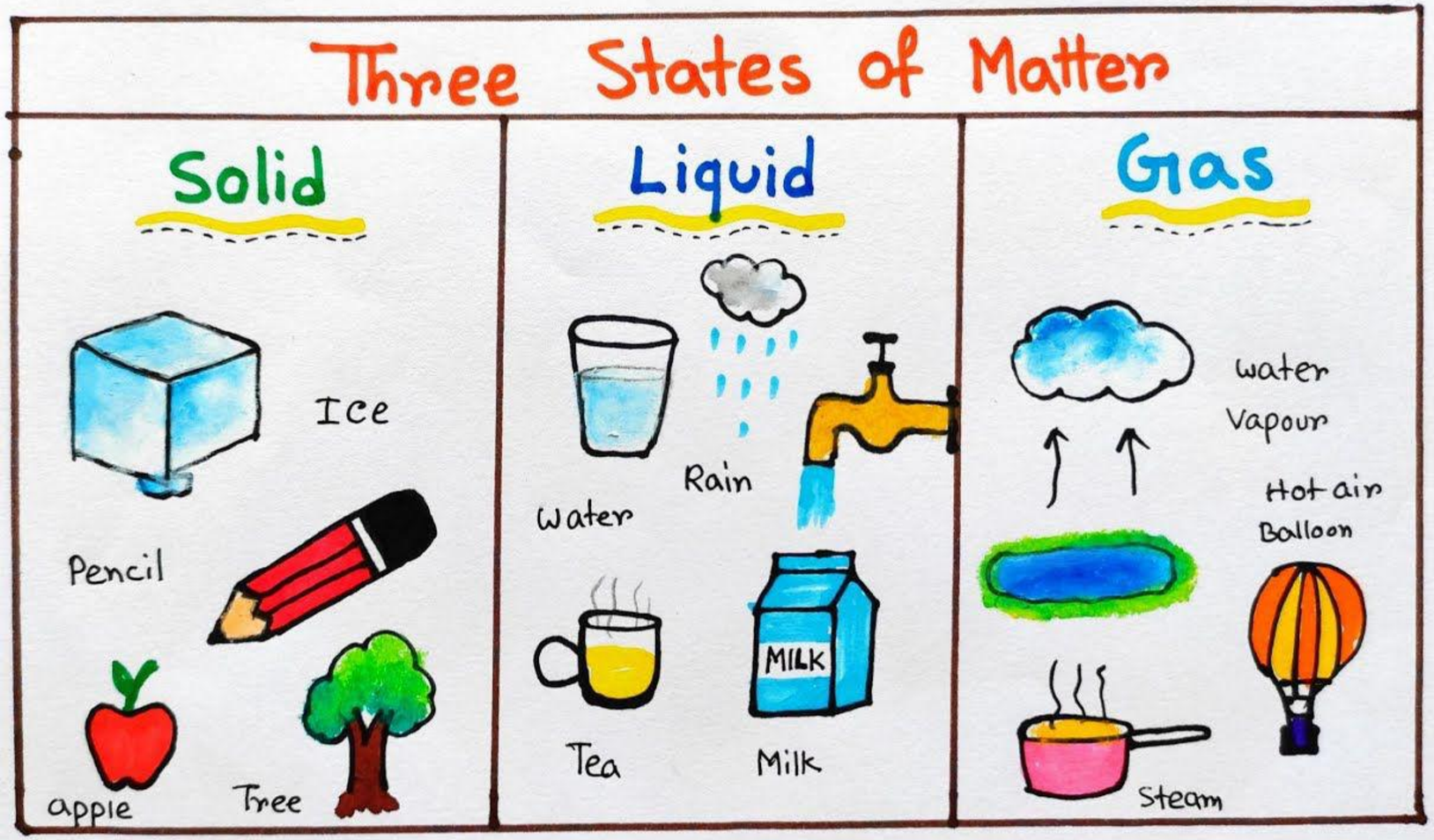
Review!

- I can understand that matter can exist in different phases.
- I can define heating and cooling
- I can define the the phases of matter.




Three States of Matter
Solid
Ice
Pencil
apple
Tree
Liquid
Water
Rain
Tea
MILK
Milk
Gas
water
Vapour
Hot air
Balloon
Steam

Ice Cream

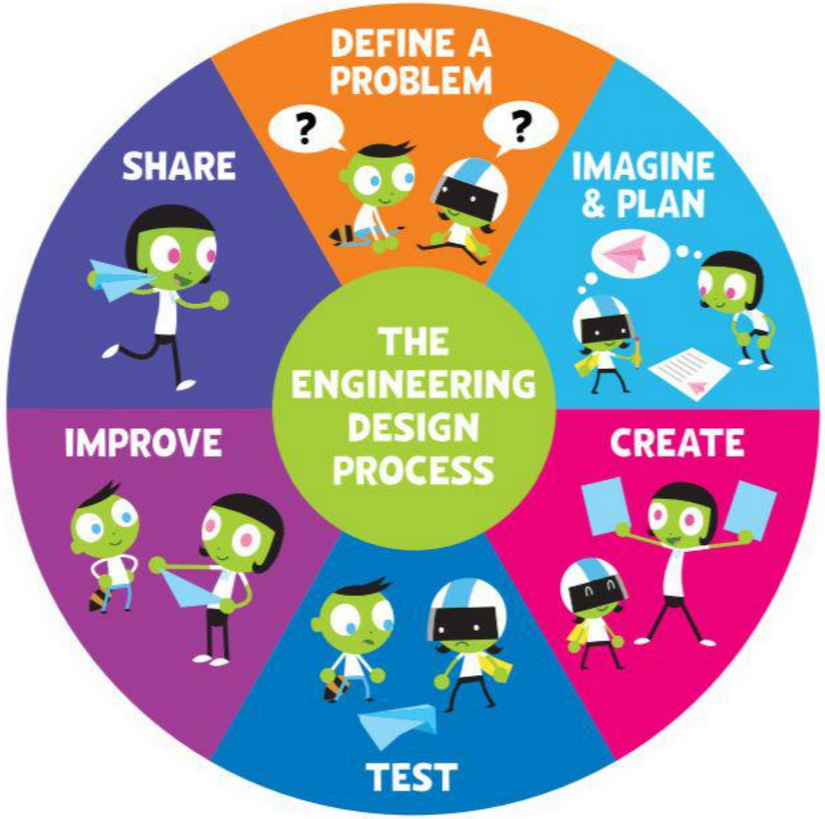
+

– Viscosity –

Kayla Davies, Ethan Kishinevskiy, Gershon Tolliver, Ethan Eisenburger, Josiah Taylor

What is Viscosity?

