

## Lesson 5 - Metals and Non-Metals

71 Lu Lutetium	99 Es Einsteinium	18 Ar Argon	7 N Nitrogen	53 I Iodine	7 N Nitrogen	31 Ga Gallium			
53 I Iodine	7 N Nitrogen	90 Th Thorium	68 Er Erbium	7 N Nitrogen	69 Tm Thulium	53 I Iodine	76 Os Osmium	7 N Nitrogen	16 S Sulfur

By the end of this lesson I will be able to

- ★ describe where on the periodic table metals and non-metals are.
- ★ can comment on the appearance of metals
- ★ link the uses of metals to their properties

### Task 1: Element Classification

Element	Group
Lithium	
Chlorine	
Argon	
Neon	
Astatine	
Francium	
Bromine	

Elements can be categorised in a number of ways, we have so far learned about some of the groups that metals can be categorised into.

Examples of these groups are:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

Elements are also categorised due to their properties.

You are now going to categorise elements as metals and non-metals and look at their properties.

### Task 2 - Metals & Non-Metals

Elements can also be categorised as metals or non-metals.

The elements of the periodic table are split into metals on the left (under the magic staircase) and non-metals on the right (above the magic staircase).

Draw the magic staircase onto the periodic table below and colour it to show the metals and non-metals.

hydrogen 1 <b>H</b> 1.0079																	helium 2 <b>He</b> 4.0026	
lithium 3 <b>Li</b> 6.941	beryllium 4 <b>Be</b> 9.0122											boron 5 <b>B</b> 10.811	carbon 6 <b>C</b> 12.011	nitrogen 7 <b>N</b> 14.007	oxygen 8 <b>O</b> 15.999	fluorine 9 <b>F</b> 18.998	neon 10 <b>Ne</b> 20.180	
sodium 11 <b>Na</b> 22.990	magnesium 12 <b>Mg</b> 24.305											aluminium 13 <b>Al</b> 26.982	silicon 14 <b>Si</b> 28.086	phosphorus 15 <b>P</b> 30.974	sulfur 16 <b>S</b> 32.065	chlorine 17 <b>Cl</b> 35.453	argon 18 <b>Ar</b> 39.948	
potassium 19 <b>K</b> 39.098	calcium 20 <b>Ca</b> 40.078	scandium 21 <b>Sc</b> 44.956	titanium 22 <b>Ti</b> 47.867	vanadium 23 <b>V</b> 50.942	chromium 24 <b>Cr</b> 51.996	manganese 25 <b>Mn</b> 54.938	iron 26 <b>Fe</b> 55.845	cobalt 27 <b>Co</b> 58.933	nickel 28 <b>Ni</b> 58.693	copper 29 <b>Cu</b> 63.546	zinc 30 <b>Zn</b> 65.39	gallium 31 <b>Ga</b> 69.723	germanium 32 <b>Ge</b> 72.61	arsenic 33 <b>As</b> 74.922	selenium 34 <b>Se</b> 78.96	bromine 35 <b>Br</b> 79.904	krypton 36 <b>Kr</b> 83.80	
rubidium 37 <b>Rb</b> 85.468	strontium 38 <b>Sr</b> 87.62	yttrium 39 <b>Y</b> 88.906	zirconium 40 <b>Zr</b> 91.224	niobium 41 <b>Nb</b> 92.906	molybdenum 42 <b>Mo</b> 95.94	technetium 43 <b>Tc</b> [98]	ruthenium 44 <b>Ru</b> 101.07	rhodium 45 <b>Rh</b> 102.91	palladium 46 <b>Pd</b> 106.42	silver 47 <b>Ag</b> 107.87	cadmium 48 <b>Cd</b> 112.41	indium 49 <b>In</b> 114.82	tin 50 <b>Sn</b> 118.71	antimony 51 <b>Sb</b> 121.76	tellurium 52 <b>Te</b> 127.60	iodine 53 <b>I</b> 126.90	xenon 54 <b>Xe</b> 131.29	
caesium 55 <b>Cs</b> 132.91	barium 56 <b>Ba</b> 137.33	57-70 *	lutetium 71 <b>Lu</b> 174.97	hafnium 72 <b>Hf</b> 178.49	tantalum 73 <b>Ta</b> 180.95	tungsten 74 <b>W</b> 183.84	rhenium 75 <b>Re</b> 186.21	osmium 76 <b>Os</b> 190.23	iridium 77 <b>Ir</b> 192.22	platinum 78 <b>Pt</b> 195.08	gold 79 <b>Au</b> 196.97	mercury 80 <b>Hg</b> 200.59	thallium 81 <b>Tl</b> 204.38	lead 82 <b>Pb</b> 207.2	bismuth 83 <b>Bi</b> 208.98	polonium 84 <b>Po</b> [209]	astatine 85 <b>At</b> [210]	radon 86 <b>Rn</b> [222]
francium 87 <b>Fr</b> [223]	radium 88 <b>Ra</b> [226]	89-102 * *	lawrencium 103 <b>Lr</b> [262]	rutherfordium 104 <b>Rf</b> [261]	dubnium 105 <b>Db</b> [262]	seaborgium 106 <b>Sg</b> [269]	bohrium 107 <b>Bh</b> [264]	hassium 108 <b>Hs</b> [269]	meitnerium 109 <b>Mt</b> [268]	ununnitium 110 <b>Uun</b> [271]	ununium 111 <b>Uuu</b> [272]	ununbium 112 <b>Uub</b> [271]	ununquadium 114 <b>Uuq</b> [289]					

