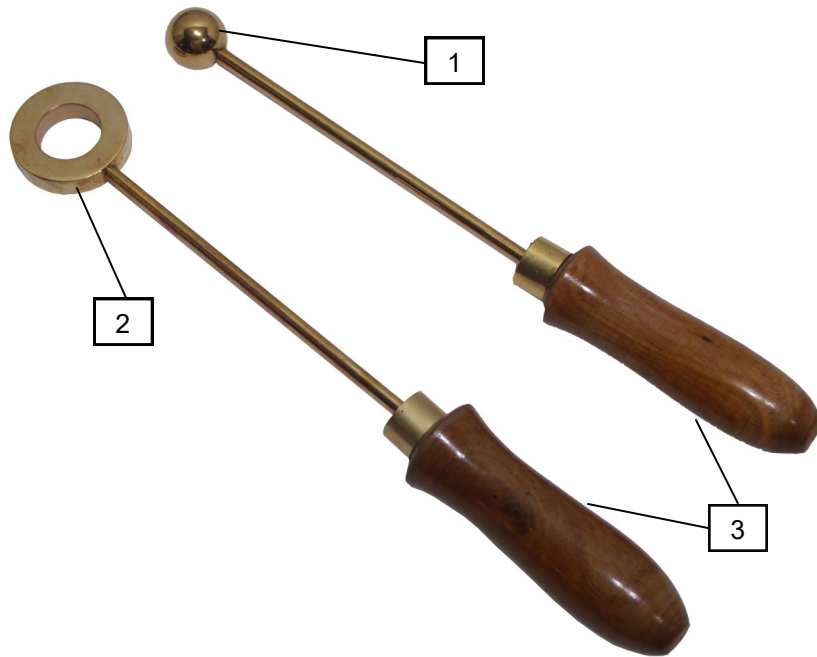


## **BALL AND RING APPARATUS**

**BRA001**



*Figure 1*

### **DESCRIPTION**

The ball and ring is made of all brass construction with wooden handles. The heating of the ball will expand its dimensions to the point where it will not fit into the ring. This visual demonstration allows students to see linear thermal expansion in action in all three dimensions.

### **IDENTIFICATION OF COMPONENTS**

1. Brass ball
2. Brass ring
3. Wooden handles

## PRE-LAB ASSEMBLY

### **SAFETY FIRST:**

IF YOU ARE USING A PROPANE TORCH, MAKE SURE THE NOZZLE OF THE TORCH IS AWAY FROM YOUR BODY BEFORE LIGHTING IT.

ALWAYS USE THE HANDLES OF THE APPARATUS WHEN HOLDING IT—THE BRASS RODS HOLDING THE BALL AND RING CAN BE HOT.

### **Apparatus set up:**

- Set up all the needed materials in a central location so all students can see.
- Have a beaker or container of water nearby in case of fire.

## THE DEMONSTRATION

### **THERMAL EXPANSION**

Materials included: Ball and ring apparatus

Materials Required: Heat source, Bunsen burner

- Observe the ball apparatus.
- Slide the ball through the opening of the ring, noting how tightly it fits.
- Remove the ball apparatus from the Ring.
- Turn on your propane torch or heating element carefully.
- After lighting the propane torch, place the ball into the center of the flame for one minute.
- Pick up the ring with your other hand by the handle.
- Carefully place the ball into the center of the ring and try if it fits.
- Does the ball pass through the ring?  
Why do you think it does or doesn't pass through the ring?
- Place the ball and ring in the center of the ceramic gauze pad.
- Allow both to cool for a few minutes.
- Carefully place the ball into the center of the ring again.  
Does the ball pass through the ring this time?
- Repeat the activity again by heating the ball.
- Carefully place the ball into the center of the ring.  
Does the ball go through the center of the ring this time?  
What do you think happened to the ball when it was heated?
- Place the ball and ring on the center of the ceramic gauze pad after completing the investigation.  
Allow the ball and ring to cool for a few minutes before testing it again.