



Design a Strong Arm

Source - <http://www.yesmag.bc.ca>

A cantilever is a structure that sticks out from a support and usually bears a load of some kind. Cantilevers are used everywhere. The most common use is as a support to hang signs, but they are also used in bridge construction.

Materials:

- ✿ Newspaper
- ✿ Doweling (to roll newspaper)
- ✿ Masking tape
- ✿ String
- ✿ Plastic cup (or yogurt container)
- ✿ Marbles, pennies, or other small, heavy items
- ✿ Scissors

Instructions:

- ✿ Design and build a strong arm.
- ✿ There's no right or wrong way to build a strong arm, just do whatever you want with the materials.
- ✿ Remember, you will hang something off your arm 60 cm from the table edge, so make sure your arm is at least 60 cm long.
- ✿ Attach your strong arm to the edge of the table.
- ✿ Make the testing device by attaching a string to the plastic cup (or yogurt container) so the cup won't tip.

Testing:

- ✿ To test the arm, hang the cup from your arm 60 cm out from the table.
- ✿ One-by-one, add marbles or pennies to the cup. Once your arm has broken, you can weigh the cup (or count the marbles or pennies) to see how much it held. (If you don't want to break your arm, stop adding weight as soon as there's any bending.)

Further Investigation:

Think you can improve on your first design? Record how much weight it held and try again. See if you can improve your results. Build several arms and try to find out what design works best.

Tips & Hints:

Engineers use various techniques to strengthen structures. Bundling is a technique in which a collection of materials is fastened together. When bundled together and tied securely, the material is significantly stronger than individual items in the bundle.