

42. Building a Hydraulic/Pneumatic Device

Classroom Activity: Build a device with moving parts that uses hydraulics and pneumatics such as a jack-in-the-box, maze, crane, dentist chair.

Grade: 8

Strand (s): Understanding Matter and Energy

This task addresses the following overall expectations:

- analyse how the properties of fluids are used in various technologies, and assess the impact of these technologies on society and the environment;
- investigate the properties of fluids;
- demonstrate an understanding of the properties and uses of fluids.

and the following specific expectations:

- assess the social, economic, and environmental impacts of selected technologies that are based on the properties of fluids;
- follow established safety practices for using apparatus, tools, and materials;
- investigate applications of the principles of fluid mechanics;
- use technological problem-solving skills to design, build, and test devices that use pneumatic or hydraulic systems;
- use appropriate science and technology vocabulary, including viscosity, density, particle theory of matter, hydraulic, and pneumatic, in oral and written communication;
- use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes;
- explain the difference between liquids and gases in terms of their compressibility and how their compressibility affects their usage;
- explain how forces are transferred in all directions in fluids (Pascal's law);
- compare the ways in which fluids are used and controlled in living things to the ways in which they are used and controlled in manufactured devices.



Assessment Categories:

- Knowledge and Understanding
- Thinking and Investigation
- Communication
- Application
- Teambuilding skills

Type of Activity: Classroom or Science Lab

Preparation: gather required materials

Time needed to complete this activity:

300-350 minutes

Materials/Resources for teachers:

Science Power 8 textbook (1999)

Materials/Resources for students:

wood, dowling, plywood

mitre box

nails

glue

saw

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syringes

plastic/rubber tubing

other found materials

Activity Description:

Explain the concepts of pneumatics and hydraulics.

Divide the students into groups of two and three.

Have the students design their device and prepare a sketch labelling all the components. They should include a list of materials to be used, what the final product will look like and how it will be used. Make the building materials available, preferably in a technology room.

Go over rules for the safe use of equipment.

Have the students build and test their devices.

Tips:

A field trip to a construction site or plant where pneumatic and hydraulic devices are used.

Cross-disciplinary connections: Language, Mathematics, The Arts