



Science Department

2023/2024

Year 8

Term 1, Summary Sheet of lesson 3.1 & 3.2

3.1 Density 3.2 Heat and temperature

Name:

Class:


3.1 Density

Density Formula

density mass

$$\rho = \frac{m}{v}$$

volume


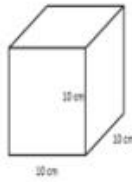
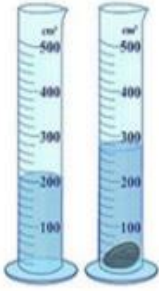


density = mass ÷ volume
 mass = density × volume
 volume = mass ÷ density

thecalculatorsite.com

Measuring the volume

You have to determine the state of matter either liquid or solid first, then the shape of the solid


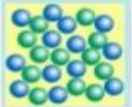
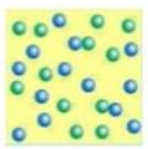
liquid	Regular solid	Irregular solid
<p>Measuring Volume of Liquids</p> <p>To measure the volume of a liquid, we use a tool called a graduated cylinder.</p> 	<p>Finding the Volume of a Regular Solid</p>  <p>Volume = height x length x width Volume of this cube = 10 cm x 10 cm x 10 cm = 1,000 cm³</p>	<p>Finding the Volume of an Irregular Solid</p> <p>• example:</p> <ul style="list-style-type: none"> – first reading: 200 ml – second reading: 260 ml – volume = second reading – first reading – volume = 260 ml – 200 ml – volume = 60 ml 

Volume is measured in liter, milliliter and cubic centimeter

Mass is measured by balance or scale.

Measuring unit of mass is gram, while density is g/cm³

Comparing different densities of different state of matter

	Picture	Particles	Density	Motion	Example
SOLID		Tightly packed	Usually the most dense	Particles locked into place	ICE
LIQUID		Loosely packed	Usually less dense than solids, denser than gases	Particles move past each other	Water
GAS		Not packed at all	Least dense	Particles move past each other	Water Vapor

- If something is more dense than water, it will sink in water.
- If something is less dense than water, it will float in water.

3.2 Heat and temperature

Heat	Temperature
<ul style="list-style-type: none"> Heat is a measure of the energy in the particles. Heat is the total thermal energy of the vibrating particles in an object. Heat tells us about the total energy of the particles. 	<ul style="list-style-type: none"> Temperature also gives us information about the energy of the particles. Temperature tells us the average energy of the particles.
Measured in joules	Measured in Celsius , Fahrenheit & Kelvin

the thermal energy (heat) is greater at the water of the higher temperature because it contains particles that are moving faster, the **number of particles in both glasses of water is the same, but the total thermal energy (heat) of the particles in the water with the higher temperature is higher.**

- As there are more particles, the total thermal energy (heat) of all these particles is greater than in the water with fewer particles.
- That means the larger volume of water has greater total thermal energy (heat) than the smaller volume, even when their temperatures are the same**

Factors affecting the thermal energy

<u>Factor</u>	<u>Factor Variation</u>	<u>Result</u>
Number of Particles	More particles	Increased thermal Energy
	Less particles	Less thermal energy
Temperature	Higher Temperature	Increased thermal energy
	Lower Temperature	Reduced thermal energy

Temperature gives us information about two things:

- **the direction that thermal energy will be transferred**
- **the average energy of the particles in an object.**