

1. Explain the differences between protons, neutrons, and electrons.

Proton = positive - in nucleus
neutron = neutral - in nucleus
electron = negative - in electron shells

2. Which subatomic particle determines the identity of the atom?

Protons!

3. Which statement is true?

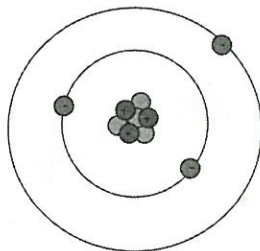
- A. The nucleus is found in the center of atoms and contain protons and electrons
- B. The nucleus is found in the center of atoms and contains protons and neutrons
- C. Electrons have a neutral charge
- D. Neutrons have a negative charge

4. What is the role of electrons in an atom?

- A. Electrons are in the nucleus and have a negative charge
- B. Electrons are in the nucleus and have a positive charge
- C. Electrons are outside the nucleus and have a negative charge
- D. Electrons are outside the nucleus and have a positive charge

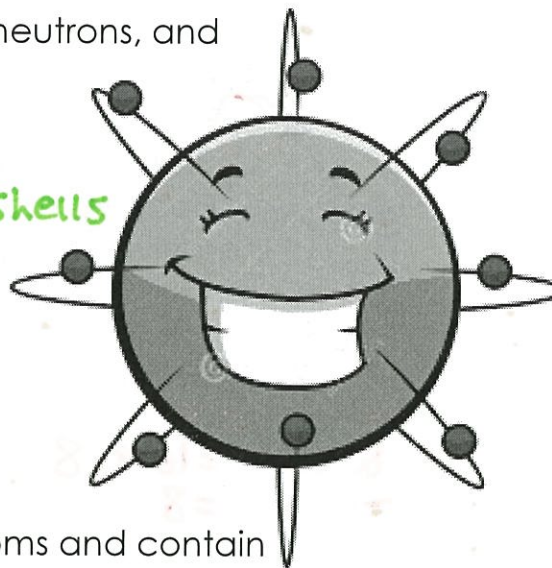
5. How many electrons are in Lithium?

- A. 3
- B. 4
- C. 7
- D. 10



use periodic table

* in an atom,
protons = # electrons



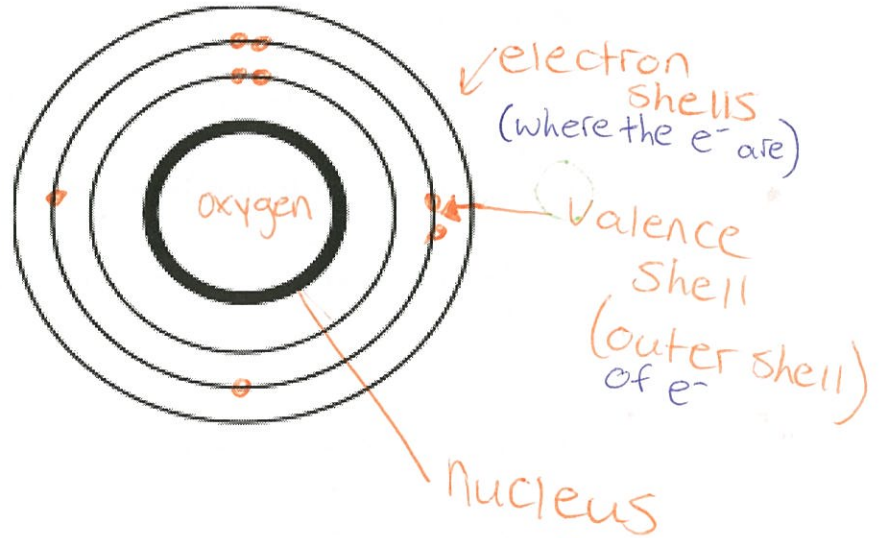
6. What statement is not true?

- A. Protons are positive and neutrons are neutral
- B. Electrons have the most mass of the subatomic particles
- C. Protons and Neutrons are found in the nucleus
- D. Electrons are found outside the nucleus and have a negative charge

electrons have no mass -

7. Draw an oxygen atom. You must use the following labels:

- + Proton = 8
- Neutron = $16 - 8 = 8$
- Electron = 8
- Nucleus
- Positive (+)
- Neutral (o)
- Negative (-)
- Electron shell
- Valence shell



8. Explain what a compound is. How can you tell one by looking at a chemical formula?



Mixture



Compound

Compounds have more than 1 element bonded together.

★ Look for capital letters

9. How many different elements are present in $C_6H_{12}O_6$?

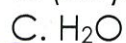
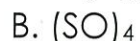
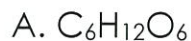
How do you know?

