



## NEWTON'S THIRD LAW OF MOTION

**Objective:** Students will experiment with BrickLab materials to gain an understanding of Newton's third law of motion.

**\*Vocabulary:** FORCE  
MASS  
MOMENTUM  
NEWTON- THIRD LAW OF MOTION  
SIR ISAAC NEWTON  
VELOCITY

**Materials:** BrickLab bricks, String, Large rubber bands, Scissors, Rulers, Smooth, round pencils to act as rollers.

**Preparation:** Prepare and test your own device prior to having your students do this experiment.

**Discussion:** Lead a discussion focusing on key vocabulary terms. Introduce **Sir Isaac Newton** and his **third law of motion**: For every action, there is an equal and opposite reaction. This means it is not possible to exert a **force** on an object without exerting a force in the opposite direction. **Momentum** is an object's **mass** multiplied by its **velocity**. Newton's third law is often called the law of **conservation of momentum**. When an object is given momentum in a certain direction, some other body will receive an equal momentum in the opposite direction. A real-life example is the recoil of a gun.

\*Use the PCS Edventures™ Term Browser, <http://www.edventures.com>, or a dictionary to find vocabulary definitions.

**Activity 1:** Create a brick launch pad and projectile using an 8x16 brick, BrickLab bricks, rubber bands, string, and pencils as shown. Use the scissors to snip the string and smoothly launch the projectile brick. Have students observe the amount of recoil by measuring the launch pad's movement in the opposite direction. Stage an informal challenge where students strive to get the most distance out of their recoil. Hint: Increasing the projectile mass, or the velocity of the launch, should increase this distance.

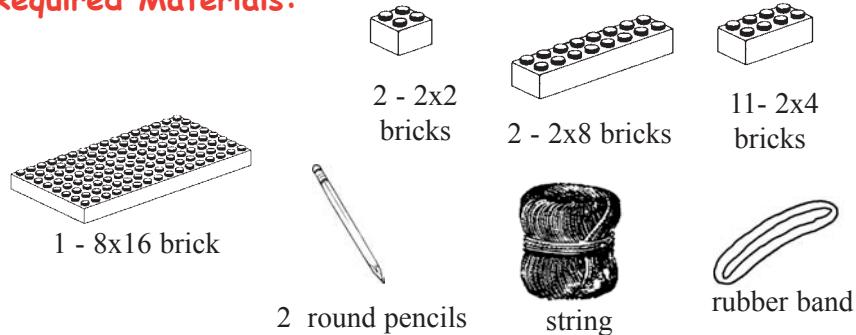
**Activity 2:** Challenge your students to collectively design a larger version of the Conservation of Momentum Machine built in activity 1. Form small groups and encourage them to work together to create this super slider using BrickLab materials and found objects.

**Activity 3:** Challenge your students to identify and draw a diagram of unique examples of Newtons' third law in action in the real world.

**Activity 4:** Challenge your students to write a fictional newspaper article that announces the discovery of Newton's Third Law of Motion. Require them to use all of the pertinent vocabulary terms in the article.

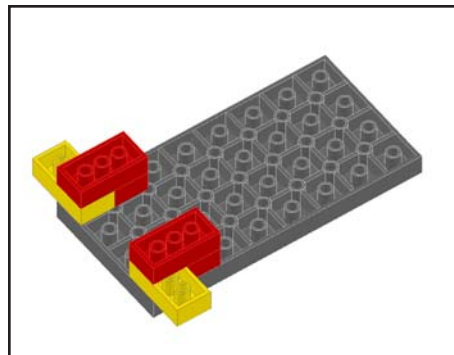
## NEWTON'S THIRD LAW OF MOTION

### Required Materials:



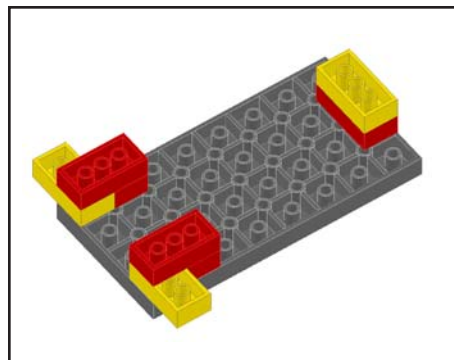
**1.** Turn your brick upsidedown. Place a 2x4 brick on the left corner of the building brick. Make the brick hang towards you with two studs out. Place a 2x2 flush with the edge next to the 2x4. Stack a 2x4 over the 2x4 and 2x2. Repeat on the opposite side.

