

T E A C H E R S GUIDE



**SMASHING STEEL SPHERE -
KINETIC ENERGY DEMO**
ITEM # 3484-38

ENERGY - MOTION

These colliding steel spheres will help demonstrate the Law of Conservation of Energy, and show students how mechanical systems convert energy to heat. When objects collide, the kinetic energy transforms into sound, heat, and kinetic energy in the opposing direction. It can be difficult, however, to show the heat produced through energy transformations. These steel spheres are a great way to show kids how energy “loss” is actually energy being released as heat! When these two 1/2 pound steel spheres are smashed together, the kinetic energy transforms into enough heat to burn a hole through a piece of paper. An excellent way to demonstrate energy transformation!



Materials

- Two 1-pound, 2-inch diameter chrome steel spheres
- Piece of paper

Goals & Objectives

Students will:

- explain the Law of Conservation of Energy, and demonstrate ways in which energy can be transferred.
- demonstrate that mechanical systems convert some of the energy into heat.

DISCUSSION

Optional Study and Discussion

- 1** How do the spheres colliding demonstrate the Law of Conservation of Energy?

The kinetic energy generated by the colliding spheres is turned into heat energy when they stop moving. This is evident by the hole burnt into the page.

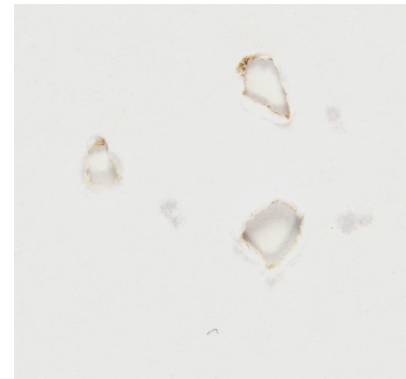
- 2** Give an example in everyday life of a mechanical system that loses some of its kinetic energy as heat.

Students' answers may vary but can include things such as a car, computer, or drill.

ACTIVITIES

- 1** Have a student hold up the piece of paper and have another student hold the spheres on each side. Ask the student with the spheres to carefully, but firmly, crash them together, with the paper in between.

- 2** Ask the class to make observations of the paper. There should be a small hole where the spheres collided. Some students may speculate that the hole was ripped by the motion of the spheres. To confirm that the hole was actually burned in the paper, have them sniff the hole in the paper and smell the smoke.



Note

It is always best to DO an experiment ahead of time to be able to best present it to the class.



- 3** Try thicker papers, or more than one layer or paper to test the limits of the heat energy. Avoid paper with wax coatings, however, as the wax will prevent a hole from forming.
- 4** Try repeating the experiment with a sheet of aluminum foil instead of the paper. A number of concentric rings can be observed in the foil!