\* Lanthanide series

lanthanum 57 <b>La</b> 138.91	cerium 58 <b>Ce</b> 140.12	praseodymium 59 <b>Pr</b> 140.91	neodymium 60 <b>Nd</b> 144.24	promethium 61 <b>Pm</b> [145]	samarium 62 <b>Sm</b> 150.36	europium 63 <b>Eu</b> 151.96	gadolinium 64 <b>Gd</b> 157.25	terbium 65 <b>Tb</b> 158.93	dysprosium 66 <b>Dy</b> 162.50	holmium 67 <b>Ho</b> 164.93	erbium 68 <b>Er</b> 167.26	thulium 69 <b>Tm</b> 168.93	ytterbium 70 <b>Yb</b> 173.04
actinium 89 <b>Ac</b> [227]	thorium 90 <b>Th</b> 232.04	protactinium 91 <b>Pa</b> 231.04	uranium 92 <b>U</b> 238.03	neptunium 93 <b>Np</b> [237]	plutonium 94 <b>Pu</b> [244]	americium 95 <b>Am</b> [243]	curium 96 <b>Cm</b> [247]	berkelium 97 <b>Bk</b> [247]	californium 98 <b>Cf</b> [251]	einsteinium 99 <b>Es</b> [252]	fermium 100 <b>Fm</b> [257]	mendeleevium 101 <b>Md</b> [258]	nobelium 102 <b>No</b> [259]

\*\* Actinide series

**Metals**

**Non-Metals**

### Task 3: Metal or Non-Metal

Use the periodic table to help you identify if the elements in the table are metal or non-metal.

Element	Metal/non-metal
copper	
sulfur	
tin	
bromine	
chlorine	
lead	
aluminium	
hydrogen	
iron	
carbon	
carbon - graphite	

### Task 4: Conductor or Non-Conductor

Metals will conduct an electrical current.

Non-metals will not conduct an electrical current.

The exception to this rule is carbon graphite which is a non-metal and will conduct electricity.

**Below is the method for an experiment to test conductivity of elements.**

1. Collect all equipment
2. Connect the wires to the bulb. Place a crocodile clip at the other end of each wire.
3. Connect the crocodile clips to the first sample to be tested.
4. Record if the bulb lit up or not in the results table.
5. Repeat steps 3-4 for the remaining 9 elements.

Decide whether the following elements would light the bulb in the experiment.

Element	Metal/non-metal	Bulb Light? (Y/N)
copper		
sulfur		
tin		
bromine		
chlorine		
lead		
aluminium		
hydrogen		
iron		
carbon		
carbon - graphite		

Was I successful?	Red	Yellow	Green
I can describe where on the periodic table metals and non-metals are.			
I can comment on the appearance of metals.			
I can link the uses of metals to their properties			

