

Let's Learn About Newton's 1st Law of Motion

Learn more about Sir Isaac Newton and complete two mini experiments and demonstrations of Newton's first law of motion.

Who was Sir Issac Newton?

Isaac Newton (1642-1727) Isaac Newton was born in England on December 25, 1642. He was a physicist, an astronomer, and a mathematician. At the age of 45, Newton published his theories of motion and gravity. Newton's great book is usually called the Principia. It is considered one of the most important works in the history of science. Newton explained his three laws of motion and his theory of gravitation. Newton also invented a branch of mathematics called calculus to help predict motion using his three laws. Newton also made many important discoveries about light and color. Newton was a professor of mathematics at Cambridge University and a member of the Royal Society. He was knighted by Queen Anne in 1705. (And yes, he was actually knighted for his works).

Newton's 1st Law of Motion

Also known as the Law of Inertia, Newton's 1st law is the one you've probably heard a million times. The first law states that: an object at rest will remain at rest unless acted on by an unbalanced force. An object in motion continues in motion with the same speed and in the same direction unless acted upon by an unbalanced force. You can see the effects of inertia everywhere. In baseball, for example, to overcome inertia a base runner has to "round" the bases instead of making sharp turns. As a more familiar example of inertia, think about riding in a car. You and the car have inertia. If the car comes to a sudden stop, your body tends to keep moving forward. When the car starts moving again, your body tends to stay at rest. You move forward because the car seat exerts an unbalanced force on your body.

What does this mean? To us common folk, this means that there is a natural tendency of objects to keep on doing whatever it is that they are doing (resting, moving, etc...) All objects resist changes in their state of motion and only something acting upon it will change that.

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Experiment One: Tablecloth Trick

Materials

- 3-4 Cloth table cloths
- 3-4 Unbreakable plates (heavy plastic works best to avoid breaking and still provide enough weight)
- 3-4 Unbreakable cups (heavy plastic works best to avoid breaking and still provide enough weight)
- 3-4 of each: Forks, Spoons, & Napkins
- Textbook or large book

Instructions

1. Start with the tablecloth on a table or desk
2. Set the table as if for dinner
3. Notice the difference in mass of each object. The book has the most mass and the napkin has the least.
4. Try the magician's trick of grabbing the edges of the table cloth and then quickly jerk it out from under the items on the table.
5. Hopefully you'll notice that the napkin flew off (less inertia), and things like the silverware, plates and book stayed put.

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Experiment Two: Egg Hole-In-One

Materials

- Large drinking glass
- Metal pie tin
- Cardboard tubes (toilet paper roll size)
- Eggs

Instructions

1. Fill the large drinking glass about three-quarters full with water
2. Center a pie pan on top of the glass.
3. Place the cardboard tube on the pie plate, positioning it directly over the water.
4. Carefully set the egg longways on top of the cardboard tube.
5. With your writing hand, smack the edge of the pie pan horizontally. Don't swing up, and don't swing down! It's important that you hit the pie pan horizontally and use a pretty solid hit, so plan on chasing the plate and tube.
6. Watch the egg plop nicely into the water. It's even more fun to watch someone else try to drop the egg.