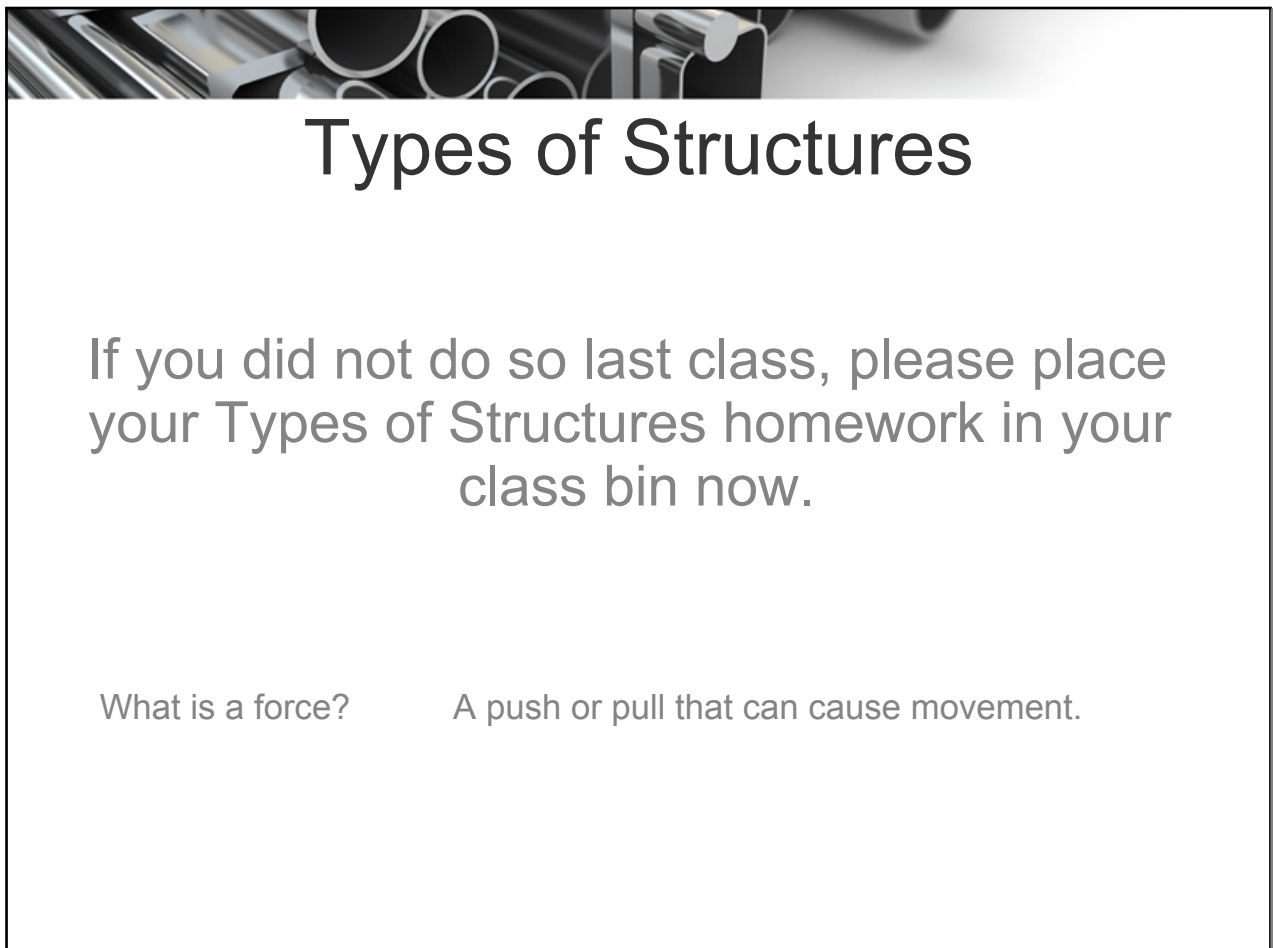


Grade 7 Science

Unit 4: Structures



Types of Structures

If you did not do so last class, please place your Types of Structures homework in your class bin now.

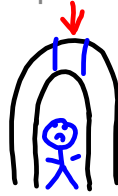
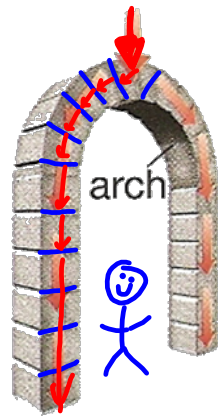
What is a force?

A push or pull that can cause movement.

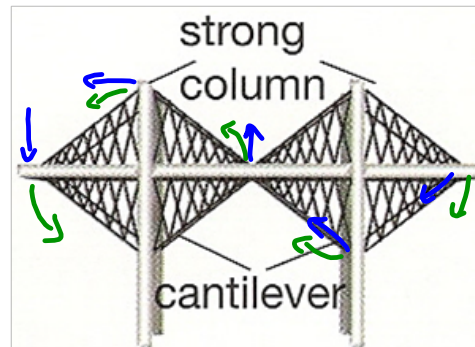
Shape

- Shape of a structure is made such that it can withstand the necessary forces.
- Shape can be used to spread forces.

o Arch



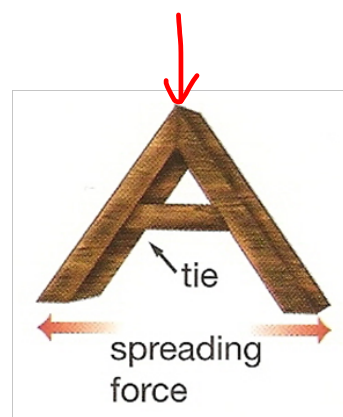
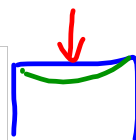
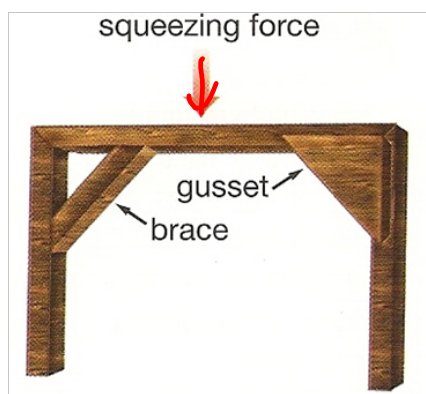
o Wired cantilever



- “Column” – an upright support
- “Beam” – a horizontal support

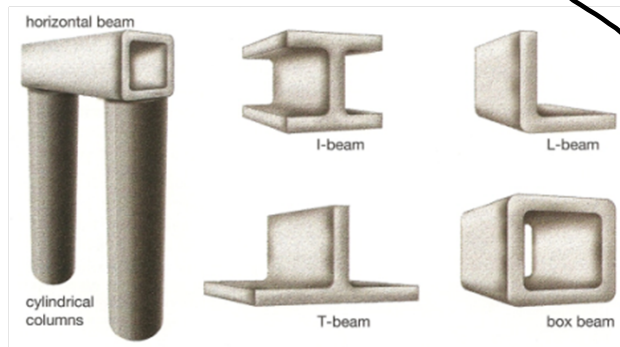
Shape

- Rectangular frames are made of two columns and a beam, however alone they are weak.
- Triangular frames are made from two diagonal columns, which are also weak.
- Need to add support for a weak structure, for example a brace, tie or a gusset.

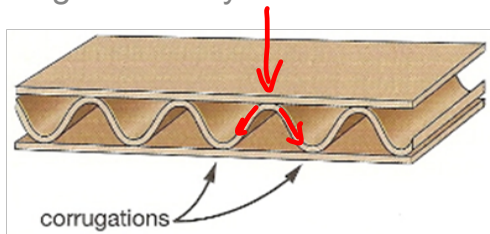


Shape

- The shape of the material can be solid, hollow, or irregular, depending on the forces being applied.



- Corrugations may be used to increase the strength of the structure.



Corrugations are folded materials made into a wave pattern that spreads forces, making the material stronger.

Material

- Materials are chosen based on several considerations – strength needed, environment, etc.
- Composite materials use two different materials together so that the beneficial properties of both may be used.
 - Concrete and iron rods – concrete is very strong when pushed, iron rods are very strong when pulled
 - Fiberglass



Material

- Layered materials (laminates) are used to create extra strength or to take advantage of multiple properties.
 - o Juice boxes have a leak resistant inner layer
 - o Windshields have a plastic layer to resist shattering



Laminates are materials that are pressed together (in layers).

- Woven or knit materials are very flexible.
 - o Newspaper (as we saw under the microscope)
 - o Cloth