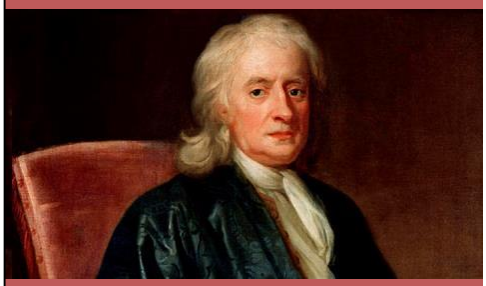


Newton Car

Gregory L. Vogt, EdD

Slides by Gregory L. Vogt, EdD,
and Michael Vu, MS

Center for Educational Outreach

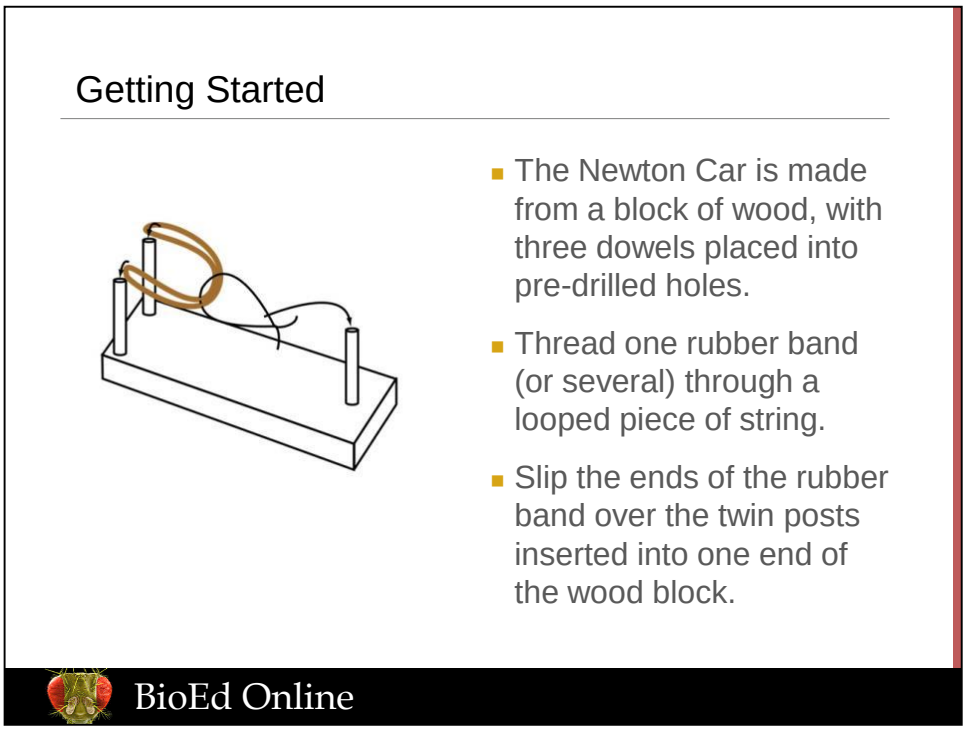
Baylor College of Medicine

The purpose of this activity is to demonstrate the effects of Newton's Second Law of Motion.

Image Reference:

Portrait of Sir Isaac Newton, circa 1726, by Enoch Seeman. Public domain.

For additional information about rocket launchers and other rocket-related activities, view and/or download the complete *Rockets Educator Guide* available on BioEd Online at http://www.bioedonline.org/lessons-and-more/teacher-guides/rockets/.



Getting Started

Assemble Newton Car using a block of wood as the base. Three dowels can be placed into drilled holes and held with glue, or three large screws can be used. Tie a loop of string and slide over rubber band(s). Place the ends of the rubber band(s) over the twin posts. Pull the looped string back over the remaining post. Make sure the rubber band(s) are taut.

Image Reference

Vogt, G.L. (2009). *The Newton Car: Force and Motion*. Center for Educational Outreach. Houston, TX: Baylor College of Medicine.

