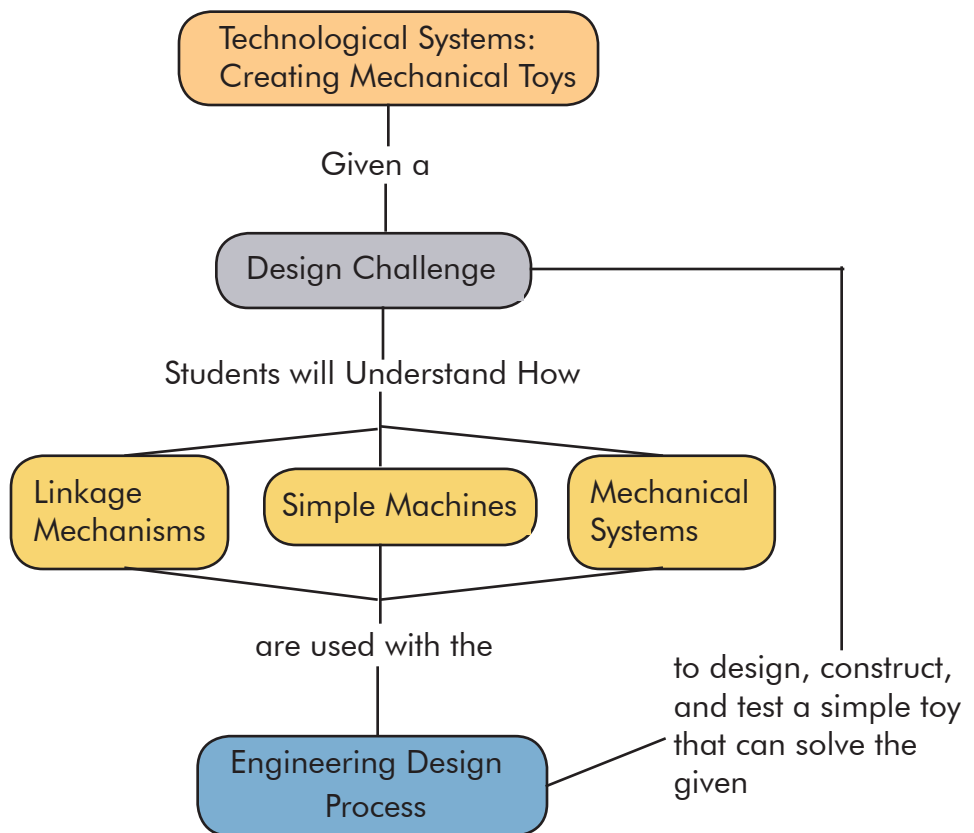


Technological Systems: Creating Mechanical Toys

This unit integrates the study of technology, science, and mathematics through the design and development of a toy that uses simple machines and linkage mechanisms to create movement.



Conducting the Unit

Notes:

There are two main topics in this unit. Each topic varies in length and scope depending on the schedule and length of the teaching time.

• Topic I: Mechanisms (Time Needed)

1. Discuss mechanisms and give examples. (See transparencies on pages 26-28) Transparency 26 shows an example of piston movement and transparency 27 shows an example of salad tongs.

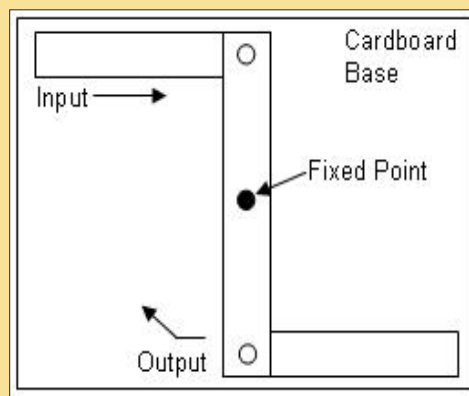
Note: A folding chair is a sample of a mechanism as well as pop-up books. The type of linkage the students will use is joined by a pivot (brass fastener) so that the link can rotate around another. Some examples are an eyelash curler, a bicycle hand brake, ironing board, drying rack, or fishing tackle box.

2. Demonstrate some common linkages using the following directions:

- a. Make three large (about 2" x 12") cardboard or thin plywood strips and punch holes at the ends.

