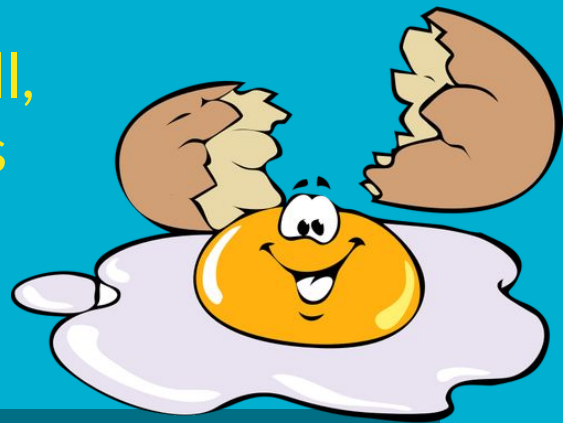
Humpty Dumpty had an Egg Drop

(Or cereal, cracker, or pasta drop)

Lindsey Snipp, Elizabeth Hassell,
Trey Ward, and William Helms



Introductions

Who are the teachers?

My name is Ms. Hassell

I am an Art Education student at ODU.

I like drawing, reading, and playing video games.

My name is Ms. Snipp.

I am an Education student at ODU.

I enjoy singing and spending time with my family.

Introductions

Who are the teachers?

Mr. Ward

Engineering student at ODU

Military Aviation/ Mechanical Engineering

I like Brazilian Jiu Jitsu and kickboxing

Mr. Helms

Engineering student at ODU

Space Weather Enthusiast! (We're at solar minimum right now! So don't worry about solar flares!)

If I'm not studying I enjoy playing video games.

Rules

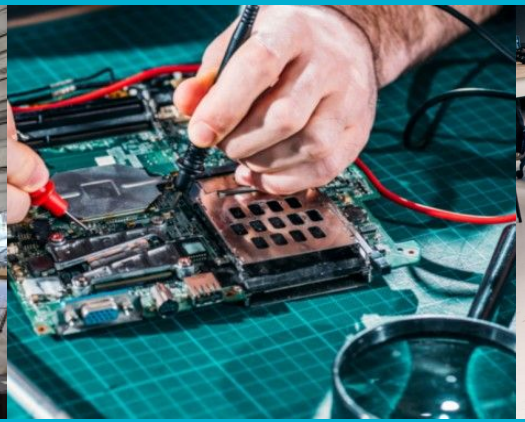
- Follow directions
- Be kind to yourself
- Respect the materials
- Work hard and never give up

What is Engineering?

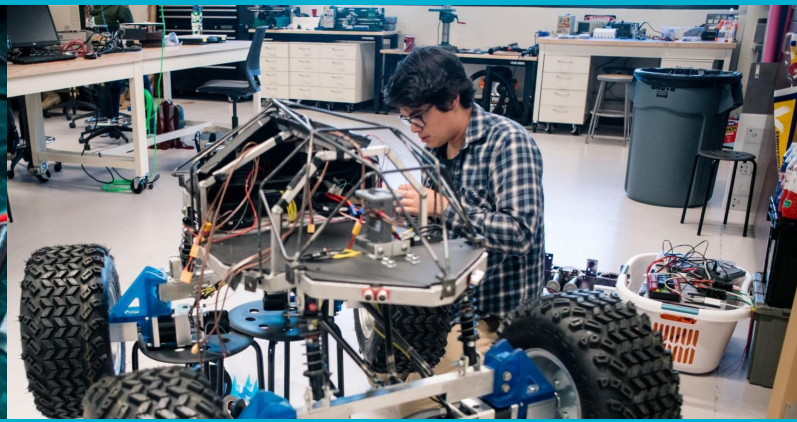
It is using math, science, and technology concepts to solve everyday problems.

These problems can range from: Buildings, Machines, Cars, and so many more!