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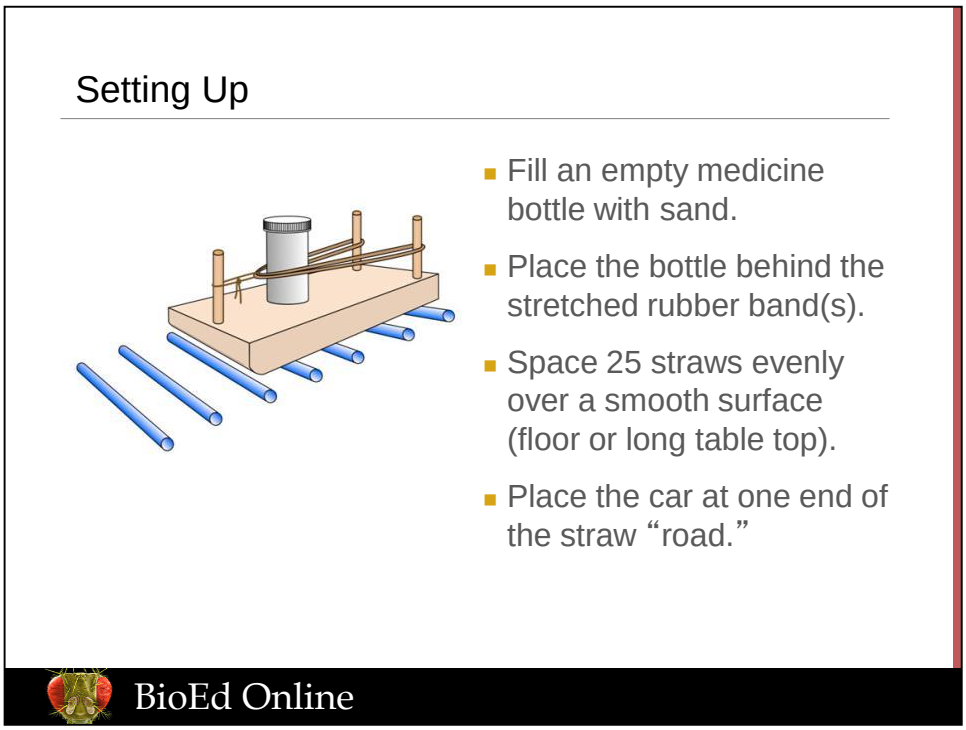

Setting Up

Use an empty pill bottle or fill with water, washers, sand or other objects to change the mass in the bottle. Place bottle in the nook of the rubber band(s), make sure that band(s) are centered on the posts. Distribute straws below the car, making sure they are parallel and placed evenly across a smooth surface. It is helpful to mark the positions of the straws to enable accurate measurement of the distance moved by the car during various trials of the experiment. Place the car on top of one end of the straw "road," with the end of the car with looped string facing toward the straws.

Image Reference

Vogt, G.L. (2009) *The Newton Car: Force and Motion*. Center for Educational Outreach. Houston, Tx: Baylor College of Medicine.

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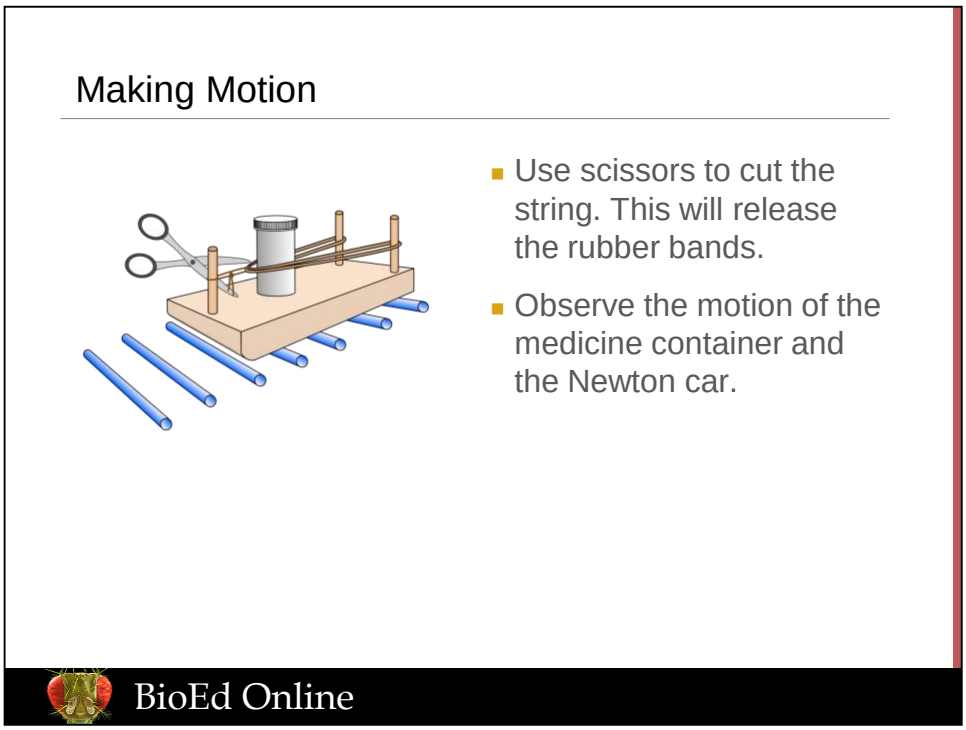

Making Motion

Use scissors to cut string. Another option is to use a match or small lighter to burn through string. Using a match or lighter will produce less friction and physical interference with the car. Make sure that students follow school safety rules and wear any protective equipment needed. When the rubber bands are released, the pill bottle should be thrown off the car, and the car will roll. This is an example of Newton's "Action-Reaction" Law of Motion.

