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CA Summary booklet: Grade 6 ASP Science

Chapter 6.1 Substances and Mixtures

Matter (شيء) anything that has mass and takes up space (مساحة). Matter is everything you CAN see like water, trees and objects and some things you CANNOT see such as air.

Can you draw a picture of a house here and label it using the words: **Matter, Elements and Atoms.**

Atom small particle that is the building block of matter.

Substance (مادة) matter with a composition (تكوين) that is always the same. For example, Gold and salt because it is the same for all of it.

Element a substance that is made of only one kind of atom.

The periodic table (الجدول الدوري) tells us all the elements that are found on Earth. Example of elements are Oxygen, Silver, Carbon, Gold and Hydrogen.

Molecule when two or more atoms are held together by chemical bonds (الروابط الكيميائية). Some elements such as Hydrogen have their atoms joined together instead of one atom on its own.

Compounds substances that are made of two or more elements chemically joined together.

Example: H_2O (water)

- **What is the difference between properties of compounds and elements?**

Properties of compounds such as Salt--- NaCl. Na (Sodium) is a soft metal and Cl (Chlorine) is a poisonous green gas. But when you mix the two together you have a completely different property.

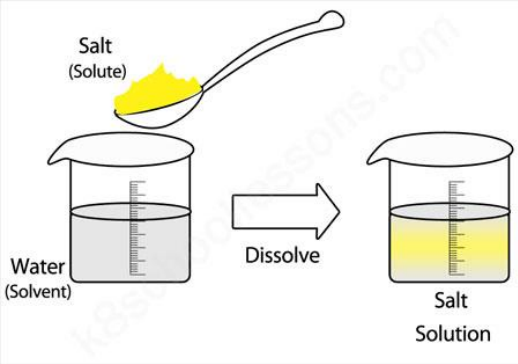
Sometimes the same elements combine (دمج) to make different compounds. Insert table 1 page 212.

Mixtures is matter mixed in different amounts. Mixtures are not chemically bonded together. We have two types of mixtures:

1. **Homogeneous mixture** is when you mix two substances and they are evenly mixed. They are not bonded together.

The mixture looks the same everywhere example: salt + water. Dye + Water. Some alloys.

Another name for homogeneous mixture is **solution** (المحلول) has two parts: A **solvent** which is the large amount (Example: water) and **solute** which is the substance with the smaller amount that will dissolve in the solvent.



2. **Heterogeneous mixture**

Is when a mixture has two or more substances mixed together that are not evenly mixed. Examples are salad mix, nut mix, water + oil, sand + water.

- **How can we separate (فصل من) mixtures from each other?**

-To separate heterogeneous mixtures, you can look at what the physical properties are. If something is magnetic you can use a magnet to remove. You could use a strainer to separate rocks of different sizes from each other.

-To separate homogeneous mixtures, you can use boiling (غليان) or evaporation (تبخر).

Chapter 6.2 The structure of Atoms

All Atom have three particles:

Proton- positively charged particle found in the **nucleus** of an atom.

Neutron- uncharged (no charge) particle found in the nucleus of an atom.

Electron- negatively charged particle found in the **Electron cloud** which is outside the nucleus. All the electrons move in the electron cloud. If the electrons are closer to the nucleus, they have stronger charge. If they are farther from the nucleus, they have less charge. This is what we call **Electron energy**.

- **Why are all elements different?**

Every element has a different **Atomic number** which means the number of protons in each atom is different.

When each atom of that element has the same number of protons but different number of neutrons in the atom we call this **Isotope.**

Ion when an atom loses or gains an electron and becomes charged.

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Chapter 7.1 Matter and its properties

Matter is anything that has mass and takes up space.

Three states of matter are: Solid, Liquid and Gas.

Volume is the amount of space matter takes up.

