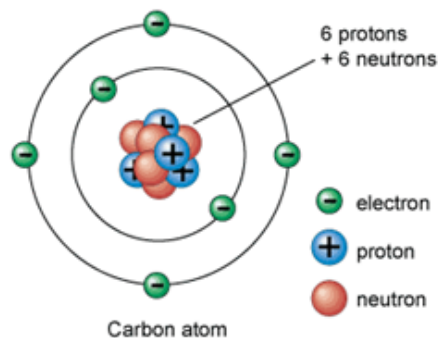


Atomic Structure Knowledge Organiser

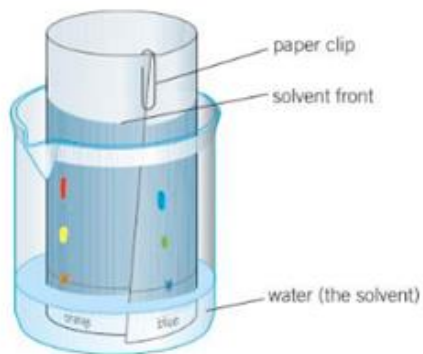


Name	Charge	Mass
Proton	+1	1
Neutron	0	1
Electron	-1	1/1840

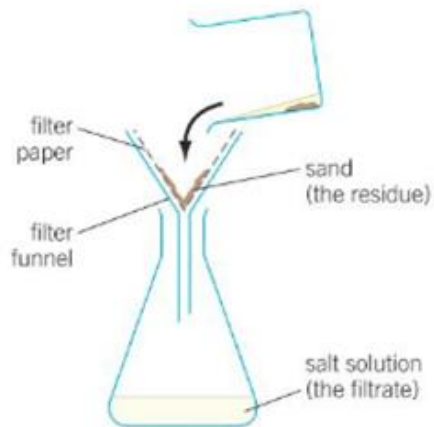
Year	History of the Atom
1800s	John Dalton came up with the idea of the atom—tiny, hard spheres.
1800s	J.J. Thomson discovered the electron and theorised the Plum Pudding model.
1900s	Geiger and Marsden completed the gold-foil experiment and discovered the nucleus.
1914	Niels Bohr came up with the idea of energy levels.
1932	James Chadwick discovered the neutron.

Keyword	Definition	Keyword	Definition
1. Atoms	The smallest part of an element that can still be recognised as that element.	13. Reactant	The substances you start a reaction with
2. Element	A substance made up from only one type of atom. An element cannot be broken down chemically into any simpler substance.	14. Product	The substances made from the reaction
3. Compound	A substance made when two or more elements are chemically bonded together.	15. Symbol Equation	An equation that uses the symbols for elements found in the periodic table.
4. Mixture	When some elements or compounds are mixed together and intermingle but do not react together (i.e. no new substance is made)	16. Word Equation	An equation that uses words to name the substances found in the reaction.
5. Periodic Table	An arrangement of elements in the order of their atomic numbers, forming groups and periods.	17. Law of the conservation of mass	The total mass of the products formed in the reaction is equal to the total mass of the reactants.
6. Group	A column of the periodic table.	18. State symbol	Added to a reactant or product to tell you whether or not a substance is solid (s), liquid (l), gas, (g) or aqueous (aq)
7. Period	A row of the periodic table.	19. Atomic Number	The amount of protons found in the nucleus for that particular element.
8. Nucleus	The very small and dense central part of an atom that contains protons and neutrons.	20. Ion	When an electron is either gained or lost from an atom
9. Electron	A tiny particle with a negative charge. Electrons orbit the nucleus of atoms or ions in shells. It has a negligible mass.	21. Isotope	When the number of electrons and protons for an element is the same but the neutrons have changed
10. Proton	A tiny positive particle found inside the nucleus. It has a mass of one.	22. Shell	Electrons are arranged around the nucleus, going up in energy per shell.
11. Neutron	A dense particle found in the nucleus of an atom. It is electrically neutral, carrying no charge.	23. Electronic Structure	The arrangement of electrons around the nucleus. There are 2 electrons in the first shell, and 8 in every shell after that.
12. Molecule	A grouping of two or more atoms bonded together.	24. Noble Gas	Gases that always have a full outer shell of electrons.

