

## THE PERIODIC TABLE

25 FEBRUARY 2014



### Lesson Description

In this lesson we:

- Discuss the arrangement of elements in the periodic table.
- Practise working with electron configurations.
- Consider trends in the periodic table.



### Summary

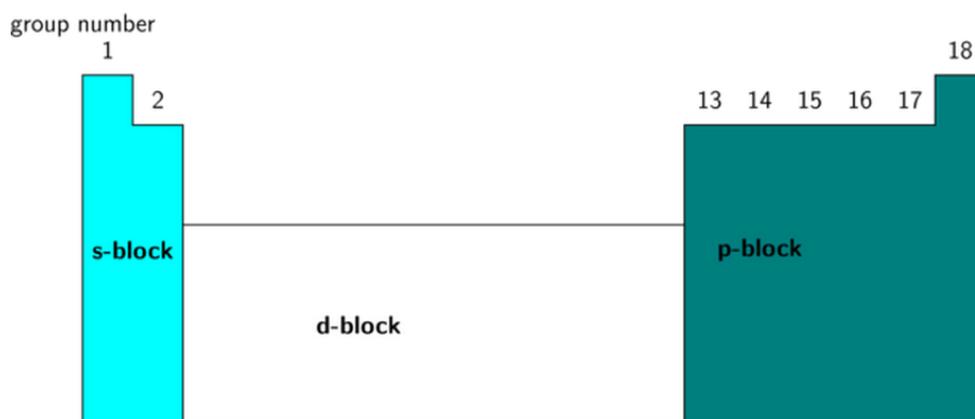
#### Periodic Table

Vertical columns – groups

Horizontal rows – periods

Elements are arranged in increasing atomic number.

Electron configuration – consider the arrangement of the periodic table.



Picture: [www.everythingscience.co.za](http://www.everythingscience.co.za)

Group number gives the number of valence electrons

Period gives the last energy level that is filled.

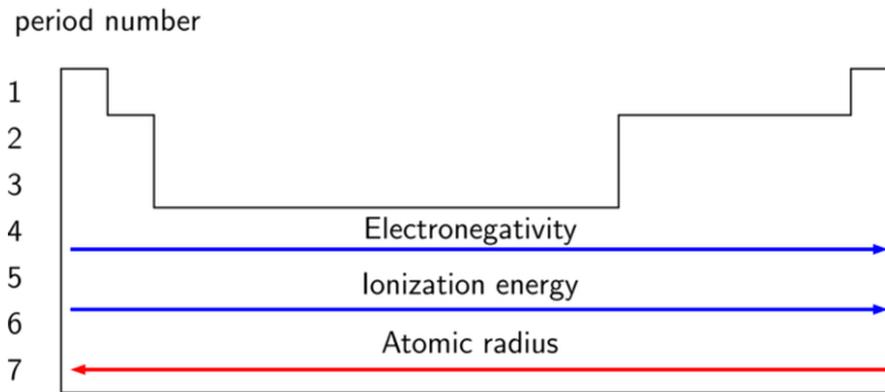
#### Trends in Periodic Table

##### Terminology

- **Atomic radius** = a measure of the size of an atom.
- **Ionisation energy** = the energy needed to remove one electron from an atom in the gas phase. Could also be used to define second, third ionisation energies.
- **Electronegativity** = the tendency of atoms to attract electrons.

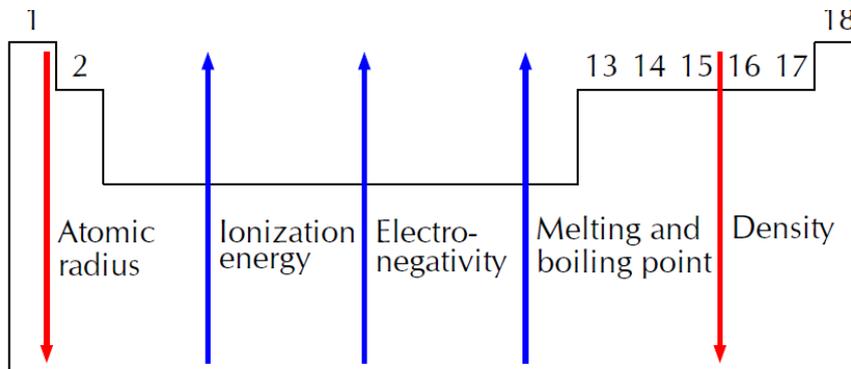
notes for...

Across the table i.e. along periods:



Picture: [www.everythingscience.co.za](http://www.everythingscience.co.za)

Down a column i.e. within a group:



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## Test Yourself

(Adapted from *Physical Science, Brink and Jones, 1997*)

### Question 1

Write down only the word/term for each of the following descriptions.

- A vertical column in the periodic table
- A horizontal row in the periodic table
- Energy needed to remove one electron from an atom

### Question 2

How many valence electrons do the following groups have?

- alkali metals
- alkali earth metals
- halogens

### Question 3

An element has an electron configuration  $1s^2 2s^2 2p^6 3s^2 3p^5$

- In which group is it found?
- In which period is it found?
- Identify this element as a metal or a non metal.
- Write the chemical name for this element.

### Question 4

Li, Na and Ca are all found in the first group in the periodic table. Explain why this is so.



## Improve your Skills

### Question 1

Consider the following electron configurations and answer the questions that follow using letters A – E where appropriate.

- $1s^2 2s^2 2p^6 3s^2 3p^4$
- $1s^2 2s^2 2p^6 3s^1$
- $1s^2 2s^2 2p^6 3s^2 3p^5$
- $1s^2 2s^2$
- $1s^2 2s^2 2p^6$
- $1s^2 2s^2 2p^1$

- Identify a halogen.
- Which element is found in the second period and the third group?
- Identify an alkali earth metal.
- Which will form positive ions when they bond?
- Comparing elements B and F; which will have the lowest 1<sup>st</sup> ionisation energy?
- Write the chemical name for element A.
- Which will have the electron configuration simplified to  $[\text{Ne}] 3s^1$

### Question 2

- Explain what is meant by the term *electronegativity*.
- Identify the trend observed in electronegativity as one moves across a period.



## Links

- [www.everythingscience.co.za](http://www.everythingscience.co.za)