Solids: definite shape, definite volume, molecules packed closely

Example: solid state of water is ice

Liquids: takes shape of container, definite volume, molecules can move somewhat

Example: liquid state of water is the water that comes out of your sink

Gases: takes shape of container, expands to volume of container, molecules can move freely

Example: gaseous state of water is vapor

Physical properties and Chemical properties

PHYSICAL PROPERTY	CHEMICAL PROPERTY
1. observed with senses 2. determined without destroying matter	1. indicates how a substance reacts with something else 2. matter will be changed into a new substance after the reaction

Examples of physical properties are:

Mass is amount of matter in an object

Volume is amount of space matter takes

Density is the amount of mass per unit volume of a substance

Solubility when one material dissolves (تذوب) in another. Example salt is soluble in water.

Melting and Boiling point when liquid (water) evaporates to gas this is physical property because the water has not changed materials it has just changed states

Magnetism magnetic materials

Examples of chemical properties:

This is when a substance combines (دمج) with or becomes a new substance. It always happens because of a reaction (تفاعل) with another material.

Flammability ability of matter to burn easily. Gasoline is flammable.

Ability to rust (الصدأ)when iron reacts with water and oxygen in the air.

Chapter 7.2 Matter and its Changes

- **What happens in physical and chemical changes?**

- When you change the shape, size, form or state of matter of an object but do not change its identity (صفة) then this is a physical change (فيزيائي) only. The energy of the particles and distance (مسافة) between each other is different in solids, liquid and gas.

-Dissolving (يذوب) mixing sugar molecules with water gives a sugar water solution. However, the identity of substance of sugar and the water do not change.

-Melting and boiling point think of when you change solid ice cubes and melt them into water. You are not changing the material (water) you are just changing the state it is in. you are also changing the amount of energy between the particles in solid, liquid and gas.

- The change in matter where a completely new substance is made with different chemical and physical properties is called Chemical change (تغير كيميائي).

-gas is formed

-precipitate (ترسب) is formed

-color change can happen

Can you Summarise table 3 here: (Page 263).Talk about the comparisons between physical and chemical changes.

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'The law of conservation of mass'

Mass cannot be created or destroyed during chemical and physical reaction. You must start reactants (متفاعل) and end product (نتاج) with the same total number of mass.

- **Example**

Chapter 8.1 The Sun-Earth-Moon Systems

How Earth Moves

Earth rotates around the sun because of the sun's heavy gravitational pull. If this gravity was not there the planets will not move in a round way they will move in a straight line.

Revolution when one object in the solar system orbits (يدور في مدار) around another object. 365 days for Earth to travel one time around the Sun.

Rotation is the spinning (الدوران) of an object around its own axis. This causes Day and Night. Side of Earth facing Sun is daylight. Side of Earth facing away from the Sun is Nighttime/darkness. 24 Hours for one Earth rotation.

How Earth Tilts and Seasons

Seasons (مواسم) on Earth happen because of the tilt (إمالة) of Earth at 23̊degrees.

Spring and Fall- (March and September) **Equinox** makes the Earth spin around Sun with no tilt. This means number of daylight hours equal darkness hours.

Summer and Winter- (June and December) **Solstice** happen because the rotation axis of Earth is facing towards the Sun or Away from it. North pole tilt towards the sun will give summer. North pole will have winter. Every six months the two seasons will reverse (عكس)

Earth's Moon

Earth has one Moon which rotates around Earth. Moon rotates on its own axis. The same side of Moon always faces the Earth. The Moon does not have its own light, it reflects sunlight which is why we have different shape of the Moon. Phases of Moon (دورة القمر).

Can you define **Waxing and Waning phases of the moon?** (Page 280).

