

STAGE 4 SCIENCE

TOPIC: PERIODIC TABLE AND ATOMIC STRUCTURE - PART 1

Classification of Matter

Elements

- An element is:

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There are 90 naturally occurring elements and over 20 synthetic (artificial) elements.

- The most naturally occurring elements on Earth are Oxygen (O) 47%, Silicon (Si) 28%, Aluminium (Al) 8% and Iron (Fe) 5%. (Remember OSAFe!!)
- In the human body the naturally occurring elements are O, C, H and N.
- Synthetic elements are made by humans in laboratories through nuclear reactions. They are unstable and exist only for a few seconds, breaking down to more stable elements.

Most things we use every day can be broken down to simpler substances.

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Physical and Chemical Properties

- Physical properties are:

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Examples of Physical Properties:

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- Chemical properties are:

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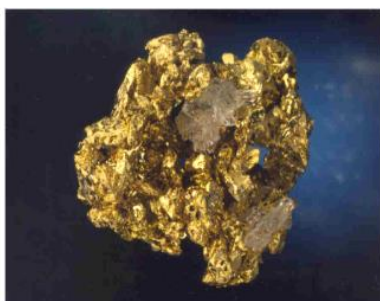
Examples of Chemical Properties:

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Elements are classed according to their physical properties:

Properties	Metals	Non-Metals	Metalloids (Semi – Metals)
Physical state (at room temperature)			
Appearance			
Melting point			
Density			
Malleability			
Ductility			
Conductivity of electricity and heat			

Examples of Elements:

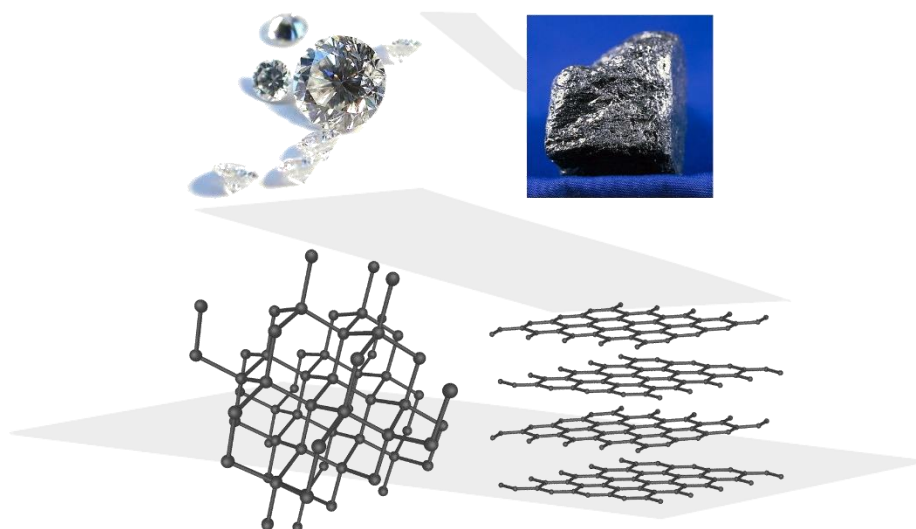


Allotropes

- Allotropes are:

Examples: Carbon

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Exercise 1

Question 1

The table below lists elements that you might use in your everyday life. Identify where they might be used.

