ASPIRE
INTERNATIONAL SCHOOL

Science Department

2023/2024

Year 7

Term 1, Revision Pack (Unit 2)

Name: …….

Class: ……

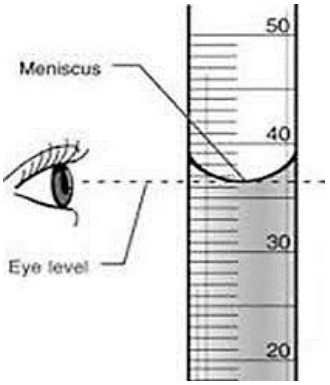
Study Notes (Unit 2)

	Solids	Liquid	Gas
Shape	Definite	No definite	No definite
Volume	Definite	Definite	No definite
Compressing	Can't be compressed	Can't be compressed	Can be compressed
Flow	Can't flow	Can flow	Can flow
Arrangement	Regular (organized)	Irregular (random)	Irregular (random)
Closeness	Close & tightly packed	Far a little larger spaces than the solids but still touching each other	Very far with large spaces between them
Movement	Vibrating in the place	Slide past each other	Move freely

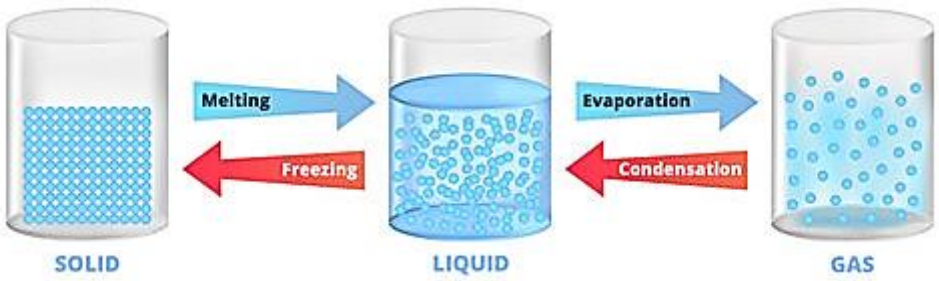
Measuring the volume & the temperature of the liquid

1- Volume: use the measuring cylinder
2- Temperature: use the thermometer

Don't forget to put your eye at the same level as the liquid and read at the meniscus level



Changing the States of Matter



What will happen to the solid when it gets heated?

- When solids are heated, they **expand** (get bigger).
- **Heat energy** is **transferred** to the particles in the solid.
- The more energy the particles have, the more they vibrate.
- As the particles vibrate more, they take up more space.
- The particles are still held in position by the **attractive forces** between them.

When solids are heated more strongly, they melt. They become liquid. (Heating more strongly means that even more heat energy is transferred to the particles.) The particles can slide past one another – they can now move, not just vibrate.

Heating a liquid:

When liquids are heated, they evaporate and boil.

The particles in liquids touch each other as they are held together weakly.

The particles move more as heat energy is transferred to them. Some particles have enough energy to break the weak attractive forces holding them together.

These particles can move freely and escape as gas particles.

Cooling down a gas:

The particles in a gas are free to move anywhere and spread out. There are no forces holding them. When a gas gets cooler it condenses to form a liquid.

When gas particles reach a cold surface, some of the heat energy from the particles transfers to the surface.

The particles move less and get closer together. They form a liquid.

Freezing liquids:

The particles in a liquid can move and flow past each other.

As heat energy is transferred from the particles to the surroundings, the particles move more slowly and the liquid gets cooler.

