

Hautlieu Chemistry Department



Summer Task 2026

Name: _____

The purpose of this task is to remind you of some key ideas and concepts. You must bring this to your first lesson in September.

The Periodic Table of the Elements

The Periodic Table of the Elements

1	2	Key												3	4	5	6	7	0					
		relative atomic mass symbol name atomic (proton) number												1.0 H hydrogen 1									18.0 He helium 2	
6.9 Li lithium 3	9.0 Be beryllium 4													10.8 B boron 5	12.0 C carbon 6	14.0 N nitrogen 7	16.0 O oxygen 8	18.0 F fluorine 9	20.2 Ne neon 10					
23.0 Na sodium 11	24.3 Mg magnesium 12	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	27.0 Al aluminium 13	28.1 Si silicon 14	31.0 P phosphorus 15	32.1 S sulfur 16	35.5 Cl chlorine 17	39.9 Ar argon 18							
39.1 K potassium 19	40.1 Ca calcium 20	45.0 Sc scandium 21	47.9 Ti titanium 22	50.9 V vanadium 23	52.0 Cr chromium 24	54.9 Mn manganese 25	55.8 Fe iron 26	58.9 Co cobalt 27	58.7 Ni nickel 28	63.5 Cu copper 29	65.4 Zn zinc 30	68.7 Ga gallium 31	72.6 Ge germanium 32	74.9 As arsenic 33	79.0 Se selenium 34	79.9 Br bromine 35	83.8 Kr krypton 36							
85.5 Rb rubidium 37	87.6 Sr strontium 38	88.9 Y yttrium 39	91.2 Zr zirconium 40	92.9 Nb niobium 41	96.0 Mo molybdenum 42	97.9 Tc technetium 43	101.1 Ru ruthenium 44	102.9 Rh rhodium 45	106.4 Pd palladium 46	107.9 Ag silver 47	112.4 Cd cadmium 48	114.8 In indium 49	118.7 Sn tin 50	121.8 Sb antimony 51	127.6 Te tellurium 52	126.9 I iodine 53	131.3 Xe xenon 54							
132.9 Cs caesium 55	137.3 Ba barium 56	138.9 La* lanthanum 57	178.5 Hf hafnium 72	180.9 Ta tantalum 73	183.8 W tungsten 74	186.2 Re rhenium 75	190.2 Os osmium 76	192.2 Ir iridium 77	195.1 Pt platinum 78	197.0 Au gold 79	200.6 Hg mercury 80	204.4 Tl thallium 81	207.2 Pb lead 82	209.0 Bi bismuth 83	209.0 Po polonium 84	210.0 At astatine 85	222.0 Rn radon 86							
223.0 Fr francium 87	226.0 Ra radium 88	227.0 Ac+ actinium 89	267.0 Rf rutherfordium 104	270.0 Db dubnium 105	289.0 Sg seaborgium 106	270.0 Bh bohrium 107	270.0 Hs hassium 108	278.0 Mt meitnerium 109	281.0 Ds darmstadtium 110	289.0 Rg roentgenium 111	289.0 Cn copernicium 112	289.0 Nh nihonium 113	289.0 Fl flerovium 114	289.0 Mc moscovium 115	289.0 Lv livermorium 116	289.0 Ts tennessine 117	294.0 Og oganeson 118							

* 58 – 71 Lanthanides

140.1
Ce
cerium
58

140.9
Pr
praseodymium
59

144.2
Nd
neodymium
60

[145]
Pm
promethium
61

150.4
Sm
samarium
62

152.0
Eu
europium
63

157.3
Gd
gadolinium
64

158.9
Tb
terbium
65

162.5
Dy
dysprosium
66

164.9
Ho
holmium
67

167.3
Er
erbium
68

168.9
Tm
thulium
69

173.0
Yb
ytterbium
70

175.0
Lu
lutetium
71

† 90 – 103 Actinides

232.0
Th
thorium
90

231.0
Pa
protactinium
91

238.0
U
uranium
92

[237]
Np
neptunium
93

[244]
Pu
plutonium
94

[243]
Am
americium
95

[247]
Cm
curium
96

[247]
Bk
berkelium
97

[251]
Cf
californium
98

[252]
Es
einsteinium
99

[257]
Fm
fermium
100

[258]
Md
mendelevium
101

[259]
No
nobelium
102

[262]
Lr
lawrencium
103

* 58 – 71 Lanthanides

+ 90 – 103 Actinides

140.1 Ce cerium 58	140.9 Pr praseodymium 59	144.2 Nd neodymium 60	145.0 Pm promethium 61	150.4 Sm samarium 62	152.0 Eu europlum 63	157.3 Gd gadolinium 64	158.9 Tb terbium 65	162.5 Dy dysprosium 66	164.9 Ho holmium 67	167.3 Er erbium 68	168.9 Tm thulium 69	173.0 Yb ytterbium 70	175.0 Lu lutetium 71
232.0 Th thorium 90	231.0 Pa protactinium 91	238.0 U uranium 92	237.0 Np neptunium 93	244.0 Pu plutonium 94	243.0 Am americium 95	247.0 Cm curium 96	247.0 Bk berkelium 97	251.0 Cf californium 98	252.0 Es eesenium 99	257.0 Fm fermium 100	258.0 Md mendeleevium 101	259.0 No nobelium 102	262.0 Lr lawrencium 103

Activity 9 Atoms

1. Give the atomic number of:

- a) Osmium
- b) Lead
- c) Sodium
- d) Chlorine

2. Give the relative atomic mass (A_r) of:

- a) Helium
- b) Francium
- c) Barium
- d) Oxygen

3. What is the number of neutrons in each of the following elements?

- a) Fluorine
- b) Beryllium
- c) Gold

Activity 10 Formulae of common compounds

State the formulae of the following compounds:

1. Methane
2. Sulfuric acid
3. Potassium manganate (VII)
4. Water

Activity 11 Ions and ionic compounds

The table below lists the formulae of some common ions.