3 elements

Carbon
Hydrogen
Oxygen

★ Everytime a capital letter appears

10. Which of the following is not a compound?



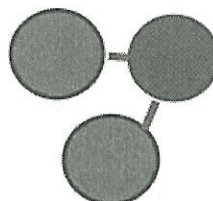
11. This model represents a:

A. Compound

B. Mixture

C. Element

D. Electrons



12. Classify each as a mixture, element, or compound

a. H_2O Compound

b. H_2 element

c. Fe and S Mixture

13. Classify each as an element (E), compound (C), or mixture (M) – Put letter in each box

C_4 E	O E	Cl_3 E	N_2 E
Cl E	$C_6H_{12}O_6$ C	NaCl C	CO_2 C
HCl C	H_2O_2 C	$CaCO_3$ C	NaOH C
NaCl + H_2O M	Chocolate Milk M	Sand + H_2O M	Tea + Sugar M

14. How many elements are present in the compound below?



3 elements



3

15. How many total atoms are present in the compounds below?



1 2 2 = 5



1 3 1 1 = 6

16. Label metals, metalloids, and non-metals on the following periodic table – hint start by drawing the staircase!

Periodic Table
of Elements

1 H																	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89 Ac	104 Rf	105 Ha	106 Sg												

Metals

Non-Metals

Metalloids

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

17. Label each property as a property of **METAL (M)**, **METALLOID (L)**, or **NON-METAL (N)**.

Right Side of periodic table <i>N</i>	Found on the 'staircase' of the periodic table <i>L</i>
Shiny Luster <i>M</i>	Good conductor <i>M</i>
Mostly Solid <i>L, M</i>	Dull <i>N</i>
Malleable <i>M</i>	Brittle <i>L, N</i>
Ductile <i>M</i>	Poor Conductor <i>L, N</i>
Left side of the periodic table <i>M</i>	Properties of metals and nonmetals <i>L</i>

18.  Circle one – groups aka families on the periodic table go (up & down / left & right)

19. Circle one – periods on the periodic table go (up & down / left & right) 

20. Use the picture to the right. Which is not true about all of these elements?

- A. They are all in the same group
- B. They all have the same number of valence electrons
- C. They all have the same number of protons
- D. They all share similar properties

16 6A
8 O 15.999 Oxygen
16 S 32.066 Sulfur
34 Se 78.96 Selenium

21. Which element has 2 valence electrons and is in period 4?

- A. Sodium
- B. Carbon
- C. Beryllium
- D. Calcium

alkaline earth family
→ run left and right

22. Which two elements share similar properties?

- A. Oxygen and Sulfur *→ in same family*
- B. Oxygen and Nitrogen
- C. Oxygen and Helium
- D. Oxygen and Chlorine

23. Which element is the most reactive? HOW DO YOU KNOW?

- A. Silicon
- B. Oxygen
- C. Lithium *→ Alkali metal family*
- D. Aluminum

24. Which number determines how the periodic table is arranged?

- A. Atomic number *→ # of protons*
- B. Atomic Mass
- C. Number of Neutrons
- D. Number of ions

25. All of the elements in the same group have the same _____.

- A. Valence electrons
- B. Energy shells or orbitals
- C. Atomic mass
- D. Atomic number

↓
family

26. Colour each family in a different colour. Be sure to make a key.

valence e⁻

- Hydrogen → 1
- Noble Gas → Full shell
- Alkali → 1
- Halogens → missing 1
- Alkaline Earth → 2

