SCIENCE MUSEUM OF MINNESOTA ENGINEERING ASSEMBLY, GRADES K-2

Concepts, Learning Goals, & Logistics

GENERAL OUTLINE:

Discover Engineering
What do everyday objects have to do with engineering? As student volunteers examine the contents of mystery bags, the audience determines that these ordinary looking objects are designed by people to solve a problem, perform a process, or meet a need. That makes them technology, and engineers design technology.

Put it to the test
The young engineers in the audience test and explore multiple solutions to sledding down a hill with various "snow" conditions by using a toy bear and models of sleds, sometimes with surprising and humorous results!

Build it Tall, Build it Sturdy
Experience the process engineers use to solve problems by building tall and sturdy towers. Be amazed by how an unexpected tool helps hold the building blocks together.

Science Learning Goals

- Engineers use math, science, and creative thinking to design solutions to problems.
- Engineers test and observe solutions to see how well they solve a given problem.
- Engineers ask, imagine, plan, create, and improve again and again until they reach a solution to the problem.

Vocabulary Introduced:

- Engineering
- Technology,
- Observation

Program Length: 40 minutes
Audience Size: Up to 150 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.

SCIENCE MUSEUM OF MINNESOTA ENGINEERING RESIDENCY, GRADES K-2

MITTEN MAKERS SESSION

Students use the Engineering Design Process (Ask, Imagine, Plan, Create, Improve) to design a mitten that is warm, water resistant and flexible. Pairs of experimenters conduct tests with a variety of fabrics to gather information of the properties of the fabrics and evaluate the test results. Then they design a "best" mitten that meets all criteria and share the process and decisions that led to their design.

Program Length: Please allow 1 hour each for initial setup and final teardown.
Allow for at least 10 minutes to reset between classes or 15 minutes if changing classrooms.

Audience Size: Up to 30 students

Preparation: Science Museum Instructor brings all needed equipment and materials. This program requires at least 1 table for instruction materials and access to water. Materials can be moved from room to room or taught in a designated space.

Science Learning Goals

- Engineers use math, science, and creative thinking to design solutions to problems.
- Engineers repeatedly ask, imagine, plan, create and improve their solutions to problems.
- Engineers test and observe solutions to see how well they solve a given problem.

Vocabulary Introduced:

- Engineering
- Technology

Standards

MN Academic Standard Strand
Program supports Minnesota Academic Standards and Next Generation Science Standards, including disciplinary core ideas, science and engineering practices and crosscutting concepts. More details available upon request.

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SCIENCE MUSEUM OF MINNESOTA ENGINEERING RESIDENCY, GRADES K-2

BRIDGE BUILDERS SESSION

Students apply the Engineering Design Process (Ask, Imagine, Plan, Create, Improve) to solve the problem of building a bridge that can span a roadway and/or support the weight of a model car. Teams of two experiment with the properties of the blocks and of bridges, share their best solutions, and then build their final bridge based on class recommendations of what make a bridge wide enough and strong enough.

Program Length: Please allow 1 hour each for initial setup and final teardown.
Allow for at least 10 minutes to reset between classes

Audience Size: Up to 30 students

Preparation: Science Museum Instructor brings all needed equipment and materials.
This program requires at least 2 tables for instruction materials, tables for students and access to water.
It is best to try to leave program in a designated space rather than moving from room to room.

Science Learning Goals

- Engineers use math, science, and creative thinking to design solutions to problems.
- Engineers repeatedly ask, imagine, plan, create and improve their solutions to problems.
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CELEBRATE ENGINEERING!

Explore, experiment, celebrate

Science Museum of Minnesota

OVERVIEW

Let the Science Museum make your event a science celebration with some of our favorite hands-on activity stations. These experiments allow **kids and adults to work together** to explore, experiment, and have fun!

Our base science celebration event includes hands-on stations for up to **150 children and adults, for 90 minutes**. (We can also double the event size for up to 300 people, for more exploration fun!)

PRICING

Group size: 10-150
Event time: 90 min
Price: $600

The length or the capacity of the event can be increased for an additional cost.

FREE PRE-K ADD-ON!

While most of our stations are appropriate for K-5 audiences, you can also add on a special general science area for your youngest learners at no additional cost, thanks to our partners at PNC!

RECOMMENDED STATIONS

These stations are what we'd recommend for an average Celebrate Engineering event. We're happy to discuss other available stations to best meet the needs of your theme, space, or attendees!

Bridge Building

Build a bridge over the river with only water to stick the blocks together!
Serves 25-50 participants, grades K-5
Engineering, forces and motion, math

Frog Flingers

Can you catapult your frog to all three lily pads?
Serves 25-50 participants, grades K-5
Engineering, forces and motion, math

Stomp Rockets

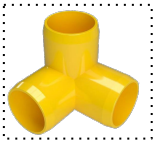
Build a rocket from paper and launch it using the power of air in a stomp launcher!
Serves 25-50 participants, grades K-5
Engineering, forces and motion, math

Cantilever Challenge

Avoid obstacles by building out over them, exploring center of gravity!
Serves 10-15 participants, grades 3-5
Engineering, forces and motion, math

Pipe Shape Building

Free build with PVC pipes to find patterns and shapes!
Serves 10-15 participants, ages K-5
Engineering, computational thinking, math, creativity



Cup Stacking

Build as many different towers as you can with only five cups!
Serves 10-15 participants, grades 3-5
Engineering, computational thinking, math, creativity