

Engineering Design Process

Unit 2, Lesson 1

Big Idea

- **ENGR-EET-3: Students will explain the engineering design process.**

Critical Knowledge/Elements

A) Examine the engineering design attributes

Essential Question

What is the Engineering Design Process?



Word Wall

Engineering Design Process

Limitations

Brainstorm

Scale

Prototype

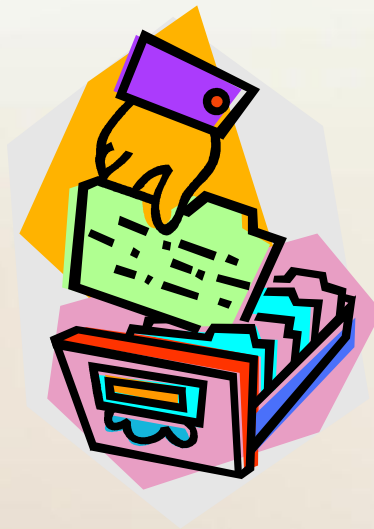
Patent

Engineering Design Process



- Each group will receive a pack of the “*Engineering Design Process Cards.*” (*EDP Cards*).
 - Organize the cards into a logical sequence, to which you all agree.
 - On a sheet of paper, record the steps in the order your group agreed on.
 - Be prepared to defend your process, whether it appears right or wrong. It is important that all members of your group can explain why the cards are arranged as they are.
- Engineering Design Process Cards (EDP Cards)***

Review order of Engineering Design Cards (EDP Cards)



Steps in the Engineering Design Process



Identify a Challenge



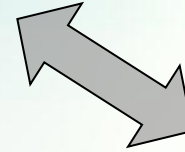
**Engineering
Design
Process**

Steps in the Engineering Design Process



- Identify a Challenge
 - Usually the first step of the EDP.
 - It is important to carefully examine existing products to identify their limitations. This is a key step of innovation.
 - An example would be the telephone and how it has changed and improved because people wanted it to be smaller, lighter, more mobile, faster and more attractive.

Identify a Challenge



Explore Ideas



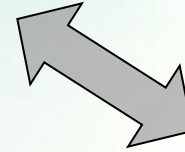
**Engineering
Design
Process**

Steps in the Engineering Design Process

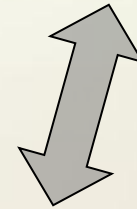
- Identify a Challenge
- Explore Ideas
 - This step is designed to brainstorm ideas to innovate the product.
 - It is important to come up with as many ideas as possible. The ideas can be sketched and/or written.
 - It is important to ask other people such as parents, neighbors, and friends, to help generate ideas they have not thought of.



Identify a Challenge



Explore Ideas



Plan & Develop



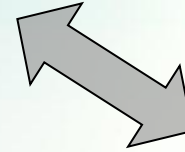
**Engineering
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Steps in the Engineering Design Process

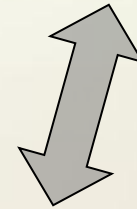
- Identify a Challenge
- Explore Ideas
- Plan and Develop
 - Begin by making a final sketch of their idea.
 - Add notes and dimensions as applicable.
 - Use models and a prototypes.
 - Models are for show.
 - Prototypes function as desired.
 - Gather tools and materials to construct a new product.



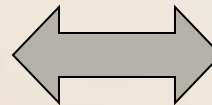
Identify a Challenge



Explore Ideas



Plan & Develop



Test & Evaluate



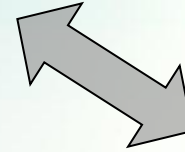
**Engineering
Design
Process**

Steps in the Engineering Design Process

- Identify a Challenge
- Explore Ideas
- Plan and Develop
- Test and Evaluate
 - Make sure the new product works as it was intended.
 - Find out if their product would be accepted on the market by asking other people what they think of it.



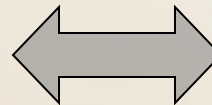
Identify a Challenge



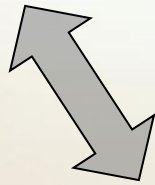
Explore Ideas



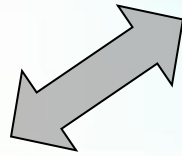
Plan & Develop



Test & Evaluate



Present the Solution



**Engineering
Design
Process**

Steps in the Engineering Design Process

- Identify a Challenge
- Explore Ideas
- Plan and Develop
- Test and Evaluate
- Present the Solution
 - Although final step in the EDP, many times it leads back to Step 1: Identify a Challenge.
 - Give a short presentation/demonstration about the product.
 - Some of the final steps in the process go beyond what the engineer does, but they are key to the successful use of the product or system.



