SEEDS of STEM
Professional Development Session I

STEM & the Engineering Design Process
Goals of today’s workshop

1. Get familiar with the engineering design process

2. Discuss vocabulary associated with STEM and problem solving

3. Collaborate with colleagues around teaching the EDP to young children
But... What is Engineering?

Video break
STEM education is an interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering, and mathematics in contexts that make connections between school, community, work, and the global enterprise, enabling the development of STEM literacy and with it the ability to compete in the new economy.

(Tsuiopros, Kohler, & Hallinen, 2009)
Engineering is...

...an iterative design and the optimization of materials and technologies to meet needs as defined by criteria under given constraints. Engineers use systematic processes, mathematical tools and scientific knowledge to develop, model, analyze, and improve solutions to problems.

(Carr, Bennett & Strobel, 2012).
STEM & Engineering at the Pre-K Level

Take a few minutes to discuss your definitions for STEM & Engineering on the opening survey, then:

1. Review the handout with definitions
2. Come up with a group definition for engineering that matches the level of Head Start children’s understanding

Time: 10 min
Use the sheets of blue paper to build a structure that:

1. Has 3 stories, and
2. Is at least 8 inches (20 cm) high

Time: 5 minutes
Design Challenge

Use the sheets of blue paper to build a structure that:

1. Has 3 stories, and
2. Is at least 8 inches (20 cm) high - AND
3. Can support 5 markers

Time: 5 minutes
The problem solving process

What steps did you follow when solving the challenge?
The Engineering Design Process
Design Cycle by the Boston Museum of Science
Design Cycle by “Design Squad”
Design Cycle by NASA

1. State the Problem
2. Generate Ideas
3. Select a Solution
4. Build the Item
5. Evaluate
6. Present Results
Steps of the Engineering Design Process

1. Identify the Need or Problem
2. Research the Need or Problem
3. Develop Possible Solution(s)
4. Select the Best Possible Solution(s)
5. Construct a Prototype
6. Test and Evaluate the Solution(s)
7. Communicate the Solution(s)
8. Redesign

The process is iterative, allowing for feedback and refinement at each step.
Ask?

* What is the problem?

Improve

* Talk about what works, what doesn’t, and what can make it better.
* Modify design to make it better.
* Test it out!

Create

* Follow your plan and create it!
* Test it out!

Plan

* Draw a diagram.
* Think of materials.

Suggestion ideas

What are some solutions?
Design Your Own Engineering Clock

In small groups explore the different engineering process visuals and create a visual that fits your children’s abilities and vocabulary

15 min