

# Lesson 4: Elements and the Periodic Table

# Organizing the Elements in the Modern Periodic Table

- Most elements are **arranged by atomic number (A)**.
- The **lightest** element has the **lowest atomic number (A)**.
- Divided into **3 main groups**:
  - **METALS** (left-side)
  - **NON-METALS** (right-side)
  - **METALLOIDS** (step-like line that divides metals from non-metals)
- have the **properties of both metals and non-metals**.

**FAMILIES/GROUPS**

✓ arranged in columns

**PERIODS**

✓ arranged in horizontal  
row

- Use a **different colour** to identify each of the following group:
  - **Metals** (left-side)
  - **Non-metals** (right-side)
  - **Metalloids** (both sides of step-wise line that divides metals from non-metals)
- Label the **groups** (Group 1 to 18 - across) & **periods** (Period 1 to 7 - down).

**Period** →

**Group or Family** ↓

Alkaline earth metals												Halogens					Noble gases		
1 1A	2 2A											13 3A	14 4A	15 5A	16 6A	17 7A	18 8A		
1 H	2 He											3 Li	4 Be	5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg	3	4	5	6	7	8	9	10	11	12	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar		
Alkali metals		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 Act†	104 Unq	105 Unp	106 Unh	107 Uns	108 Uno	109 Une	110 Uun	111 Uuu							

\*Lanthanides

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
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† Actinides

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
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# Calculate the Number of Protons, Neutrons and Electrons

- To find out the number of **protons, electrons, and neutrons** from the **periodic table**:
- **NUMBER OF PROTONS = ATOMIC NUMBER (A)**
- **NUMBER OF ELECTRONS = NUMBER OF PROTONS = ATOMIC NUMBER (A)**
- **NUMBER OF NEUTRONS = MASS NUMBER (Z) – NUMBER OF PROTONS**
- because **Number of neutrons + number of protons = MASS NUMBER (Z)**

# Example 1

*Calculate # of protons, electrons, and neutrons for **Sodium**.*

- Number of **protons**:

- Sodium has an **atomic number** of 11.

- **# of protons** = **atomic number** = 11

- Number of electrons:

- An atom of an element (sodium) is **electrically neutral**, so

- **# of electrons** = **# of protons** = 11

- Number of neutrons:

- Sodium has **mass number** of 23.

- **# of neutrons** = **Mass number (Z)** – number of protons  
= 23 – 11 = 12

# Example 2

*Calculate # of protons, electrons, and neutrons for **Oxygen**.*

- Number of **protons**:
- Oxygen has an **atomic number** of
- 8.
- **# of protons = atomic number**
- = 8
- Number of **electrons**:
- An atom of an element (oxygen) is **electrically neutral**, so
- **# of electrons = # of protons**
- = 8
- Number of **neutrons**:
- Oxygen has **mass number** of
- 16.
- **# of neutrons = Mass number (Z) – number of protons**
- = 16-8=8