Image Reference

Vogt, G.L. (2009) *The Newton Car: Force and Motion*. Center for Educational Outreach. Houston, Tx: Baylor College of Medicine.

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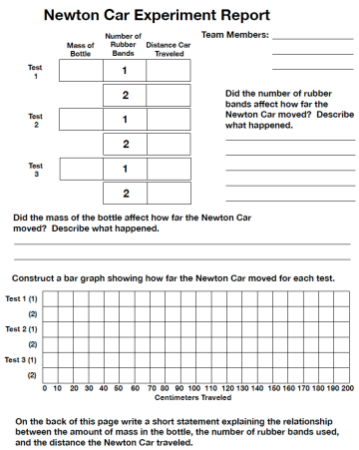
Newton Car Extensions



- Extend this investigation by changing:
  - the number of rubber bands, or
  - the mass inside the medicine bottle.
- Measure the distance the car moves.
- Be sure students change only one variable at a time.

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Newton Car Extensions

Different versions of the experiment can be conducted and graphed. Change one variable at a time, either number of rubber bands or mass inside bottle. Observe change in the distance the car travels with each different variable. Remember to maintain a consistent distribution of straws and the same length of the looped string for all trials.

Image Reference

Vogt, G.L. (2009) *The Newton Car: Force and Motion*. Center for Educational Outreach. Houston, Tx: Baylor College of Medicine.

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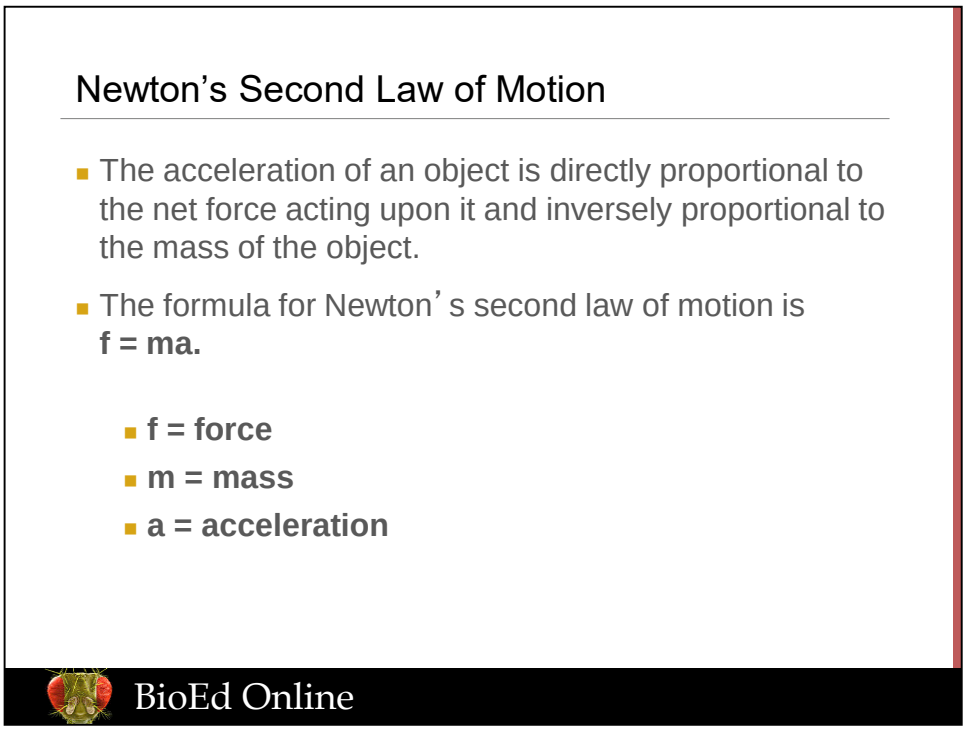

Newton's Second Law of Motion

Acceleration is represented by the number of rubber bands. The more rubber bands, the greater the acceleration. The greater the acceleration, the greater distance the car travels due to the force on the car.

Mass is represented by the weight of the pill bottle. The greater the mass, the greater distance the car travels due to the force on the car.

If acceleration and mass are both increased, the force on the car is even greater and car will travel even further.

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