Inquiry Question

Newton's First Law states that objects at rest tend to stay at rest while objects in motion tend to remain in motion. It is often called the "Law of Inertia". What does "inertia" mean? Can you design an experiment that proves this law?

Name: _____ Date: _____

A classic demonstration of Newton's First Law is one where a person quickly pulls a table-cloth out from under a set of dishes. Why does this work? Does it always work? What if we used paper plates and cups instead of regular dishes? What about the "pull" technique?

Newton's First Law is said to be a qualitative law. This means that it is primarily based on carefully controlled observations. Can you design an experiment to prove Newton's First Law? What factors are important?

General Instructions

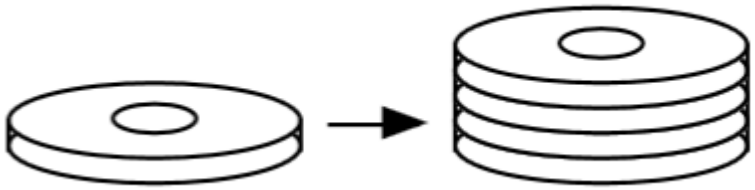
Students are to design an experiment prove or disprove Newton's First Law of Motion

Materials you'll need:

- Your course notes
- The internet
- around 10 identical washers (coins may work as well)

Procedure:

- Attempt to "flick" a washer at stacks of identical washers in an effort to knock out the bottom washer while leaving the top in place.



- To prepare for this experiment, stack 4 washers one on top of the other so that you form a tower of washers.
- Place the stack of washers on top of your textbook or on the floor so that you have a smooth, slick surface.
- Aim one washer at the bottom of the stack of four washers and give it a good hard flick with your finger or hand. What happens?
- Summarize results and describe your best technique.
- Explain: How does the technique make use of Newton's Laws?

Ideas and Hints

- Make sure your washers are clean. Sticky washers will not work.
- Practice your flick and aim a few times before your record any results
- Experimnet with many different combinations. Vary the number of washers in the stack. Try shooting the stack with a variety of speeds and distances. Try different size washers or coins.

Project submission:

- If you can drop-in to the school, you can present it to your teacher in-person. Otherwise, scan or take a photo and upload it to the project submission folder at the end of the unit.

Project Timing:

- In its most basic form, this project will take the average student 1 hour. Locating and collecting all of the necessary materials will vary.

Inquiry Questions and Experimental Design:

1. Flick a one washer into a stack of four washers. What happens?
2. Flick a one washer into a stack of two washers. What happens?
3. Flick a one washer into a stack of eight washers. What happens?
4. Flick a stack of two washers into a stack of four washers. What happens?
5. Flick a stack of four washers into a stack of four washers. What happens?
6. Try using a different set of objects (coins instead of washers. Try a variety of different size coins).
7. Describe the properties of the object (washers, coins etc) that worked the best (you could easily remove ONLY the bottom washer from the stack)
8. What happens when a heavier object was used to strike the stack? How does the thickness of this object come into play?
9. Design a table that clearly shows all of your combinations and results.
10. Summarize your findings by relating your experimental results to one of Newton's Laws.
11. Look up the word "inertia". How is "inertia related to Newton's First Law. Define it in your own words.