

Name:

Date:

Lesson #1

The Bridge



Your Project is Due On

(please keep them ^{at} home until this date).

Make Sure to:

- Bring booklet back and your bridge!
- Use the test materials to test your bridge.
- Use a meter stick to make sure that your bridge spans 30cm.
- Use the weights to make sure that your bridge will support 4 math textbooks
- Have fun!

* Use your science notes to help!



The Bridge

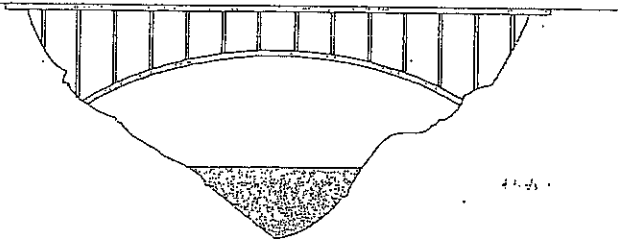


The Job Description

The Task

Design and build a bridge.

- ◆ The bridge may use arches
- ◆ The bridge may use trusses
- ◆ The bridge may use support beams
- ◆ The bridge **MUST** span 30 cm.
- ◆ The bridge **MUST** be stable and support 4 math textbooks
- ◆ Add up the cost of all your materials
- Fill in your journal everytime you work on project (what you did, what you fixed, etc)

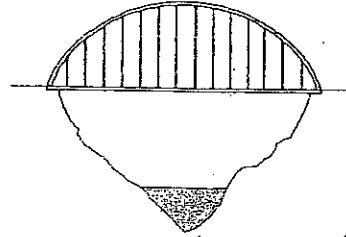


All materials ***must*** be purchased from
"The Canadian Super Suppliers".

The Bridge



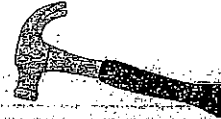
Testing the Bridge



check ✓

Does the bridge have trusses?	
Does the bridge have arches?	
Does the bridge have support beams?	
Does it span a gap of 30 cm?	
Does the bridge have strong connections?	
Is the bridge stable?	
Will the bridge support 4 math textbooks?	
Is your journal complete?	
Is the project done on time?	
Is the report complete?	
Is the report done neatly?	
Did you figure out the cost of the project?	

The Bridge



The Plan

How you will make your bridge.

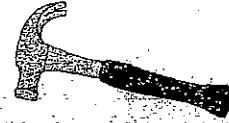


Materials That I Think I Will Use

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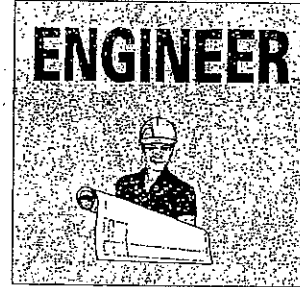
The plan to make my bridge stable and strong enough to carry a load.

The Bridge



The Diagram of the Bridge

Draw a diagram of your bridge.
Label the bridge with the materials that
you plan to use.



A large, empty rectangular box intended for drawing a diagram of a bridge and labeling it with materials.

The Bridge



The Canadian Super Suppliers Price List

(if an item isn't on here, match it with the closest item)

Item	Unit price
plastic straws	500.00
pipe cleaners	100.00
manila tag paper/sheet	100.00
paper clips	50.00
gussets	50.00
glue gun rental/day	500.00
glue sticks	100.00
white glue/day	200.00
string/meter	100.00
sugar cubes	10.00
tooth picks	100.00
popsicle sticks	1000.00
plastic yogurt container	400.00
toilet paper tube	800.00
Rental of Test Materials	600.00

The Bridge



Continue to make notes about your construction.



Reflections

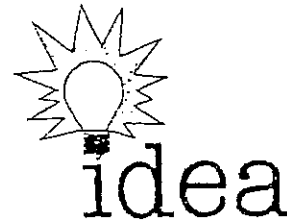


Thinking Back

What do you like the best about your project?