From: Buffalo.edu



From: InterestingEngineering.com



From: erau.edu

Presenter: Will

You Will Be an Aerospace Engineer!

In today's Lesson you will be an Aerospace Engineer!

- Aerospace Engineers design Planes, Rockets, and the many systems that go into them (safety systems!).
- Make designs, research, and solve everyday problems in regards to anything air or space.
- For example, lessening the amount of fuel used in air travel.

Meet an Engineer

From: thekidshouldseethis.com

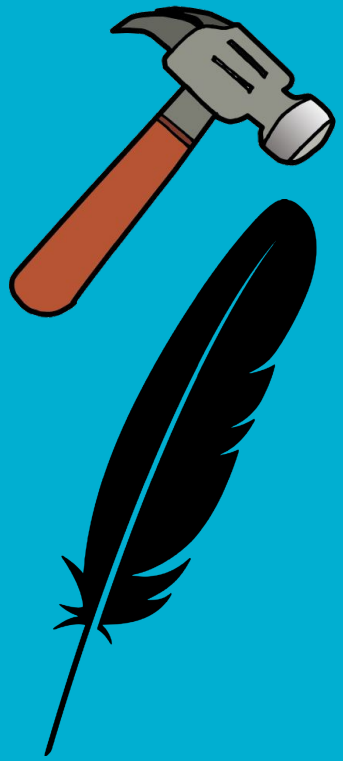
Lonnie Johnson (1949 - Present)

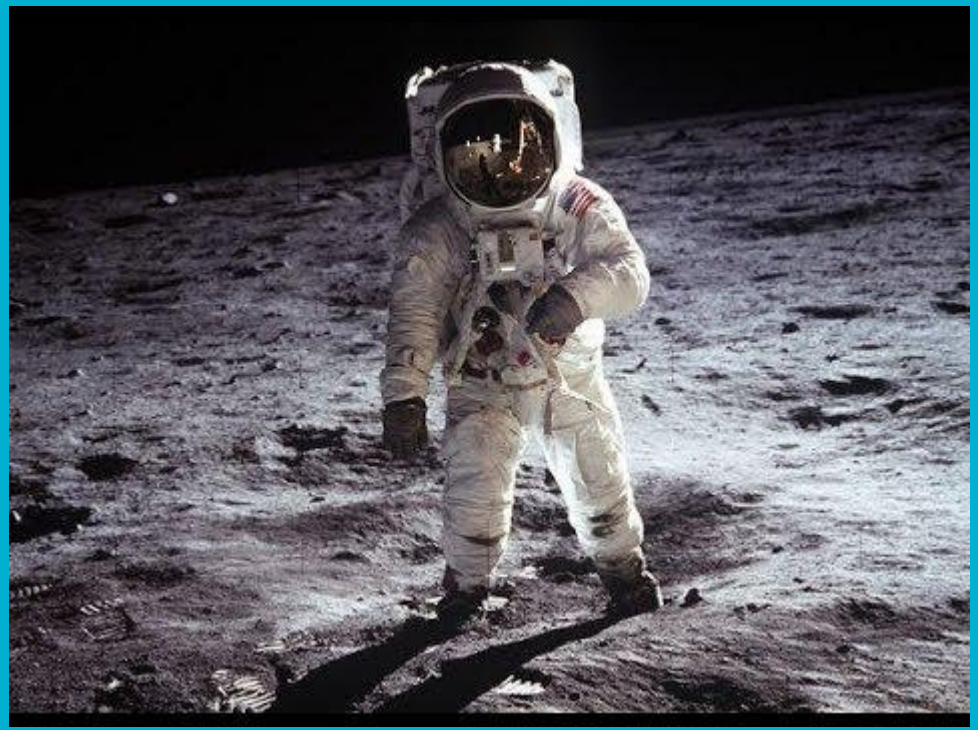
- Invented the super soaker in 1982
- Did not set out to invent a water gun
- Worked for the Air Force and NASA

Presenter: Trey

Here is some more about Lonnie!