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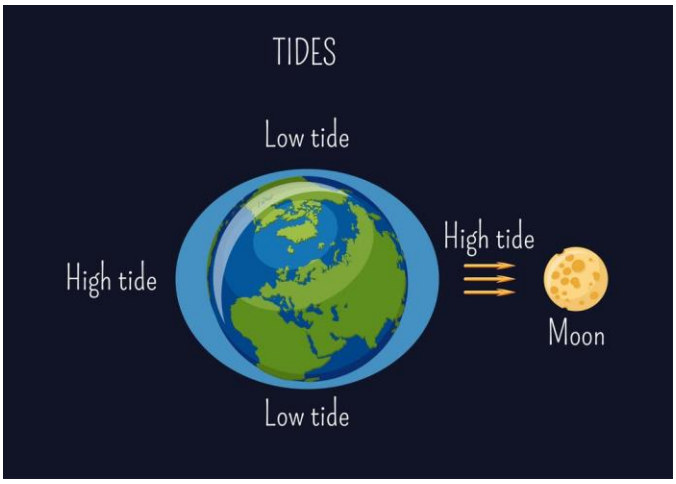
Tides (المد والجزر)

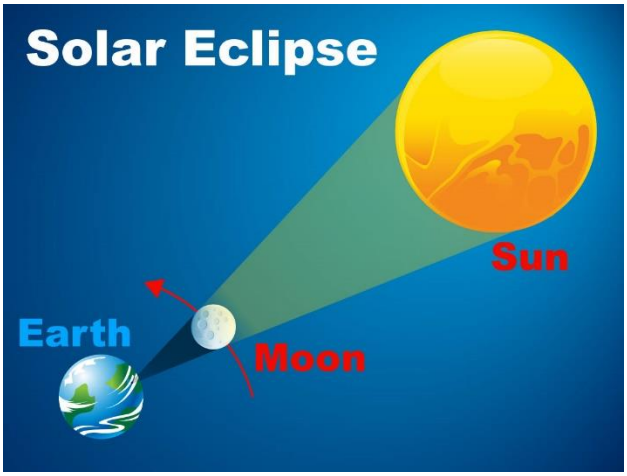
This is the rise and fall of the ocean's surface caused by gravitational force between Earth and the Moon and the Sun. Locations (موقع) on Earth closest to and furthest from the Moon have large **Tidal waves.** Moon affects the ocean's water tides because its Gravitational pull affects Earth.

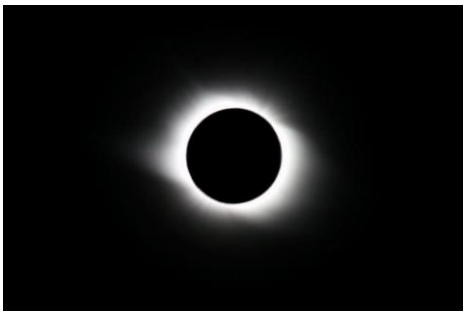


Eclipses (الكسوف)

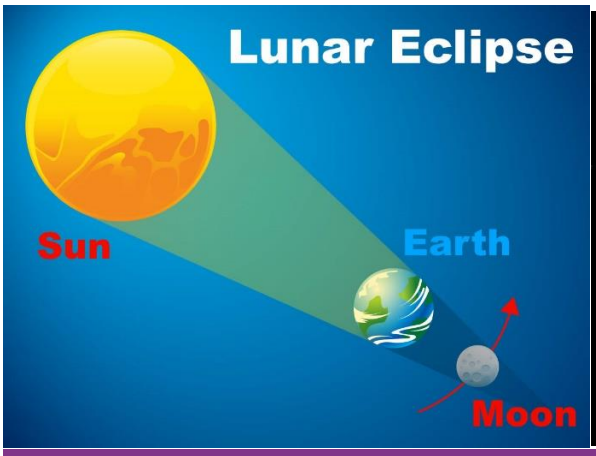
Eclipses happen when one object in solar system moves into shadow (ظل) of another object.

