Bo!nks

POP-200

Some background:

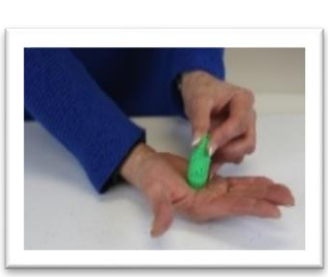
Sir Isaac Newton's ideas about gravity and motion changed the way we think about our world. After seeing an apple fall from a tree in his garden, Newton realized that gravity was the force causing the apple to fall—and keeping us on the ground. Today we understand that gravity is a universal force that applies to everything around us.

Newton's Laws are fundamental for young scientists to understand. For instance:

Newton's Third Law

For every action, there is an equal and opposite reaction.

In other words, when you push an object, it pushes back! This law explains how rockets are able to launch off the ground and into outer space. And it is the basic principle behind our Bo!nks—which, admittedly, is a rather silly name for a very serious concept in physics.



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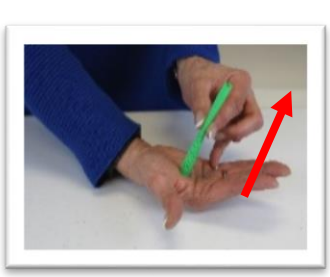

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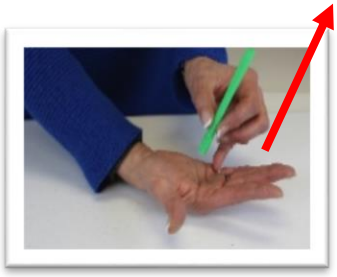

and away!

These colorful little tubes will help your students understand Newton's Third Law as well as the concepts of potential and kinetic energy.

Potential energy *is energy that's stored in an object. For example, when you stretch a rubber band, you give it potential energy.*

Kinetic energy *is energy of motion. As the rubber band is released, the potential energy is changed to motion—so it becomes kinetic energy.*

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Experimenting with Bo!nks

Bo!nks are colorful, stretchy tubes that will provide your students with a fun and fascinating chance to find out what happens when **potential energy** gets turned into **kinetic energy**.

Directions:

1. Discuss these questions with your students. Tell them to write down their predictions.

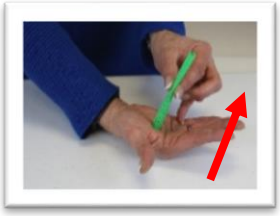
If you compress the Bo!nk to half its size,
what do you think is going to happen when you release it?
How high do you think it's going to jump?

2. Next, students should measure the length of the tube. Instruct them to write down their measurement.

3. Here's where students will do the "work" that gives the Bo!nks their potential energy. Working in pairs, have one student hold the tube so that one end rests on his or her palm. Holding the top lightly between two fingers, the student should push the tube down until it is compressed to AT LEAST half its original size.

4. The second student in the pair should measure the tube again, and write down the compressed measurement.

5. **FIRST TEST:** The first student in each pair should hold the compressed Bo!nk. Then let go and see what happens!



6. If possible, students should measure the actual height (or distance) that the tube has traveled. If rulers are not available, students can make their best guesses. As before, they should write down their measurements and record the traveled height (or distance) on a data sheet.

7. **SECOND TEST:** Students should push the tube down even further. Again, they should record their measurement of the compressed tube and write down their predictions before launching. Ask students:

Do you think it's going to jump higher, lower or the same as the first time?

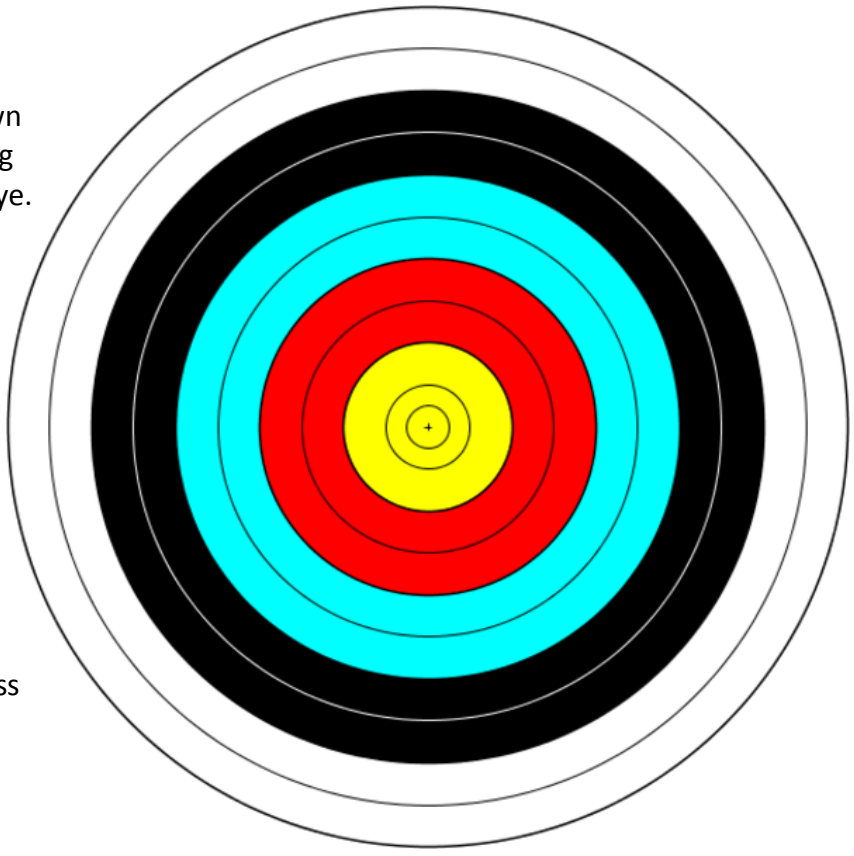
8. **REPEAT:** As time permits, allow students to try new variables. Students can decide how far they should compress the Bo!nk tube. In each case, remind them to measure the compressed Bo!nk before launching it, and measure how high it springs up when released.

Try This!

Instruct students to design their own bull's eye target and practice aiming their Bo!nks so they hit the bull's eye. Encourage them to try different variables to see what works best.

For instance, their results will change depending upon:

- how far away they stand from the target
- the angle of the Bo!nk
- how much they compress the tube



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To extend your lesson, consider these Educational Innovations products:

Dropper Popper (POP-100)

Dropper Poppers are more than just half of a rubber ball. This incredible device seemingly defies the laws of physics by bouncing higher than where you dropped it! Requires a small amount of 'activation energy' to work. It is molded into a very special shape that allows it to store elastic potential energy and then convert it to kinetic energy with a POP when dropped from a low height. Dropper Poppers make a great 'activation energy' demonstration. An engaging activity for any Physics or Chemistry class!

Seismic Accelerator (SS-150)

Several balls are threaded on a wire. When the apparatus is dropped straight downward onto a hard surface, the top ball can rebound to a height equal to five times the original drop. WOW! Leads into an interesting discussion of what has happened due to the Law of Conservation of Energy. Comes with safety glasses.

Reaction Rocket (RKT-625)

Appearances can be deceiving. This rubber ball launcher and foam rocket may look simple, but they're a sure-fire way to provoke a WOW reaction—and introduce students to Newton's Laws. Hold the launcher by its straw and drop straight down onto a hard surface. The rocket shoots up dramatically higher than its original drop height. Explaining energy conversion was never this easy... or this much fun! Comes with one launcher, two rockets. Class Kit includes 15 launchers and 40 rockets.