Hammer and Feather Dropped on the Moon





Before watching the video:

What do you think will hit the ground first when dropped on the moon, a hammer or a feather?

Presenter: Will

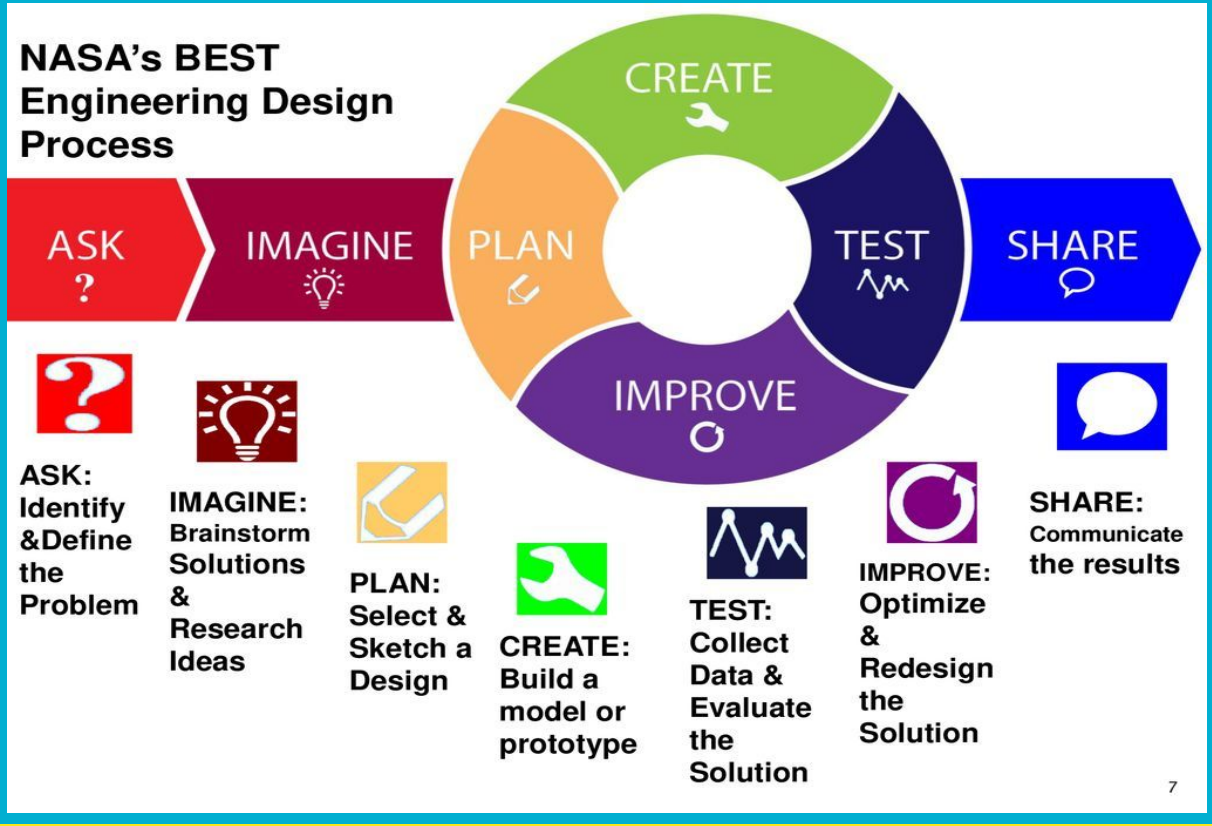
Engineering/Science Concepts —(You should remember this!)

- Speed: How fast an object is falling! Like how a car travels at a certain mph (miles per hours) an object that's falling has speed as well.

- Air resistance: The air slightly resists objects when they are falling. Think of a piece of paper vs. a pencil.