Element	Uses
Aluminium	
Copper	
Gold	
Mercury	
Sulfur	
Carbon	
Silicon	

Compounds

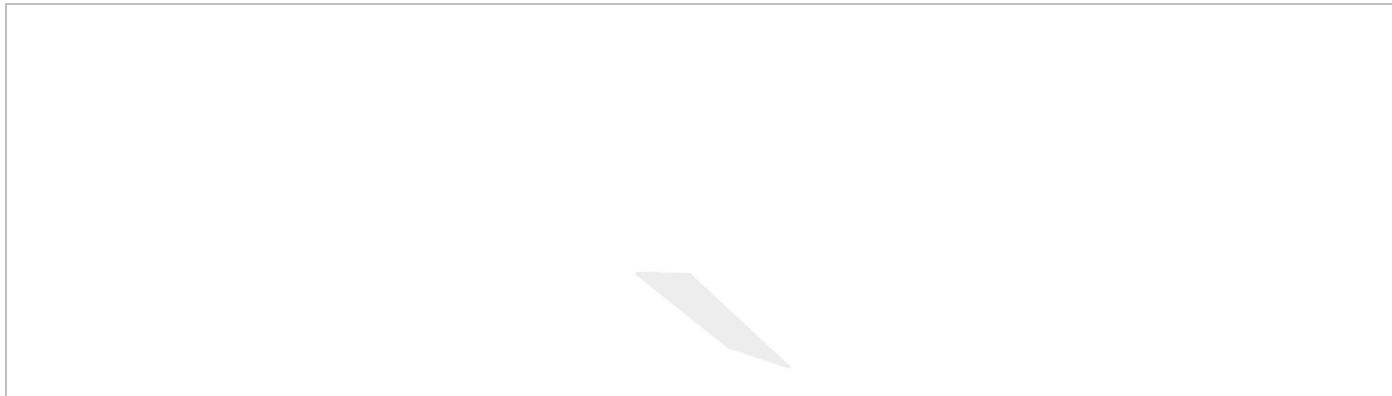
- A compound is:

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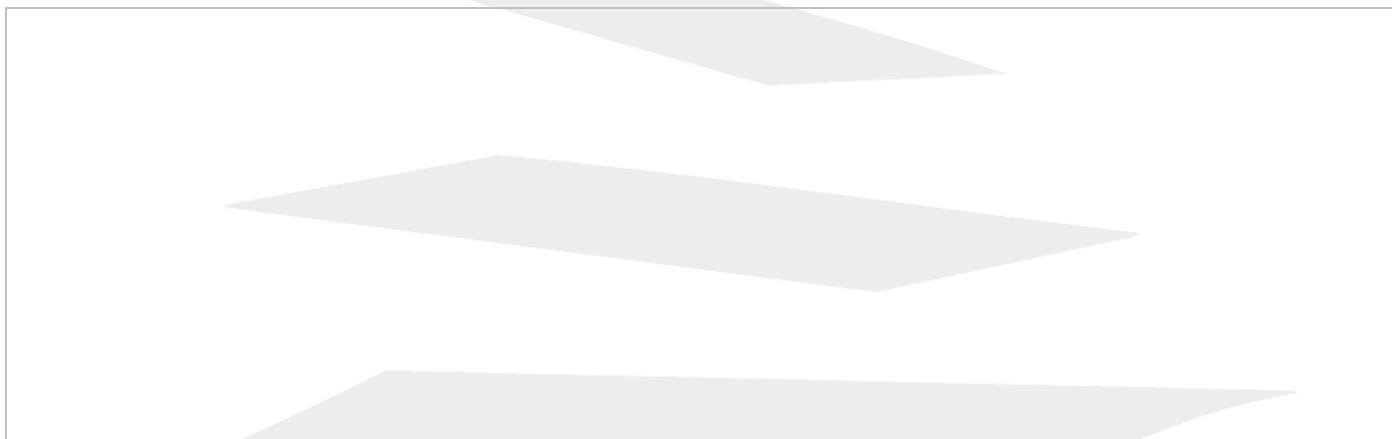
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Example: Water is a compound as molecules



