

LESSON NOTES

Subject: Basic Science

Year/Level: 9

Week 19

Strand	2: MATTER
Sub Strand	2.1 : INVESTIGATING MATTER
Content Learning Outcome	Realize the fact that particles are small and behave differently in different states of matter under different situations.

Expansion and Contraction of Matter

materials are constantly getting bigger and shrinking again in response to changes in temperature.
particle model can be used to explain changes in the size of substances as well as changes in state.

Solid/Liquid/Gas Particles	What happens to the particles?	What happens to the substance?
When heated	gain energy move faster moves further apart takes up more space	Substance will expand Gases usually expand much more than solids or liquids because their particles are not strongly attracted to each other and are far apart or spread out.
When cooled	lose energy slow down move less become more strongly attracted to each other	Substance will contract

Effects of Expansion and Contraction in Everyday Life

In solids, this expansion and contraction may be small, but the forces experienced can be tremendous.

Engineers and architects allow for expansion and contraction of materials when designing bridges and buildings.

a) Bridges

have gaps at each end of large sections:

allow the metal and concrete to expand in hot weather so they will not buckle.

Rollers and sliding joints:

allow for the movements of the bridge as it expands and contracts.

b) Railway lines

continuous track of metal rail if used, will expand in hot weather and buckle.

To prevent this, there are gaps laid in between sections to allow for expansion.

c) **Electrical wires or overhead power lines**

hung loosely from poles so that when the weather cools, they will not become too tight and break as they contract.
Overhead cables expand and sag on hot days, but contract and tighten in cold weather.
Allowance has to be made for thermal expansion and contraction of the overhead wires during their installation.

NOTE:

Liquids expand more than solids, so, makes them useful in thermometers.
Most thermometers that we use in the lab are made up of thin tubes and a bulb containing a liquid.
As the temperature increases, the liquid expands and moves up the tube.
Two common liquids used in thermometers:
1. Mercury
2. Alcohol
Clinical thermometer: measure human body temperature.

The amount by which each structure will expand will depend on the material it is made from.

Effect of Heating and Cooling on Matter

Changes of State

Substances can exist in more than one physical state and change from one state to another due to the behavior their particles.
Change happens with a change in temperature.
If a solid is heated, its particles have more energy and can move around more freely.
Finally they break of their fixed positions, and the solid turns into a liquid.

ACTIVITY:

1. Explain what happens to the particles in:
a) ice-cream as it melts?

- b) the air bubbles trapped in dough as it is cooked to make bread?

2. Why does sugar dissolve more quickly in hot than in cold tea? Explain what happens to the sugar particles.

...STAY SAFE... 