Presenter: Will

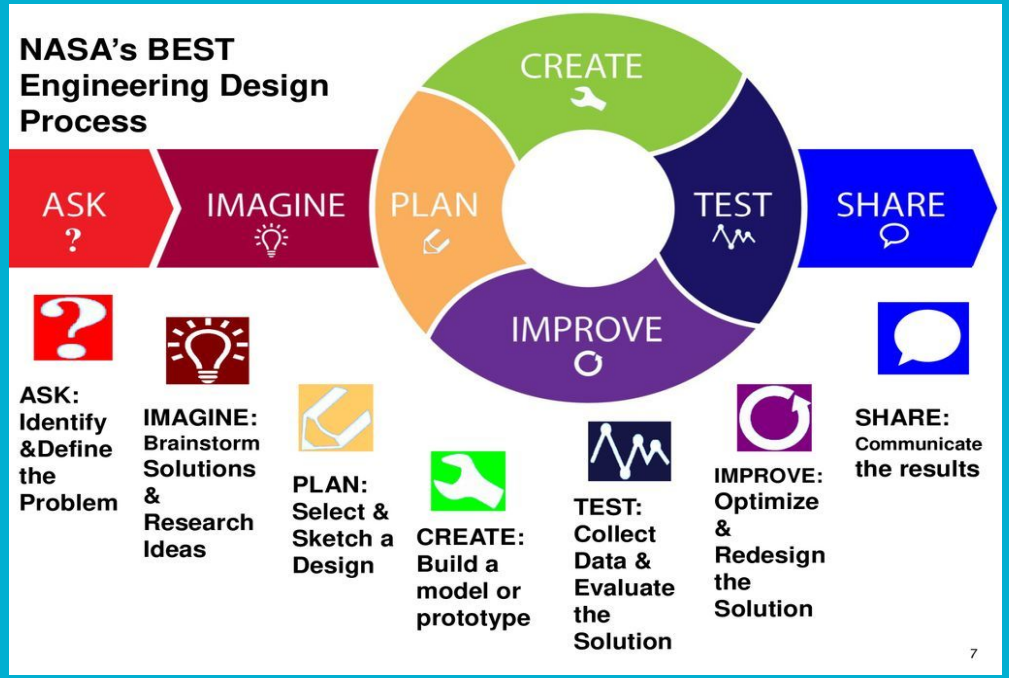
The Engineering Design Process (EDP)



- Ask: Why is this a problem?
- Imagine: How can I solve this problem?
- Plan: What steps can I take to solve this problem?
- Create: How can I build this
- Test: How can I test this and analyze the data?
- Improve: Where did it fail, and how can I fix that?
- Share: How can I make this information/product easily available

Presenter: Elizabeth

The Engineering Design Process (EDP)



Presenter: Josh

Today's Engineering Design Challenge Is An... EGG DROP!

This challenge is best done in groups of two. If you have a sibling or parent, ask them to participate in this challenge with you. If you do not have anyone to participate with you, that is okay!

- Building Materials Manager: In charge of handling the supplies
- Quality Assurance Specialist: Tests prototype and records results

Remember Both team members must contribute to planning, designing, and building the prototype!

Presenter: Elizabeth

Materials

Due to the circumstances this “Egg Drop” can be done with things like cereal, pasta or various other food items, just get your parent’s approval, especially for the egg!

Building Materials

- Scissors, glue, tape.

Ideas for materials

- Cotton Balls, Pipe cleaners, Paper Towels, Paper Plates, Cardboard, straws, Paper, plastic bags.
- Please do not feel that you have to use the supplies above, use anything at your disposal, as long as you have your parent’s permission.
  ATTENTION: Keep your food items in a ziploc bag! No messes please!
  If you don't have one of the materials use something similar (Ex. Replace cotton balls with paper shreds- Be creative!)

Presenter: Will

ASK?

- Before you watch the video, answer this question: What is going to happen when Mr. Ward drops this egg?
- Now watch the video and see what happens!

