EXPLORE
THE NEW MANUFACTURING

Lesson 1

Session Title: Engineering Building Activity

Grade Level: 3rd – 6th Grade

Focus: Engineering

Objectives: As a result of this lesson, the student will:

- Watch "What's So Cool About Manufacturing" videos that demonstrate history and manufacturing.
- Use their creativity and imagination to create their own structure.
- Make their own housing structures.
- Follow instructions to create a finished product.
- Expand their knowledge about manufacturing and engineering.

PA Standards	
Career Education and Work	• 13.1.3. A Recognize that individuals have unique interests. • 13.1.3. B Identify current personal interests. • 13.1.3. C Recognize that the roles of individuals at home, in the workplace and in the community are constantly changing. • 13.1.3. D Identify the range of jobs available in the community. • 13.1.3. E. Describe the work done by school personnel and other individuals in the community. • 13.1.3. F. Explore how people prepare for careers. • 13.1.3. G. Explain why education and training plans are important to careers. • 13.1.3. H. Explain how workers in their careers use what is learned in the classroom. • 13.1.3. E. Discuss the importance of the essential workplace skills, such as, but not limited to: Dependability, Health/safety, Team building, Technology. • 13.3.3. A. Identify attitudes and work habits that contribute to success at home and school. • 13.3.3. C. Explain effective group interaction terms, such as, but not limited to: Compliment, Cooperate, Encourage, Participate.
Engineering	• 3.4.3.B2. Explain how materials are reused or recycled. • 3.4.3.C1. Recognize design is a creative process and everyone can design solutions to problems. • 3.4.3.C2. Explain why the design process requires creativity and consideration of all ideas. • 3.4.3.C3. Recognize that all products and systems are subject to failure; many products and systems can be fixed. • 3.4.3.D3. Collect information about everyday products and systems by asking questions. • 3.4.3.D1. Identify people's needs and wants and define some problems that can be solved through the design process.
Artifact Opportunity	• The Journal Worksheet can be used as an artifact.
Videos	• Moon Area - Industrial Scientific: https://www.youtube.com/watch?v=kJ86CK0nQgc • Greater Johnstown - Lockheed Martin AeroParts: https://www.youtube.com/watch?v=fTPdKcb5iRo • Forest Hills - JWF Industries: https://www.youtube.com/watch?time_continue=16&v=xFhu1z_5Uog

Lesson Plan

Materials Needed

- ☐ Construction paper
- ☐ Popsicle sticks
- ☐ Tooth picks
- ☐ Clay or play doh
- ☐ Cotton balls
- ☐ Marshmallows
- ☐ Scissors
- ☐ Glue
- ☐ Journal Worksheet
- ☐ Internet access
- ☐ Internet access
- ☐ "What's So Cool About Manufacturing?" videos

Prior Knowledge

Overview: We will be creating our own housing structure with a variety of materials. Much like in manufacturing, we have to follow a specific list of steps in order to create our finished product. Many food products, toys, and materials are made through the process of manufacturing.

Procedures and Activities

Guiding Questions:

- What is manufacturing?
- What are the properties of the materials being used?
  - Where can you find it? Can you find it easily?
  - Do you need to use special tools to work with this material?
  - What happens to this material when it gets wet?
  - Is it a strong material?
  - Is it heavy or light?
  - Cheap or expensive?
- What is the goal of your design/structure? To be the tallest? To be the most stable?
- How is engineering used in manufacturing?
- What products use the materials we are using today?

Directions:

Step 1: Provide students with the materials to build their own structure

Step 2: Allow students to create their own houses/structures

Step 3: Have each student present their structure and describe how they engineered it

Step 4: Add patterns or designs with coloring pencils and other optional provided materials.

Step 6: Culminating Activity:

Students will:

- Journal their discoveries
- Revisit the guiding questions
- Talk about how engineers produce creative solutions to real world problems
- Journal any remaining questions they have about the activity and manufacturing

Journal Worksheet

Sketch a draft of your structure	

Did you have to make any modifications? If yes, why? If you didn't have to make any modifications what would you like to be able to add or change the next time?	
Journal any remaining questions about the activity and manufacturing	

Photo of final product: