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SCIENCE ★ TECHNOLOGY ★ ENGINEERING ★ MATH

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Bungee Jump Physics

Ever wanted to take the plunge and bungee jump off a bridge, building or platform in mid air? Does the thought of jumping make you nervous? Test the bungee cord elasticity and see if you can keep the egg from cracking.

TEKS:

6.8A Compare and contrast potential and kinetic energy.

6.8B Identify and describe the changes in position, direction, and speed of an object when acted upon by unbalanced forces.

6.9 Force, motion, and energy. The student knows that the Law of Conservation of Energy states that energy can neither be created nor destroyed, it just changes form.

Materials:

- 6 eggs (just in case), hopefully you only need 1
- 30 pennies
- Duct tape
- Loose sheets of newspaper (in case you do the activity inside this will protect the floor)
- Pair of pantyhose
- Ruler

How To

1. Choose an elevated spot for the bungee jump. A tree branch outdoors is ideal, but a ladder also works. You want the egg to fall to within an inch of the child's face when he/she is lying on the ground looking up at it, but no closer.
2. Use the ruler to measure the distance from the back of his/her head to the tip of his/her nose; add an “inch for safety” to this number.
3. Before experimenting with the egg, have the child work out the weight of the egg for a test run. Ask him/her to hold the egg in one hand and add pennies to the other hand until it feels like the coins weigh the same as the egg.
4. Add the “egg’s worth” of pennies to one leg of the pantyhose and push them down to the toes. Tape the toes end of the other pantyhose leg to the branch or ladder.

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How To Continued…

5. Do the test run. Hold the "egg" of pennies on the edge of the branch or ladder step and let the pantyhose full of coins fall toward the ground. Check its distance from the ground. It should stop above the ground at exactly the distance calculated in step two. If it doesn't, adjust the height by re-taping the hose to the branch or ladder higher up or down on the leg.
6. Test again if needed to check your adjustments.
7. Now you are ready for the real thing. Remove the pennies from the pantyhose and replace them with an egg. Call in your audience, have the child settle in his/her place on the ground, and after a suspenseful countdown, do the drop. Bombs away!

Why Does it Work?

The nylon in the pantyhose has a natural elasticity and works like a bungee cord; the force of the falling egg causes it to change its form. As the cord stretches, it slows the egg until it stops falling, and the spring in the cord pulls the egg up and away from the ground. Elastic materials return to their original shape after they have been stretched, and for this activity the amount of elasticity in the pantyhose and how much the egg weighs determine how far the hose will stretch. As you measure and conduct test runs, you'll be working out the components of Newton's famous physics equation: force = mass × acceleration.

Career Connection:

Materials Engineers are in charge of researching and designing new materials that are improving technology in every field. Memory metals are a specific example of a new elastic material engineers designed to remember their original shape and return to them if they are bent or misshapen, for example sunglass frames. Other examples of products created by materials engineers include mosquito repellent clothing, nano-sized polymers to repair broken bones, polymers used in LCD technology for smart phones and improved skin grafts for burn victims.

Resources: http://www.education.com/activity/article/egg-bungee-jump/

http://pbskids.org/zoom/printables/activities/pdfs/eggbungeejump.pdf