Presenter: Lindsey

IMAGINE! Let's brainstorm...

- What could Mr. Ward have done to prevent the egg from breaking?

  Remember! There are no BAD ideas when you are brainstorming

If you're having trouble brainstorming check out this tutorial/troubleshooting video!

https://youtu.be/uupwZd1shyU

PLAN

- Explain your design and why you think it will work
- Make a decision on which design to build if you made more than one (and think of edits!)
- Think about how you can best build the design
- You will have 15 minutes to design and create prototype one
- Timer on the next page!

Presenter: Trey

Time to CREATE!

Here's a trouble shooting video if you need it that shows some uses for paper!

https://youtu.be/31ys2yhOyE0

TEST: Now we get to test our prototypes!

Quality Assurance Specialists, it is your time to shine!

Let’s drop those prototypes and record our results

Remember The goal is to not break your precious cargo!

Presenter: Elizabeth

What happened?

Two Big Questions:

- Did your design work? Why or why not?
- What are you going to do differently to improve your design?
- On your second trial, we encourage you to try to use a plastic bag in your design!

Presenter: Lindsey

Engineering/Science Concept Revisited

Original Concept:

- Apply the concepts from earlier:
  - Air Resistance: How can we increase the air resistance?
  - Speed: How can we slow down the descent?

NEW CONCEPT:

- Collisions and Collisions time
  - Collision: how can we soften the impact against the ground?
  - Collision time: How can we extend the duration of the collision?

- Think about implementing changes based on these concepts!

Presenter: Trey

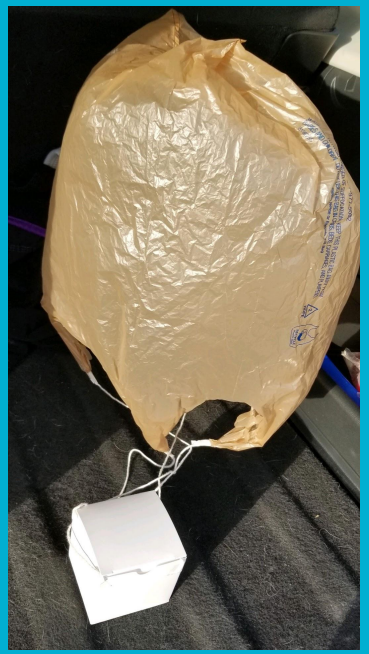
IMPROVE your design!

Trial Two: 5 minutes

- Give yourself about 5 minutes to improve your design, then test the design again.
- Hint: Take a look at our prototypes for inspiration! And consider using a plastic bag if you haven't already.

A plate that uses straws, and springs made out of pipe cleaners to reduce how hard it hits the ground. It also uses a plastic bag to act as a parachute.

Sometimes simple is better! Here we put cotton balls in a box, and attached strings to a plastic bag as a parachute.



Presenter: Will

Wait! You're not done yet!

