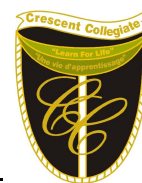


# Science 1206

## Unit 2: Chemical Reactions

### Worksheet 3: The Periodic Table



**Element:** a pure substance that cannot be broken down into simpler components. There are more than 115 different elements.

**Chemical Symbols:** international symbol for each element consisting of one or two letters,

O for oxygen  
Na for sodium  
Au for Gold

*Note the first letter is always capitalized; second letter is never capitalized*

You need to know the following elements:

(i)	Hydrogen	H	(xi)	Nitrogen	N
(ii)	Sodium	Na	(xii)	Oxygen	O
(iii)	Potassium	K	(xiii)	Neon	Ne
(iv)	Magnesium	Mg	(xiv)	Helium	He
(v)	Calcium	Ca	(xv)	Chlorine	Cl
(vi)	Iron	Fe	(xvi)	Silicon	Si
(vii)	Nickel	Ni	(xvii)	Silver	Ag
(viii)	Copper	Cu	(xviii)	Gold	Au
(ix)	Zinc	Zn	(xix)	Mercury	Hg
(x)	Carbon	C	(xx)	Lead	Pb

**Periodic Table** is a chart that organizes the elements according to their physical and chemical properties.

**Periodic Table of the Elements**

The periodic table is organized into 18 groups and 7 periods. The elements are color-coded as follows:

- Alkali Metals: Yellow
- Alkali Earth Metals: Light Blue
- Transition Metals: Dark Blue
- Rare Earth Metals: Light Purple
- Other Metals: Purple
- Non Metals: Green
- Halogens: Orange
- Noble Gases: Red

The elements are arranged in the following order:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	H																He	
2	Li	Be										B	C	N	O	F	Ne	
3	Na	Mg										Al	Si	P	S	Cl	Ar	
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
6	Cs	Ba	*La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
7	Fr	Ra	+Ac	Rf	Ha	106	107	108	109	110								

The Lanthanides and Actinides series are shown below the main table:

58	59	60	61	62	63	64	65	66	67	68	69	70	71	Lanthanides
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	
90	91	92	93	94	95	96	97	98	99	100	101	102	103	Actinides
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	

**Dmitri Mendeleev:** considered to be the founder of the periodic table. He is referred to as the father of the periodic table



**Periods:** The horizontal rows labelled from 1 to 7

**Groups:** The vertical columns are labelled from 1 to 18

## Metals, Nonmetals and Metalloids:

Most periodic table contain a staircase line which allows you to identify which elements are metals, nonmetals and metalloids

H																	nonmetals					He
Li	Be	metals										B	C	N	O	F	Ne					
Na	Mg											Al	Si	P	S	Cl	Ar					
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr					
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sb	Te	I	Xe						
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn					
Fr	Ra	Ac	Rf	Ha	Sg	Ns	He	Mt									metalloids					

Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

## Metals:

- Metals are good conductors of heat and electricity.
- Metals have a metallic luster (shiny).
- Metals are ductile (can be stretched into thin wires).
- Metals are malleable (can be pounded into thin sheets).
- A chemical property of metal is its reaction with water which results in corrosion.

