



DIY ACTIVITY

BALANCED AND UNBALANCED FORCES

GRADES 3-5

OBJECTIVES

- Experiment with balanced and unbalanced forces.
- Observe that unbalanced forces result in motion.

PROCEDURE



WATCH THE GENERATION GENIUS BALANCED AND UNBALANCED VIDEO AS A GROUP.

1. Fill the plastic cup with 120 mL of water.
2. Place the plate centered on top of the mouth of the cup.
3. Stack the toilet paper tube in the center of the plate. It should also be above the center of the opening of the cup.
4. Finally, balance the egg on top of the toilet paper tube.
5. When you are ready—you can have someone set up a video camera so that you are able to review what happens next later—use your hand to knock the plate sideways. You need to use enough force so that both the plate and the toilet paper tube are knocked out of the way. If the right amount of force is used, the egg should drop directly into the cup of water.

MATERIALS NEEDED

- Metal or plastic plate
- Measuring cup
- 8 oz plastic cup
- Egg
- Toilet paper tube
- Water
- Paper towels and other clean up materials
- Video camera/cellphone camera (optional)

Activity Duration: 15 minutes

WHAT IS GOING ON HERE?

Why does the egg fall into the cup instead of flying off to the side along with the plate and tube? As it sits on top of the stack, the forces acting upon the egg are balanced. Gravity pulls the egg down while the tube pushes it up, so the egg is not in motion. When the plate is hit with enough force, it hits the tube and sends both flying. The force that was holding the egg up is suddenly removed and the only force on the egg is gravity—causing it to move in a downward direction.

FURTHER EXPLORATION

What happens if a smaller amount of force is used? Try the experiment again with less force and observe (hint: keep clean up materials handy). If possible, have a friend take a video of each trial. If you can, review the video in slow motion like Zoe did. Can you see the forces at work? How is this experiment similar to pulling a tablecloth off a table while the place settings stay put?