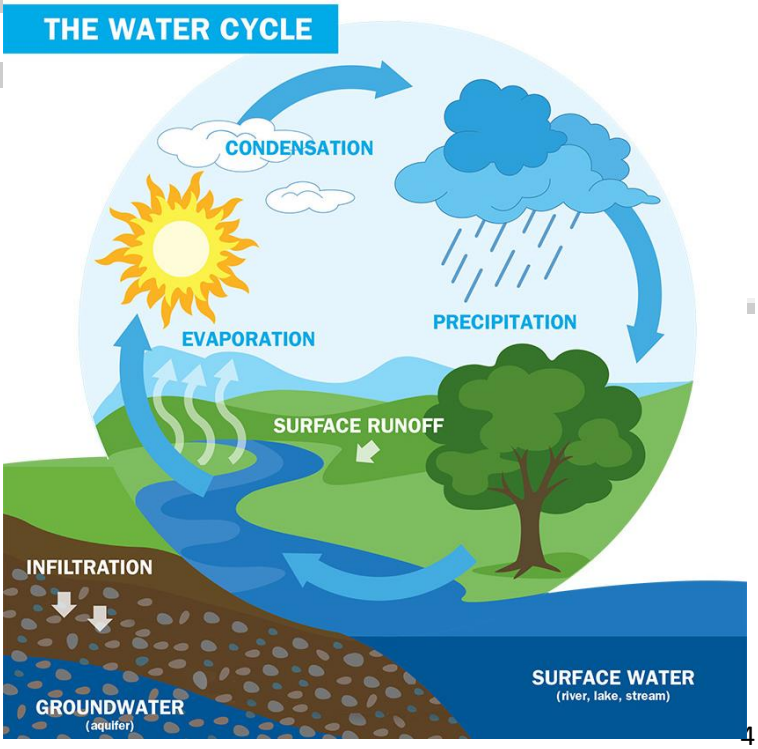
The cooler the liquid, the less energy the particles have.

The less energy the particles have, the less able they are to move or slide past one another.

Eventually, the particles have so little energy they cannot move and flow anymore – they can only vibrate. They become arranged in a fixed pattern to form a solid.

Steps of the water cycle:

1- Heating of water surfaces
2- Evaporation & transpiration
3- Condensation
4- Precipitation
5- Collection of water to the open water again by surface run-off.



Atoms, Elements and the Periodic Table

Atoms are the smallest part of the matter.

There are 118 atoms found (94 are naturally found and 24 prepared in the Lab).

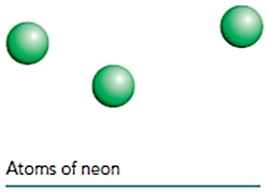
Atoms may be singular or combine (to identical atoms) to form elements.

Elements:

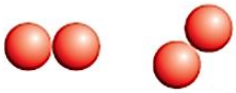
Singular atoms
(Six atoms only)

Atoms join together to form small particles
Small number of atoms

Closely packed together
Most of the atoms



Atoms of neon



Particles of oxygen

Particle of sulfur

Atoms of gold

Elements are arranged in 1 table according to their characteristics to:

- Groups (columns)
- Periods (rows)
- Note that:
  1- the atoms are organised so that, as you read across each row (period) from left to right, **the atoms increase in mass**.

- For example: Hydrogen atoms have the smallest mass, then helium atoms, then lithium atoms, and so on.

metals
non-metals

																	He helium
Li lithium	Be beryllium										B boron	C carbon	N nitrogen	O oxygen	F fluorine	Ne neon
Na sodium	Mg magnesium										Al aluminium	Si silicon	P phosphorus	S sulfur	Cl chlorine	Ar argon
K potassium	Ca calcium															

2- Elements with similar properties are close together. (All the elements that are metals are in yellow boxes. All the elements that are non-metals are in blue boxes)

- Chemical symbols

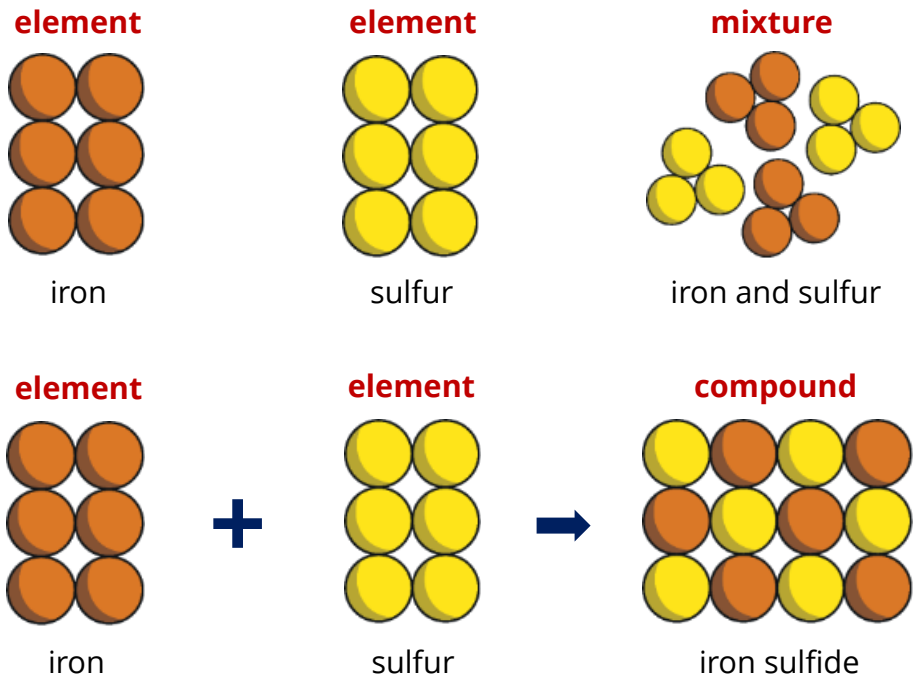
  Each of the elements has been given a symbol.

