

# SCIENCE MUSEUM OF MINNESOTA ENGINEERING ASSEMBLY, GRADES 3-5



## Concepts, Learning Goals, & Logistics

### GENERAL OUTLINE:

#### Engineering Habits of Mind and an Engineering Design Process

How do engineers think as they approach problems affecting people in today's world? Students see that engineers first must identify and understand a problem before developing solutions such as using various types of gloves to complete some tricky tasks. The challenge of moving a large fragile object under design constraints allows the audience to propose different solutions with the provided materials. Teams of volunteer engineers test their solutions, hoping for success but also experiencing failure. Students see that repeated designing does bring engineers to optimal solutions, as in the real-world case of designing high-speed trains. They realize that in each of the presented challenges, engineers were using an engineering design process.

#### Living in a Designed World

Student volunteers help reveal how engineers are involved in creating many of the things we use every day, even having a party! One by one we discover how engineers design everything from board games, to tables, to the pizza we eat. By examining the breadth of the engineering field and meeting a few people who work in it, students understand how engineering affects our daily life, the world, and society.

#### Science Learning Goals

- Engineers design solutions (products, processes, and systems) to meet human needs and wants.
- Engineering design is a systematic and iterative approach that includes the following:
  - Understanding and defining problems (criteria and constraints)
  - Developing and Testing possible solutions
  - Determining the optimum solution given the criteria and constraints)
- People live a designed world in which technology and society affect each other and the natural world.

#### Vocabulary Introduced:

- Engineering
- Technology,
- Design Process

**Program Length:** 50 minutes

**Audience Size:** Up to 250 students

**Preparation:** Science Museum instructor brings all needed equipment and materials. School provides two tables for demonstrations and access to electricity. Allow 45 minutes before and after program for set-up and take-down.

**MN Academic Standard Strand:** The Nature of Science and Engineering (0.1.1.2.1, 1.1.1.1.1, 1.1.1.1.2)

**NGSS Science and Engineering Practices:** Analyzing and Interpreting Data (1-ESS1-1), Constructing Explanations and Designing Solutions (1-LS3-1)

**NGSS Crosscutting Concepts:** Structure and Function (2-LS2-2)

If you have further questions on bringing programming to your school, please contact our Outreach Registration Coordinator at (651) 221-4748 or [schooloutreach@smm.org](mailto:schooloutreach@smm.org).