

Intermediate Science 7
Unit 1: Temperature and Heat
Topic 7: Observing the Effects of Heat

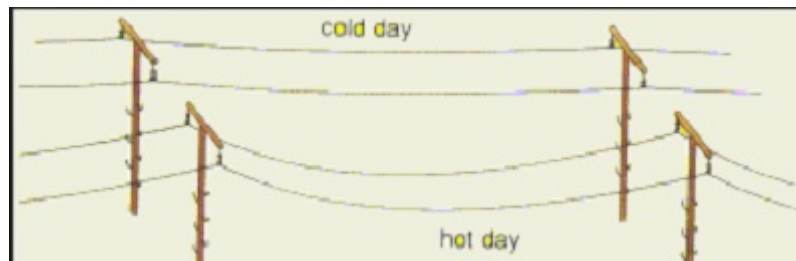


Student Name _____

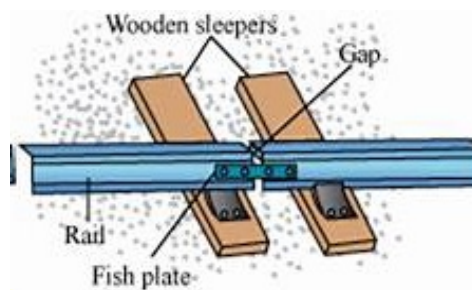
Materials expand or contract when subjected to changes in temperature. Most materials expand when they are heated, and contract when they are cooled.

Solids: can become longer or shorter depending on the temperature (average energy of the particles)

-Telephone wires are hung up slack in the hot summer weather so that they do not pull the telegraph poles over when they contract in the winter



- Railway lines are laid with small gaps to allow for expansion in hot weather



- Girders in buildings and bridges are made with gaps at the ends



- Bimetallic strip - this is made of two metals joined together that expand by different amounts when heated. It is used in thermostats and fire alarms



Liquid: When the particles in a liquid are heated, their average energy increases and they need more room, so they expand. When the particles in a liquid are cooled, the volume decreases, or contracts, because the particles need less room. This is demonstrated by the liquid used in a thermometer. As the liquid expands and contracts, it moves up and down the inside tubing (the bore) of the thermometer.

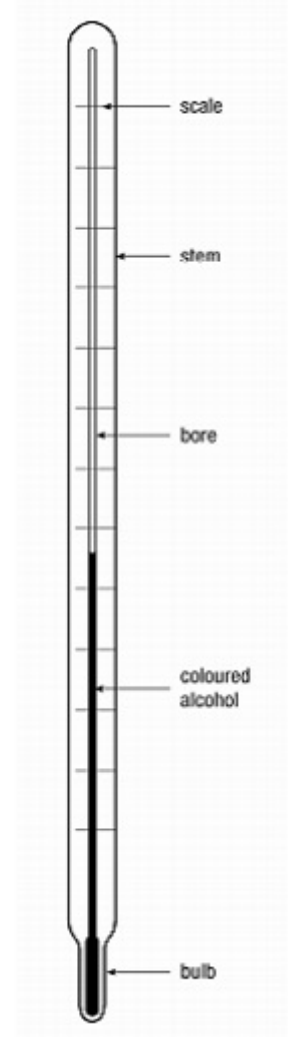
Scale: refers to the series of lines that are etched into an area and allows the temperature to be read off in units of degrees. The type of degree unit depends upon the specific thermometer. Two commonly used temperature scales, are degrees Celsius and degrees Fahrenheit

Stem: containing the scale that is measuring the temperature and a capillary through which the liquid can accordingly expand and contract

Bore refers to a thin open inside the stem which gives the liquid a route of travel as it expands and contracts.

Bulb: the lowest part of the thermometer, which has a spherical shape. It holds the liquid

Liquid: The substance that expands and contracts. Usually alcohol or mercury.



