



Curiosity Guide #606

Springs

Accompanies Curious Crew, Season 6, Episode 6 (#606)

Stretchable Paper Clip

Investigation #1

Description

Paper clips can't stretch, or can they? Find out!

Materials

- Paper clip
- Pencil
- A friend

Procedure

- 1) Challenge a friend to try to stretch the clip by pressing on its ends.
- 2) Is the task difficult or easy?
- 3) Now unbend the paper clip into a straight piece of wire.
Coil the wire around a pencil until you have made a small spring.
- 4) Now try compressing and stretching.
- 5) What do you notice?
- 6) Why does the shape make such a difference?
- 7) Compare different clips with different numbers of coils. Which are the easiest to move and why?

My Results

Explanation

Stretching the paper clip is hard because the atoms are positioned in a crystal lattice, and moving the atoms out of position is very difficult. Bending the paper clip is a little challenging, but the work required transfers energy into the clip that the clip stores. This is referred to as being prestressed. The coiled paper clip requires much less energy to change its shape, either by stretching or squeezing. The more turns in the spring, the easier the job is to compress or stretch the spring. However, a tighter coiled spring requires more energy to reshape than a looser one. A compressed spring stores that energy until the force is removed and the spring springs back to its relaxed position.

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