1.1 – Structure of Atoms	
Atoms	**All substances** are made of **atoms**. **Radius** of atom = **0.1 nm** (**1 x 10 $^{-10}$ m**)
Protons	Mass = **1**, charge = **+1**, location = **nucleus**.
Neutrons	Mass = **1**, charge = **0**, location = **nucleus**.
Electrons	Mass = **very small**, charge = **-1**, location = **shells**.
Nucleus	Most of the **mass** is **concentrated** here. **Positively** charged. **Radius** of nucleus = **1 x 10^{-14} m** (**1/10000** of radius of atom).
Shells / Energy Levels	**1st shell** = **2** electrons max, **2nd shell** = **8** electrons max, **3rd shell** = **8** electrons max.
Overall Charge on Atom	**Zero charge** (neutral) because **proton** charge = **+1**, **electron** charge = **-1**. **Same number** of protons and electrons so **charges cancel** out.
1.2 - Atomic Number, Mass Number and Isotopes	
Atomic number	Number of **protons**. (Also gives number of electrons)
Mass number	**Total** number of **protons** and **neutrons**.
Isotopes	Atoms of the **same element** with **same** number of **protons** and **different** numbers of **neutrons**.
Relative Atomic Mass (A_r)	The **weighted average** of the masses of all of the isotopes of an element
Calculating A_r	1. **Multiply** each **mass** by the **% abundance**. 2. **Add** them up. 3. **Divide** by **100**.

1.3 – History of the Atom	
Dalton's Model	Described atoms as **tiny solid spheres**.
Plum Pudding Model	Described atoms as a **ball** of **positive charge** with **negative electrons** stuck in it.
Rutherford's Experiment	**Fired** positive **alpha** particles at a thin sheet of **gold**.
Rutherford's Result	**Most** alpha particles went **straight through** or slightly **scattered**. Very small number **deflected** back.
Rutherford's Explanation	Nucleus is **tiny** and **positively** charged. Most of the atom is **empty space**. **Cloud** of negative **electrons** surround nucleus.
Bohr's Nuclear Model	Discovered that **electrons** orbit the nucleus in **fixed shells**.
Protons & Neutrons	**Rutherford** discovered **protons**. Later, **Chadwick** discovered **neutrons**.
1.4 – Elements, Compounds, Mixtures and Separation Processes	
Element	A substance made up of **one type** of **atom.**
Compound	A substance made up of **two** or **more types** of **atom** **chemically joined** together.
Mixture	A substance made up of **two** or **more substances** mixed together but **not chemically joined**.
Filtration	Separates an **insoluble solid** from a **liquid** using **filter paper**.
Evaporation	**Heat** solution to **evaporate** liquid until **dry crystals** are left.
Crystallisation	**Heat** solution until **crystals** form, leave to **cool**, **filter** out crystals and leave to **dry**.
Distillation	Separates out a **liquid** from a **mixture**. Liquid **evaporates** then **condenses**. Two types – **simple** and **fractional**.
Chromatography	Separates a **mixture** of **coloured liquids**.

Y9 Science – Cycle 1 – Sheet 1

Chemistry C1 – Atomic Structure