Gas: When the particles in a gas are heated, their average energy increases and they need more room, so they expand. When the particles in a gas are cooled, the volume decreases, or contracts, because the particles need less room. Under extremely high temperature conditions (like the temperatures inside the Sun, particles can be split into what makes them up (electrons and ions). This creates a fourth state of matter called plasma.

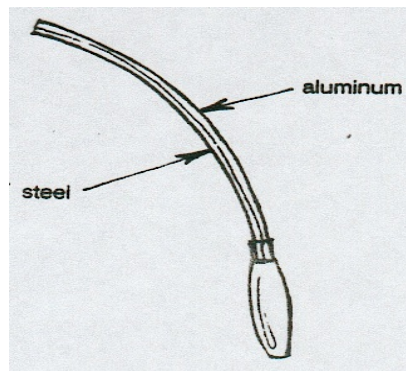


A balloon is tied to the mouth of a bottle and placed in cold water. The balloon will shrink in size as the air inside contracts on cooling.

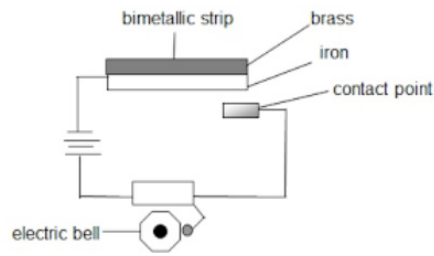
PART A: MULTIPLE CHOICE

Instructions: Shade the letter of the correct answer on the computer scorable answer sheet provided

- Small gaps are left between the metal rails on railway tracks in order to allow for ...
 - Expansion of the metal rails on cold days
 - Expansion of the metal rails on hot days
 - Expansion of the metal rails on cold days
 - Contraction of the metal rails on hot days
- Many objects, such as train tracks and road joints, are specifically designed to allow extra space for ...
 - Conductors
 - Insulators
 - Thermal energy
 - Thermal expansion
- A solid expands when heated because the particles in the solid ...
 - Become larger and so push each other further apart
 - Become smaller and so push each other further apart
 - Vibrate faster and so push each other further apart
 - Vibrate slower and so push each other further apart
- A bimetallic strip is made up of _____ welded together.
 - Two metals of the same kind
 - Two different metals that expand and contract unequally
 - Two different metals that expand and contract equally
 - It is made of one metal that contracts or expands at different temperatures
- What is the name given to a thermometer that consist of two strips of metals bonded together?
 - Bimetallic strip
 - Gas thermometer
 - Liquid crystal thermometer
 - Thermocouple
- For the diagram below, which metal expands the most?
 - Steel
 - Aluminum
 - Both expand the same amount
 - No expansion occurs

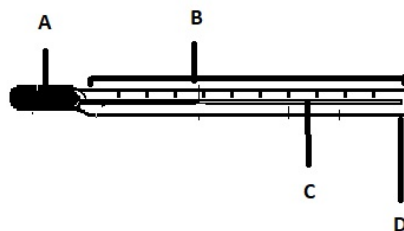


7. The picture shows a bimetallic strip in a fire alarm. When there is a fire outbreak, the bimetallic strip will get hot...



- (A) Bend downwards, complete the circuit and the alarm rings
 (B) Bend upwards, open the circuit and the alarm will not ring.
 (C) Becomes longer, open the circuit and the alarm will not ring.
 (D) Nothing will occur
8. The liquid in the thermometer rises when it is placed in the hot water because...
- (A) It gains heat from the hot water and expands
 (B) Loses heat from the hot water and contracts.
 (C) The surrounding air is too warm.
 (D) The liquid is boiling
9. The mercury rises in a clinical thermometer when the temperature is increased due to the _____ of the mercury.
- (A) Contraction
 (B) Expansion
 (C) Evaporation
 (D) Sublimation

Use the thermometer below to answer questions 10 - 12



10. Which part of the thermometer shows the bulb?
- (A) A
 (B) B
 (C) C
 (D) D
11. Which part of the thermometer shows the scale?
- (A) A
 (B) B
 (C) C
 (D) D