1 1A	2 2A											13 3A	14 4A	15 5A	16 6A	17 7A	18 8A	
1 H 1.008																	2 He 4.003	
2 Li 6.941	Be 9.012											B 10.812	C 12.011	N 14.007	O 15.999	F 18.998	Ne 20.180	
3 Na 22.990	Mg 24.305											Al 26.982	Si 28.086	P 30.974	S 32.066	Cl 35.453	Ar 39.948	
4 K 39.098	Ca 40.078	Sc 44.956	Ti 47.867	V 50.942	Cr 51.996	Mn 54.938	Fe 55.845	Co 58.933	Ni 58.693	Cu 63.546	Zn 65.38	Ga 69.723	Ge 72.64	As 74.922	Se 78.96	Br 79.904	Kr 83.798	
5 Rb 85.468	Sr 87.62	Y 88.906	Zr 91.224	Nb 92.906	Mo 95.96	(98)	Tc 101.07	Ru 102.906	Rh 106.42	Pd 107.868	Ag 107.868	Cd 112.412	In 114.818	Sn 118.711	Sb 121.760	Te 127.60	I 126.904	Xe 131.294
6 Cs 132.905	Ba 137.328	Lu 174.967	Hf 178.49	Ta 180.948	W 183.84	Re 186.207	Os 190.23	Ir 192.217	Pt 195.085	Au 196.967	Hg 200.59	Tl 204.383	Pb 207.2	Bi 208.980	Po (209)	At (210)	Rn (222)	
7 Fr (223)	Ra (226)	Lr (262)	Rf (267)	Db (268)	Sg (271)	Bh (272)	Hs (276)	Mt (276)	Ds (281)	Rg (280)	Mass numbers in parentheses are those of the most stable or most common isotope.							
Lanthanide Series		57 La 138.905	58 Ce 140.116	59 Pr 140.908	60 Nd 144.242	61 Pm (145)	62 Sm 150.36	63 Eu 151.964	64 Gd 157.25	65 Tb 158.925	66 Dy 162.500	67 Ho 164.930	68 Er 167.259	69 Tm 168.934	70 Yb 173.055			
Actinide Series		89 Ac (227)	90 Th 232.038	91 Pa 231.036	92 U 238.029	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)			

Ionic vs Molecular

27. In ionic bonds, electrons are (taken/ shared)
28. In molecular bonds, electrons are (taken, shared)

29. Draw an atom of lithium.
List the protons, neutrons, and electrons.

$$\begin{aligned} + p &= 3 \\ \& N = 7 - 3 = 4 \\ - e^- &= 3 \end{aligned}$$



very reactive.
wants to get
rid of outer
electron.

30. Draw an ION of lithium. *overall neutral charge*
List the number of protons, neutrons, and electrons. AND CHARGE!

lost a
negative
 e^-

$$\begin{aligned} P &= 3 & \text{Charge} &= 1+ \\ N &= 4 \\ e^- &= 2 \end{aligned}$$

so it is
more positive
now



31. Calculate the number of neutrons for:

Fluorine:

$$\begin{array}{r} 19 \\ - 9 \\ \hline 10 \end{array}$$

Gold:

$$\begin{array}{r} 197 \\ - 79 \\ \hline 118 \end{array}$$

Mercury:

$$\begin{array}{r} 201 \\ - 80 \\ \hline 121 \end{array}$$

NAMING IONIC VS MOLECULAR:

32. Remember some basic rules- Molecular

1) Mono 2) di 3) tri 4) tetra 5) penta

6) hexa 7) hepta 8) octa 9) nona 10) deca

* No mono for first element.

1. Cl_2Br_3 dichlorine tribromide2. N_2O dinitrogen monoxide3. P_3As_2 triphosphorous diarsenide4. C_2S_5 dicarbon pentasulphide5. carbon hexachloride CCl_6 6. diphosphorus trifluoride P_2F_3 7. oxygen trichloride OCl_3 8. diarsenic monoxide As_2O 9. sulphur pentanitride SN_5 10. triiodine dioxide I_3O_2 11. carbon triarsenide CA_3

33. Remember some basic rules- Ionic.

- 1) I 2) II 3) III 4) IV 5) V
 6) VI 7) VII

* roman numerals are used to show which metal ion charge you are using. Metal first, then non-metal. CHARGES OF POSITIVE AND NEGATIVE MUST BALANCE!

- a. $\overset{+1}{Li}_2\overset{2-}{O}$ lithium oxide
- b. $Zn_3\overset{2-}{As}_2$ zinc arsenide
- c. CaS Calcium Sulphide
- d. Na₃N sodium nitride
- e. BeF₂ Beryllium fluoride
- f. SrBr₂ Strontium bromide
- g. $\overset{2+}{Mg}\overset{2-}{S}$ magnesium sulphide MgS
- h. $\overset{2+}{Be}\overset{1-}{F}_2$ beryllium fluoride BeF₂
- i. $\overset{3+}{Al}_2\overset{2-}{O}_3$ aluminum oxide Al₂O₃
- j. $\overset{3+}{Al}\overset{3-}{N}$ aluminum nitride AlN
- k. $\overset{2+}{Ca}_3\overset{-3}{As}_2$ calcium arsenide Ca₃As₂
- l. $\overset{3+}{Au}\overset{1-}{F}_3$ gold (III) fluoride AuF₃
- m. $\overset{1+}{Hg}_2\overset{0}{O}$ mercury (I) oxide Hg₂O
1. $\overset{3+}{Ti}\overset{1-}{Cl}_3$ titanium (III) chloride TiCl₃

