



## Curiosity Guide #306

### Skeletal System

Accompanies Curious Crew, Season 3, Episode 6 (#306)

#### Strong Cylinders

Investigation #3

#### Description

Make a model that shows how bones keep us from collapsing under a force.

#### Materials

- 2 sheets of 8.5 by 11-inch paper
- Rubber band
- Bricks or books
- Straws, not the flexible kind, cut to 8.5 inches
- Measuring tape or ruler
- Scissors

#### Procedure

- 1) Measure and cut a series of drinking straws and to the width of a piece of paper, which is 8.5 inches.
- 2) Challenge a friend to see if he or she can hold up a book with a piece of paper.
- 3) Try rolling the paper in a tube. The paper will still collapse under the stress of the book.
- 4) Try adding the rubber band to the tube.
- 5) How much weight can the tube hold?
- 6) What if you fill the paper tube with straws? Can the tube hold even more weight?

## My Results

### Explanation

Cylinders are incredibly strong because they spread out any forces throughout the shape. Many of our bones are generally cylindrical to withstand forces more effectively. Our bones have a hard, outer layer, which is generally smooth and extremely strong. Inside the bone is another tissue that is more sponge-like. The honeycomb fibers help provide strength while still being lightweight. These inner fibers are stronger and lighter than steel. Adding the straws, which are also lightweight, adds strength to the cylinder. Our long bones, like the ones in our arms and legs, would be too heavy if they were not fibrous inside.

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