

An Egg-citing Ride

GOAL

To demonstrate the principles of kinetic energy.

GRADE LEVEL

Elementary through middle school, depending on depth of technical discussion.

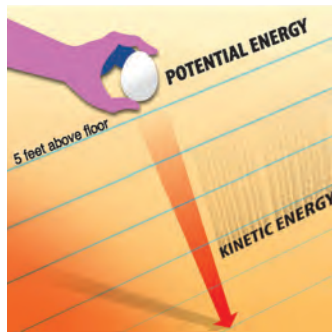
DISCUSSION

The science behind how things move (physics) is of great importance to engineers. The goal here is for students to understand the basics of engineering design associated with kinetic and potential energy as they design, build, and test a bungee jump cord that will keep an egg safe while still delivering a thrilling “ride” for the egg.

Potential energy: Energy an object has because of its relative location.

Kinetic energy: Energy associated with motion of an object.

Gravitational force: Force exerted between the earth and an object that attracts the object toward the earth.



MATERIALS

(for each team):

- nylon stockings
- rubber bands
- balloons
- yarn
- 2 plastic sandwich bags
- pennies
- an egg
- newspaper
- ruler

ACTIVITY

Tip: For maximum suspense use raw eggs. Be sure to spread newspaper within the testing zone, even though the egg will be inside a plastic bag.

Divide the class into teams of 2-3 students. Provide each team with the materials and explain that they have been charged with seeing which team can design a bungee jump so that the rider (the egg) stops within 2 inches of the floor when dropped from 5 feet.

If the egg stops too far above the floor, the bungee jump attraction won't be exciting enough. Of course, if the egg hits the floor, the jump fails the safety test.

Design

Have students gather the nylon stockings, rubber bands, balloons, and yarn, and pull on each to test how elastic, or stretchy, they are. Then have them use the materials they select to make a bungee cord. Make a test egg by



filling a plastic bag with pennies until it weighs about the same as a real egg. Tie one end of the bungee cord to the plastic bag.

Test

Using the ruler, mark a spot 5 feet above the floor. Point out that when the egg is held at this point, it has potential energy. When the egg is released, gravity pulls on it; the egg then has kinetic energy. When the test egg comes to rest, measure how close it is to the ground.

Tip: Avoid measuring and launching against a wall, to avoid a collision on the way down.

Evaluate and redesign

Ask students what changes they can make to improve their bungee design. Discuss the concept of variables and what happens if more than one change is made at a time. Retest. When they're ready, have them try their bungee design with a real egg.

What happened:

- What happens if the length of the bungee cord is changed?
- What happens if the materials are changed?
- What happens if more weight is added to the test egg?



Ask students what they think about engineering, now that they have had a chance to experience it themselves. What do they know now that they didn't know before?

CONNECT TO ENGINEERING

Engineers use their math and science know-how in all areas of an amusement park. They need to understand how to make rides fast and fun, without compromising structural integrity which is needed for ride safety. Engineers use other skills to make line wait-times shorter, park layout inviting and environmentally friendly, services like food delivery and trash control efficient, and park security up-to-date.

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