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Engineering Design Packet

Pre-Assessment Questions

Instructions: Answer the following questions.

1. What do you remember about the story *The Three Little Pigs*?

2. What materials did each pig use to build their house?

3. Which house do you think was the strongest? Why?

4. What do you think engineers do?

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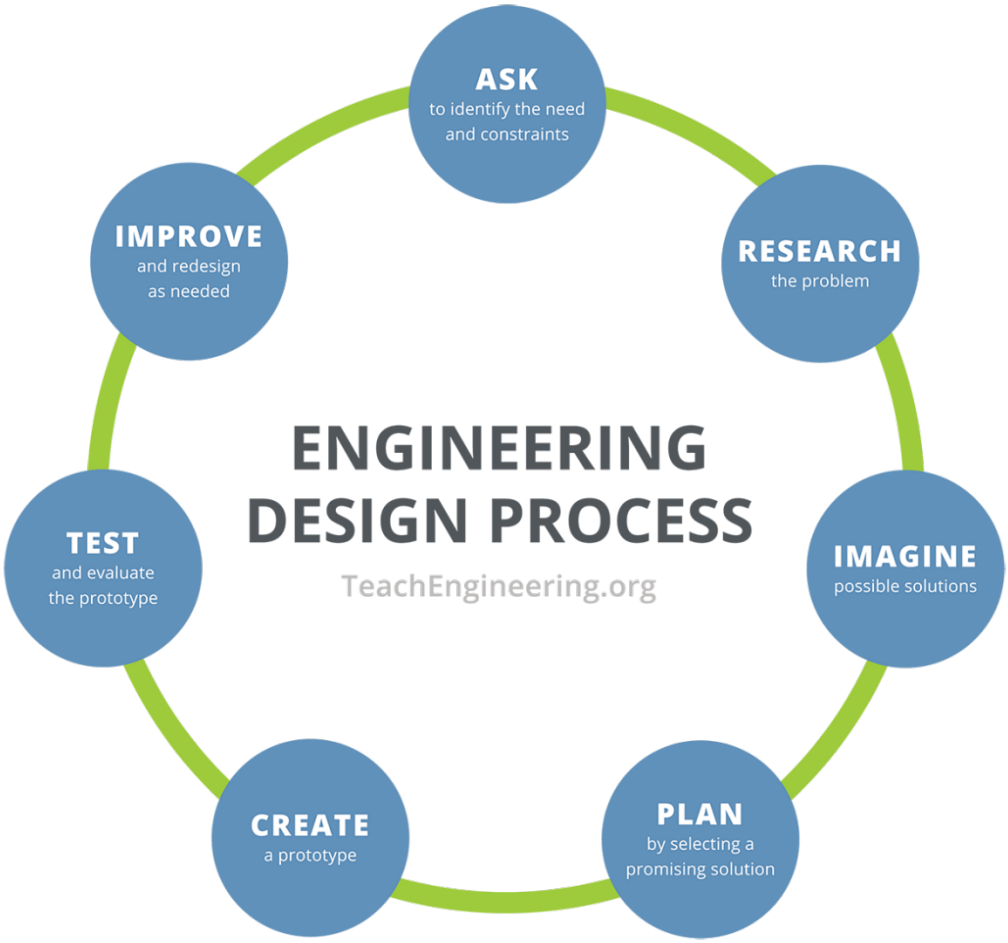
Engineering Challenge

Instructions: Using the engineering design process, you and your team will act as engineers tasked with building three houses, one out of straws, one out of popsicle sticks, and one out of LEGO bricks, and then testing each to see which materials are the strongest and the weakest.



1. **Ask** - What is the problem we are trying to solve?

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2. **Research** - What do we already know?

3. **Imagine** - Sketch four different ways to build a strong house with each material.

a	b
c	d

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4. **Plan** - Have each team member share their ideas. As a team, select ONE solution for each building material. Note: This can be one specific solution or a mixture of ideas. Draw your team's solutions in the boxes below.

Design for house made of straws
Design for house made of popsicle sticks
Design for house made of LEGO bricks

5. **Create** - Build your prototypes as shown in your group's drawings.

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6. **Test** - Test your prototypes, record your data in the data charts below, and then answer the following questions.

Straw House

	10 ft	9 ft	8 ft	7 ft	6 ft	5 ft	4 ft	3 ft	2 ft	1 ft
Air Flow										
Observations										

Popsicle Stick House

	10 ft	9 ft	8 ft	7 ft	6 ft	5 ft	4 ft	3 ft	2 ft	1 ft
Air Flow										
Observations										

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LEGO House

	10 ft	9 ft	8 ft	7 ft	6 ft	5 ft	4 ft	3 ft	2 ft	1 ft
Air Flow										
Observations										

What worked in your prototypes, and why?

_____

_____

_____

_____

_____

What did not work in your prototypes, and why?

_____

_____

_____

_____

_____

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7. **Improve** - Based on your testing and results, draw how would you improve your designs.

8. **(optional) Iterate** – Make changes and retest your updated prototypes.

Straw House

	10 ft	9 ft	8 ft	7 ft	6 ft	5 ft	4 ft	3 ft	2 ft	1 ft
Air Flow										
Observations										

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Popsicle Stick House

	10 ft	9 ft	8 ft	7 ft	6 ft	5 ft	4 ft	3 ft	2 ft	1 ft
Air Flow										
Observations										

LEGO House

	10 ft	9 ft	8 ft	7 ft	6 ft	5 ft	4 ft	3 ft	2 ft	1 ft
Air Flow										
Observations										

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Did your changes improve your prototypes? How?

What worked in your updated prototypes, and why?

What did not work in your updated prototypes, and why?

What would you do to further improve your prototypes, and why?

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Reflection Questions

What did you learn about building strong structures?

What would you do differently next time?

How did your group work together to solve problems?