IIA (2)												VIII B														
3 Li Lithium 6.939	4 Be Beryllium 9.0122			11 Na Sodium 22.9898	12 Mg Magnesium 24.312	III B (3)	IV B (4)	VB (5)	VIB (6)	VII B (7)	(8)	(9)	(10)	IB (11)	IIB (12)	13 Al Aluminum 26.9815										
19 K Potassium 39.102	20 Ca Calcium 40.08	21 Sc Scandium 44.956	22 Ti Titanium 47.90	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.9380	26 Fe Iron 55.847	27 Co Cobalt 58.9332	28 Ni Nickel 58.71	29 Cu Copper 63.546	30 Zn Zinc 65.37	31 Ga Gallium 69.72	37 Rb Rubidium 85.47	38 Sr Strontium 87.62	39 Y Yttrium 88.905	40 Zr Zirconium 91.22	41 Nb Niobium 92.906	42 Mo Molybdenum 95.94	43 Tc Technetium (99)	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.905	46 Pd Palladium 106.4	47 Ag Silver 107.868	48 Cd Cadmium 112.40	49 In Indium 114.82	50 Sn Tin 118.69
55 Cs Cesium 132.905	56 Ba Barium 137.34	57 La Lanthanum 138.91	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.85	75 Re Rhenium 186.2	76 Os Osmium 190.2	77 Ir Iridium 192.2	78 Pt Platinum 195.09	79 Au Gold 196.967	80 Hg Mercury 200.59	81 Tl Thallium 204.37	82 Pb Lead 207.19	83 Bi Bismuth 208.980	84 Po Polonium (210)											
87 Fr Francium (223)	88 Ra Radium (226)	89 Ac Actinium (227)	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (266)	107 Bh Bohrium (264)	108 Hs Hassium (269)	109 Mt Meitnerium (268)	110 Uun Ununium (269)	111 Uuu Ununium (272)	112 Uub Ununium (277)															
58 Ce Cerium 140.12	59 Pr Praseodymium 140.907	60 Nd Neodymium 144.24	61 Pm Promethium (145)	62 Sm Samarium 150.35	63 Eu Europium 151.96	64 Gd Gadolinium 157.25	65 Tb Terbium 158.924	66 Dy Dysprosium 162.50	67 Ho Holmium 164.930	68 Er Erbium 167.26	69 Tm Thulium 168.934	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.97													
90 Th Thorium 232.038	91 Pa Protactinium (231)	92 U Uranium 238.03	93 Np Neptunium (237)	94 Pu Plutonium (242)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (254)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (260)													

## Nonmetals

- Non-metals are poor conductors of heat and electricity.
- Non-metals are not ductile or malleable.
- Solid non-metals are brittle and break easily.
- They are dull.
- Many non-metals are gases.

					VIIIA (18)
IA (1)	IVA (14)	VA (15)	VIA (16)	VIIA (17)	2 He Helium 4.0026
1 H Hydrogen 1.00797	6 C Carbon 12.01115	7 N Nitrogen 14.0067	8 O Oxygen 15.9994	9 F Fluorine 18.9984	10 Ne Neon 20.183
		15 P Phosphorus 30.9738	16 S Sulfur 32.064	17 Cl Chlorine 35.453	18 Ar Argon 39.948
			34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.80
				53 I Iodine 126.9044	54 Xe Xenon 131.30
					86 Rn Radon (222)

## Metalloids:

- These elements are found along the stair-step line that distinguishes metals from non-metals.
- Metalloids (metal-like) have properties of both metals and non-metals.
- They are solids that can be shiny or dull.
- They conduct heat and electricity better than non-metals but not as well as metals.
- They are ductile and malleable.

IIIA (13)				
5 B Boron 10.811				
	14 Si Silicon 28.086			
	32 Ge Germanium 72.59	33 As Arsenic 74.9216		
		51 Sb Antimony 121.75	52 Te Tellurium 127.60	
				85 At Astatine (210)

## Families on the Periodic Table:

Family refers to a group of elements with similar chemical properties. Chemical families tend to be associated with the vertical columns on the periodic table. Families may consist of one column, or several columns put together. The periodic table has the following families:

Alkali Metal Family	Alkali EARTH Metal Family	Transition Metal Family										Boron Family	Carbon Family	Nitrogen Family	Oxygen Family	Halogen Family	Noble Gas Family
		Lanthanide Series										Actinide Series					

Here are five families you are expected to remember

**1) Alkali Metals:**

- Group #1 on the periodic table.
- Very reactive metals, always combined with something else in nature (like in salt).
- Soft enough to cut with a butter knife

**2) Alkaline Earth Metals**

- Second column on the periodic table. (Group 2)
- Reactive metals that are always combined with nonmetals in nature.
- Several of these elements are important mineral nutrients (such as Mg and Ca)

**3) Transition Metals**

- Elements in groups 3-12
- Less reactive harder metals
- Includes metals used in jewelry and construction. Metals used “as metal.”