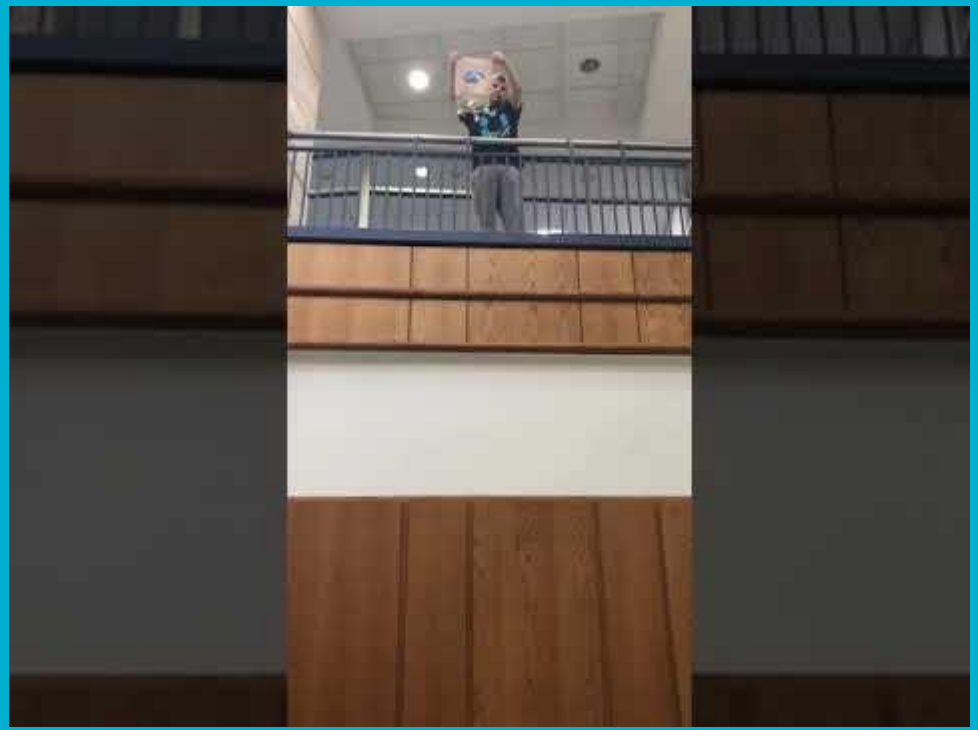
If you are able to, take a photo of your model so you can

share how much fun you had with us today!

Click the link below to upload your photo!

https://padlet.com/ehass006/xgv322mlw0bq

Here's A Video of One Our Prototypes!



How we applied to concepts:

The parachute:

The parachute slowed down the descent by creating more air resistance

The suspension (acting as a spring):

We used straws and pipe cleaners to create and suspension system that extended the impact against the ground

Results (Questions to Think About)

- What did you change on your second prototype?
    - For Engineers changing your design is essential!
- Do you have any ideas of how this could be used in a real world situation?
    - Ex. Airdrop supplies to hurricane victims
- Would you have to change anything about the design to be used in the real world?

What did you learn?

- What were some of the difficulties you faced when designing and building your prototype?
- If you were to make your design better, what would you add?

Click the link below to tell us about what you thought of our lesson!

https://www.flexiquiz.com/SC/N/cb40bbeb-3b6f-42f3-bef4-287761c2e499

Presenter: Lindsey

Submit your engineered solution. Win a Prize!

You have completed the lesson from TEAM 12!

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

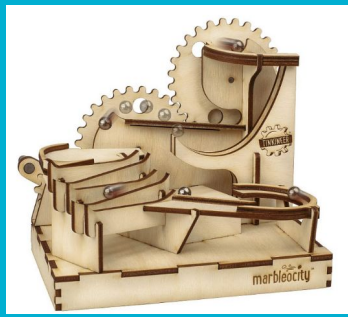
We will randomly select 10 winners from all entries. Everyone who enters is eligible to win! Choose from 5 different prizes.

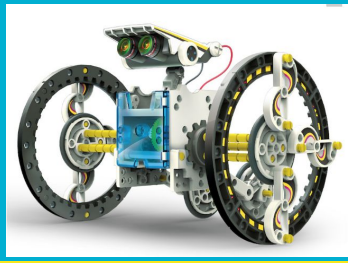
We will also award a few prizes

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)

Resources

- Nakaya, R. (2020, February 17). *The rocket scientist who invented the super soaker.* Retrieved from https://thekidshouldseethis.com/post/the-rocket-scientist-who-invented-the-super-soaker
- The Henry Ford. (2018, April 24). *Super Soaker Inventor.* Retrieved from https://www.youtube.com/watch?v=j7m1L16tQrQ
- 4thcouch. (2010, January 9). *Dropping a bowling ball in a bathtub full of pudding.* Retrieved from https://www.youtube.com/watch?v=WNWCQedMWkU