MADANI BOYS SCHOOL YEAR 8 HALF TERM 1

SCIENCE

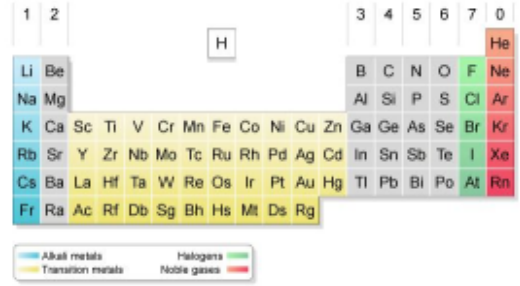
Key Terms

Periodic Table	A tabular representation of all known elements in order based on atomic number.
Atomic Number	The number of protons in the nucleus of an atom. Also called the proton number.
Periods	A horizontal row in the periodic table.
Groups	A vertical column in the periodic table containing elements with similar chemical properties.
Element	A substance made of only one type of atom.
Compound	A Substance where two or more elements have chemically joined together.
Mixture	Two or more substances that are not joined together. The substances can be elements, compounds or both.
Reactive	The tendency of a substance to undergo a chemical reaction.

Periodic Table

All the different elements are arranged in a chart called the **periodic table**. A Russian scientist called Dmitri Mendeleev produced one of the first practical periodic tables in the 19th century. The modern periodic table is based closely on the ideas he used:

- the elements are arranged in order of increasing **atomic number**
- the horizontal rows are called **periods**
- the vertical columns are called **groups**
- elements in the same group are similar to each other



The main groups are numbered from 1 to 7 going from left to right, and the last group on the right is group 0. The section in the middle of the table is called the Transition Metals. You may also see **all** the groups numbered (including the transition metals), this time from 1 to 18. If you know what one of the elements in a group is like, you can make predictions about the other elements in a group. For example, all the elements in group 1 are **reactive** metals, and all the elements in group 0 are unreactive non-metals.

Making predictions using the periodic table

Groups in the periodic table contain elements with similar chemical properties. But there are usually trends in properties that allow us to make predictions. For example, in group 1:

	Melting point	Density	Reactivity
Lithium	Decreases down the group	Increases down the group	Increases down the group
Sodium	Decreases down the group	Increases down the group	Increases down the group
Potassium	Decreases down the group	Increases down the group	Increases down the group
Rubidium	Decreases down the group	Increases down the group	Increases down the group

Caesium is the next element in group 1, and it can be found below rubidium. You can accurately predict that it will have the lowest melting point, the highest density and the highest reactivity of all the elements in group 1.

Elements

Elements

There are over a hundred different **elements**. The atoms in a particular element are the same as each other, and they are different from the atoms of all other elements. For example, lead and gold are elements. A piece of pure gold contains only gold atoms. A piece of pure lead contains only lead atoms.

The atoms of some elements do not join together, but instead they stay as separate atoms. Helium is like this. The atoms of other elements, such as hydrogen and oxygen, join together to make **molecules**.

Helium Hydrogen Oxygen

What are Atoms?

Everything is made from **atoms**, including you. Atoms are tiny particles that are far too small to see, even with a microscope. If people were the same size as atoms, the entire population of the world would fit into a box about a thousandth of a millimetre across.

Compounds

Compounds

A **compound** is a substance that contains atoms of two or more different elements, and these atoms are chemically joined together. For example, water is a compound of hydrogen and oxygen. Each of its molecules contains two hydrogen atoms and one oxygen atom. There are very many different compounds.

