

BOING!



All Coiled up

When you picture a spring, what comes to mind? A coil? A spiralled wire? A Slinky™? While there are other types of springs, the coiled are the most common. They come in many sizes and perform many functions. Coiled springs release and store energy depending on the type of wire used, the diameter of the coil (in other words, the circle size of the coil), and the distance between each coil.

Coiled springs pop up...

- in locks, where tiny springs squeeze together when the right key is inserted
- in car shock absorbers, where springs help to give you a smoother ride
- on some doors, which use the energy of the spring to close again after they have been opened.
- in pinball machines, where the spring attached to the handle sends the ball shooting up the track.

Where else can you find coiled springs?

Today's activities give you the chance to experiment with how coil size affects a spring's ability to store and release energy. After you explore with different springs, you'll use your homemade springs to create your own pinball machine!

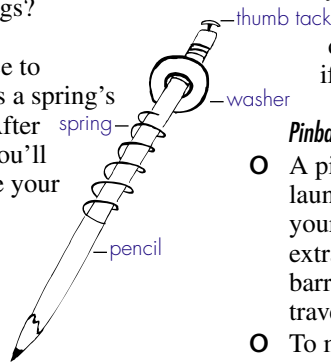
What you'll need:

for coiled spring experiments

thin wire, at least 6 feet long, cut into 2 foot segments

a piece of string, 4 feet long

a pencil, a magic marker, and a broom handle



for the pinball machine

a shoebox top, extra cardboard, a spring (homemade or one from a spiral notebook or a pen), tape, an unsharpened pencil, a washer, a thumbtack, rubberbands, a marble

Try it!

Coil experiments:

- Experiment with coiled springs by making three different springs, each from the same type of wire, but with different coil diameters. First, wrap two feet of wire tightly around the pencil to create a spring. Try to make the coils very close together.
- Next, wrap two feet of wire around a magic marker to create a new spring. How is the spring action of this one different from the one wrapped around a pencil? Make a third spring by wrapping wire around a broom handle.
- To test the springiness of your different springs, tie one end of the string to a chair or table leg and stretch the string taut. Thread the loose end of the string through a spring, push the spring back against your hand and release it. How far does it travel along the string?
- Before testing the other two springs, predict how far you think they'll each travel. Does the diameter of the coils seem to make a difference? What do you think would happen if you made another spring using thicker wire?

Pinball Machine:

- A pinball machine uses the action of a spring to launch the marble around the board. Try making your own. To make a base, use the shoebox lid, extra cardboard, rubberbands and tape. Create barriers, bumpers, and chutes for the marble to travel through. Use your imagination!
- To make the launcher, stick the thumbtack into the pencil's eraser. Slide the washer up next to the thumbtack, and then thread a spring onto the pencil. Push the spring up against the washer to compress it.

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Children's Discovery Museum



- To install the launcher, make a pencil-sized hole in the bottom right hand side of the box lid and thread your launcher through the hole. Use a small piece of cardboard to create a chute next to the launcher for the marble. Place your marble on top of the thumbtack, pull the pencil, and let it go!
- Challenge a family member to a game of pinball!

Spring into *The San Jose Mercury News*

1. Pinball is fun game using springs. You can create a fun word game using words that you find in *The San Jose Mercury News*. Gather together a list of words that you like from different pages of the newspaper. Choose words that are new to you or that fit within a theme. Use the words to create a “find the word” puzzle, a crossword puzzle, or a scramble the word game. Look in the “Silicon Valley Life” section of *The San Jose Mercury News* to see some of the word games featured there.

2. Can you find any words in the newspaper that rhyme with spring? Are there words that rhyme with bounce? How many can you find?

Find out more....

Check out these books and Internet sites:
Teaching Physics with Toys by Beverly A.P. Taylor.
www.lysator.liu.se/pinball/ Visit the Pinball Pasture for everything you want to know about pinball.