Engineering Design Process



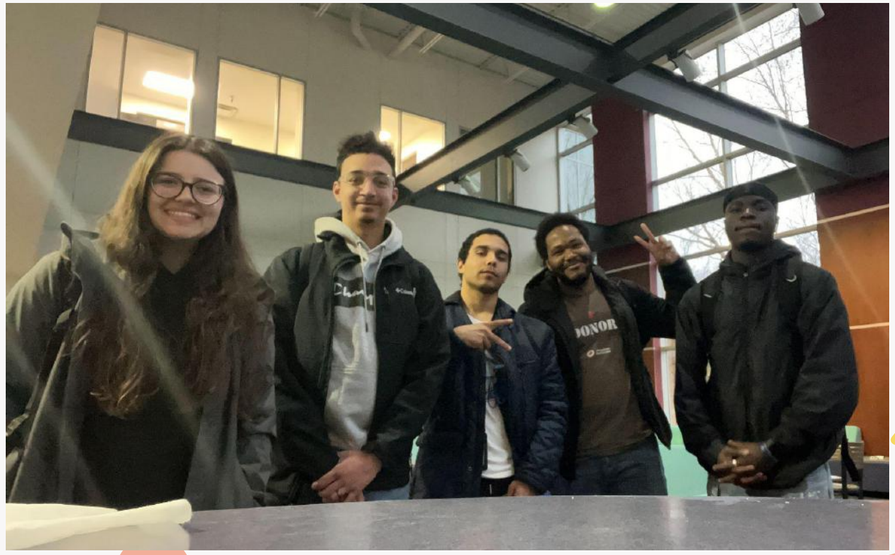
Materials and Procedure

- Sugar
- Milk
- Vanilla Extract
- Salt
- Ziplock bags
- Whisk
- Mixing bowl (optional)

1. Whisk milk, cream, sugar, vanilla together
2. Pour the mixture into the ziplock bag
3. In a separate bag, put the ice and salt
4. Put the bag with the mixture INSIDE of the ice and salt bag.
5. Shake until Frozen
6. Eat!!!

Let's Make it!

Thank you!

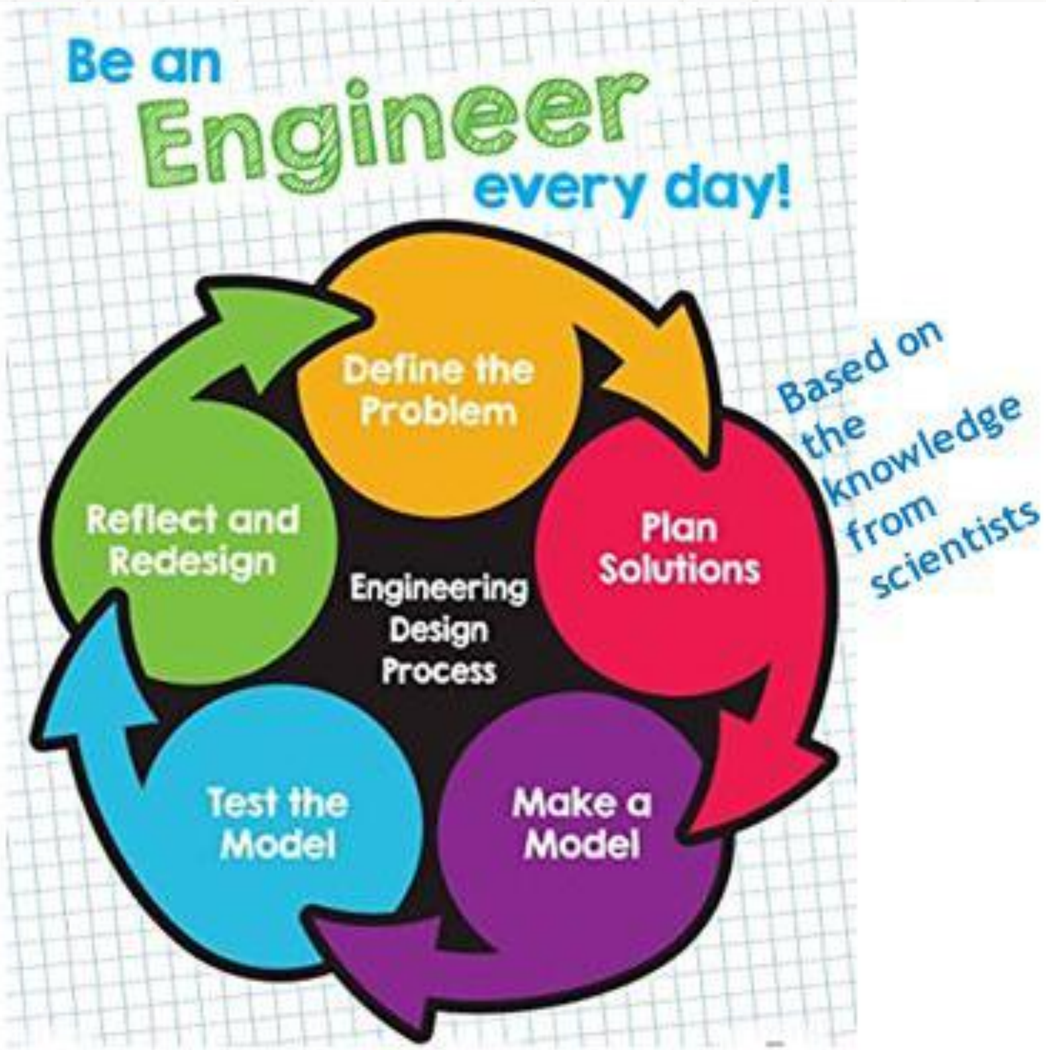


What we are engineering today!

Smores?

Materials we are using!

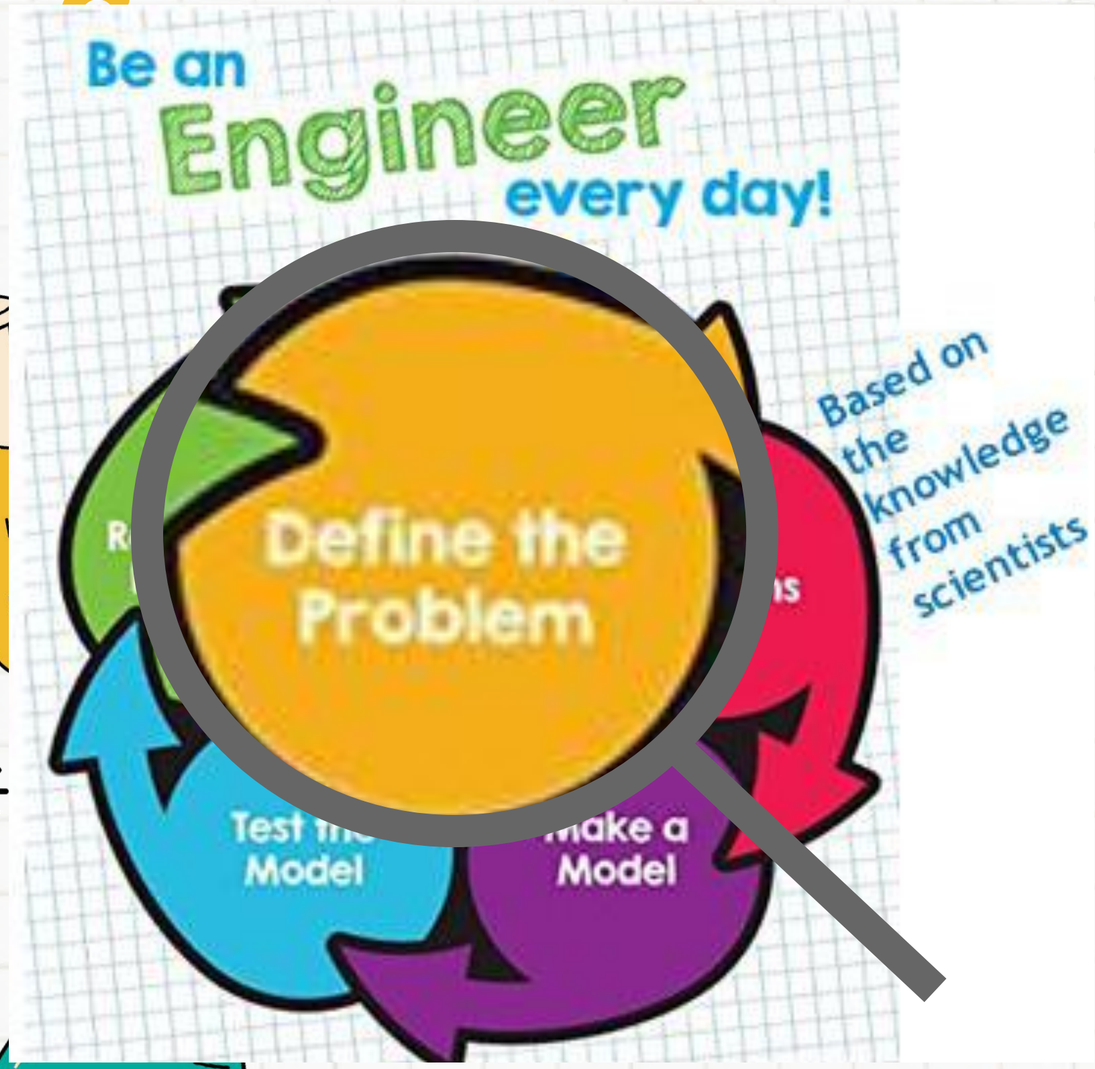
- Clipboards
- Pencil
- Cardboard Boxes
- Aluminum Foil
- Scissors
- Tape
- Glue Sticks
- Plastic Wrap
- Black and White Construction Paper
- Food Safe Gloves
- Graham Crackers
- Chocolate Bars
- Marshmallows
- Heat Lamps
- Heat Save Oven Mitts



