

COMPILATION: unit 7- springs that work!

Date: Fri, 12 Feb 1999
From: rob lee <rjl@NETDEX.COM>
Subject: Springs

I'm having a hard time locating springs for unit VII. At the workshop this summer we used rather large springs which were tapered slightly at one end; does anyone know the source of those springs (or a comparable spring).

Date: Fri, 12 Feb 1999
From: Jim Rynearson <jrynear@LPS.ORG>

I just got done with the lab; I used springs from a window and ones from a science catalog; they worked great. The spring from the catalog has no preload (no Y intercept) and the one from the window has a preload of about 10 newtons. Using both springs makes the students stop and think about what is going on as the window spring data looks like a squareroot function. When they go to linearize the data it doesn't work. Your local hardware store should have springs that have a preload.

Date: Fri, 12 Feb 1999
From: Joseph Vanderway <jvanderway@CSUN.EDU>

Other sources for springs:

- * Go to garage (or yard, or "tag") sales. I've been quite successful in getting folks to donate those springs used in various exercising devices. Also springs from adjustable desk lamps work well.
- * I also use the springs from the PASCO dynamics systems (the ones that come with the carts, tracks, friction blocks, etc.) they work well in that they can be stretched to over 40 cm (from an initial length of about 6 cm) without being overstretched.
- * Using the small PASCO springs also allows a lab which students measure a cart's final velocity vs. on the work done on the cart (with constant mass) and final velocity vs. mass (with constant work) which can lead to the work-energy theorem.

Date: Fri, 12 Feb 1999
From: Jerry Loomer <jerryloomer@hotmail.com>

CHEAP SPRINGS>>>>>>>>>> THAT WORK!!!

The best springs for the price that I've used are the long snakey springs that are used for showing pulses and wave train propagation. Every year I get one or two that get distorted and after a few stretched portions, they become candidates for the trash.

However, I take wire cutters and cut the good sections into equal lengths. Bend the end one or two coils perpendicular to the spring so that the students have something to hold onto. When the number of coils between different short springs is equal, the spring constant is equal. If the number of coils are different, the spring constants are different. (i.e. The spring with 20 coils will have twice the spring constant of a spring with only 10 coils). {project for the serious student... Have them find the ratio of the spring constant to the number of coils... is it a constant for all springs made from the same long spring?}

For all of you MODELERS, here is Another model of what I just wrote.....

If your wave demonstration spring looks like this
 O)))))))))))))))))))))))))))))O
 then cut it so that you have pieces like this...
 O))))))))))))))))))))))))))))))O
 now bend the end one-or-two coils to give loops at each end....
 O))))O O))))O O))))O O))))O O))))O O))))O

and now you have a half dozen smaller springs for the students to use for Hooke's Law experiments and other uses.

(Throw away the stretched portions unless someone wants to do more in-depth experiments with those stretched portions.) This works best with the long springs having about 2 cm diameter.

In the past I used to get rid of them by taking them and winding them up into a ball. I put a marble or two into the middle of the ball and called them the nucleus (nucleons) of an atom and the spring represents the electrons zipping around the nucleus in almost chaotic spinning paths. OK, so it's not too good, but for someone who hates to throw anything away, it wasn't too bad on short notice :-)

Date: Sat, 13 Feb 1999

From: Tom Gordon <tomgordon@juno.com>

The idea of using the "ruined" springs is an excellent one. If you are willing to sacrifice an unspoiled one to make a class set, insert a Bic pen between the coils at one end and move it around and around etc ,etc to uniformly stretch the spacing between the coils.(this also relieves the initial loading ---for introductory spring lab.) Make the end loops as previously suggested, using two pair of needlenose pliers. I also suggest that the number of coils vary ---18--21--24--27--30--33--36-- etc so that each lab group's spring is different. I anchor one end on the lab table and pull HORIZONTALLY with a spring "scale". The contact point between the scale hook and the spring end loop is the zero point for position. The spring is then stretched by incremental amounts and the corresponding force is the dependent variable. DO NOT STRETCH THE SPRING TO MORE THAN TWICE ITS ORIGINAL LENGTH-----so that each group has to decide the increment of length related to the number of data points wanted.

data points X length increment length = spring length

I know many teachers would be reluctant to use a spring ("scale") to gather data about another spring--- But if you can get past that, it makes for a much more efficient lab---length along the X axis and force along the Y axis---NO masses to fumble with---no ruined springs---etc etc AND for more advanced kids, combining everyone's results to discover the relationship between spring constant and the number of coils in the spring. If the groups mutually share springs they can also verify the relationship for springs in series.

For "daughter " springs cut from the same l-o-n-g "parent " spring
the spring "constant " is inversely ppl. to the number of coils.

Date: Sun, 14 Feb 1999

From: Don Yost <DoYost@AOL.COM>

Building on Tom Gordon's suggestion: Use force probes instead of spring scales. Can set up so input length of stretch manually or even use a position sensor and draw the graph in real time--hey, how about that technology!

Date: Sun, 14 Feb 1999

From: Tim Mcleod <tmcleod@va.prestige.net>

Another source of very usable springs is to contact a remodeling contractor and ask them to save the "sash springs" from windows they have replaced for you. These springs are usually about 18"-24" long and are very flexible.

UPDATE. (In Dec. 2000 Jane asked these teachers to update if they wanted to. Most replied & said they're satisfied with their post.)

Date: Mon, 04 Dec 2000

From: Timothy McLeod

The window sash springs I referred to worked great. They are remodeling one of our old buildings here at MWC and they just threw away a truckload of heavy duty (36"+) sash springs. A remodeling contractor is a great source for finding the sash springs.

Another use for them is to make large spring scales. This can be done by using 2 pieces of PVC pipe that fit inside each other and fastening the ends of the springs to opposite ends of the pipes. Hangers can be added to the ends by placing an eye bolt in an end cap and then cementing it to the end of the respective pipes. Building these is a good exercise in calibrating an instrument as well and they are much cheaper than the ones you buy from Fisher or the other suppliers.
