Mystery toy

Overview: This mystery toy will help us uncover the dynamics of energy transfer, and how kinetic and potential energy are related.

What to Learn: Ask yourself, "How is the energy moving through this system?" Where is the potential energy stored? Where is the kinetic energy interacting?

Materials

- can with a lid
- heavy rock or large nut
- two paper clips
- rubber band

Lab Time

1. You'll need two holes punched through your container – one in the lid and the bottom. Thread your rubber band through the heavy washer and tie it off (this is important!).
2. Poke the ends of the rubber band through one of the holes and catch it on the other side with a paper clip. (Just push a paper clip partway through so the rubber band doesn't slip back through the hole.) Do this for both sides, and make sure that your rubber band is a pulled mildly tight inside the can. You want the hex nut to dangle in the center of the can without touching the sides of the container.
3. Now for the fun part… gently roll the can on a smooth floor away from you. The can should roll, slow down, stop, and return to you! If it doesn't, check the rubber band tightness inside the can.

Mystery Toy Observations

1. Where is the energy stored in this system at the point when the can stops rolling away from you?

2. What happens to the kinetic energy at this point?

Reading

The hex nut is a weight that twists up the rubber band as the can rolls around it. The kinetic energy (the rolling motion of the can) transforms into potential (elastic) energy stored in the rubber band the free side twists around. The can stops (this is the point of highest potential energy) and returns to you (potential energy is being transformed into kinetic). The farther the toy is rolled, the more elastic potential energy it stores.

Exercises Answer the questions below:

1. Explain in your own words two types of energy transfer:
    a.

    b.

2. True or false: All energy in a system is lost to heat.
    a. True
    b. False

Answers to Exercises: Mystery Toy

1. Explain in your own words two types of energy transfer
2. True or false: All energy in a system is lost to heat. (false)