**4) Halogens**

- Elements in group 17
- Very reactive, volatile, diatomic, nonmetals
- Always found combined with other element in nature .
- Used as disinfectants and to strengthen teeth

**5) The Noble Gases**

- Elements in group 18
- VERY unreactive, gases
- Used in lighted “neon” signs

**PART A: MULTIPLE CHOICE**

1. An element contains only one kind of
  - (A) Atom
  - (B) Compound
  - (C) Property
  - (D) Family
2. Which of the following is an element?
  - (A) Calcium carbonate
  - (B) Sodium chloride
  - (C) Calcium
  - (D) Water
3. Which one of the following elements is used in party balloons?
  - (A) Helium
  - (B) Nitrogen
  - (C) Oxygen
  - (D) Neon

4. What is the chemical symbol for iron?
- (A) I
  - (B) Ir
  - (C) Fe
  - (D) Hg
5. What does the chemical symbol "P" represent?
- (A) Lead
  - (B) Phosphorous
  - (C) Platinum
  - (D) Potassium
6. The elements in each vertical column on the periodic table usually have similar properties and are called a(n)
- (A) Period
  - (B) Group
  - (C) Element
  - (D) Property
7. The rows of the periodic table are called:
- (A) Classes
  - (B) Periods
  - (C) Groups
  - (D) Families
8. A horizontal row on the periodic table is called a(n)
- (A) Group
  - (B) Family
  - (C) Period
  - (D) Atomic number
9. In the periodic table, elements in each column had similar
- (A) Atomic masses
  - (B) Numbers of proton
  - (C) Properties
  - (D) Symbols
10. Which element is in Group 2 and Period 7 on the periodic table?
- (A) Magnesium
  - (B) Radon
  - (C) Radium
  - (D) Manganese
11. How would you locate sodium on the periodic table?
- (A) Group 2, Period 4
  - (B) Group 4, Period 2
  - (C) Group 3, Period 1
  - (C) Group 1, Period 3

12. Which group contains the most elements?
- (A) Transition elements
  - (B) Nonmetals
  - (C) Metalloids
  - (D) Metals
13. Which group of elements shares characteristics with both metals and nonmetals?
- (A) Halogens
  - (B) Lanthanides
  - (C) Salts
  - (D) Metalloids
14. Carbon and other nonmetals are found in which area of the periodic table?
- (A) On the left-most side
  - (B) On the right side
  - (C) In the middle column of the periodic table
  - (D) In the bottom rows
15. As you move from left to right across the periodic table, elements
- (A) Become less metallic
  - (B) Have a lower atomic weight
  - (C) Have a lower atomic number
  - (D) Become more metallic
16. The three main groups of elements are metals, nonmetals, and
- (A) Noble gases
  - (B) Isotopes
  - (C) Alkali metals
  - (D) Metalloids
17. Most nonmetals are
- (A) Brittle
  - (B) Metalloids
  - (C) Good conductors
  - (D) Shiny
18. Which element is a metalloids?
- (A) Carbon
  - (B) Sodium
  - (C) Silicon
  - (D) Uranium
19. Metals tend to be
- (A) Gases
  - (B) Dull
  - (C) Good conductors of heat
  - (D) Brittle

20. The elements to the right of the zigzag line on the periodic table are called
- (A) Metalloids
  - (B) Conductors
  - (C) Metals
  - (D) Nonmetals
21. Most metals are
- (A) Solid at room temperature
  - (B) Bad conductors of electric current
  - (C) Dull
  - (D) Not malleable
22. What is O?
- (A) Metal
  - (B) Metalloid
  - (C) Nonmetal
  - (D) None of the above
23. The only metal that is a liquid at room temperature is \_\_\_\_\_.
- (A) Copper
  - (B) Silver
  - (C) Mercury
  - (D) Sodium
24. Which noble gas is found in the fifth period?
- (A) I
  - (B) Kr
  - (C) Xe
  - (D) Rb
25. Which alkaline earth metal is located in the third period?
- (A) Ca
  - (B) Sc
  - (C) Na
  - (D) Mg
26. Which of the following series of elements represents the alkali metals family?
- (A) Fe, Co, Ni, Cu, Zn
  - (B) Li, Na, K, Rb, Cs
  - (C) F, Cl, Br, I, At
  - (D) Li, Be, C, N, O
27. Which elements have the most similar chemical properties?
- (A) K and Na
  - (B) K and Ca
  - (C) K and Cl
  - (D) K and S