Engineering Design Process Recap

SAFETY RULES

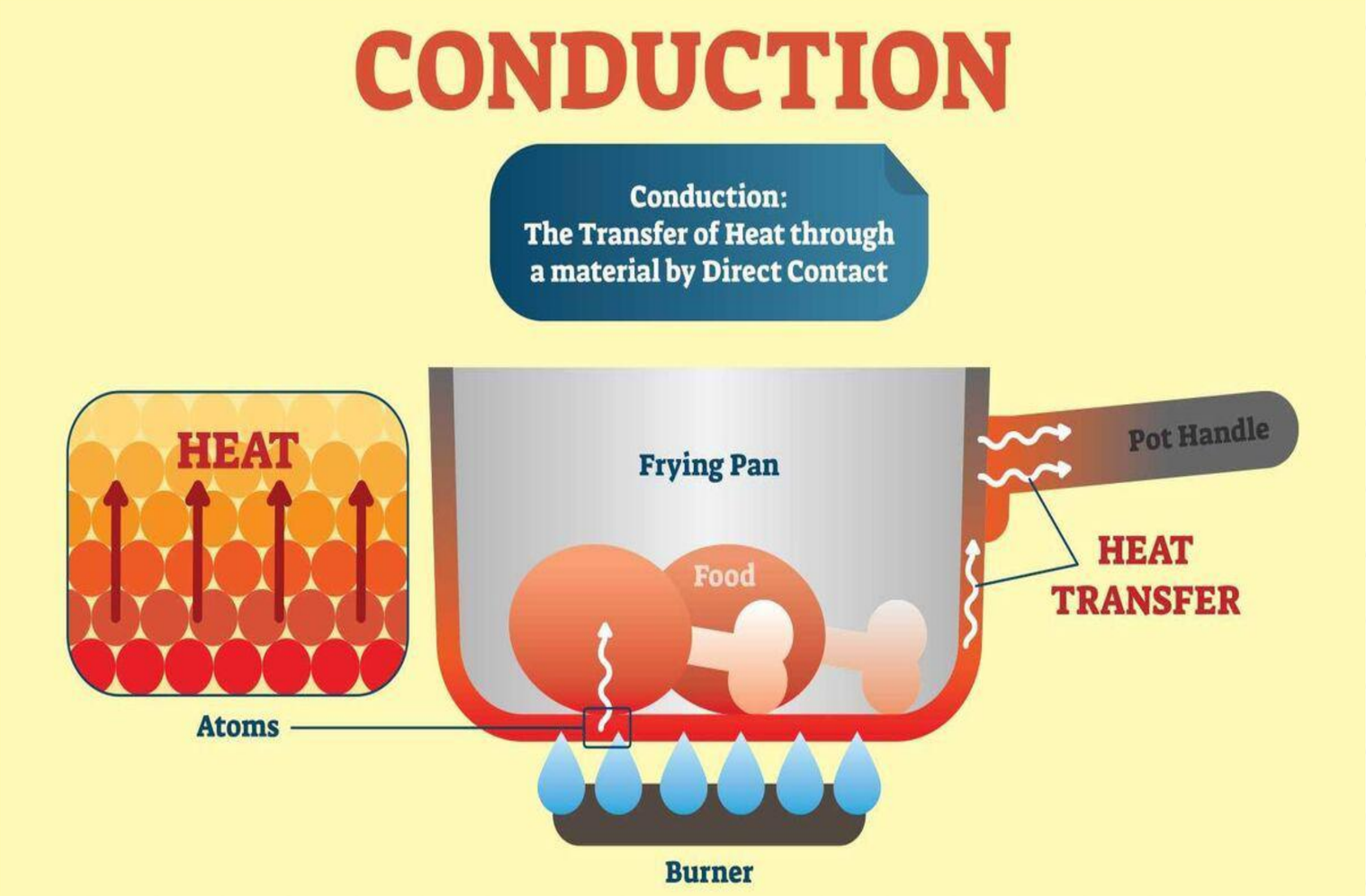
- The oven can get hot, so we have to be careful handling the oven/anything we are cooking in it! We will have oven mitts incase the oven does get too hot
- Heat lamps are being used! The heat lamps also get hot, do not handle heat lamps ! Engineers will help us here!
- Students must stay near their prototype to observe if it is working and to measure the temperature throughout testing.
- Students will have to use caution when using scissors, ask if a teacher if needing assistance
- Students please don't throw materials!