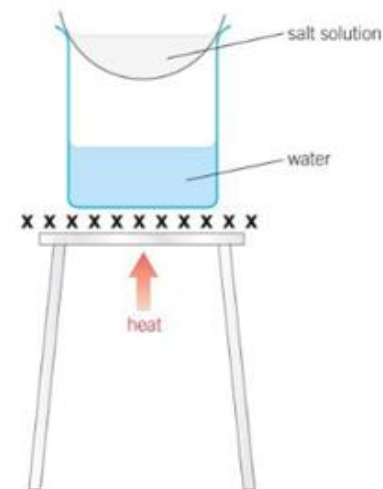
Atomic Structure Knowledge Organiser



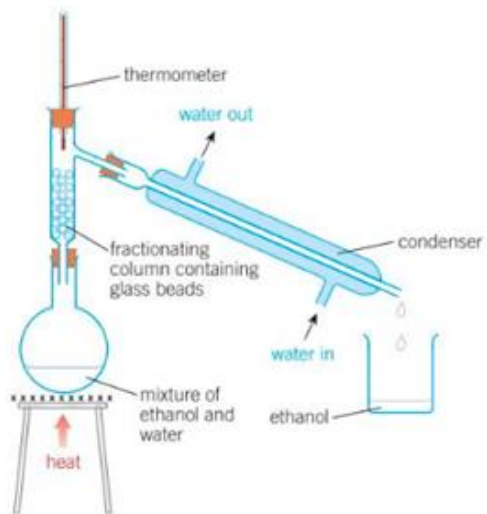
Chromatography



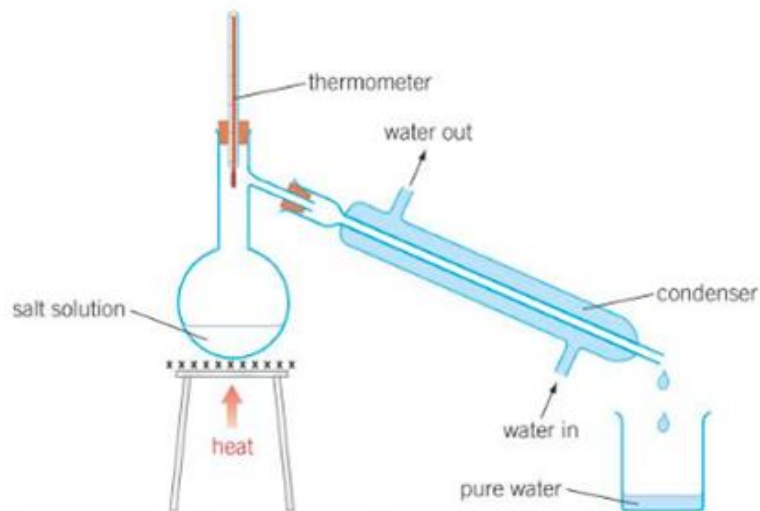
Filtration



Crystallisation



Fractional Distillation



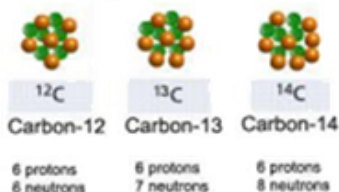
Distillation

The Periodic Table knowledge Organiser

The History Of The Periodic Table

- Throughout history scientists have tried to classify substances and many scientists attempted to construct a Periodic table.
- Before the knowledge of proton, neutrons and electrons, scientists arranged the periodic table by **atomic weight**. This meant the groups were not always correct.
- In 1869 Dimitri **Mendeleev**, a Russian scientist, published his Periodic Table. It was slightly different to those that had been before. He still arranged elements by atomic weight but he also left gaps for where he predicted elements would be.
- He very accurately predicted the properties of elements that were not discovered until many years later; for example Gallium.
- Mendeleev's Periodic table is still different from the modern one as some of his masses were wrong due to the existence of **isotopes**.
- Isotopes are elements with the same number of protons and electrons but a different number of neutrons and therefore different atomic weight.

Isotopes of Carbon



Mendeleev's Periodic Table

H = 1
 He = 4
 Li = 7
 Be = 9
 B = 11
 C = 12
 N = 14
 O = 16
 F = 19
 Ne = 20
 Na = 23
 Mg = 24
 Al = 27
 Si = 28
 P = 31
 S = 32
 Cl = 35.5
 Ar = 39
 K = 39
 Ca = 40
 Sc = 45
 Ti = 48
 V = 51
 Cr = 52
 Mn = 55
 Fe = 56
 Co = 59
 Ni = 59
 Cu = 63.5
 Zn = 65
 Ga = 70
 Ge = 72
 As = 75
 Se = 78
 Br = 80
 Kr = 84
 Rb = 85
 Sr = 88
 Y = 89
 Zr = 91
 Nb = 93
 Mo = 96
 Tc = 98
 Ru = 101
 Rh = 103
 Pd = 106
 Ag = 108
 Cd = 112
 In = 113
 Sn = 117
 Sb = 122
 Te = 128
 I = 127
 Xe = 131
 Ba = 137
 La = 139
 Ce = 140
 Pr = 141
 Nd = 144
 Pm = 145
 Sm = 150
 Eu = 152
 Gd = 157
 Tb = 159
 Dy = 163
 Ho = 165
 Er = 167
 Tm = 169
 Yb = 173
 Lu = 175
 Hf = 178
 Ta = 182
 W = 184
 Re = 187
 Os = 190
 Ir = 193
 Pt = 195
 Au = 197
 Hg = 201
 Tl = 204
 Pb = 207
 Bi = 209
 Po = 210
 At = 210
 Rn = 210

Key Terms	Definitions
Dimitri Mendeleev	A Russian chemist, who in 1869 published a Periodic Table con-
Periodic Table	The Table which organises the 118 elements based on atomic
Isotope	Two atoms with the same number of protons and electrons but
Metal	An element which loses electrons to form a positive charge.
Non Metal	An element which gains electrons to form a negative charge.
Ion	An element with a positive or negative charge

The transition metals, in the central block of the periodic table are :

- good conductors of heat and electricity.
- can be bent or hammered into shape.
- copper is used in plumbing because it is resistant to corrosion (will not react with the water in the pipes) and electrical wiring because it is a good conductor of heat and electricity.

Aluminium and titanium are useful metals because they have a low density and are resistant to corrosion.

Groups in the Periodic Table

	Physical Properties	Chemical Properties	Equation	Trends / Explanation
Group 1 (Alkali Metals)	Soft, low density	React vigorously with water releasing hydrogen.	Sodium + water → sodium hydroxide + hydrogen	More reactive as you go down. Outermost electron further from the nucleus so it's easy to lose.
Group 7 (Halogens)	Low melting point, exist as a pair (Cl ₂)	React with group 1 metals to form compounds. Can carry out displacement reactions.	Sodium + chlorine → sodium chloride Sodium bromide + chlorine → sodium chloride + bromine	Higher melting point as you go down the group (higher molecular mass). Less reactive as you go down the group.
Group 0 (Noble Gases)	Low melting / boiling point. Eight electrons in outer shell (except helium)	Unreactive, as they have a full outer shell	N/A	Higher melting point and boiling point as you go down the group (due to increase in density).