  - ❖ The symbol is the first letter of the English name of the element. Oxygen (O), Nitrogen (N)
  - ❖ The symbol is the first letter of the English name plus another letter from its name. Helium (He), Argon (Ar)
  - ❖ The symbol is taken from another language. Sodium is called Natrium (Na) in old Latin, Iron is Ferrum (Fe)

Compounds: When two different elements combine together, they form a compound

Sodium, an element + Chlorine, an element → Sodium chloride, a compound

Difference between mixture and compounds



Naming compounds (Chemical formulae)

1. Compounds formed of a metal and a non-metal

First write the name of the metal, then write the name of the non-metal but change its end to *-ide*.

Metal	Non-metal	Name of compound formed
zinc	oxygen	Zinc oxide
sodium	chlorine	Sodium chloride
calcium	sulfur	Calcium sulfide
potassium	iodine	……
……	……	Magnesium bromide

2. Compounds containing a metal and a group of non-metals (a non-metal with oxygen)

First: write the name of the metal
Second: write the name of the non-metal but change its end to *–ate*. (the ending *–ate* shows that the compound contains oxygen)
Exception: OH is called hydroxide

Metal	Non-metals group	Name of compound
copper	Sulfur + oxygen	Copper sulfate
potassium	Nitrogen +oxygen	Potassium nitrate
calcium	Carbon + oxygen	Calcium carbonate
magnesium	Phosphorus + oxygen	Magnesium phosphate
sodium	Oxygen + Hydrogen	Sodium hydroxide

3. Compounds containing non-metals only

Here, you need to mention the number of atoms of each element in the compound name.

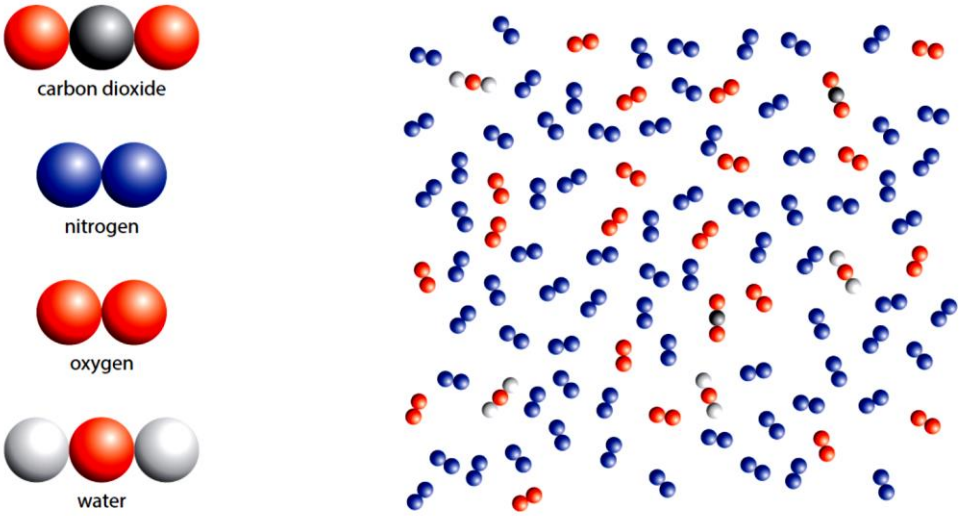
Mon = one atom
Di = 2 atoms
Tri = 3 atoms
Tetr = 4 atoms

