

Ball & Ring

33-0630



INSTRUCTIONS:

Hold the insulating handles. Show that the ball fits easily through the ring.

Heat the ball in a flame. As it heats, ask students to predict whether it will fit through the ring. Show that it has expanded and does not fit. Dip the ball in water to cool it. Heat the ring, and ask students to predict if the cool ball will fit through the heated ring. Show that it does fit.

WHAT'S GOING ON?

Most students will accurately predict that thermal expansion will cause the heated ball not to fit through the cool ring. The ball expands due to increased molecular motion.

Many students will predict that the cool ball will not fit through the heated ring. In fact, it does. Both the inner and outer diameters of the ring expand. Think about enlarging a photograph. See the diagram. Another way to explain it is to realize that, for the hole to get smaller, the metal atoms on the inner wall would have to get closer together. When heated, they can only get farther apart, enlarging the hole.



RELATED PRODUCTS:

Compound Bar (P6-7070). Explore differential thermal expansion with this classic demonstration.

Solar Bag (P6-7300). Thermal expansion of air causes this giant bag to float!

Portable Micro Burner (C5-1005). The Micro Burner uses butane and can be used anywhere for experiments or demonstrations.