

## Industrial Engineering

If you find yourself searching for better ways to do things, you're thinking like an industrial engineer. Industrial engineers use their knowledge of science, mathematics, and engineering—along with design, computer science, operations management, and other disciplines—to design systems that are simpler, higher quality, a better value, safer, and more efficient.

### CATEGORY

- Engineering

### OBJECTIVES

By the end of this session, participants will be able to:

- Understand what industrial engineering is.
- Demonstrate key industrial engineering concepts.

### SUPPLIES

- Several examples of types of shopping bags with different shapes and designs
- Sketch paper and pencil
- 8-by-12-inch pieces of thin, plastic material (such as a plastic tarp cut into pieces)
- Masking tape
- Twine
- Rulers
- Scissors
- Scale, such as spring scale
- Measuring cups
- Bags of candy, blocks, or other objects to be used as weights
- Items to check for volume, such as rice or candy
- Activity pages for the Design and Build a Better Candy Bag lesson from TryEngineering.org (see below)

**ADVISOR NOTE:** Text in italics should be read aloud to participants. As you engage your post in activities each week, please include comments, discussions, and feedback to the group relating to **Character, Leadership, and Ethics**. These are important attributes that make a difference in the success of youth in the workplace and life.

### ACTIVITY

#### Introduction

*Ask: Have you ever worked as a part of an “assembly line” to accomplish a task? For example, you may have volunteered with a service group to assemble a large number of meals. Why are assembly lines used in manufacturing? How can they benefit a company and its employees?*

Explain to Explorers that the most famous person to use the assembly line was Henry Ford, who used industrial engineering to improve the process of making cars. To build his Model T, Ford began using an assembly line that moved the partially-made cars down a conveyor belt from one worker to the next. As a result of that improvement, the production process became much less expensive and soon many more people were able to afford cars—a shift that led to significant changes in society.

Have Explorers share their ideas for processes or designs they would like to see improved. Allow time for a brief discussion of the ways these everyday problems impact people's lives and how a better solution would improve them.

Tell Explorers they will be learning the story behind an invention they have probably used hundreds of times without thinking about its value or history. Following that, they will be taking on an industrial engineering challenge of their own.

### **Design and Build a Better Candy Bag**

Divide Explorers into teams of two.

Follow the instructions for the Design and Build a Better Candy Bag activity from TryEngineering.org, found at the following link:  
[www.ieee.org/documents/Design\\_and\\_Build\\_Your\\_Own\\_Candy\\_Bag\\_Lesson\\_Plan.pdf](http://www.ieee.org/documents/Design_and_Build_Your_Own_Candy_Bag_Lesson_Plan.pdf)

### **ADVISOR NOTE**

Some sample questions are below to help the participants get the most out of the session and make them think. The questions are designed to help the participants apply what they have learned to their own interests. You are welcome to use these questions or develop your own questions that relate to your post or specific focus area.

### **REFLECTION**

#### **Focusing Questions**

- *What was the purpose of these activities? Why did we do them?*
- *Can you think of other things industrial engineers might do?*

#### **Analysis Questions**

- *When you tested your prototype, what was the approximate volume of the bags?*
- *How much weight did your bag hold?*
- *Did you redesign your initial prototype?*
- *If so, what did you discover because of your redesign?*
- *If not, why do you believe your prototype worked so well the first time?*
- *Complete these sentences:*
  - *One thing I liked about our design was ...*
  - *One thing I didn't like about our design was ...*
  - *One thing I would change about our design based on my experience is ...*

## Generalization Questions

- *Is this a career you might be interested in? What about it appeals to you?*
- *What subjects in school do you believe you will need for a career in industrial engineering?*