Define the problem

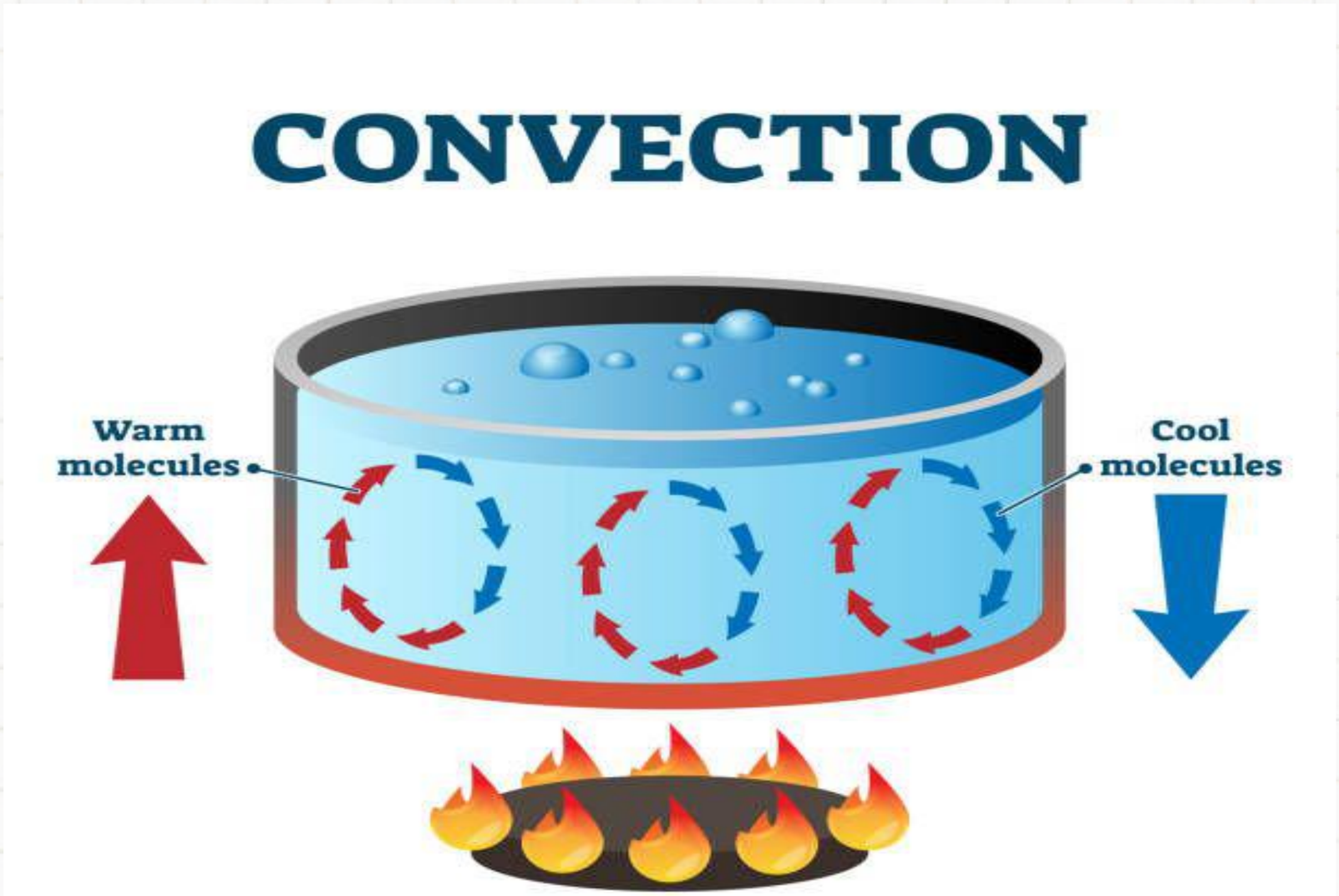
How can we cook if we suddenly lost power?

Science Concepts to think about!



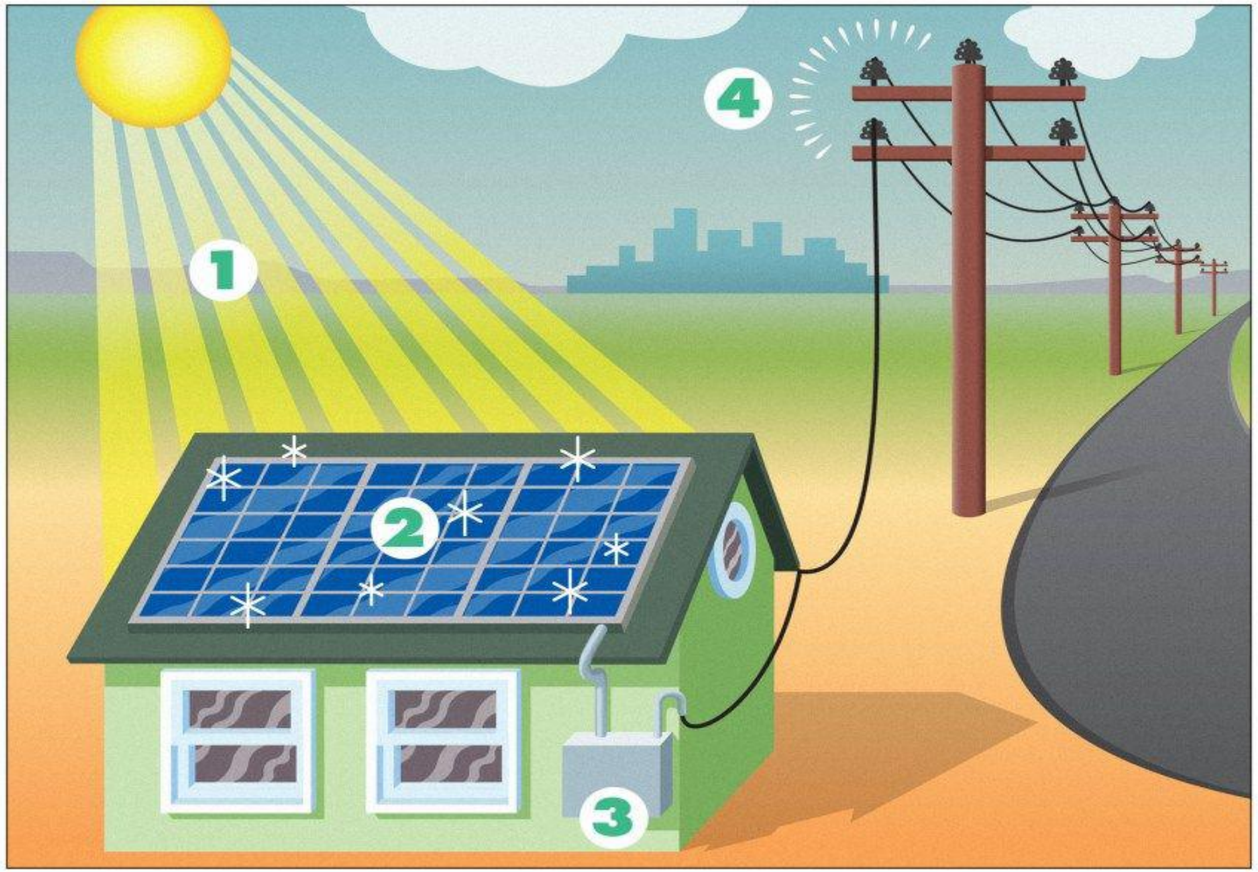
- **Conduction:**
  Conduction is the process by which heat is transferred from the hotter end to the colder end of an object.

Science Concepts to think about!



- **Convection:** It occurs when heat is transferred by the movement of liquids or gases.