Example: Salt is a compound as a lattice



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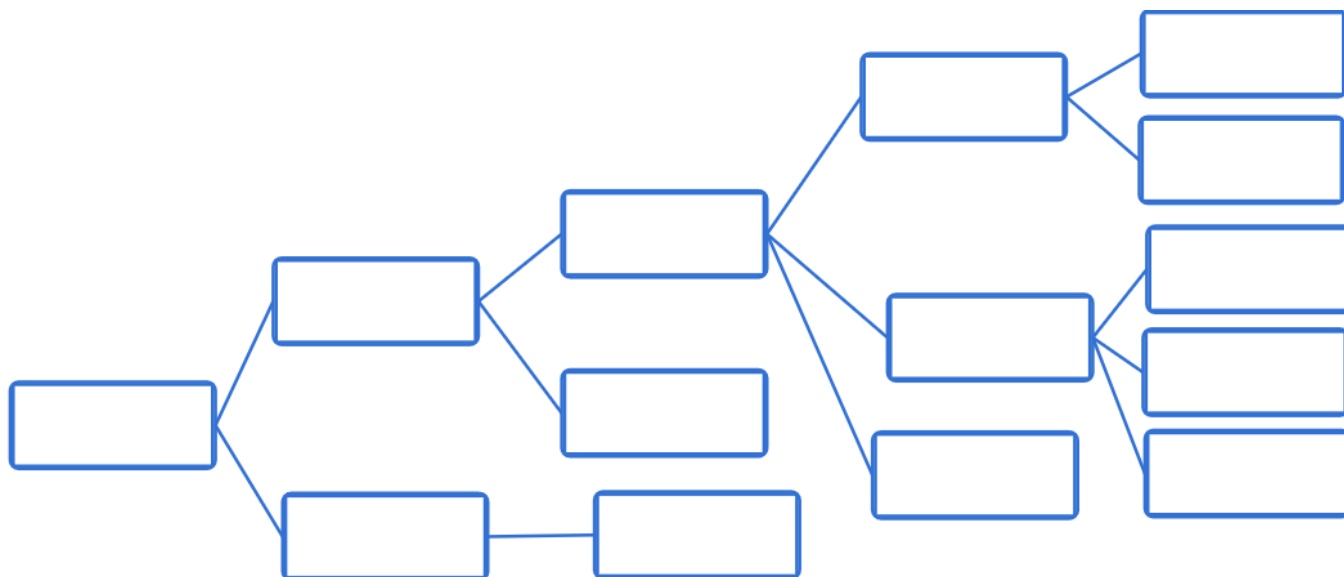
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Atomic Structure

Evolution of Models of Atomic Structure

- Models for atomic structure have evolved over time due to the work of multiple physicists to create accurate models and advancements in technology.

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Solid Ball Model (Dalton – 1803)

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- He was influenced by a similar model by Greek philosopher Democritus, who had his own theory (that atoms are infinite in number and eternal) disproved by another Greek philosopher, Epicurus.

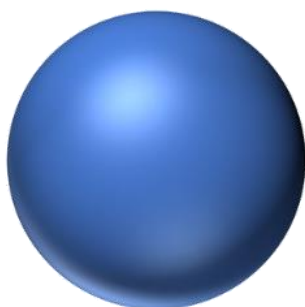


Figure 1 John Dalton

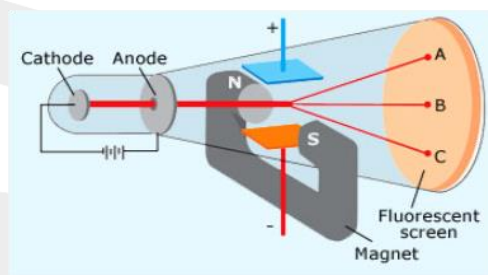
Dalton also stated some atomic theories:

1.
2.
3.
4.
5.

Plum Pudding Model (Thomson – 1904)

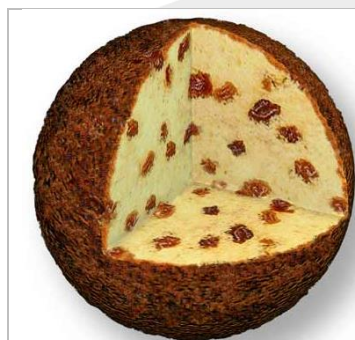
- J.J. Thomson experimented with electric charges and cathode ray tubes (used to produce pictures in television sets in the 20th Century).

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- Thomson expanded on Dalton's theories, likening the make of an atom to a plum pudding.

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Plum Pudding Model