Workshops at The Works Museum
Compliance with State Standards

Pre-K

60 minute workshop/$8 per student

Start Your Engineers Preschoolers will participate in engineering stations where they can explore design challenges, use real tools and make a fun project to take home.

Minnesota Early Childhood Indicators of Progress addressed in this workshop:

Self-Concept

1) Begin to experiment with own potential and show confidence in own abilities

Curiosity

2) Show interest in discovering and learning new things

Risk-taking

2) Use a variety of strategies to solve problems

Imagination and invention

1) Approach tasks and experiences with flexibility, imagination and inventiveness
2) Use new ways or novel strategies to solve problems or explore objects

Persistence

3) Demonstrate ability to complete a task or stay engaged with an experience

Creating

1) Use a variety of media and materials for exploration and creative expression

Scientific thinking and problem-solving

2) Identify and/or describe objects by physical characteristics
4) Ask questions and seek answers through active exploration
7) Make comparisons between objects that have been collected or observed

Kindergarten to Grade 2

30 minute workshops/$6 per student

Kaleidoscopes Investigate reflection and symmetry with bendable mirrors. Build a unique and colorful kaleidoscope to take home.

Glow-in-the-Dark Slime Explore color mixing and chemical reactions while mixing a batch of gooey, colorful slime!

60 minute workshops/$8 per student

Light and Kaleidoscopes Bend light and break it apart with special lenses. Experiment with mirrors. Build a unique and colorful kaleidoscope to take home.

Minnesota K-12 Science Standards/Benchmarks addressed in this workshop:

0.1.1.2.1	Use observations to develop an accurate description of a natural phenomenon and compare one's observations and descriptions with those of others.

1.1.1.1.2	Recognize that describing things as accurately as possible is important in science because it enables people to compare their observations with those of others.
1.1.3.1.1	Observe that many living and nonliving things are made of parts and that if a part is missing or broken, they may not function properly.
2.1.1.2.1	Raise questions about the natural world and seek answers by making careful observations, noting what happens when you interact with an object, and sharing the answers with others.
2.1.2.2.2	Describe why some materials are better than others for making a particular object and how materials that are better in some ways may be worse in other ways.

Circuit Explore Learn about the flow of electricity and hook up different circuits to light up a bulb or make a noise.

Minnesota K-12 Science Standards/Benchmarks addressed in this workshop:

0.1.1.2.1	Use observations to develop an accurate description of a natural phenomenon and compare one's observations and descriptions with those of others.
1.1.1.1.1	When asked "How do You Know?" students support their answer with observations.
1.1.3.2.1	Recognize that tools are used by people, including scientists and engineers, to gather information and solve problems.
2.1.2.2.1	Identify a need or problem and construct an object that helps to meet the need or solve the problem.
2.1.2.2.3	Explain how engineered or designed items from everyday life benefit people.

Chemical Changes Experiment with chemical changes to solve a problem. Make a tub of slimy polymer that glows in the dark.

Minnesota Ky 12 Science Standards/Benchmarks addressed in this workshop:

0.1.1.2.1	Use observations to develop an accurate description of a natural phenomenon and compare one's observations and descriptions with those of others.

1.1.1.1.1	When asked "How do You Know?" students support their answer with observations.
1.1.3.2.1	Recognize that tools are used by people, including scientists and engineers, to gather information and solve problems.
2.1.2.2.1	Identify a need or problem and construct an object that helps to meet the need or solve the problem.
2.1.2 Standard	The physical properties of materials can be changed, but not all materials respond the same way to what is done to them.

What Floats Your Boat? Explore surface tension with different materials, then build your own boat. Evaluate and improve your design, just like a real engineer!

Minnesota K-12 Science Standards/Benchmarks addressed in this workshop:

0.2.1.1.1	Sort objects in terms of color, size, shape, and texture, and communicate reasoning for the sorting system.
1.1.1.1.1	When asked "How do You Know?" students support their answer with observations.
1.1.3.2.1	Recognize that tools are used by people, including scientists and engineers, to gather information and solve problems.
2.1.1.2.1	Raise questions about the natural world and seek answers by making careful observations, noting what happens when you interact with an object, and sharing the answers with others.
2.1.2.2.1	Identify a need or problem and construct an object that helps to meet the need or solve the problem.
2.1.2.2.2	Describe why some materials are better than others for making a particular object and how materials that are better in some ways may be worse in other ways.
2.2.1.1.1	Describe objects in terms of color, size, shape, weight, texture, flexibility, strength and the types of materials in the object.