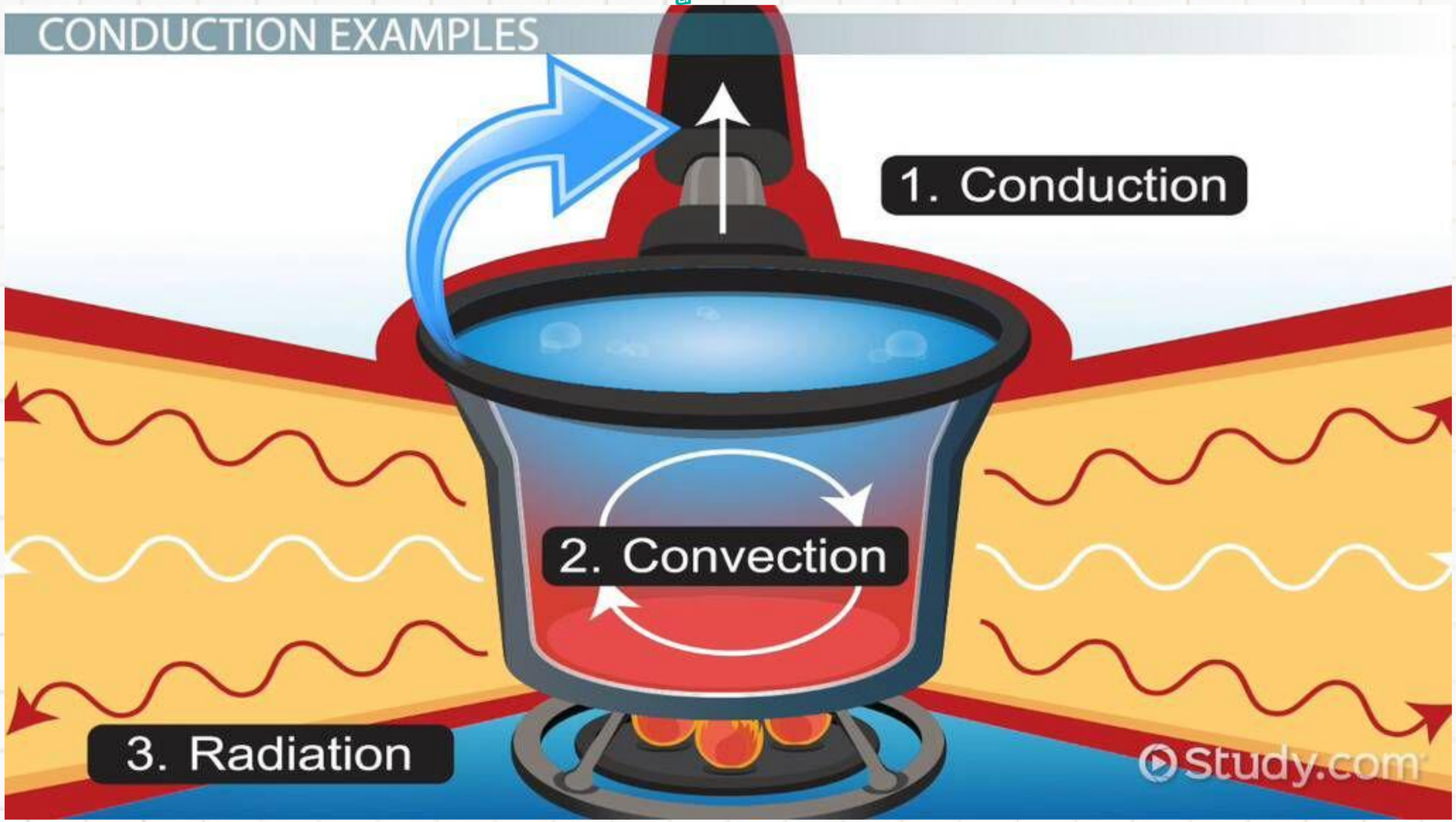
Science Concepts to think about!



Solar Energy:

Energy from the sunlight collected to heat objects

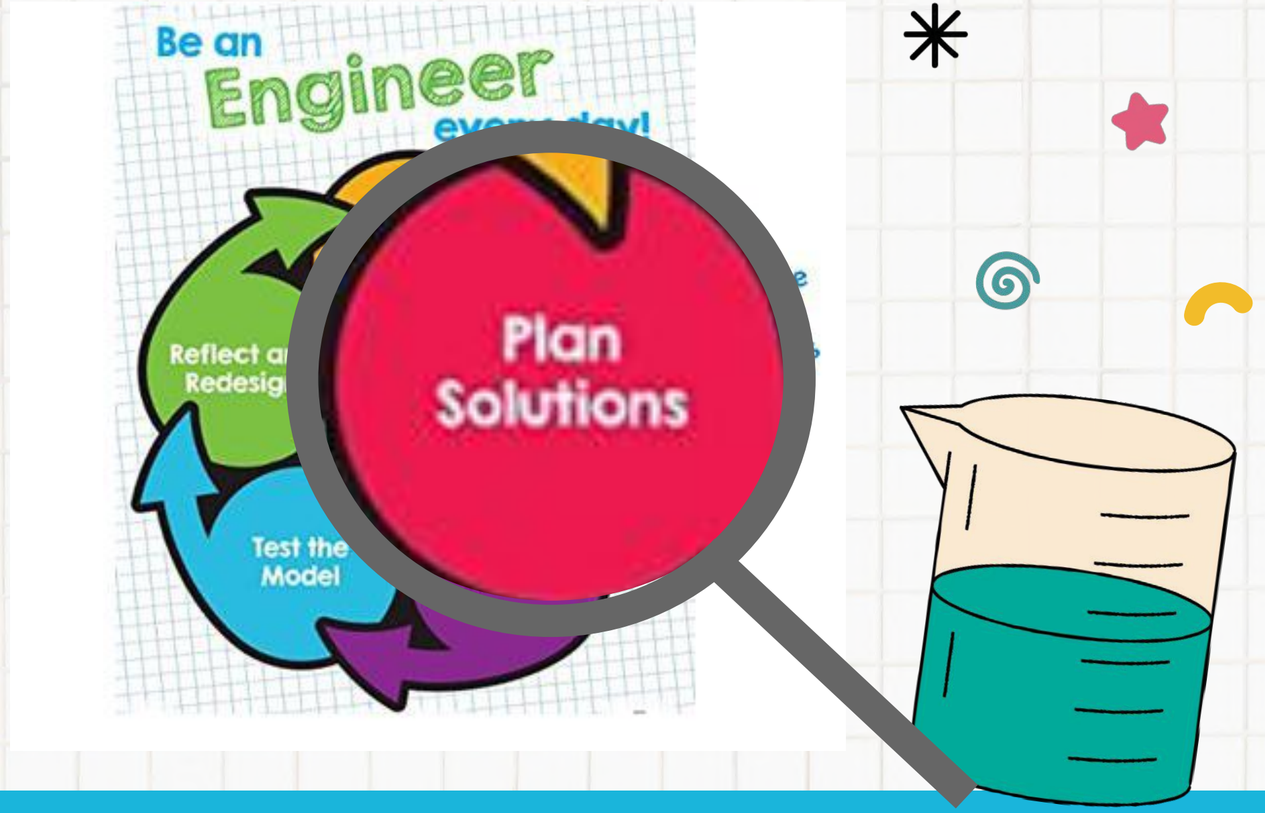
Science Concepts to think about!

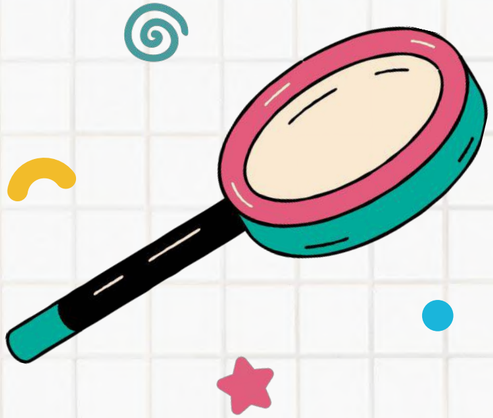


Plan Solutions!

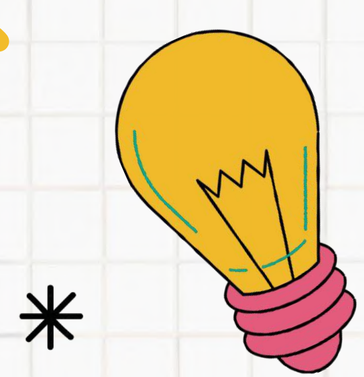
2. Let's start planning! Partner with your group and write/draw ideas below! Compare and think together! (5 minutes)

TIMER





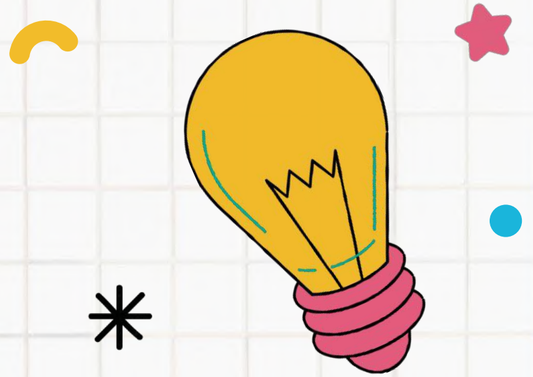
Before we Build



Do you think your prototype will succeed in cooking the marshmallow? Why or why not?

What parts of your prototype do you think helps with convection and heat transfer? Why do you think those would be effective for that?

Make a Model!

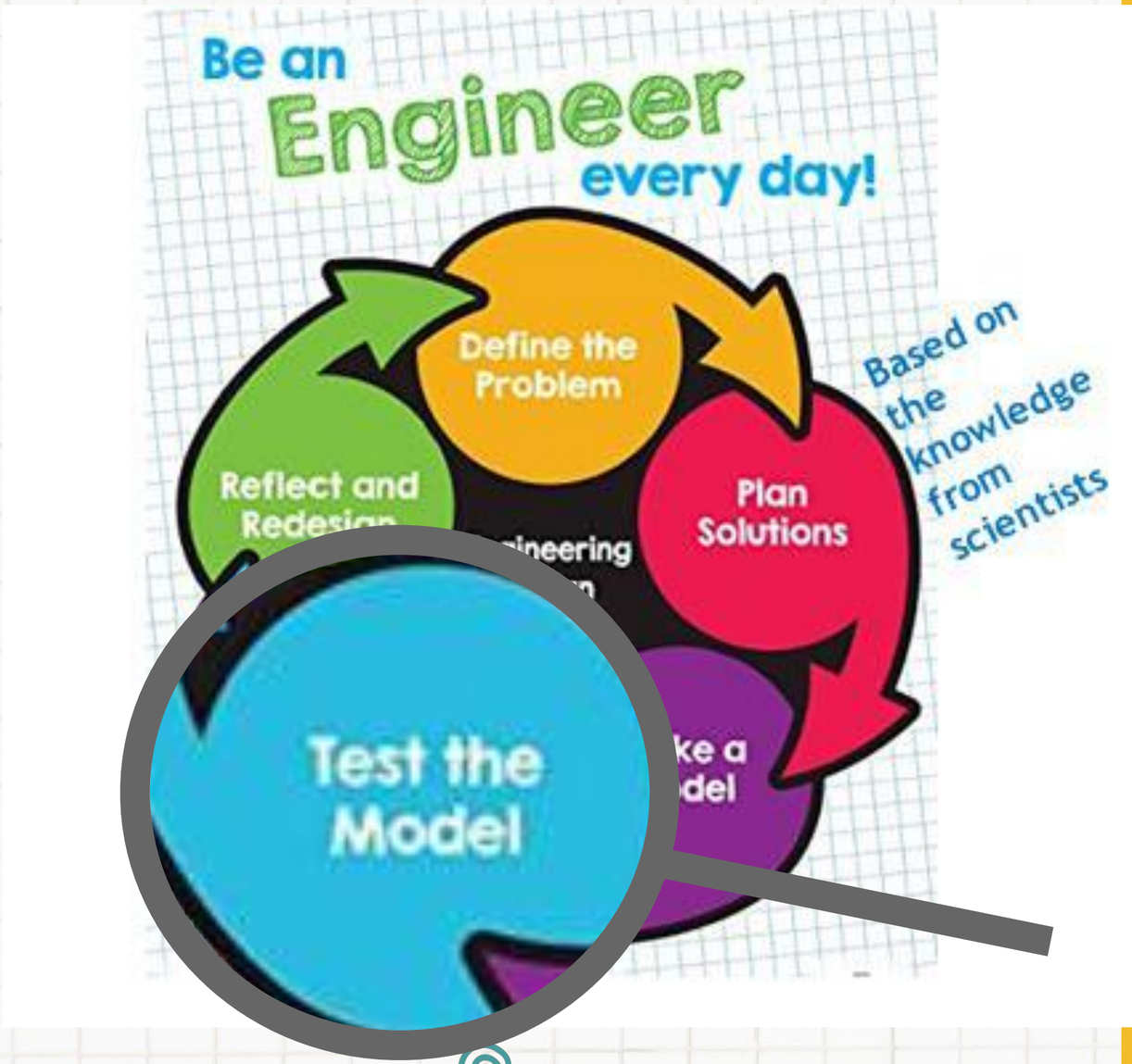


3. Let's Build our prototypes! Work together with your team to build your plan you made together. Please ask an educator if you need help!!

(8 minutes)

TIMER

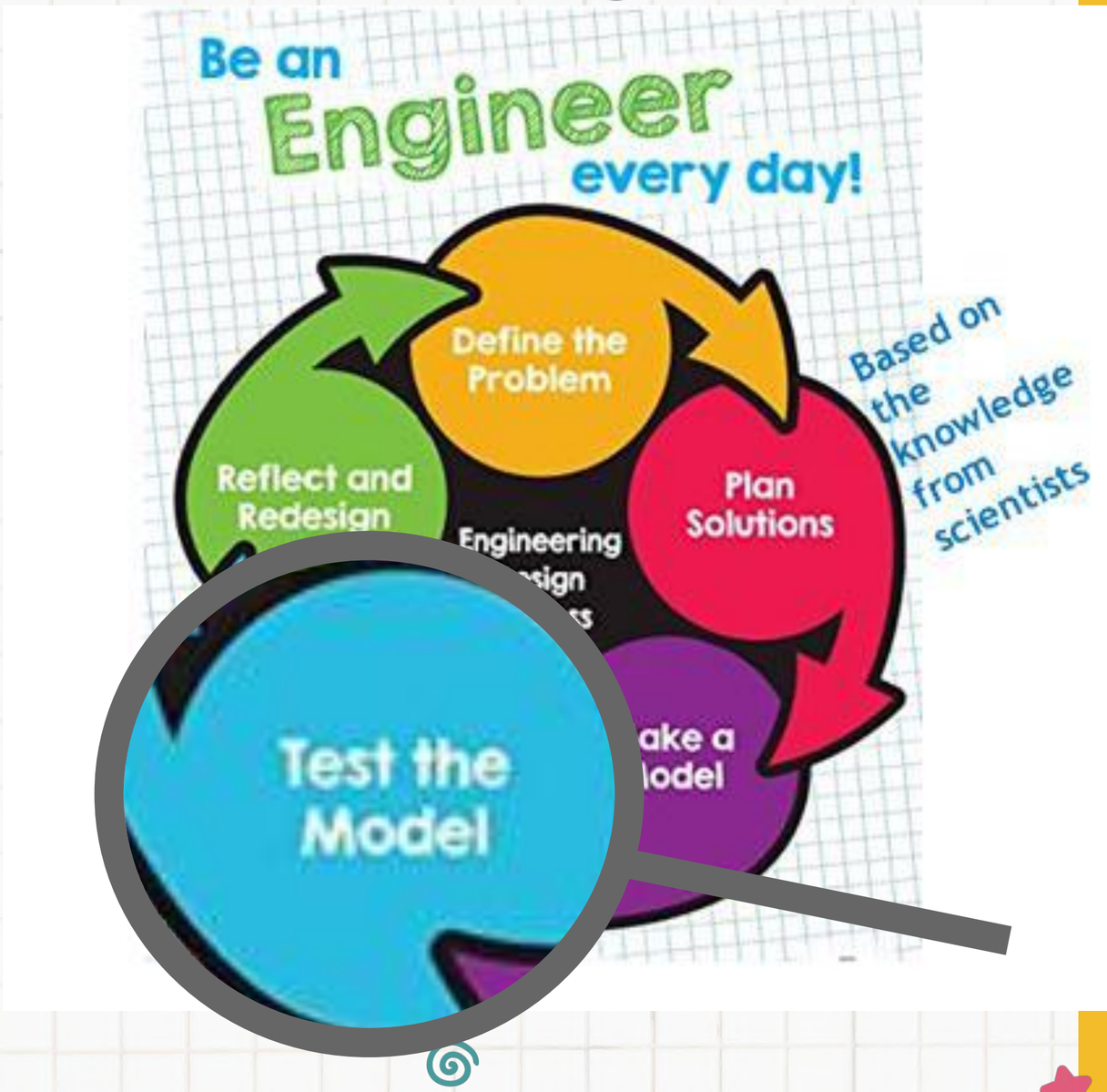
Test the Model!