Positive ions		Negative ions	
Name	Formula	Name	Formula
Aluminium	Al^{3+}	Bromide	Br^-
Ammonium	NH_4^+	Carbonate	CO_3^{2-}
Barium	Ba^{2+}	Chloride	Cl^-
Calcium	Ca^{2+}	Fluoride	F^-
Copper(II)	Cu^{2+}	Iodide	I^-
Hydrogen	H^+	Hydroxide	OH^-
Iron(II)	Fe^{2+}	Nitrate	NO_3^-
Iron(III)	Fe^{3+}	Oxide	O^{2-}
Lead	Pb^{2+}	Sulfate	SO_4^{2-}
Lithium	Li^+	Sulfide	S^{2-}
Magnesium	Mg^{2+}		
Potassium	K^+		
Silver	Ag^+		
Sodium	Na^+		
Zinc	Zn^{2+}		

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Use the table to state the formulae for the following ionic compounds.

1. Magnesium bromide
2. Barium oxide
3. Zinc chloride
4. Ammonium chloride
5. Ammonium carbonate
6. Aluminium bromide
7. Calcium nitrate
8. Iron (II) sulfate
9. Iron (III) sulfate

Activity 12 Empirical formula

Use the periodic table on page 21 to help you answer these questions.

1. The smell of a pineapple is caused by ethyl butanoate.

A sample is known to contain:

- o 0.360 g of carbon
- o 0.060 g of hydrogen
- o 0.160 g of oxygen.

What is the empirical formula of ethyl butyrate?

2. What is the empirical formula of a compound containing:
 - o 0.479 g of titanium
 - o 0.180 g of carbon
 - o 0.730 g of oxygen
3. A 300g sample of a substance is analysed and found to contain only carbon, hydrogen and oxygen.

The sample contains 145.9 g of carbon and 24.32 g of hydrogen.

What is the empirical formula of the compound?

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4. Another 300 g sample is known to contain only carbon, hydrogen and oxygen.

The percentage of carbon is found to be exactly the same as the percentage of oxygen.

The percentage of hydrogen is known to be 5.99%.

What is the empirical formula of the compound?

Activity 13 Balancing equations

1. Write balanced symbol equations for the following reactions.

You'll need to use the information on the previous pages to work out the formulae of the compounds.

Remember some of the elements may be diatomic molecules.

- a. Aluminium+ oxygen → aluminium oxide
- b. Methane+ oxygen → carbon dioxide+ water
- c. Calcium carbonate+ hydrochloric acid → calcium chloride+ water+ carbon dioxide

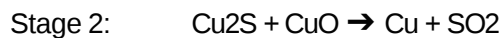
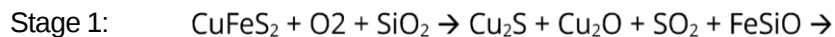
2. Chalcopyrite is a sulfide mineral with formula CuFeS_2 .

Chalcopyrite is the most important copper ore. It is a sulfide mineral, a member of iron (2+) sulfides and a copper sulfide.

Copper can be produced from rock that contains CuFeS_2 in two stages.

Balance the equations for the two stages in this process.

Hint: remember that sometimes fractions have to be used to balance equations.



Activity 14 Moles

The amount of a substance is measured in moles (the SI unit). The mass of one mole of a substance in grams is numerically equal to the relative formula mass of the substance. One mole of a substance contains the same number of the stated particles, atoms or ions as one mole of any other substance. The number of atoms, molecules or ions in a mole of a given substance is the Avogadro constant. The value of the Avogadro constant is:

6.02×10^{23} per mole.

Complete the table. Use the periodic table on page **NUMBER** to help you.

Substance	Mass of substance in g	Amount in moles	Number of particles
Helium			18.12×10^{23}
Chlorine (Cl)	14.2		
Methane		4	
Sulfuric acid	4.905		

Activity 15 Isotopes and calculating relative atomic mass

- What is the relative atomic mass of bromine if the two isotopes ^{79}Br and ^{81}Br exist in **equal** amounts?
- A sample of neon is made up of three isotopes:
 - o ^{20}Ne accounts for 90.9%
 - o ^{21}Ne accounts for 0.3%
 - o ^{22}Ne accounts for 8.8%.

What is the relative atomic mass of neon?

Give your answer to 4 significant figures.

- Copper's isotopes are ^{63}Cu and ^{65}Cu .

If the relative atomic mass of copper is 63.5, what are the relative abundances of these isotopes?