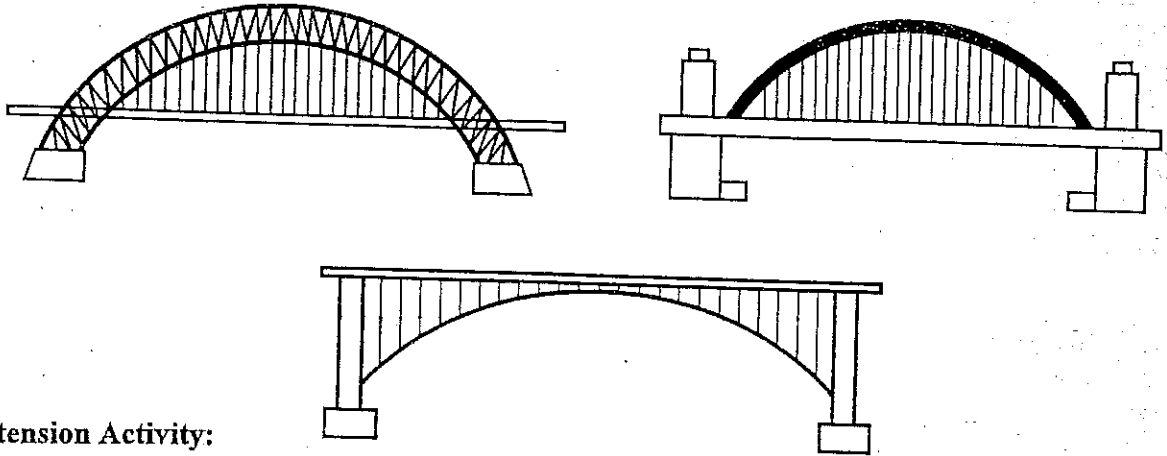
What part of the job was the hardest for you?

If you could start over, what would you do differently?



Examples of different bridges you can build!

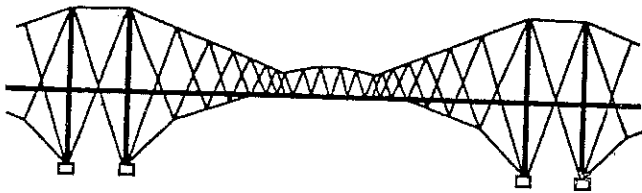
Examples of Arch Bridges



Extension Activity:

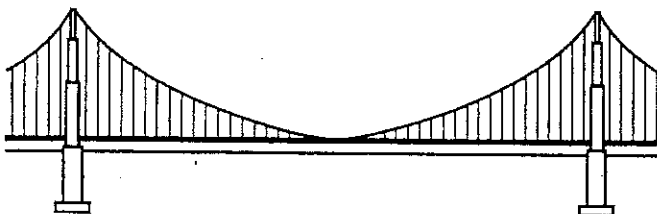
Students could test whether the height of the arch affects how strong the arch is. They could make a variety of lengths of manila tag into arches and use books as the abutments. Students could graph which arch supported the most mass.

A **cantilever bridge** consists of a beam jutting from each side of a body of water. The beam is supported by concrete blocks or *abutments*. The two beams meet in the middle. If the bridge needs to be longer, a third piece or span is added between them. The beams of the cantilever bridge balance on a column in the center of each.



Cantilever bridge

A **suspension bridge** is the best bridge to build to span a very large body of water. The roadway or deck is easily supported by the steel cables that curve from one tower to the other.



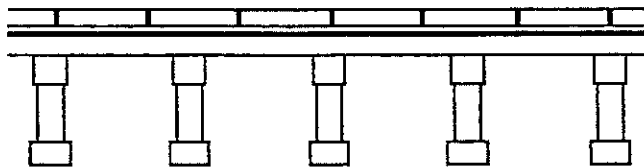
Suspension bridge

The **arch bridge** is used to span a deep chasm and it is quite economical to build. Originally, arch bridges were built out of stone blocks placed over an arch-shaped wooden framework. When the blocks were in place, the wooden frame was removed. The pressure of the rocks against each other, particularly the middle stone or *keystone* held the arch up. Now, however, arch bridges are made out of steel or reinforced concrete. Hollow concrete blocks are used instead of stone. Arch bridges made of steel are constructed by joining curved beams of steel. The builders start the beams at either end of the bridge and keep adding beams until they meet in the middle. An arch adds strength to a bridge. It spreads the force of weight both downwards and outwards from the center of the arch down the sides.



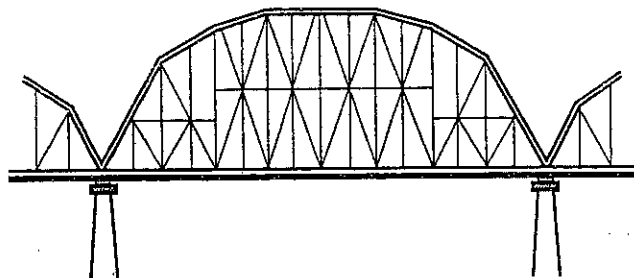
Arch bridge

A simple **beam bridge** can be used when spanning a shorter gap that is not very high. A beam bridge is supported on either end by land or tall columns. Because a beam bridge must be strong enough to support the weight of traffic, it is made out of concrete or steel. Some beam bridges are very long, however. This is possible by having as many support columns as necessary along the bridge or by using many short beams which are connected from one support column to another.



Beam bridge

A **truss bridge** is similar to a beam bridge, but is stronger. Trusses consist of different patterns of triangular shapes. This type of bridge is often used to support both the weight and vibrations of trains.



Truss bridge