

A STEM in the Park

Take Home Activity

STEM

in the **PARK**™

Science, Technology, Engineering, and Mathematics

The Button Flywheel Toy

A lesson in energy and rotational physics and the history of toys



What You Need

- One Large Button for each person (1 inch diameter minimum)
- One three-foot piece of nylon string or thick thread for each button.

What To Do

1. Pull the thread through the button's holes. If you have a four-hole button, use diagonal holes.
2. Tie the ends of the thread together.
3. Slide the button to the middle of the looped string.
4. Take one end of the loop in each hand and twirl the button around about 20 or 30 times until the thread gets tightly twisted.
5. Form a hypothesis: What do you think will happen when you pull the string outward at the same time on both sides?

Continued on back

Observe...

1. Now conduct your experiment (pull the string.)
2. What happened? Was your hypothesis correct?
3. What happens to the button if you keep pulling and loosening the string?

Learn...

Science: This lesson demonstrates that energy is neither created nor destroyed, it is simply converted from one form to another. While the string is just sitting there twisted, it contains only *Potential Energy* (energy waiting to happen). When the string is pulled, the *Potential Energy* begins to convert to *Kinetic Energy* (energy in motion) as the button begins spinning. The *Kinetic Energy* is converted back to *Potential Energy* as the button winds the string again by itself. The button is acting like a flywheel and storing energy for you, much like a yo-yo.

History: When the region of Northwest Ohio was being settled in the 1830s-1870s, children who came to live here didn't have access to stores that sold toys. So, many of their toys were made by hand, either by parents or the children themselves. Because of the buzzing noise this toy makes when it is turning, it is often called a "buzzer or buzz saw". This was also a popular toy among Native American children except the "button" was made of bone or wood and the string was often a strip of rawhide. Boys used to get into trouble for getting them tangled into a girl's long hair.

Investigate...

Take your button flywheel home and use it as a model. Find a new button and different string that you might have around the house. Try a smaller button and thinner string to make a new button flywheel. How does your small button flywheel act differently than the one with the big button? Why do you think there is a difference? How long can you keep your buttons spinning?

This activity is brought to you by the Maumee Valley Historical Society

