

 Date: July 17

Topic: Advanced Manufacturing

Time Required: 60 minutes

 Learning Target/Objectives:

- I can understand what assembly lines are, how they impact the manufacturing of goods, and how humans on the assembly line versus robotics on the assembly line will impact the production and quality of goods.

 Vocabulary:

- Advanced Manufacturing
- Assembly Line
- Cycle Time
- Downtime
- Good Manufacturing Practices
- Manufacturing
- Manufacturing USA
- Make-To-Order
- Performance %
- Programmable Logic Controller
- Quality %
- Standard Operating Procedure
- Quality Management System

## Color Legend:

Red = Essential

Blue = Enrichment

Purple = In Depth

 Guiding Questions:

- What is manufacturing?
- How were items created in the past vs the present?
- What are some products that are manufactured?
- What were some of the major developments made in manufacturing?
- Provide some examples of the technology that has been created that benefits/is used in manufacturing
- How has manufacturing developed over time?
- How were products produced in the past (when modern technology was not available)?
- How is robotics used in manufacturing?

 Lesson Design Details:

**Activity 1:** Artisan versus Factory - Have each individual student cut a snowflake out of coffee filters into any pattern they wish in 5 minutes. Discuss how many were made and how they differ.

**Activity 2:** Put students into groups to act as a factory. Each student will have one role and a repetitive role to create a snowflake. The goal is to make the same product. How many can be produced in 5 minutes. Discuss how many were made and how they differ versus the goods produced by individual artisans.

**Activity 3:** Students will discuss the pros and cons of artisans versus factory workers.

## Key Points:

- What do we know about assembly lines? Show video clips of assembly lines in TV shows:
  - Suggestions: I Love Lucy Chocolate Assembly Line scene
  - Drake and Josh Sushi Assembly Line scene
- Factory: Humans versus Robotics
  - Show video clips of robotic assembly lines
  - Discuss how an assembly line of humans and robots will differ in production, quality of goods, and resources needed to produce

- Extension: discuss the economic, social, and educational impacts of switching from human to robotic assembly lines

 **Materials/Resources:**

- Digital Journal (Google Slides RECOMMENDED):

 **Closing (Check for Understanding):**

- Discussion Review - students will share
  - Answers to Guiding Questions
  - Any surprises they experienced

CATEGORY	STANDARD ORGANIZATION	STANDARD/BENCHMARK CODE & DESCRIPTION
Technology	ITEEA	<b>STEL-1: PreK-2, 1A</b> - Compare the natural world and human-made world.
Science	NCSOS	<b>S3.ESS3.A</b> - Develop an understanding of the nature of technology by recognizing that technology is a tool that helps people solve problems and improve their lives.
Technology	ISTE	<b>T3.1a</b> - Students will understand the power of technology to assist individuals in working with information, ideas, and experiences.