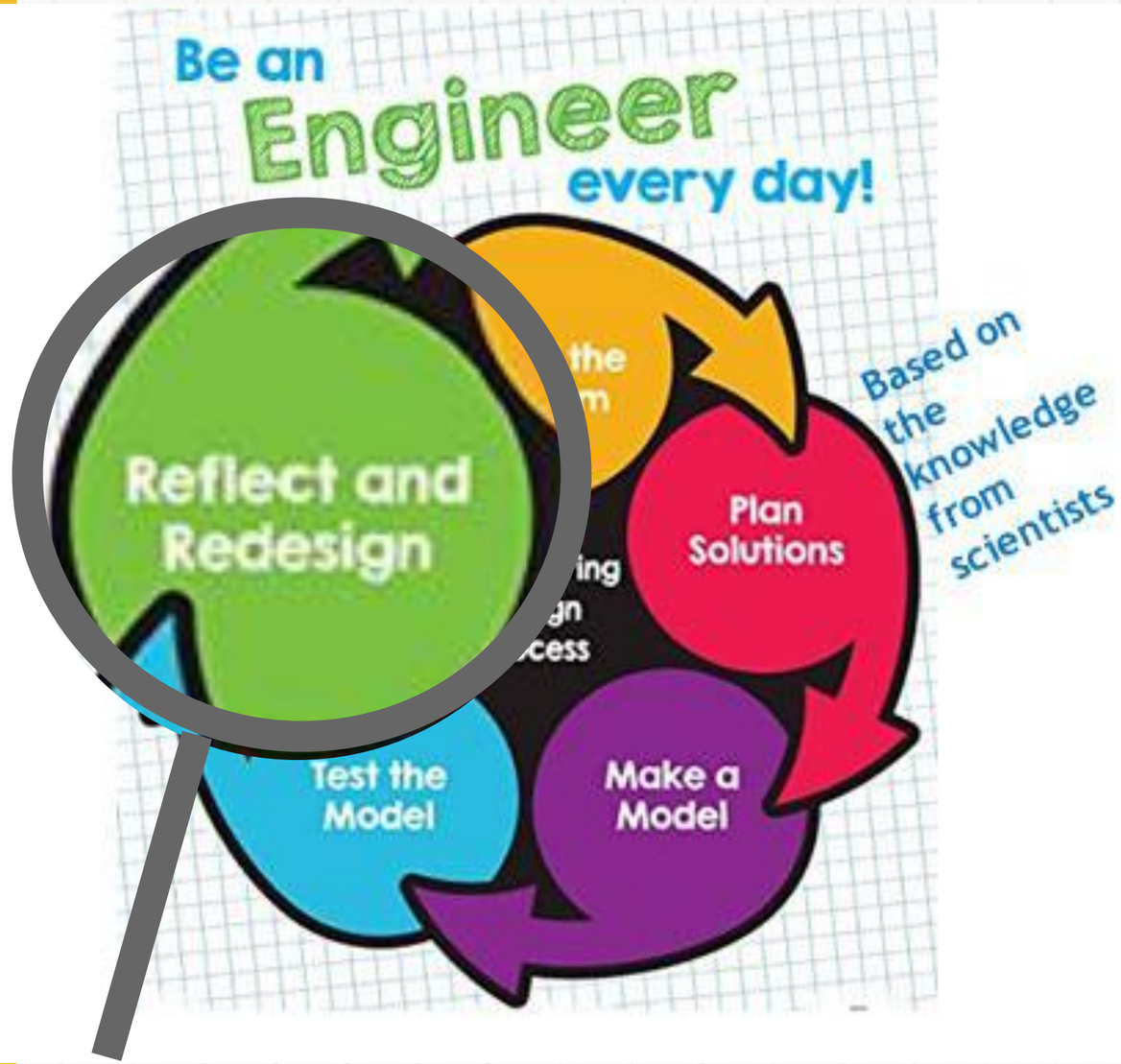


4. While we are testing, let's do some observations! Answer the questions below with your team.

How do you think heat is helping cook the s'more inside the oven?

What do you think the <u>viscosity</u> of the marshmallow is right now? What <u>stage of matter</u>? Why do you think so?

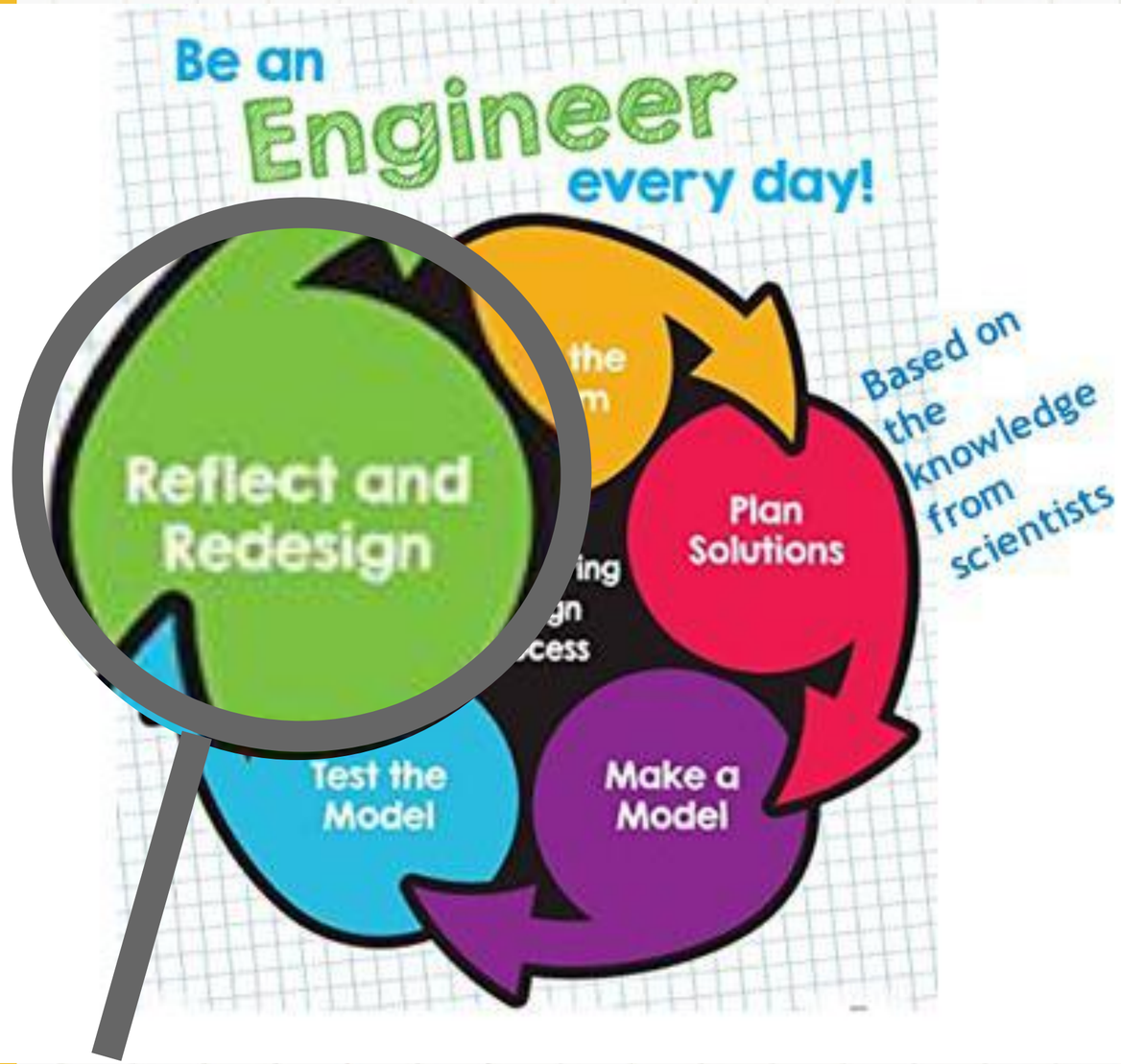




Reflect!

- Does your oven get hotter than their oven or not?
- What do you think is different from the other prototypes you see?

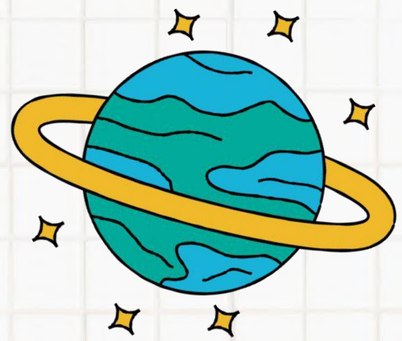
Redesign!



Time to plan! Remember, engineering is constantly doing the process over and over again!

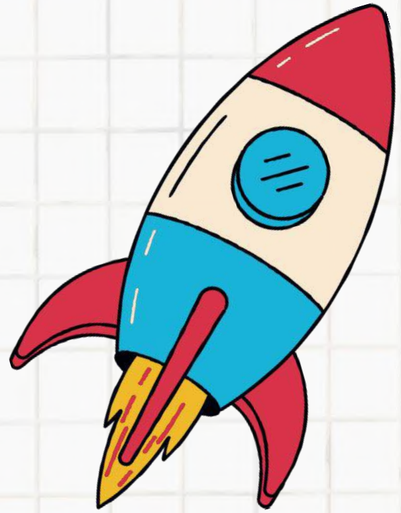
- What do you think you want to change from your model?
- What do you think you will keep the same?

Make and Test the model (again!)



Do you think there can be other changes made to your prototype? What changes would there be and why would you make those changes?

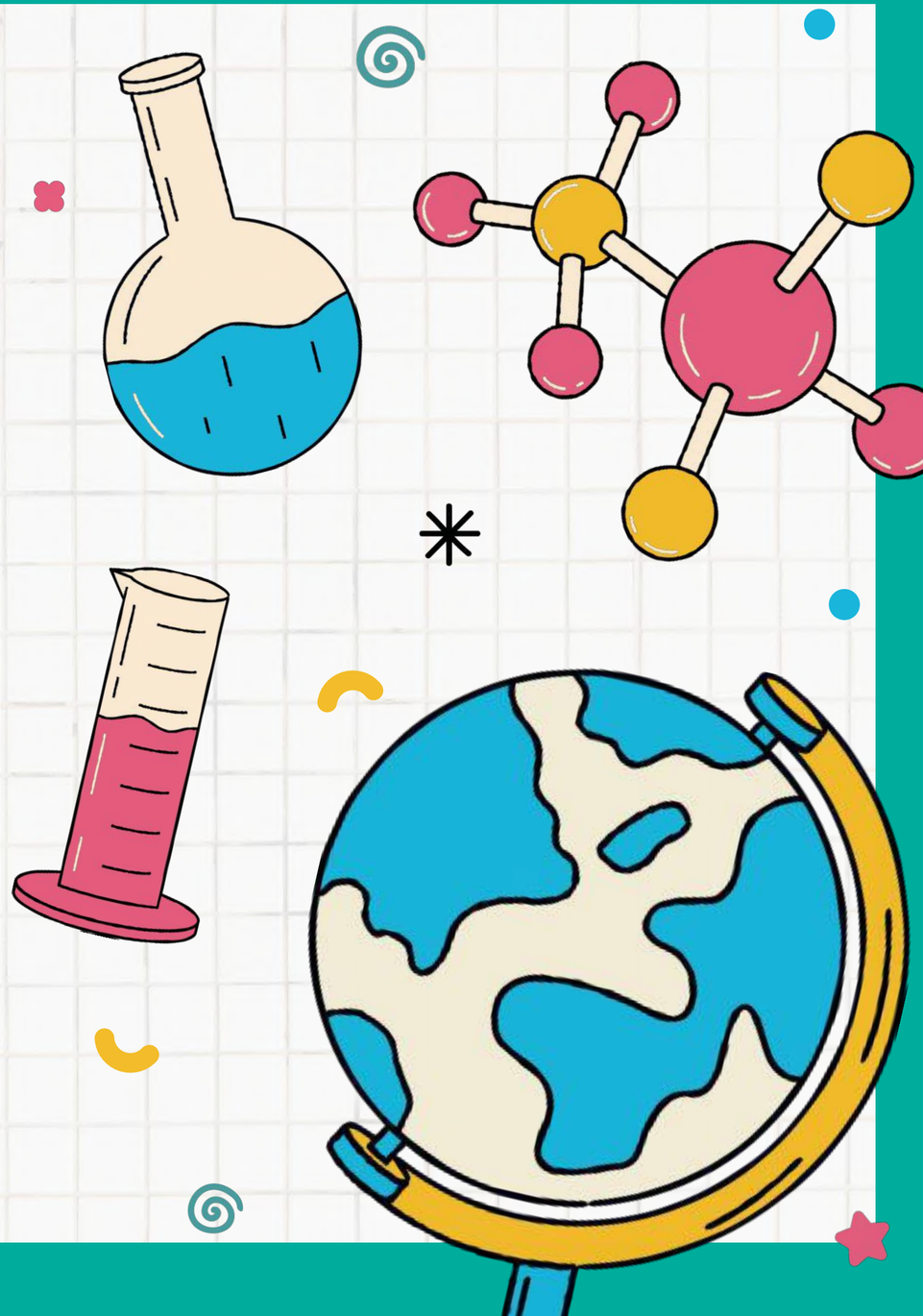
Would there be anything you keep the same if you redesigned this again? What would stay the same and why?



Let's talk about it.

What can you do differently?

What can you do the same?



POP QUIZ!

Answer the following questions on your handout!

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THANK YOU!

We had fun engineering with you!