- b. Connect them using brass fasteners to create a linkage that reverses the input of motion. The middle fastener must be connected to a cardboard base so it stays stationary.

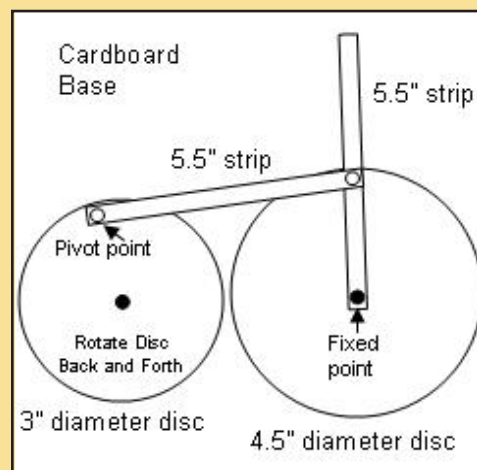
Note: fixed points need to be mounted to a base so no rotation occurs.



- c. Make a linkage system that simulates windshield wipers by making 2 5.5" long strips and two discs that are 3" and 4.5" in diameter. The strips can be made from balsa wood and the discs can be cut out of a manila folder.

- d. Connect the strips, as shown in the drawing, using brass fasteners.

- e. Rotate the smaller disc back and forth and notice the upright strip on the larger disc will move back and forth much like a windshield wiper.





Mechanical Toys News

Simple Machine - any device that helps people perform work when a force is applied on it.

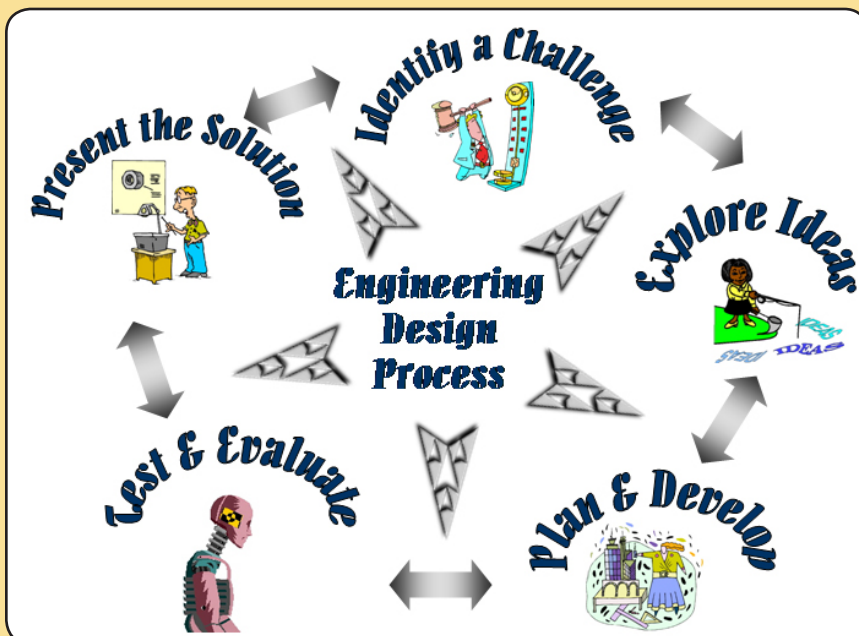
Background

Toys are objects that are used primarily for children to play. Research has revealed that toys have been present in most cultures throughout history. Remains of early Egyptian, Greek, and Roman dolls, tops, balls, rattles, hoops, and dishes have been uncovered.

In more recent history, mechanical toys, were created for the amusement of adults. These devices were first developed in the Middle Ages. Many new toys are created each year, some of these objects have been around year after year.

Challenge

You are a toy designer who is familiar with the Engineering Design Process. You have been asked to use this process to design, build, and test a safe toy that incorporates simple machines and linkage mechanisms.



Limitations

- ✓ The toy should be appropriate for children ages 8-12.
- ✓ The toy should have moving parts that are controlled by linkage mechanisms.
- ✓ The toy may include a simple machine.
- ✓ The toy must fit into a shoebox.



Creating Mechanical Toys

Identify the Challenge

Name: _____

Class: _____

What is the design challenge?

What limitations were given?

What additional limitations has your design team developed?
