

Gadget Works

Details & Academic Standard Connections



Description

Gadget Works is a 60 minute program where students will meet with Professor Gadgeteer to learn about simple machines and their many uses. Before the program you will be sent a kit of materials, with enough supplies for 30 students. Included in the kit are pre and post-visit activities along with materials needed for the program. Once connected for the program, Professor Gadgeteer will take the wind-up toys provided in the kits apart with your students and discuss how all the simple machines work together to make the toy work. After the students learn about the professor's inventions the students are then challenged to take that knowledge and invent their own wind-up toy for Gadget Toys, Inc.

Relevant Grade Levels

Grades 2-6

Pricing

- \$220 per connection (this includes the cost of one kit). Kits have enough materials for 30 students (additional kits are \$60 each).
- \$200 per connection for quantity discount (must sign up for 10 or more Gadget Works programs in a school year).
- \$190 per connection for TWICE (password must be on the reservation in order to receive discount).

Companion Kit

A companion kit with supplies (including wind-up toys) for 30 students is included in the price of your program. The kit includes pre- and post-visit activities along with materials needed for the program.

Pre-visit activities include formulating a hypothesis about what simple machines make the wind-up toy move and measuring toy movement. Post-visit activities include imaginatively designing your own wind-up toy on paper, redesigning the wind-up toys in the kit to perform different movements, disassembling home gadgets, and discussing the pros and cons of a new, fictional gadget.

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With the exception of paper and pencil, all the supplies needed for the above activities are provided in the kit. Additional kits of materials (supplying 30 students) may be purchased for \$60 each. Please note that this program is not offered in COSI's Galaxy Theater; connections must be made remotely.

Reservation Information

The Gadget Works program can be requested at the date and time you choose by using our online reservation system found at: <https://education.cosi.org/eers/>

To reserve a time and date, log in to the reservation system, select the month you would like the program, click on the date you are interested in, and confirm the time you want is available. If COSI is free at that time, scroll to the bottom of the screen and select "request a show not scheduled." From there, choose "Gadget Works" in the drop down menu and the desired time (Eastern Time), and fill out the information form.

Technical Information

COSI can accept ISDN or IP connections. For good video quality, we strongly recommend a connection speed of 384 kbps or higher. Gadget Works is a single point connection between COSI and one participating school.

Alignment with Ohio Academic Content Standards for Science

Science and Technology

- 2.4 (Grade 2): Communicate orally, pictorially, or in written form the design process used to make something.
- 3.4 (Grade 3): Use a simple design process to solve a problem (e.g., identify a problem, identify possible solutions and design a solution).
- 4.3 (Grade 4): Describe, illustrate and evaluate the design process used to solve a problem.

Scientific Inquiry

- 2.5 (Grade 2): Use evidence to develop explanations of scientific investigations. (What do you think? How do you know?)
- 2.7 (Grade 2): Use appropriate tools and simple equipment/instruments to safely gather

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scientific data (e.g., magnifiers, non-breakable thermometers, timers, rulers, balances, calculators, and other appropriate tools).

- 2.8 (Grade 2): Measure properties of objects using tools such as rulers, balances and thermometers.
- 3.5 (Grade 3): Record and organize observations (e.g., journals, charts, tables).
- 3.6 (Grade 3): Communicate scientific findings to others through a variety of methods (e.g., pictures, written, oral and recorded observations).
- 4.1 (Grade 4): Select the appropriate tools and use relevant safety procedures to measure and record length, weight, volume, temperature and area in metric and English units.
- 5.3 (Grade 5): Select and safely use the appropriate tools to collect data when conducting investigations and communicating findings to others (e.g., thermometers, timers, balances, spring scales, magnifiers, microscopes and other appropriate tools).

Scientific Ways of Knowing

- 2.4 (Grade 2): Demonstrate that in science it is helpful to work with a team and share findings with others.
- 3.2 (Grade 3): Keep records of investigations and observations and do not change the records that are different from someone else's work.
- 4.1 (Grade 4): Differentiate fact from opinion and explain that scientists do not rely on claims or conclusions unless they are backed by observations that can be confirmed.
- 6.1 (Grade 6): Identify that hypotheses are valuable even when they are not supported.

Alignment with National Science Standards*

*From *National Science Education Standards* by the National Committee on Science Education Standards and Assessment, National Research Council. National Academies Press, 1996.

Students in grades K-4 should have abilities necessary to do scientific inquiry, including:

- Employing simple equipment and tools to gather data and extend the senses.
- Using data to construct a reasonable explanation.
- Communicating investigations and explanations.

Students in grades K-4 should have abilities of technological design, including:

- Proposing a solution.
- Implementing proposed solutions.
- Evaluating a product or design.
- Communicating a problem, design, and solution.

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Students in grades K-4 should know that:

- Objects have many observable properties, including size, weight, shape, color, temperature, and the ability to react with other substances.
- Objects are made of one or more materials, such as paper wood, and metal.
- An object's motion can be described by tracing and measuring its position over time.
- Scientists and engineers often work in teams with different individuals doing different things that contribute to the results.
- People continue inventing new ways of doing things, solving problems, and getting work done.

Students in grades 5-8 should have abilities necessary to do scientific inquiry, including:

- Using appropriate tools and techniques to gather, analyze, and interpret data.
- Developing descriptions, explanations, predictions, and models using evidence.
- Communicating scientific procedures and explanations.

Students in grades 5-8 should have abilities of technological design, including:

- Designing a solution or product.
- Implementing a proposed design.
- Evaluating completed technological designs or products.
- Communicating the process of technological design.

Students in grades 5-8 should know that:

- Energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei, and the nature of a chemical. Energy is transferred in many ways.
- Technological solutions have side effects, and technologies cost, carry risks, and provide benefits.
- Perfectly designed solutions do not exist. All technological solutions have trade-offs, such as safety, cost, efficiency, and appearance.
- Technological designs have constraints.
- Technological solutions have intended benefits and unintended consequences. Some consequences can be predicted, others cannot.
- Technology influences society through its products and processes.
- Science cannot answer all questions and technology cannot solve all human problems or meet all human needs. New technologies often will decrease some risks and increase others.