Atoms and Molecules

The nucleus of radioactive isotopes spontaneously decays, emitting particles and/or wave-like radiation. A large group of identical nuclei decays at a predictable rate. This predictable rate allows radioactivity to be used for estimating the age of materials that contain radioactive substances.

Scientists continue to investigate atoms and have discovered even smaller constituents of which neutrons and protons are made.

The nucleus, a tiny fraction of the volume of an atom, is composed of protons and neutrons, each almost two thousand times heavier than an electron. The number of positive protons in the nucleus determines what an atom's electron configuration can be and hence defines the element.
- Chemical Reactions
- Electricity & Magnetism

An atom's electron configuration, particularly the outermost electrons, determines how an atom can interact with other atoms. Atoms form bonds to other atoms by transferring or sharing electrons.
- Chemical Reactions

The configuration of atoms in a molecule determines the molecule's properties. Shapes are particularly important in how large molecules interact with others.
- Chemical Reactions
- Cell Functions

Neutrons have no electrical charge. Although neutrons have little effect on how an atom interacts with others, they do affect the mass and stability of the nucleus. Isotopes of the same element have the same number of protons (and therefore of electrons) but differ in the number of neutrons.

When elements are listed in order by the masses of their atoms, the same sequence of properties appears over and over again in the list.

A system usually has some properties that are different from those of its parts but appear because of the interaction of those parts.
- *Macro & Micro Properties*
- Chemical Reactions
- States of Matter

Atoms are made of a positive nucleus surrounded by negative electrons.
- Chemical Reactions

Atoms from any element are alike but different from atoms of other elements.

Atoms may stick together in well-defined molecules, or may be packed together in large arrays. Different arrangements of atoms into groups compose all substances.
- *Particle theory*
- Chemical Reactions
- States of Matter
- Conservation of Matter
- Flow of Energy
- Flow of Matter

There are groups of elements that have similar properties, including highly reactive metals, less-reactive metals, highly reactive non-metals and some almost completely non-reactive gases.
- Chemical Reactions

All matter is made up of atoms, which are far too small to see through a microscope.
- *Particle theory*
- Chemical Reactions
- States of Matter
- Conservation of Matter

About 100 different elements have been identified, out of which everything is made.
- *Chemical reactions*
- Chemical Reactions

A lot of different materials can be made from the same basic materials.
- *Chemical reactions*
- Chemical Reactions

Air is a substance that surrounds us and takes up space.
- Conservation of Matter
- States of Matter
- *A gas is matter*

Materials may be composed of parts that are too small to be seen without magnification.

When a new material is made by combining two or more materials, it has properties that are different from the original materials.
- *Chemical reactions*
- *Natural & processed materials*
- Chemical Reactions

Magnifiers help people see things they could not see without them.
- Stars
- Solar System
- Cells & Organs
- Cell Functions

Most things are made of parts.
- Conservation of Matter
- Cells & Organs
- Cell Functions

Objects can be described in terms of the materials they are made of (clay, cloth, paper etc) and their physical properties (colour, size, shape, weight, texture, flexibility etc).
- Chemical Reactions
- Conservation of Matter

invisibly tiny pieces

basic ingredients

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