Atoms in the compound	Name of compound
1 atom of carbon + 1 atom of oxygen	Carbon **mon**oxide
1 atom of carbon + 2 atoms of oxygen	Carbon **di**oxide
1 atom of sulfur + 2 atoms of oxygen	Sulfur **di**oxide
1 atom of sulfur + 3 atoms of oxygen	Sulfur **tri**oxide
1 atom of phosphorus + 3 atoms of chlorine	Phosphorus **tri**chloride
2 atoms of nitrogen and 4 atoms of oxygen	**Di**nitrogen **tetr**oxide

Examples of mixtures:

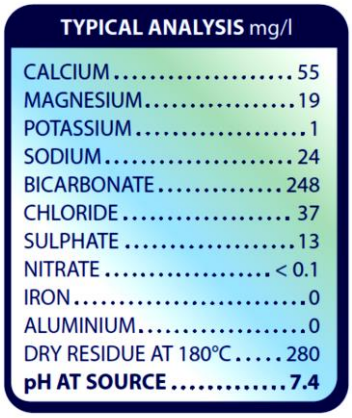
1- Air: it contains Nitrogen + Oxygen + Carbon dioxide + Water vapour + small quantities of other gases.

The Composition of the air varies because:
a- The amount of water vapour changes all the time due to weather.
b- The amount of carbon dioxide and other gases change because of natural emissions.



Air is a mixture of several elements and compounds.

2- Mineral water: it contains a mixture of water and some minerals dissolved in it.



The label shows the minerals found in mineral water.

Practice

Vocabulary - words about the water cycle

These are some words that we use to describe the water cycle. The words are not spelt correctly.

precipatation **growndwater** **transperation** **surfice run-off**

evapouration **rian** **atmosfere**

1 Write each word correctly.

_____

_____

_____

_____

2 Here are some descriptions of these words. Write the correctly spelt word next to its description.

a The gases above the surface of the Earth: _____

b The water that falls on the Earth: _____

c The hail, rain and snow that fall from the sky: _____

d The process where water evaporates from plants: _____

e The water from precipitation that soaks into the soil and rocks: _____

f The water that flows across the land into rivers and lakes: _____

g This happens when water from the oceans, rivers and lakes changes into a gas: _____

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2.2 Reading and writing about heating a solid

What happens when a solid melts?

Place these sentences in the correct order so that they answer the question.

You may find it helps if you cut the sentences out and move them around on a table until you have them in the correct order. Then stick them in place into your book.

The first sentence is in the correct place.

Solids are made up of particles arranged in regular rows.

The more energy the particles have, the more they can vibrate.

Eventually, some of the particles have enough energy to overcome the forces holding them together.

The particles in solids are fixed in position.

The more heat energy there is, the more particles can slide past one another until the solid has become completely liquid.

The solid begins to melt.

When a solid is heated the particles vibrate more.

The more heat energy there is, the more the particles vibrate.

They are held in place by strong attractive forces.

The particles slide past one another.

The particles are touching one another.

The particles in solids can only vibrate.

Worksheet: 2.2A

Finding mistakes

Some learners have been heating water and recording the temperatures every minute. They used the same volume of water from the same tap on the same day. Here are their results.

Sofia's results	
Time in minutes	**Temperature in °C**
0	0
1	25
2	32
3	45
4	56
5	63
6	78

Arun's results	
Time in minutes	**Temperature**
0	25
1	36
2	36
3	48
4	59
5	71
6	82

Marcus's results	
Time in minutes	**Temperature in °C**
0	25
1	36
2	47
3	52
4	68
5	79
6	89

1 Look carefully at Sofia's results. One of her results does not look quite right. What do you think she has done wrong?

_____

_____

2 Look carefully at Arun's results. He has made two mistakes. What are they?

_____

_____

3 a Look carefully at Marcus's results. One of his results does not fit the pattern. Which is it?

_____

b What should Marcus do about this result?

_____

Worksheet: 2.3B

Making links

1 For each pair of words, write a sentence that links them together.

For example: solid and freeze. If you freeze water it becomes solid ice.

a Liquid and gas.

b Melting and solid.

c Evaporate and gas.

d Heat and vibrations.

e Particles and fixed position.

2 Explain the meanings of the following terms:

a condense

_____

_____

b change of state

_____

_____

c properties

_____

_____

d vacuum

_____

_____

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Worksheet: 2.3C

Linking ideas

Look at the words in the boxes. Draw lines between them where you can think of a link. Write on them if this makes it clearer. You may link several words. One link has been done for you as an example.