28. What is the first noble gas in the periodic table?
- (A) Neon
  - (B) Argon
  - (C) Helium
  - (D) Hydrogen
29. The elements in Groups 1 and 2 are known respectively as
- (A) Alkali metals, Halogens
  - (B) Halogens, Noble Gases
  - (C) Halogens, Transition metals
  - (D) Alkali metals, Alkaline earth metals
30. Neon is an example of a(n):
- (A) Alkali Metal
  - (B) Noble Gas
  - (C) Halogen
  - (D) Transition Metals
31. Sodium is in the same group or family as:
- (A) Lithium
  - (B) Helium
  - (C) Calcium
  - (D) Thorium
32. Iodine is an example of a(n):
- (A) Noble gas
  - (B) Halogen
  - (C) Alkali metal
  - (D) Alkaline earth metals
33. What family does silver belong to?
- (A) Alkali Metal
  - (B) Alkaline Earth Metals
  - (C) Transition
  - (D) Halogen
34. Alkali metals, alkaline earth metals, and halogens are found respectively in groups
- (A) 1, 2, and 14
  - (B) 1, 2, and 18
  - (C) 1, 2, and 17
  - (D) 2, 13, and 17
35. How many halogens are in Period 3 of the periodic table?
- (A) 3
  - (B) 1
  - (C) 4
  - (D) 2
36. Which of the following elements is an alkali metal?
- (A) Calcium
  - (B) Magnesium
  - (C) Mercury
  - (D) Sodium



**PART B WRITTEN RESPONSE**

1. Finding the symbols

	Element	Symbol		Element	Symbol
1.	Copper		10.	Xenon	
2.	Lithium		11.	Barium	
3.	Silicon		12.	Platinum	
4.	Zinc		13.	Fluorine	
5.	Thorium		14.	Argon	
6.	Krypton		15.	Tungsten	
7.	Tin		16.	Magnesium	
8.	Bismuth		17.	Manganese	
9.	Boron		18.	Silver	

2. Find the element

	Symbol	Element		Symbol	Element
1.	Ge		10.	S	
2.	K		11.	Se	
3.	V		12.	Sb	
4.	No		13.	Rh	
5.	In		14.	Ti	
6.	P		15.	Sc	
7.	As		16.	Po	
8.	At		17.	Pr	
9.	Zr		18.	Rn	

3. Most of the elements that form a zigzag line in the periodic table belong to one major group. What is that group, and what kinds of properties do its elements tend to have?

**Periodic Table of the Elements (Top Section)**

	1																18	
1		2																
2																		
3			3	4	5	6	7	8	9	10	11	12						
4																		

---



---



---

4. Write an “X” in the correct column to indicate whether the element is a metal, nonmetal or metalloid.

	ELEMENT	METAL	NONMETAL	METALLOID
(A)	aluminum			
(B)	calcium			
(C)	antimony			
(D)	cesium			
(E)	carbon			
(F)	manganese			
(G)	fluorine			
(H)	silicon			

***Periodic Table Puns***

Use your imagination and the elements in the periodic Table to solve each pun.

**Example Five cents- Nickel (Ni)**

- 1. What you do in a play? \_\_\_\_\_
- 2. What do you do to a wrinkled shirt? \_\_\_\_\_
- 3. “Tasty” part of your mouth \_\_\_\_\_
- 4. Some one who likes to start fires \_\_\_\_\_
- 5. Your brother or mine \_\_\_\_\_
- 6. Extinct \_\_\_\_\_
- 7. Imitation diamond \_\_\_\_\_
- 8. A type of flower \_\_\_\_\_
- 10. Las Vegas lights \_\_\_\_\_
- 11. Police \_\_\_\_\_
- 12. Golden State \_\_\_\_\_
- 13. Name of a goofy convict \_\_\_\_\_
- 12. What you do with flowers \_\_\_\_\_
- 15. What you did with ripped jeans \_\_\_\_\_
- 13. A “prize” element \_\_\_\_\_
- 17. A very smart person \_\_\_\_\_
- 18. A person from the big blue planet \_\_\_\_\_
- 19. A fur seller \_\_\_\_\_
- 20. Not an exciting person \_\_\_\_\_
- 21. Get clean with this \_\_\_\_\_

Do you have any “punnies” of your own? Write them below and please include your answers

---

---

---

---

---

---

---