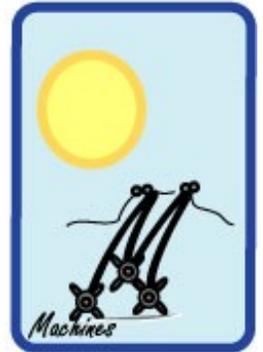


# Connecting to Machines & Mechanics IP

Connecting to Machines & Mechanics The Connecting to Machines & Mechanics IP is an interest project from the Girl Scouts of Eastern Massachusetts.



## Skill Builders

1. \*Complete Activity 1, The Mechanics of Machines, from the Connecting to Machines & Mechanics Module. Through the use of drama in small groups, act out several machines with your group. Think about the machine's purpose, its work, the noise it makes, and the individual parts. Identify the various components of your machine, including gears, belt drives, levers and pulleys.
2. Complete two additional activities in the Connecting to Machines & Mechanics Module that explain gears, levers, pulleys or belt drives. Identify various common machines that use these components to work. Create a drawing that shows how two of these components or machine parts work.
3. Complete Activity 7, Designing and Building Machines, from the Connecting to Machines & Mechanics Module. Construct with building materials, such as wood, LEGOS, or KNEX a machine that contains various moving parts. If you are unable to obtain building materials, design your machine on paper, labeling the various components. Demonstrate how your machine uses gears, levers, pulleys, or drive belts as it moves.
4. Invent a fantasy machine that you would build if you had unlimited potential and resources. What would your machine do and what would you need to build it? How would your machine be used to do work or to benefit society? Draw your machine if possible and present your invention to others.
5. Learn about the concepts of a machine's efficiency, a perfect machine, and mechanical advantage. How are these concepts determined in any given machine? What is referred to as wasted energy when discussing energy conversion in a machine as it does work? Why are these concepts important when referring to the work of machines?
6. Identify how friction affects the work and efficiency of a machine. What substances or components are used in a machine to reduce friction and increase efficiency? Name several machines that use these friction-reducing substances. Why is it necessary to oil machine parts periodically? What does the application of oil to these parts do to enable the machine to run more easily?

## Technology

1. Collect a discarded machine, such as a hair dryer or small appliance. Using basic tools, take it apart. Carefully notice how the parts go together as you take it apart. You might want to make a drawing of the parts as they remove them. When you have completed taking the machine apart, try your hand at putting it back together again. Do you have any parts left over?
2. Visit a hands-on exhibit at a science or children's museum that explains machines and their mechanical components. Choose one machine and make a sketch of the parts and how they work together. Identify gears, levers, pulleys, and drive belts in your drawing.
3. Use a computer program to design a simple machine, a roller coaster, or an amusement park through simulation. Explore the ways in which computer software effects the design process.

4. Identify a machine that is still used today in basically the same form as when it was first invented. Identify a machine that is different from when it was first invented. What technological advances happened to create these changes in design? Do the changes make the work of the machine easier or more productive? What science knowledge or training is necessary to run the new machine compared to what was needed to run the original machine?

## Service Projects

1. Visit a classroom or troop of younger girls and assist them in building or designing machines. They can build them from wood, LEGOS, or sets such as KNEX, or design machines on paper if you do not have access to building materials. Lead a discussion on the purpose of gears, pulleys, levers and belt drives in helping machines to do work.
2. Create a visual display that explains gears and levers as components of a machine. Describe how these two components increase the efficiency of the machine's work. As part of your display, demonstrate the three classes of levers, showing the fulcrum, the resistance and the load. What class of lever is used in your machine? Share your display with a classroom or troop of younger girls.
3. After completing one of the activities in the Connecting to Machines & Mechanics Module, adapt this activity to present to Brownies or elementary school girls. Make a list of what the materials they will need to do the activity, and what you want them to learn from the experience. Ask a troop leader if you can present the activity at a meeting. Review the Brownie Try-Its to see if there are existing related math or science activities.
4. Accompany a troop to a science or children's museum. Find exhibits or displays that focus on machines and components of machines. Discuss with the children what the machines do to produce work. If the machine display has gears, levers, pulleys or drive belts, point them out to the children and explain their purpose in making the machine more efficient. Make a sketch with the children of one of the machines in the exhibit for her to take home.
5. Locate a source of pollution in your community. Find out how the consumption and use of energy is related to this problem. Explain why engineers who design machines need to be increasingly aware of the environmental issues involving their use. Brainstorm a way in which this pollution could be cleaned up.

## Career Exploration

1. Research opportunities to visit an automated plant that uses machine technology to make products. (See the reference section in the Connecting to Machines & Mechanics Module). If possible, visit one of the sites listed and observe a product being made using current technology. Are computers used in the production? What jobs do the workers perform in the production process? Has increasingly sophisticated technology changed the way in which this product is being made? What knowledge is necessary for an engineer to have designed the machinery used in the production process? Where would you go to obtain this knowledge?
2. Obtain a college catalogue from a school of engineering. Make a list of those courses that you would need to be considered for acceptance into the engineering school. What courses have you taken already, and what courses would you need to take before applying to the school? Identify those classes from the course descriptions that teach knowledge of machine and mechanics technology. What branches of engineering concentrate on this field of knowledge?
3. Invite a female mechanical engineer to your classroom or meeting to talk about her work. Ask her about her knowledge of the mechanics of machines and technology. How does she use this knowledge in her work? What course of study did she pursue in high school and college? How does she integrate her career and her home life?

4. Take part in a hands-on engineering or science event at your school, a college, or other site. What did you enjoy the most about the experience? What did you enjoy the least? Were there any hands-on activities that caught your interest to learn more about the subject? What areas of science, math, engineering or technology would appeal to you as a possible career choice? Think about a hands-on activity that you would like to design that would focus on this area of interest. Share your evaluation of the science event with someone else.

## See also

[List of Council's Own Interest Projects](#)

## External Links

[Girl Scouts of Patriots' Trail Council Badges, Patches, and Recognitions](#)



[Connecting to Machines & Mechanics Interest Project](#)