Water (H_2O) Carbon Dioxide (CO_2)

MADANI BOYS SCHOOL YEAR 8 HALF TERM 1

SCIENCE

Key Terms

Chlorophyll The green chemical inside the chloroplasts of plant cells. It enables photosynthesis to take place.
Chloroplast Contains the green pigment chlorophyll; the site of photosynthesis.
Photosynthesis A chemical process used by plants to make glucose and oxygen from carbon dioxide and water, using light energy. Oxygen is produced as a by-product of photosynthesis. Algae subsumed within plants and some bacteria are also photosynthetic.
Stomata Tiny holes in the epidermis (skin) of a leaf. They control gas exchange by opening and closing and are involved in loss of water from leaves. Singular is stoma.
Aerobic respiration Respiration that requires oxygen.
Alveoli Tiny air sacs in the lungs, where gas is exchanged during breathing.
Anaerobic respiration Respiration that occurs in the absence of oxygen.
Bronchi The plural of 'bronchus'. The bronchi are the two major air tubes in the lungs.
Bronchioles The many small, branching tubules into which the bronchi subdivide.
Diaphragm A large sheet of muscle that separates the lungs from the abdominal cavity.
Diffusion The movement of molecules from an area of higher concentration to an area of lower concentration.
gas exchange Oxygen passes through the capillary wall and into the tissues; carbon dioxide passes from the tissues into the blood.
Lactic acid A toxic chemical produced during anaerobic respiration.
Mitochondria Structures in the cytoplasm of all cells where aerobic respiration takes place (singular is mitochondrion).
Respiration The chemical change that takes place inside living cells, which uses glucose and oxygen to release the energy that organisms need to live. Carbon dioxide is a by-product of respiration.
respiratory system The organ system where air is taken into and out of the body, and gas exchange happens.
Trachea The windpipe, the tube that leads from the mouth towards the lungs.
Unicellular A single-celled organism.
Ventilation Breathing in and out.

Respiration

Energy is needed for life processes such as:
•growth and repair
•movement
•control of body temperature in mammals
Respiration is a chemical reaction that happens in all living cells, including plant cells and animal cells. It is the way that energy is released from glucose so that all the other chemical processes needed for life can happen. Do not confuse respiration with breathing (which is properly called ventilation).
Aerobic respiration
Glucose and oxygen react together in cells to produce carbon dioxide and water and releases energy. The reaction is called **aerobic respiration** because oxygen from the air is needed for it to work.
Here is the word equation for aerobic respiration:

glucose + oxygen → carbon dioxide + water

Energy is released in the reaction. The **mitochondria**, found in the cell cytoplasm, are where most respiration happens.

Process of Photosynthesis

Plants need food to respire, grow and reproduce. Unlike animals, plants are able to make their own food by the process of photosynthesis.
Photosynthesis takes place in the part of the plant cell containing **chloroplasts**, these are small structures that contain **chlorophyll.**
For photosynthesis to take place, plants need to take in **carbon dioxide** (from the air), **water** (from the ground) and **light** (usually from the sun).
Here is the word equation for photosynthesis:

carbon dioxide + water —(sunlight)→ glucose + oxygen

Here is the chemical equation for photosynthesis:

Photosynthesis takes place inside plant cells in small objects called **chloroplasts**. Chloroplasts contain a green substance called **chlorophyll**. This absorbs the light energy needed to make photosynthesis happen. Plants and algae can only carry out photosynthesis in the light.

Photosynthesis

Animals need to eat food to get their energy. But green plants and algae do not. Instead they make their own food in a process called **photosynthesis**.
Almost all life on Earth depends upon this process. Photosynthesis is also important in maintaining the levels of oxygen and carbon dioxide in the atmosphere.
These are the things that plants need for photosynthesis:
•carbon dioxide
•water
•light (a source of energy)
These are the things that plants make by photosynthesis:
•glucose
•Oxygen

•Respiration releases energy from glucose so that life processes can carry on. Aerobic respiration needs oxygen but anaerobic respiration does not. The respiratory system is adapted for gas exchange

Adaptation

They are **green** because they contain lots of chlorophyll to absorb sunlight.
They have a **large surface area** to maximise the amount of sunlight they can absorb.
They are **thin**, allowing easy diffusion of gases into and out of the leaf.
They have **veins** (xylem and phloem) to allow the transport of water, mineral ions and glucose (food).