



Science Unit: **Structures**

Lesson 2: **Fascinating Fasteners**

School year: 2008/2009

Developed for: Britannia Elementary School, Vancouver School District

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Grade level: Presented to grades 3 and 4; appropriate for grades 3 – 7 with age appropriate modifications.

Duration of lesson: 1 hour and 15 minutes

Objectives

1. Learn about fasteners.
2. Discuss features of materials and fasteners (e.g., what types of materials & fasteners are rigid and what types allow flexible joints?)

Background Information

This is the second in a six-part series of lessons on “Structures.” This activity will provide students with hands-on experience testing different fasteners for building structures.

Vocabulary

Word:

fastener	a device for attaching things together
joint	the place where two things meet; can be rigid or flexible
flexible	something that can bend/move without being broken
rigid	something that can't be bent/moved without being broken

Materials

- tape
- brass fasteners
- hole punch
- string
- Popsicle sticks
- scissors
- plasticine
- cardboard

In the Classroom

Introductory Discussion

1. Ask students questions to get a discussion going about what they already know about fasteners:
 - How do you attach things together when you build things? Examples:
 - gingerbread houses (you use icing that is like glue to attach the walls and the roof)
 - model planes/cars (glue)
 - a tree house (nails)



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- Lego (the Lego blocks are really cool because contain knobs and holes as part of the block that work as the fasteners to allow you to fasten them to each other!)
- How are things attached in nature? Examples:
 - a spider's web (the webbing is coated with a sticky, glue-like substance that both attaches the pieces of the web to each other [and also attaches flies to the web and traps them!])
 - wasp nest (there are different types of wasp nests; the one we looked at last week was made by wasps collecting wood fibre, which they chew up and mix with saliva to essentially make paper – and it is held together by applying the wet “paper pulp” to the structure and allowing it to dry; other wasps use mud to make their nests)
 - bird's nests (many different ways – some use mud to “glue” together the twigs/feathers/etc. that make up their nest. Others, like the weaver bird, weave together strips of leaves (and tie them in knots) around the twigs to hold them together. And the tailorbird (India) actually uses its pointy beak to sew together leaves using spider silk like thread!)
 - your skeleton (there are many different types of joints in the skeleton, they are attached with ligaments (tissue that attaches one bone to another bone) and tendons (tissue that attaches muscle to bone))

2. Today's activity involves testing different types of fasteners.

3. Making observations and recording them is an important part of science. Like last week, today we will be recording our observations on a worksheet.

Science Activity

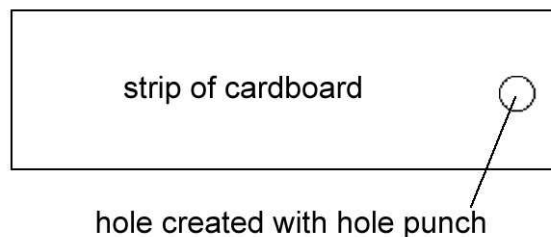
Activity Title: Fascinating Fasteners

Purpose of Activity: To test different types of fasteners and describe their features.

Methods and Instructions:

Set-up prior to experiment:

1. Cut cardboard into small strips and use the hole punch to create a single hole in the cardboard strips:



2. Stations are set up with different fasteners at each station as follows:
 - a. Station 1: Place a box of Popsicle sticks and plasticene.
 - b. Station 2: Place prepared strips of cardboard and a box of brass fasteners.
 - c. Station 3: Place a box of Popsicle sticks and tape.
 - d. Station 4: Place prepared strips of cardboard, string and scissors.



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During the activity:

1. In small groups, students spend 10 minutes at each station experimenting with ways to fasten the Popsicle sticks or cardboard together using the fastener at that station. Students are instructed to note if the joint they create is rigid or flexible.
2. Students complete the worksheet at each station.

Closure Discussion

1. What did you learn about fasteners today?



Image References:



- **Brass fasteners:** http://en.wikipedia.org/wiki/File:Split_Pins.png [Used under the GNU Free Documentation License: http://en.wikipedia.org/wiki/Wikipedia:Text_of_the_GNU_Free_Documentation_License]
- Diagram of cardboard: Created by Dr. Beth Snow and placed in the public domain.
- **Plasticene:** <http://www.flickr.com/photos/katharos/2372150254/> [Used under a Creative Commons license, allowed for non-commercial use: <http://creativecommons.org/licenses/by-nc/2.0/deed.en>]
- **Roll of tape:** <http://classroomclipart.com/cgi-bin/kids/imageFolio.cgi?action=view&link=Clipart/Home&image=crtape.jpg&img=6&search=tape&cat=all&tt=&bool=> [Free for educational use]
- **String** http://en.wikipedia.org/wiki/File:Spool_of_string.jpg [Used under the GNU Free Documentation License: http://en.wikipedia.org/wiki/Wikipedia:Text_of_the_GNU_Free_Documentation_License]

Fasteners Worksheet

Name: _____

Date: _____

Fastener	Before You Try It	After You Try It
 <p>TAPE</p>	<p>Do you think this will make a good fastener?</p>	<p>Is this a rigid fastener or a flexible fastener?</p> <p>What else did you notice about this fastener?</p>
 <p>STRING</p>	<p>Do you think this will make a good fastener?</p>	<p>Is this a rigid fastener or a flexible fastener?</p> <p>What else did you notice about this fastener?</p>

Fastener	Before You Try It	After You Try It
 <p>PLASTICENE</p>	<p>Do you think this will make a good fastener?</p>	<p>Is this a rigid fastener or a flexible fastener?</p> <p>What else did you notice about this fastener?</p>
 <p>BRASS FASTENER</p>	<p>Do you think this will make a good fastener?</p>	<p>Is this a rigid fastener or a flexible fastener?</p> <p>What else did you notice about this fastener?</p>