Year 11 Science – Term Two KO

1. Tier 3 Vocab

- **Atom** Basic building block of all substances
- **Element** A substance made up of only one type of atom. Elements are listed on the periodic table.
- **Compound** Two or more different atoms chemically bonded together.
- **Mixture** Two or more substances that are not chemically bonded together.
- **Proton** A subatomic particle found in the nucleus of an atom. It has a positive charge.
- **Neutron** A subatomic particle found in the nucleus of an atom. It has no charge (neutral).
- **Electron** A subatomic particle found in shells around the nucleus of an atom. It has a negative charge.
- **Mass number** The sum of the protons and neutrons in an atom.
- **Atomic number** The number of protons in the nucleus of an atom.
- **Isotopes** Atoms of an element with the same number of protons but different numbers of neutrons.
- **Filtration** A method of separating an insoluble solid from a liquid.
- **Crystallisation** A method of separating a soluble solid from a liquid.
- **Simple distillation** A method of separating a liquid from a solution.
- **Chromatography** A method of separating different inks/dyes.

2. Elements, compounds, mixtures

- Atoms are the basic building blocks of all substances.
- Elements contain only one type of atom. There are just over 100 elements which are listed on the periodic table in order of atomic number.
- Compounds are substances containing two or more different elements (different atoms) that are chemically bonded together.
- Compounds are difficult to separate and can only be done so by chemical reactions.
- Mixtures are when two or more substances (elements or compounds) are found together, but they are not chemically bonded to each other.
- Mixtures can usually be easily separated.

3. Separating mixtures

- Filtration: this is used to separate an insoluble solid from a liquid by passing the mixture through filter paper. E.g. separate sand from water.
- Crystallisation: used to separate a soluble solid from its solution by heated the solution to evaporate the solvent (liquid) leaving just the solid. E.g. separate salt from sea water
- Simple distillation: separate a solvent (liquid) from a solution by heating it to evaporate the liquid then cool it to condense it back to a liquid. E.g. separate water from salt water.
- Chromatography: separate different inks or dyes in a mixture by placing a sample on filter paper and standing in water.

4. Atomic structure

- The modern model of the atom has a central nucleus, containing protons and neutrons surrounded by electron shells containing the electrons
- The first electron shell can contain a maximum of 2 electrons
- Each subsequent shell can contain a maximum of 8 electrons.

Name of Particle	Relative Charge	Relative Mass
Proton	+1	1
Neutron	0	1
Electron	-1	Very small

5. History of the atom

- The atom was originally thought to be a solid sphere that could not be divided.
- In 1897 JJ Thomson discovered the electron, a negative particle found inside atoms. He proposed the plum pudding model: a ball of positive charge with negative electrons embedded within it (see diagram top-right).
- Ernest Rutherford used alpha particle scattering experiments to discover the nucleus. He pictured the atom to have a tiny positive nucleus which contained most of the mass, with electrons orbiting around it.
- Bohr modified this to predict that electrons are only found at specific distances called shells.

6. Command Words

These are the key words in a question that tell you how the question should be answered.

State – requires you to recall a key fact without any further information needed.

Example:
State what is meant by isotopes.
Answer: Atoms of an element with the same number of protons but different numbers of neutrons.

Describe – say what will happen, but <u>without</u> any reason why.

Example:
Describe the structure of an atom, referring to the subatomic particles.
Answer: An atom has a nucleus at its centre which contains protons and neutrons. Surrounding the nucleus in shells there are electrons.