Mini-Catapults Learn about levers and fulcrums. Construct a small **catapult.** Find out how far and how accurately you can fling a marshmallow.

Minnesota K-12 Science Standards/Benchmarks addressed in this workshop:

0.1.1.2.1	Use observations to develop an accurate description of a natural phenomenon and compare one's observations and descriptions with those of others.
1.1.3.2.1	Recognize that tools are used by people, including scientists and engineers, to gather information and solve problems.

1.1.3.1.1	Observe that many living and nonliving things are made of parts and that if a part is missing or broken, they may not function properly.
2.1.2.2.2	Describe why some materials are better than others for making a particular object and how materials that are better in some ways may be worse in other ways.
2.2.2.1.2	Demonstrate that objects move in a variety of ways, including a straight line, a curve, a circle, back and forth, and at different speeds.

Grades 3-6

30 minute workshops/$6 per student

Kaleidoscopes Investigate reflection and symmetry with bendable mirrors. Build a unique and colorful kaleidoscope to take home.

Glow-in-the-Dark Slime Explore color mixing and chemical reactions while mixing a batch of gooey, colorful slime!

60 minute workshops/$8 per student

Light and Kaleidoscopes Examine how light travels, changes direction and is refracted. Use the Engineering Design Process to build a kaleidoscope to take home. Great fit with third-grade standards.

3.1.1.2.1	Generate questions that can be answered when scientific knowledge is combined with knowledge gained from one's own observations or investigations.
3.2.3.1.3	Describe how light travels in a straight line until it is absorbed, redirected, reflected or allowed to pass through an object.
4.1.2.2.2	Generate ideas and possible constraints for solving a problem through engineering design.
4.1.2.2.3	Test and evaluate solutions, considering advantages and disadvantages for the engineering solution, and communicate the results effectively.
5.1.1.2.2	Identify and collect relevant evidence, make systematic observations and accurate measurements, and identify variables in a scientific investigation.

6.2.3.1.3	Use wave properties of light to explain reflection, refraction and the color spectrum.

Mixing Molecules Identify mystery chemicals by experimenting with chemical changes. Review the states of matter. Make a tub of slimy polymer that glows in the dark.

Minnesota K-12 Science Standards/Benchmarks addressed in this workshop:

3.1.1.2.1	Generate questions that can be answered when scientific knowledge is combined with knowledge gained from one's own observations or investigations.
3.1.1.2.4	Construct reasonable explanations based on evidence collected from observations or experiments.
4.2.1.2.1	Distinguish between solids, liquids and gases in terms of shape and volume.
5.1.3.4.1	Use appropriate tools and techniques in gathering, analyzing and interpreting data.
6.2.1.2.1	Identify evidence of physical changes, including changing phase or shape, and dissolving in other materials.

Feel the Noise Start with vibrations and the science of sound. Explore how wind, string and percussion instruments change pitch. Make a boomwhacker band and construct an ear harp to take home.

Minnesota K-12 Science Standards/Benchmarks addressed in this workshop:

3.2.3.1.1	Explain the relationship between the pitch of a sound, the rate of vibration of the source, and factors that affect pitch.
4.1.2.2.1	Identify and investigate a design solution and describe how it was used to solve an everyday problem.

4.1.2.2.2	Generate ideas and possible constraints for solving a problem through engineering design.
4.1.2.2.3	Test and evaluate solutions, considering advantages and disadvantages for the engineering solution, and communicate the results effectively.
4.1.3.3.1	Describe a situation in which one invention led to other inventions.
5.1.1.2.2	Identify and collect relevant evidence, make systematic observations and accurate measurements, and identify variables in a scientific investigation.
5.1.3.2.1	Describe how science and engineering influence and are influenced by local traditions and beliefs.
6.2.3.1.2	Explain how the vibration of particles in air and other materials results in the transfer of energy through sound waves.

Motor Power What's inside a motor and how does it work? Use magnets and electricity as you build and experiment with "The World's Simplest Motor." Make a crazy robotic bug to take home.

Minnesota K-12 Science Standards/Benchmarks addressed in this workshop:

3.1.1.2.1	Generate questions that can be answered when scientific knowledge is combined with knowledge gained from one's own observations or investigations.
4.1.2.2.1	Identify and investigate a design solution and describe how it was used to solve an everyday problem.
4.2.3.2.2	Construct a simple electrical circuit using wires, batteries, and light bulbs.
4.2.3.2.3	Demonstrate how an electric current can produce a magnetic force.
5.2.2.1.2	Identify the force that starts something moving or changes its speed or direction of motion.