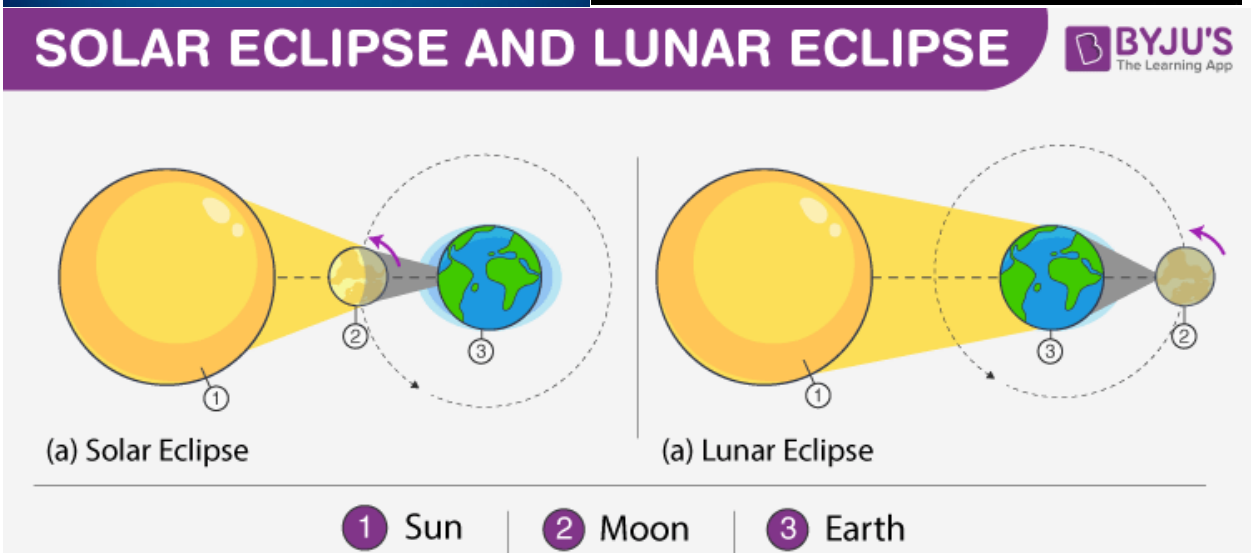
-**Solar eclipse** happens only during new moon. Small part of Earth is in Moon's shadow.





-Lunar eclipse(التفاعل النووي) when Earth's shadow covers the moo. The light that reaches the moon looks red.





Chapter 8.2 The Solar System

The solar system formed 4.6 billion years ago from a cloud of dust and gas. Because of gravity all objects got pulled together and the center of the solar system became the hottest. This is when Sun formed from hot gasses. The Sun takes up 90% of mass in Solar System.

All planets orbit the Sun. There are 8 planets and many other small objects that look like planets. We call these **dwarf planets.**

Moon is a **satellite** which means smaller object rotating around a bigger object. Earth is also a satellite.

Asteroids small rocky objects that orbit the sun.

Comets small rocky and icy objects that orbit the sun.

Meteoroid small rocky particles that move through space. When it enters close to Earth it gives a light called a **Meteor** (mee-tee-or).

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Inner planets (rocky planets)

These planets formed from rocks and heavy metals

Summaries each of the four inner planets here: (Page 291). Draw the order of the planets and comment on the distance they are from the sun.

Outer planets (Gas giants)

These planets are larger than the inner planets and formed from gases and other materials. They are made from hydrogen and helium gas and ice.

Summarise each of the four outer planets here. Also mention the gases each of the outer planets contain:

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Chapter 8.3 Stars, Galaxies and the Universe

Star is an object that is sphere and made of hydrogen gas with a nuclear reaction center (التفاعل النووي). It is hot because gravity pulls gas inwards. This causes energy to travel outwards and causes star to shine. The Sun is the closest star to Earth.

The color of the star tells us its temperature. Blue stars are the hottest. Then blue-white. Then yellow then orange stars. Red stars are the coolest. The Sun is a yellow star.

Light-year the distance light travels in one years. This is when we measure the distance we travel to stars. Light travels 300,000 km/s.

One light year = 9.46 trillion km.

Galaxies are large collections of stars, gas and dust. There are 3 different types of galaxies depending on their shape

Draw the three types of Galaxies here: (Page 300).

In one sentence state what the Big Bang Theory is: