

Structure of the Periodic Table

Aim:

- State that the periodic table is a list of all of the elements that exist
- State that all elements have an individual symbol and atomic number
- Understand that symbols are always an uppercase letter alone or an uppercase/lower case combination
- State that the elements can be classified as metal or non-metal
- State that horizontal rows are called periods
- State that vertical columns are called groups
- State that elements in the same group have similar chemical properties (react in a similar way)
- State the names of group 1(alkali metals), 7(halogens), 0(noble gases) and the central block (transition metals)
- State that the alkali metals are the most reactive metals
- State that the halogens are the most reactive non-metals
- State that the noble gases are completely unreactive

The Periodic table

The periodic table is a list of all known elements.

All elements have an individual symbol and atomic number.

Using the key it, it is easy to find this information on each element

Eg Chromium has an atomic number of 24 and its symbol is Cr
 -Xenon has an atomic number of 54 and its symbol is Xe

Column 1	Column 2		Column 3	Column 4	Column 5	Column 6	Column 7	Column 0										
1 Hydrogen H								2 Helium He										
3 Lithium Li	4 Beryllium Be																	
11 Sodium Na	12 Magnesium Mg																	
19 Potassium K	20 Calcium Ca	21 Scandium Sc	Key <div style="display: flex; justify-content: center; gap: 10px;"> <div style="border: 1px solid black; padding: 2px;">Atomic Number</div> <div style="border: 1px solid black; padding: 2px;">Name of Element</div> <div style="border: 1px solid black; padding: 2px;">Symbol</div> </div> <div style="border: 1px solid black; padding: 2px; margin-top: 10px; display: inline-block;">TRANSITION METALS</div>															
37 Rubidium Rb	38 Strontium Sr	39 Yttrium Y	40 Zirconium Zr	41 Niobium Nb	42 Molybdenum Mo	43 Technetium Tc	44 Ruthenium Ru	45 Rhodium Rh	46 Palladium Pd	47 Silver Ag	48 Cadmium Cd	49 Indium In	50 Tin Sn	51 Antimony Sb	52 Tellurium Te	53 Iodine I	54 Xenon Xe	
55 Caesium Cs	56 Barium Ba	57 Lanthanum La	58-71 ●	72 Hafnium Hf	73 Tantalum Ta	74 Tungsten W	75 Rhenium Re	76 Osmium Os	77 Iridium Ir	78 Platinum Pt	79 Gold Au	80 Mercury Hg	81 Thallium Tl	82 Lead Pb	83 Bismuth Bi	84 Polonium Po	85 Astatine At	86 Radon Rn
87 Francium Fr	88 Radium Ra	89 Actinium Ac	90-103 ■	104 Rutherfordium Rf	105 Dubnium Db	106 Seaborgium Sg	107 Bohrium Bh	108 Hassium Hs	109 Meitnerium Mt	110 Darmstadtium Ds	111 Roentgenium Rg	112 Copernicium Cn	114 Flerovium Fl			116 Livermorium Lv		
				58 Cerium Ce	59 Praseodymium Pr	60 Neodymium Nd	61 Promethium Pm	62 Samarium Sm	63 Europium Eu	64 Gadolinium Gd	65 Terbium Tb	66 Dysprosium Dy	67 Holmium Ho	68 Erbium Er	69 Thulium Tm	70 Ytterbium Yb	71 Lutetium Lu	
				90 Thorium Th	91 Protactinium Pa	92 Uranium U	93 Neptunium Np	94 Plutonium Pu	95 Americium Am	96 Curium Cm	97 Berkelium Bk	98 Californium Cf	99 Einsteinium Es	100 Fermium Fm	101 Mendelevium Md	102 Nobelium No	103 Lawrencium Lr	

Formatting of Symbols

It's very important to notice that each symbol is either just an uppercase letter on its own or an uppercase and lowercase letter together.

NEVER just lower case and NEVER two uppercase.

Name of Element	Symbol	Atomic Number
Magnesium	Mg	12
Chlorine	Cl	17
Uranium	U	92
Copper	Cu	29
Lead	Pb	82
Tin	Sn	50
Caesium	Cs	55
Europium	Eu	63

Metals and Non-Metals

Elements can be classified in many different ways.

Column 1 Column 2 Column 3 Column 4 Column 5 Column 6 Column 7 Column 0

1	2	TRANSITION METALS										13	14	15	16	17	18
Hydrogen H	Helium He											Aluminium Al	Silicon Si	Phosphorus P	Sulfur S	Chlorine Cl	Argon Ar
3 Lithium Li	4 Beryllium Be											31 Gallium Ga	32 Germanium Ge	33 Arsenic As	34 Selenium Se	35 Bromine Br	36 Krypton Kr
11 Sodium Na	12 Magnesium Mg	21 Scandium Sc	22 Titanium Ti	23 Vanadium V	24 Chromium Cr	25 Manganese Mn	26 Iron Fe	27 Cobalt Co	28 Nickel Ni	29 Copper Cu	30 Zinc Zn	49 Indium In	50 Tin Sn	51 Antimony Sb	52 Tellurium Te	53 Iodine I	54 Xenon Xe
19 Potassium K	20 Calcium Ca	39 Yttrium Y	40 Zirconium Zr	41 Niobium Nb	42 Molybdenum Mo	43 Technetium Tc	44 Ruthenium Ru	45 Rhodium Rh	46 Palladium Pd	47 Silver Ag	48 Cadmium Cd	81 Thallium Tl	82 Lead Pb	83 Bismuth Bi	84 Polonium Po	85 Astatine At	86 Radon Rn
37 Rubidium Rb	38 Strontium Sr	57 Lanthanum La	72 Hafnium Hf	73 Tantalum Ta	74 Tungsten W	75 Rhenium Re	76 Osmium Os	77 Iridium Ir	78 Platinum Pt	79 Gold Au	80 Mercury Hg	81 Thallium Tl	82 Lead Pb	83 Bismuth Bi	84 Polonium Po	85 Astatine At	86 Radon Rn
55 Caesium Cs	56 Barium Ba	58-71 Lanthanide series	72 Hafnium Hf	73 Tantalum Ta	74 Tungsten W	75 Rhenium Re	76 Osmium Os	77 Iridium Ir	78 Platinum Pt	79 Gold Au	80 Mercury Hg	81 Thallium Tl	82 Lead Pb	83 Bismuth Bi	84 Polonium Po	85 Astatine At	86 Radon Rn
87 Francium Fr	88 Radium Ra	89 Actinium Ac	104 Rutherfordium Rf	105 Dubnium Db	106 Seaborgium Sg	107 Bohrium Bh	108 Hassium Hs	109 Meitnerium Mt	110 Darmstadtium Ds	111 Roentgenium Rg	112 Copernicium Cn	114 Flerovium Fl	116 Livermorium Lv				
		58 Cerium Ce	59 Praseodymium Pr	60 Neodymium Nd	61 Promethium Pm	62 Samarium Sm	63 Europium Eu	64 Gadolinium Gd	65 Terbium Tb	66 Dysprosium Dy	67 Holmium Ho	68 Erbium Er	69 Thulium Tm	70 Ytterbium Yb	71 Lutetium Lu		
		90 Thorium Th	91 Protactinium Pa	92 Uranium U	93 Neptunium Np	94 Plutonium Pu	95 Americium Am	96 Curium Cm	97 Berkelium Bk	98 Californium Cf	99 Einsteinium Es	100 Fermium Fm	101 Mendelevium Md	102 Nobelium No	103 Lawrencium Lr		

Key: Atomic Number, Name of Element, Symbol

One of the main ways that elements are classified is into two main sets:







- Metals
- Non-metals

A thick line is often drawn onto the periodic table to separate these two sets.

Notice that Hydrogen is on the non-metal side of this line even though it's all the way over to the left

Properties of Metals and Non-Metals

Although there is a lot of variation in both the metals and non-metals, there are some properties that are common to each group.

Metals	Non-Metals
 <p>Metals are shiny when polished</p>	 <p>Non-metals have a variety of colours / appearances</p>
<p>Metals can be bent / hammered into shape</p> 	<p>Non-metals are brittle</p> 
 <p>Metals are good conductors of heat and electricity</p>	 <p>Non-metals are poor conductors of heat and electricity</p>

Groups and Periods

The periodic table is organised into PERIODS and GROUPS.

The Horizontal rows are called PERIODS

The vertical columns are called GROUPS.

There are 8 individual groups and the central block called the transition metals.

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10									
1 Hydrogen H	Key: Atomic Number, Name of Element, Symbol Period 1						2 Helium He											
3 Lithium Li	4 Beryllium Be	Period 2						5 Boron B	6 Carbon C	7 Nitrogen N	8 Oxygen O	9 Fluorine F	10 Neon Ne					
11 Sodium Na	12 Magnesium Mg	TRANSITION METALS Period 3						13 Aluminium Al	14 Silicon Si	15 Phosphorus P	16 Sulphur S	17 Chlorine Cl	18 Argon Ar					
19 Potassium K	20 Calcium Ca	21 Scandium Sc	22 Titanium Ti	23 Vanadium V	24 Chromium Cr	25 Manganese Mn	26 Iron Fe	27 Cobalt Co	28 Nickel Ni	29 Copper Cu	30 Zinc Zn	31 Gallium Ga	32 Germanium Ge	33 Arsenic As	34 Selenium Se	35 Bromine Br	36 Krypton Kr	
37 Rubidium Rb	38 Strontium Sr	39 Yttrium Y	40 Zirconium Zr	41 Niobium Nb	42 Molybdenum Mo	43 Technetium Tc	44 Ruthenium Ru	45 Rhodium Rh	46 Palladium Pd	47 Silver Ag	48 Cadmium Cd	49 Indium In	50 Tin Sn	51 Antimony Sb	52 Tellurium Te	53 Iodine I	54 Xenon Xe	
55 Caesium Cs	56 Barium Ba	57 Lanthanum La	58-71 Lanthanides	72 Hafnium Hf	73 Tantalum Ta	74 Tungsten W	75 Rhenium Re	76 Osmium Os	77 Iridium Ir	78 Platinum Pt	79 Gold Au	80 Mercury Hg	81 Thallium Tl	82 Lead Pb	83 Bismuth Bi	84 Polonium Po	85 Astatine At	86 Radon Rn
87 Francium Fr	88 Radium Ra	89 Actinium Ac	90-103 Actinides	104 Rutherfordium Rf	105 Dubnium Db	106 Seaborgium Sg	107 Bohrium Bh	108 Hassium Hs	109 Meitnerium Mt	110 Darmstadtium Ds	111 Roentgenium Rg	112 Copernicium Cn	114 Flerovium Fl	116 Livermorium Lv				

● 58 Cerium Ce	These two rows can be ignored here! Ask your teacher about them later or try to research why at a later date!	71 Lutetium Lu
■ 90 Thorium Th		103 Lawrencium Lr

Checking Understanding of Groups and Periods

Write down any two elements in the same group:

Write down any two elements in the same period:

Write down any two METALS in the same period:

Write down any two NON-METALS in the same group:

Write down any two elements in period 4:

Write down any two elements in group 2:

Write down any two METALS in the group 3:

Write down any two NON-METALS in the period 6:

Checking Understanding of Groups and Periods

Write down any two elements in the same group:

any two in the same vertical column

Write down any two elements in the same period:

any two in the same horizontal row

Write down any two METALS in the same period:

any two in the same horizontal row that ALSO appear on the LHS of the thick line

Write down any two NON-METALS in the same group:

any two in the same vertical column that ALSO appear on the RHS of the thick line

Write down any two elements in period 4:

Any two from the row that starts with K and ends in Kr

Write down any two elements in group 2:

Any two from : Be, Mg, Ca, Sr, Ba or Ra

Write down any two METALS in the group 3:

Any two from : Al, Ga, In or Tl

Write down any two NON-METALS in the period 6:

At and Rn

Names of Groups

Some of the groups have names and you need to be aware of. These are: Group 1,7,0 and the middle block.

Note that hydrogen is NOT an alkali metal even though it is often added to the top of group 1

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11 Sodium Na	12 Magnesium Mg											13 Aluminium Al	14 Silicon Si	15 Phosphorus P	16 Sulfur S	17 Chlorine Cl	18 Argon Ar	
19 Potassium K	20 Calcium Ca	TRANSITION METALS										31 Gallium Ga	32 Germanium Ge	33 Arsenic As	34 Selenium Se	35 Bromine Br	36 Krypton Kr	
37 Rubidium Rb	38 Strontium Sr	21 Scandium Sc		22 Titanium Ti	23 Vanadium V	24 Chromium Cr	25 Manganese Mn	26 Iron Fe	27 Cobalt Co	28 Nickel Ni	29 Copper Cu	30 Zinc Zn	49 Indium In	50 Tin Sn	51 Antimony Sb	52 Tellurium Te	53 Iodine I	54 Xenon Xe
55 Caesium Cs	56 Barium Ba	39 Yttrium Y		40 Zirconium Zr	41 Niobium Nb	42 Molybdenum Mo	43 Technetium Tc	44 Ruthenium Ru	45 Rhodium Rh	46 Palladium Pd	47 Silver Ag	48 Cadmium Cd	81 Thallium Tl	82 Lead Pb	83 Bismuth Bi	84 Polonium Po	85 Astatine At	86 Radon Rn
87 Francium Fr	88 Radium Ra	57 Lanthanum La	58-71	72 Hafnium Hf	73 Tantalum Ta	74 Tungsten W	75 Rhenium Re	76 Osmium Os	77 Iridium Ir	78 Platinum Pt	79 Gold Au	80 Mercury Hg	114 Flerovium Fl		116 Livermorium Lv			
		89 Actinium Ac	90-103	104 Rutherfordium Rf	105 Dubnium Db	106 Seaborgium Sg	107 Bohrium Bh	108 Hassium Hs	109 Meitnerium Mt	110 Darmstadtium Ds	111 Roentgenium Rg	112 Copernicium Cn						

Key

Atomic Number
Name of Element
Symbol

Group 0 is called the NOBLE GASES. This is the most UNREACTIVE group of ALL ELEMENTS

Group 1 is called the ALKALI METALS. This is the most reactive group of METALS

Group 7 is called the HALOGENS. This is the most REACTIVE group of NON-METALS

Elements in the Same Group – Chemical Properties

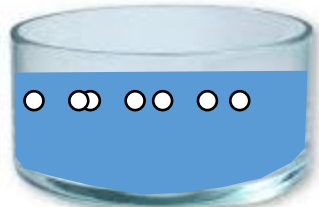
Element in the same group, share similar chemical properties (this means they react in a similar way)

All of group 1 are very reactive

Column 1	Column 2											Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	
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11 Sodium Na	12 Magnesium Mg	TRANSITION METALS										13 Aluminium Al	14 Silicon Si	15 Phosphorus P	16 Sulfur S	17 Chlorine Cl	18 Argon Ar	
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87 Francium Fr	88 Radium Ra	89 Actinium Ac	90-103 ■	104 Rutherfordium Rf	105 Dubnium Db	106 Seaborgium Sg	107 Bohrium Bh	108 Hassium Hs	109 Meitnerium Mt	110 Darmstadtium Ds	111 Roentgenium Rg	112 Copernicium Cn	114 Flerovium Fl	116 Livermorium Lv				

Key
Atomic Number
Name of Element
Symbol

Helium does nothing!
Neon does nothing!
All of group 0 are very unreactive!
Argon does nothing!
Krypton does nothing!
Xenon does nothing!
Radon does nothing!



Radon is a noble gas, but it is very radioactive and poisonous!
Hydrogen gas and creating an alkali

All of group 7 are very reactive



Checking Understanding of Groups and Periods

Write down any two alkali metals:

Write down any two UNREACTIVE ELEMENTS:

What element might react like sodium?:

Write down any two halogens:

Write down any two Noble Gases:

Write down any elements that might react like magnesium:

Write down any METAL that react like aluminium:

Write down any NON-METAL that might react like oxygen:

Checking Understanding of Groups and Periods

Write down any two alkali metals:

any two from: Li, Na, K, Rb, Cs, Fr

Write down any two UNREACTIVE ELEMENTS:

He, Ne, Ar, Kr, Xe, Rn

What element might react like sodium?:

any from: Li, K, Rb, Cs, Fr

Write down any two halogens:

F, Cl, Br, I, At

Write down any two Noble Gases:

Any two from He, Ne, Ar, Kr, Xe, Rn

Write down any elements that might react like magnesium:

Any from : Be, Ca, Sr, Ba or Ra

Write down any METAL that might react like aluminium:

Any two from : Ga, In or Tl

Write down any NON-METAL that might react like oxygen:

Any from S, Se, Te

Questions

1. What name is given to a list of all of the elements currently known?
2. What is the symbol and atomic number of mercury?
3. Write down the symbols for all the metals found in period 2.
4. Write down the symbols for all the non- metals found in group 4.
5. Why are electrical wires made from metals?
6. Write the names for groups 1, 7, 0 and the central block.
7. Write the name of the most reactive group of metals.
8. Write the name of the most reactive group of non-metals.
9. Name the most unreactive group of elements.
10. Write down the symbols of 2 elements with similar chemical properties

Questions

1. What name is given to a list of all of the elements currently known?

Periodic Table

2. What is the symbol and atomic number of mercury?

Hg and 80

3. Write down the symbols for all the metals found in period 2.

Li and Be

4. Write down the symbols for all the non- metals found in group 4.

C and Si

5. Why are electrical wires made from metals?

Metals conduct electricity

6. Write the names for groups 1, 7, 0 and the central block.

1-alkali metals 7-halogens 0-noble gases

Central –transition metals

7. Write the name of the most reactive group of metals.

Alkali metals

8. Write the name of the most reactive group of non-metals.

Halogens

9. Name the most unreactive group of elements.

Noble Gases

10. Write down the symbols of 2 elements with similar chemical properties

Any two in same group