

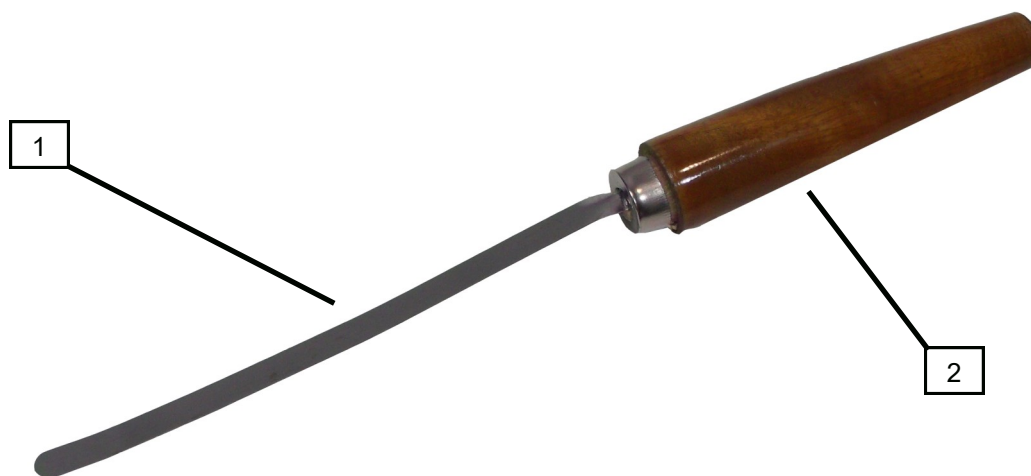


**UNITED SCIENTIFIC SUPPLIES, INC.**

**OPERATING INSTRUCTIONS AND ACTIVITY GUIDE**

## **BIMETAL STRIP**

**BMST05**



*Figure 1*

### **DESCRIPTION**

A bimetal strip is a laminated bar of two or more dissimilar metals bonded together and fastened to a wooden handle. When the metal strip is heated, the metals expand differently causing the strip to bend.

### **IDENTIFICATION OF COMPONENTS**

1. Bimetal strip
2. Insulating wooden handle

## PRE-LAB ASSEMBLY

The thermal expansion of a metal is dependent upon the physical properties of the materials. Different metals conduct heat differently (thermal conductivity) and these properties can be used for different situations.

Bridges have metal expansion joints in the road way to help in the summer when the road heats up and expands. This helps the integrity of the bridge to be maintained.

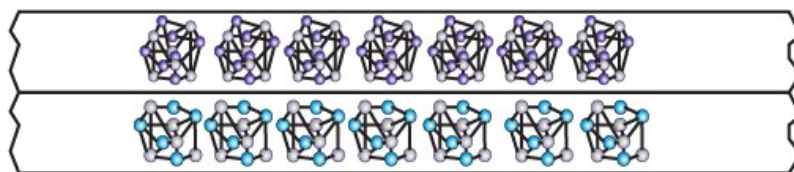
Circuit breakers use thermal expansion to help disconnect the power when the current creates too much heat and threatens to cause an electrical fire.

The coefficient of thermal expansion ( $\alpha$ ) represents a change in one direction, although when a substance is heated it does expand in all directions, but the longest dimensions is the most noticeable.

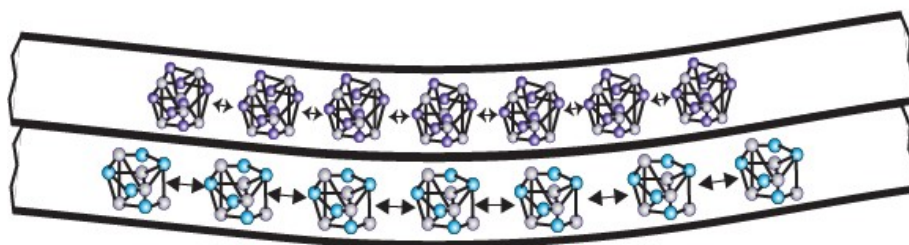


*Bridge Expansion*

The bimetallic strip has two different metals fused together. The two metals have different thermal properties ( $\alpha$ ) and will therefore have different expansion rates. This causes the bimetallic strip to bend in one direction when heated. The diagram below shows what is happening to the molecules when they are heated.



Molecules at room temperature bimetallic strip



Molecules expanding at different rates when exposed to heat

*Note:* Our bimetal strip is thin and is made of two alloys, a high expansion component with 75% manganese, 15% nickel, and 10% copper, and a low expansion component with 64% iron and 36% nickel. It responds quickly to heat; a Bunsen burner can be used as a heat source but is not required.