5.2.2.1.3	Demonstrate that a greater force on an object can produce a greater change in motion.
6.1.2.2.1	Apply and document an engineering design process that includes identifying criteria and constraints, making representations, testing and evaluation, and refining the design as needed to construct a product or system to solve a problem.
6.2.3.2.1	Differentiate between kinetic and potential energy and analyze situations where kinetic energy is converted to potential energy and vice versa.
6.2.3.2.2	Trace the changes of energy forms, including thermal, electrical, chemical, mechanical or others as energy is used in devices.

Super Circuits Experiment with the components of simple circuits: power, loads and switches. Wire a motor-powered fan to take home.

Minnesota K-12 Science Standards/Benchmarks addressed in this workshop:

3.1.1.2.1	Generate questions that can be answered when scientific knowledge is combined with knowledge gained from one's own observations or investigations.
4.2.3.2.2	Construct a simple electrical circuit using wires, batteries, and light bulbs.
5.2.2.1.2	Identify the force that starts something moving or changes its speed or direction of motion.
6.1.2.2.1	Apply and document an engineering design process that includes identifying criteria and constraints, making representations, testing and evaluation, and refining the design as needed to construct a product or system to solve a problem.
6.2.3.2.1	Differentiate between kinetic and potential energy and analyze situations where kinetic energy is converted to potential energy and vice versa.
6.2.3.2.2	Trace the changes of energy forms, including thermal, electrical, chemical, mechanical or others as energy is used in devices.

90 minute workshops/$10 per student

Pasta Bridges Use pasta, hot glue and the Engineering Design Process to build the strongest bridge you can. Test how much weight it can hold before it breaks.

Minnesota K-12 Science Standards/Benchmarks addressed in this workshop:

3.1.1.2.3	Maintain a record of observations, procedures and explanations, being careful to distinguish between actual observations and ideas about what was observed.
4.1.2.2.2	Generate ideas and possible constraints for solving a problem through engineering design.
4.1.2.2.3	Test and evaluate solutions, considering advantages and disadvantages for the engineering solution, and communicate the results effectively.
6.1.2.1.4	Explain the importance of learning from past failures, in order to inform future designs of similar products or systems
6.1.2.2.1	Apply and document an engineering design process that includes identifying criteria and constraints, making representations, testing and evaluation, and refining the design as needed to construct a product or system to solve a problem.

Maze Engineering Use the Engineering Design Process to design and construct your own maze, pinball or pachinko game. Experiment with changes in speed and direction and the effect of friction.

Minnesota K-12 Science Standards/Benchmarks addressed in this workshop:

3.1.1.2.3	Maintain a record of observations, procedures and explanations, being careful to distinguish between actual observations and ideas about what was observed.	
4.1.2.2.2	Generate ideas and possible constraints for solving a problem through engineering design.	
4.1.2.2.3	Test and evaluate solutions, considering advantages and disadvantages for the engineering solution, and communicate the results effectively.	
	5.2.2.1.1	Give examples of simple machines and demonstrate how they change the input and output of forces and motion.

	5.2.2.1.2	Identify the force that starts something moving or changes its speed or direction of motion.
	5.2.2.1.3	Demonstrate that a greater force on an object can produce a greater change in motion.
6.1.2.1.4	Explain the importance of learning from past failures, in order to inform future designs of similar products or systems.	
6.1.2.2.1	Apply and document an engineering design process that includes identifying criteria and constraints, making representations, testing and evaluation, and refining the design as needed to construct a product or system to solve a problem	

2 hour workshop/$12 per student

Catapults Learn about levers and fulcrums. Use hammers, drills, and saws to build your own catapult**.** Find out how far and how accurately you can fling a marshmallow.

Minnesota K-12 Science Standards/Benchmarks addressed in this workshop:

3.1.1.2.3	Maintain a record of observations, procedures and explanations, being careful to distinguish between actual observations and ideas about what was observed.	
4.1.2.2.2	Generate ideas and possible constraints for solving a problem through engineering design.	
4.1.2.2.3	Test and evaluate solutions, considering advantages and disadvantages for the engineering solution, and communicate the results effectively.	
	5.2.2.1.1	Give examples of simple machines and demonstrate how they change the input and output of forces and motion.
	5.2.2.1.2	Identify the force that starts something moving or changes its speed or direction of motion.
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6.1.2.2.1	Apply and document an engineering design process that includes identifying criteria and constraints, making representations, testing and evaluation, and refining the design as needed to construct a product or system to solve a problem.