Check off when complete



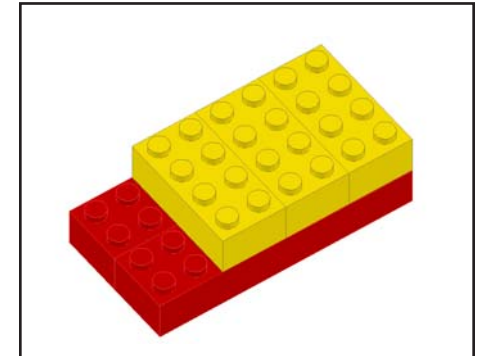
**2.** On the other end, place a stack of two 2x4 bricks two studs from either side and make them flush with the right side of the building brick.

Check off when complete



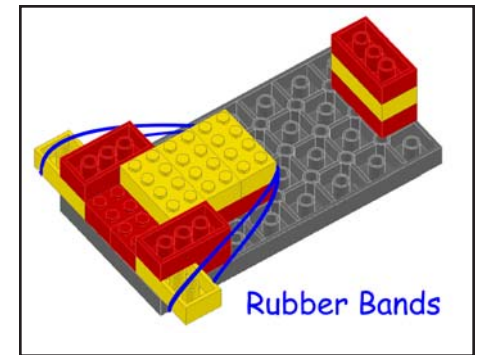
**3.** Build the launching cart by placing two 2x8 bricks side by side. Cover the 2x8s with three 2x4 bricks.

Check off when complete



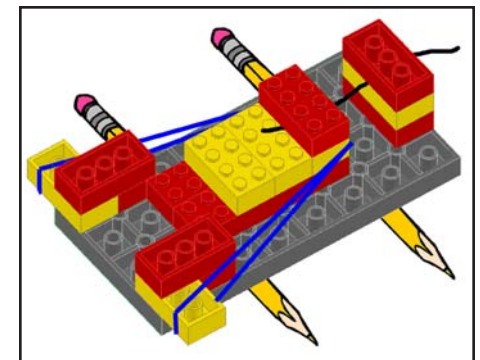
**4.** Loop one large rubber band, (or connect a few small rubber bands together) each end around the 2x4 bricks that stick off the building brick.

Check off when complete



**5.** Place one end of a piece of string on the cart, then cover it with a 2x4 brick. Stretch the rubber band and place the other end of the string on the stack of 2x4s. Cover with a 2x4. Place two round pencils underneath. Cut the string to experiment!

Check off when complete





# Assessment

Physics  
#11

## NEWTON'S THIRD LAW OF MOTION

### Vocabulary Review:

SIR ISAAC NEWTON    NEWTON- THIRD LAW OF MOTION

FORCE            MOMENTUM            MASS            VELOCITY

### Multiple Choice:

1. The Third Law of Motion states that every action:

- Requires mass
- Has an equal and opposite reaction
- Has no opposite reaction
- None of the above

2. The Law of Conservation of Momentum:

- Was defined by Dr. Momentum in the year 1704
- States mass doesn't matter when calculating momentum
- Is also called Newton's Third Law of Motion
- None of the above

3. The formula for calculating momentum is:

- Momentum = Mass X Acceleration divided by Velocity
- Momentum = Mass X Velocity divided by Acceleration
- Momentum = Mass X Velocity
- None of the above

### Questions to Ponder:

(Use these questions as a starting point for your journal entry.)

1. Explain Newton's third law of motion in your own words.
2. Is Newton's third law of motion true on the Moon?
3. Describe a real world example of Newton's third law.

### Journal Entry:

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