

BioMedical Admissions Test (BMAT)

Section 2: Chemistry

Topic C2: The Periodic Table

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Topic C2: The Periodic Table

The Periodic Table

- The periodic table can be used to **identify the chemical makeup of elements**; the number of electrons, protons and neutrons, as well as the number of electron shells and how the electrons are arranged in the shells. This information can be used to **predict properties** of elements.
- Elements are arranged in the periodic table in order of **ascending atomic number**.
- Elements are also arranged in “**groups**” (vertical columns) and “**periods**” (horizontal rows).
- Elements in the **same group** have the **same number of electrons in their outer shell**, **except** transition metals.
 - For example, all elements in group 2 have 2 electrons in their outer shell.
 - This also means that elements in the same group will have similar chemical properties.
- Elements in the **same period** have the **same number of shells of electrons**.

Worked Example:

| Group | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|----------|----------|----------|----------|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Period 1 | 1 H | | | | | | | | | | | | | | | | | 2 He |
| Period 2 | 3 Li | 4 Be | | | | | | | | | | | 5 B | 6 C | 7 N | 8 O | 9 F | 10 Ne |
| Period 3 | 11 Na | 12 Mg | | | | | | | | | | | 13 Al | 14 Si | 15 P | 16 S | 17 Cl | 18 Ar |
| Period 4 | 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 |
| Period 5 | 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 |
| Period 6 | 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 |
| Period 7 | 87 Fr | 88 Ra | 89 Ac | * 104 Rf | 105 Db | 106 Sg | 107 Bh | 108 Hs | 109 Mt | 110 Ds | 111 Rg | 112 Cn | 113 Nh | 114 Fl | 115 Mc | 116 Lv | 117 Ts | 118 Og |
| | | | | * 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 | |

- The blue rectangle is around a period.
- The orange rectangle shows a single group.
- Calcium (Ca) is in both Group 2 and Period 4

Image adapted from: https://en.m.wikipedia.org/wiki/File:Simple_Periodic_Table_Chart-en.svg





There are some groups which are important to know the names of:

| Group | Name |
|-------|-----------------------|
| 1 | Alkali Metals |
| 2 | Alkaline Earth Metals |
| 16 | Common Non-Metals |
| 17 | Halogens |
| 18 | Noble Gases |

More information on Groups 1, 17 and 18 can be found in Topic C7 - Group Chemistry.

The groups can provide information about the reactivity of compounds.

- **Reactivity increases down a metal group.**
 - This is because the electrons in the outermost shell are further from the nucleus and so it is easier to lose electrons to form a full outer shell.
- **Reactivity decreases down a non-metal group.**
 - This is because the outermost electrons are further from the nucleus so it is harder to gain an additional electron to achieve a full outer shell.
- Noble gases are **inert**. This means that they do not react easily because they already have a full outer shell of electrons.

