The Works Museum Offsite Workshops
Alignment with State Standards

Kindergarten to Grade 2

60 minute workshops

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

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 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 Standard	The physical properties of materials can be changed, but not all materials respond the same way to what is done to them.

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

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

60 minute workshops

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.

Super Circuits Experiment with the components of simple circuits: power, loads and switches. Construct and 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

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.