

## **612-1360 (15-015) Compound Bar of Unequal Expansion**

### **Introduction:**

What is thermal expansion? When materials are heated, the molecules that compose them get excited and move faster. As they gain energy, the bonds holding these molecules together become slightly less powerful, allowing them to move away from each other. Although the movement of each molecule is very small, there very many of them, and the cumulative effect can be large. Over the length of a bridge, thermal expansion can be so great that special spacers called expansion joints have to be put in to allow the bridge to grow.

Different materials expand at different rates. Ceramics expand very little, metals expand considerably, and most polymers expand even more than metals. Diamonds and fused quartz hardly expand at all. This makes them useful for applications that require a low coefficient of thermal expansion.

### **Description:**

Our compound bar consists of a strip of steel mounted to strip of brass of equal size. A wooden handle provides a place to grip the bar and provided insulation.

To use, first obtain a Bunsen burner, hot plate, or other heat source. Hold the bar in the heat. As you hold it, it will start to bend, with the curve becoming more pronounced the longer heat is applied.

Why does it do this? The answer is thermal expansion. Brass expands approximately 80% more than steel when exposed to the same amount of heat.

### **Warranty and Parts:**

We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.

### **Other Science First Items for you to consider:**

**612-0010 Ball and Ring Apparatus:** Thermal expansion of metals is easily demonstrated using the ball and ring apparatus. The ball passes freely through the ring when both the ball and ring are at the same temperature. However, after the application of heat, the ball cannot pass through the ring until it cools to the same temperature, or the ring is heated.

**612-1050 Heat Conductometer with Wax:** • 5 labeled metal spokes conduct heat at different rates. Investigate how different metals conduct heat. Hold the hub over a Bunsen burner flame and observe the rates at which wax at the small well at the end of the spokes begins to melt. Handle is wood for safety, and spokes are labeled for easy reference. Includes: 5 (five) spokes - nickel, steel, brass, aluminum, copper; wax; instructions; wood handle.