Identify a Challenge



Explore Ideas



Plan & Develop



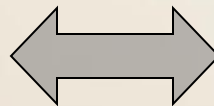
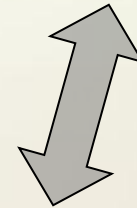
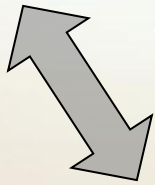
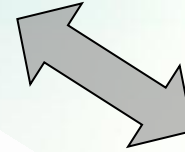
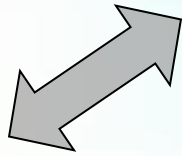
Test & Evaluate



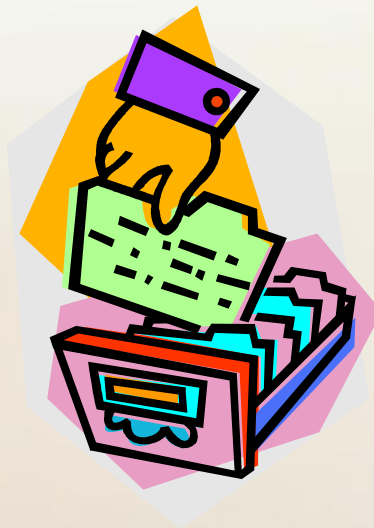
Present the Solution



**Engineering
Design
Process**



Reorder the
Engineering Design
Cards (EDP Cards)
using what you
have just learned.



Identify a Challenge



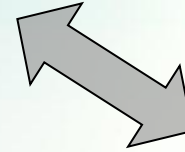
**Engineering
Design
Process**

Steps in the Engineering Design Process



- Identify a Challenge
 - Key EDP Cards: Examine Existing Products, Write down your ideas, Identify limitations.

Identify a Challenge



Explore Ideas



**Engineering
Design
Process**

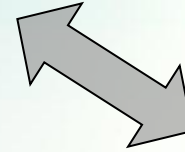
Steps in the Engineering Design Process

- Identify a Challenge
- Explore Ideas



- Key EDP Cards: Write down notes of ideas, Make sketches, Brainstorm for ideas.

Identify a Challenge



Explore Ideas



Plan & Develop



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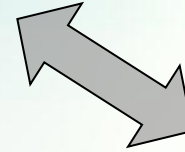
Steps in the Engineering Design Process

- Identify a Challenge
- Explore Ideas
- Plan and Develop

- Key EDP Cards: Establish a scale, Make a scale drawing, Get tools and materials, Build a prototype.



Identify a Challenge



Explore Ideas



**Engineering
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Plan & Develop



Test & Evaluate

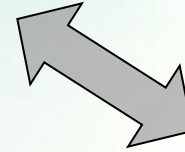


Steps in the Engineering Design Process

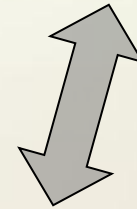
- Identify a Challenge
- Explore Ideas
- Plan and Develop
- Test and Evaluate
 - Key EDP Cards: Test the product, Ask people if they like the new product, Analyze survey data, Redesign the product, if necessary.



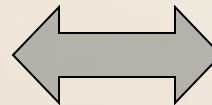
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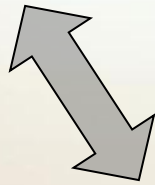
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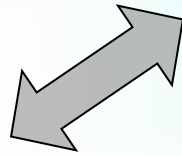
Plan & Develop



Test & Evaluate



Present the Solution



**Engineering
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Steps in the Engineering Design Process

- Identify a Challenge
- Explore Ideas
- Plan and Develop
- Test and Evaluate
- Present the Solution



- Key EDP Cards: Apply for a patent for the product, Make a commercial, Sell the new product, Analyze profit/loss results.

Many engineers do not follow the EDP strictly, but rather can move fluidly back and forth between steps. The key is that you understand the basics of the process.



Identify a Challenge



Explore Ideas



Plan & Develop



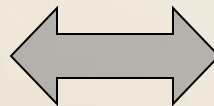
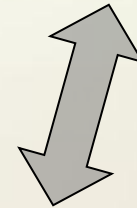
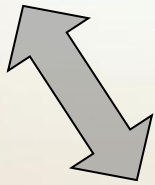
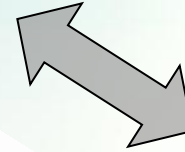
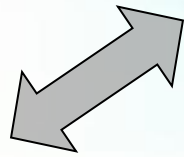
Test & Evaluate



Present the Solution



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Essential Question

What is the Engineering Design Process?



Conclusion

Unit 2, Lesson 1