...STAY SAFE. PENANG SANGAM HIGH SCHOOL P.O.BOX 44, RAKIRAKI

LESSON NOTES

Subject: Basic Science

Year/Level: 10

Week 21

Strand	2: MATTER
Sub Strand	2.1 : INVESTIGATING MATTER
Content Learning Outcome	Investigate the structure of an atom and explain the properties of common elements in relation to their position on the periodic table.

Properties of Common Elements: 1st Twenty

- scientists tried to arrange the elements in an order which is related to the size of their atoms and also showed regular repeating patterns in their behavior or properties.
- most successful attempt was published by the Russian, Dimitri Mendeleev, in 1869, and still forms the basis of the modern periodic table. Mendeleev arranged the elements in a table in order of increasing relative atomic mass. He also arranged the table so that elements with similar properties were in the same vertical column.

1. Periodic Table

- > an arrangement of the elements in order of their atomic numbers.
- Both the physical and chemical properties of an element and its compound are related to the position of the element in the periodic table.
- > This relationship has led to the table being divided into groups and periods.

IA 1	PERIODIC TABLE OF THE ELEMENTS										VIIIA 2						
1.0079	IIA	<u> </u>	lkali meta	Is		Meta	alloids		Lantha	nides		IIIA	IVA	VA	VIA	VIIA	He 4.0026
Li	Be	• A • T	 Alkaline earth metals Transition metals 			Nonmetals Actinides Halogens					B	ĉ	Ň	Ő	° F	Ne	
6.941 11 Na	12 Mg	O P	ost-transi	tion metals	•	Nob	le gases					13 AI	14 Si	15 P	16 S	17 CI	18 Ar
22.990	24.305	21	IVB 22	VB 23	VIB	VIIB	26	27	28	1B 29	11B 30	26.982	28.086	30.974	32.065	35.453	39.948
K	Ca	SC 44.956	Ti 47.867	V 50.942	Cr 51,996	Mn 54,938	Fe 55.845	Co	Ni 58.693	Cu 63.546	Zn 65.39	Ga	Ge 72.64	As	Se 78.96	Br	Kr 83.80
37 Rb	38 Sr 87.62	39 Y 88,906	40 Zr 91,224	41 Nb 92,996	42 Mo 95,94	43 TC (98)	44 Ru	45 Rh	46 Pd 106.42	47 Ag	48 Cd	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127,50	53 126,90	54 Xe 131.29
55 CS	56 Ba	57-71 La-Lu	72 Hf	73 Ta 180.95	74 W	75 Re 186.21	76 OS	77 ir	78 Pt	79 Au	80 Hg	81 TI 204.38	82 Pb 207.2	83 Bi	84 Po (209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	89-103 Ac-Lr	104 Rf (281)	105 Db (262)	106 Sg (266)	107 Bh (264)	108 Hs (277)	109 Mt (268)	110 Uun (281)	111 Uuu (272)	112 Uub (285)		114 Uuq (289)	200.00			
			57 La 138.91	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97
			89 Ac (227)	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

2. Period

- > horizontal row of elements in the periodic table.
- \succ 7 in all.
- Moving from left to right across a period, the atomic number increases by one from one element to the next.
- All elements have the same number of electron shells except the outer shell has one more electron than the previous one.

3. Group

- > vertical column of elements in the periodic table.
- are numbered (except transition metal groups) using Roman numerals one (I) –
 eight (VIII) and some have names.
- Elements in the same group have the same number of electrons in their outer shell and so have similar chemical properties.
- ➢ Groups with alternative names:
 - Group I Alkali metals
 - **Group II** Alkaline earth metals
 - **Group VII** Halogens
 - Group VIII Noble gases/Inert gases





Hi He Lies Because Boys Can Not Operate Fireplaces New Nations Might Also Sign Peace Security Clause A King Can.

H, He, Li, Be, B, C, N, O, F, Ne, Na, Mg, Al, Si, P, S, Cl, Ar, K, Ca.

Physical & Chemical Properties

- **Physical property**
 - characteristic of a substance that can be observed or measured without changing the chemical nature of the substance.
 - > Common physical properties and their characteristics are:
 - <u>Physical state</u> solid, liquid or gas at room temperature
 - <u>Colour</u> related to the ability of a substance to reflect visible light.
 - **blue Density** is the concentration of matter in a substance.
 - * Melting temperature at which a substance changes state from solid to liquid
 - Soling point temperature at which a substance changes state from liquid to solid
 - Lustre describes how well the substance shines
 - Electrical conductivity the ability of a substance to allow an electric current to pass through it.
 - * <u>Thermal conductivity</u> the ability of a substance to allow heat to pass through it.
 - Malleability the ability of a substance to be beaten into a sheet
 - **Ductility** the ability of a substance to be drawn into wires.
 - * <u>Tensile strength</u> ability to support pressure or load

Chemical properties

• are those that alter the chemical nature of the substance and enable the product to be recognized as a separate substance.

- More than three quarter of the 109 elements are **metals**.
- About 19 elements are **non-metals**
- About 7 more are **semi metals** or **metalloids** (elements having both metal and non-metal properties.
- properties of elements are **repeating themselves**.
- pattern of repeating properties matches the **pattern of electrons in their outer (last)** shells.
- elements with the same number of electrons in their outer shell have similar properties.
- **Groups** of elements with similar properties are called **blocks**.
- elements in a group resemble each other.
- Sometimes they look alike, and usually they behave in the same way.

ACTIVITY:

Atomic Number	Electron	Symbol of Element	Group of Periodic
Complete the table below	for ecomony servition the	given atomic number.	Table
3			
12			
10			
1			
17			
19			
20			
15			
9			
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