

Physics with everyday objects: springy sweets, a universe in your pocket, and drawing circuits

Extension activity

Exploring tension with strawberry laces

Estimated time: 30 min, including graph drawing

Target age: 11–14, 14–16

This variation effectively duplicates the common helical-spring experiment for Hooke's law but replaces the spring with strawberry lace sweets or similar gummy lace confectionary. It may be necessary to experiment with different lace sweets beforehand to find those that yield the best results.



Safety note

Although there is still a risk from falling masses, compared to the precautions taken with a helical spring, the safety issues are diminished, as the risks posed by breaking of a strawberry lace are much lower.

Materials

- Strawberry (or other flavour) lace sweets
- Boss, clamp, and stand
- 30 cm ruler
- Mass hook and masses (sizes needed will depend on the sweets)

Procedure

1. Tie a knot in the lace to make a loop. Hook this loop over the arm connected to the boss/clamp. Masses are then hung from the bottom of this loop. Depending on the particular lace sweets used, it may be necessary to tie double knots, as they can be a little greasy.
2. An initial small mass may need to be added to straighten the sweet. This can be ignored in terms of the results.
3. Add increasing masses to the end of the lace sweet and measure the extension compared to the unloaded length. Collect mass and extension data for the sweet.

4. Convert mass into force (use $100 \text{ g} = 1 \text{ N}$ to make conversion easy) and from this a force versus extension graph can be plotted and a best-fit line drawn.
5. If the line is straight enough, a spring/stiffness/elastic constant can be calculated from the gradient. Since extensions are usually small, they are commonly measured in centimetres, and so, in this case, the gradient will usually be calculated as follows:
force (N)/extension (cm) = constant (N/cm).

