

# Wigston College

## A level Chemistry - Transition Pack

Name: .....



	Topic	Score
<b>Skills</b>	Laboratory equipment	
	Balancing equations	
	Chemical formulae	
	Significant figures and decimal places	
	Rearranging equations and units	
<b>Calculations</b>	Moles and mass	
	Moles and concentration	
	Titrations	
	Gas volumes	
<b>Transition</b>	Oxidation and reduction	
	Electronic structure	
	Shapes of molecules	

<b>Total</b>	
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## Introduction

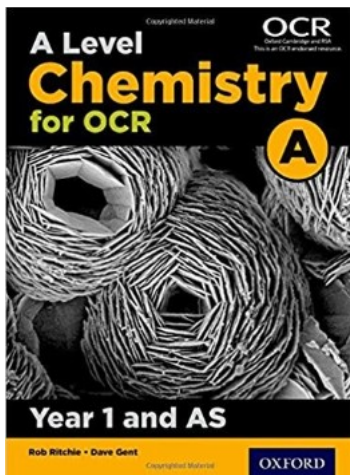
This pack contains a range of activities and resources to prepare you to start A level in Chemistry in September. It is aimed to be used after you complete your GCSE, throughout the remainder of the summer term and over the summer holidays to ensure you are ready to start your course in September.

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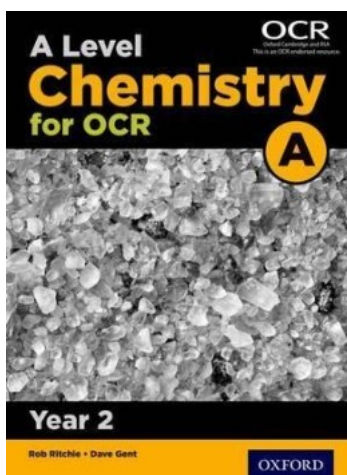
## Course textbook

You will need to buy the course textbook for OCR Chemistry A to enable you to study both in and out of lessons. You can buy one of the following options:

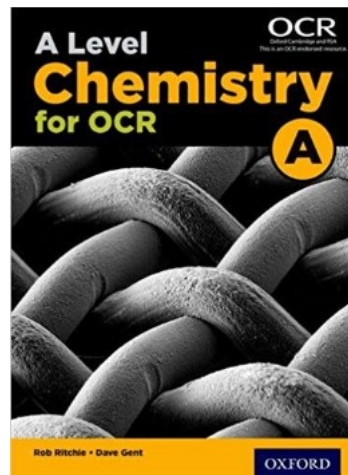
Year 1 and Year 2 books separately or the complete 2 year course in one book:



and



or



ISBN 978-0-19-835196-2

ISBN 978-0-19-835765-0

ISBN 978-0-19-835197-9

## Equipment checklist

For your first lesson after Summer, make sure you have the following:

- Course textbook (either the Year1 book or the complete 2 Year course book)
- A ring binder
- File dividers
- Scientific calculator
- Paper
- Pencil
- 30 cm ruler
- Pens – including a purple pen for marking and corrections

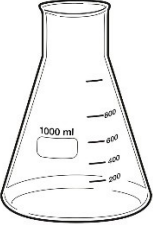
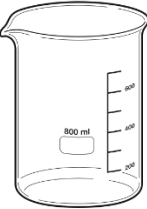

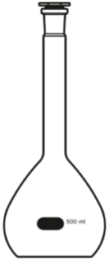

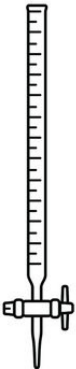


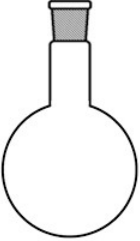



## Skill 1: Laboratory equipment

Practical work is a key aspect in the work of a chemist.

At A-level, you will be expected to plan your own practical work, so it is important that you are familiar with the common laboratory equipment available to you.

For each piece of equipment, state its name and its use.

	Name:  Use:		Name:  Use:
	Name:  Use:		Name:  Use:
	Name:  Use:		Name:  Use:
	Name:  Use:		Name:  Use:
	Name:  Use:		Name:  Use:

Score	/1 0
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## Skill 2: Balancing equations

Balancing chemical equations is the stepping stone to using equations to calculate masses in chemistry. There are loads of websites that give ways of balancing equations and lots of exercises in balancing.

<https://www.bbc.co.uk/bitesize/guides/zg2h4qt/revision/6>

Some of the equations to balance may involve strange chemicals- don't worry about that, the key idea is to get balancing right.

Balance the equations below.

- .....C + .....O<sub>2</sub> → .....CO
- .....Ba + .....H<sub>2</sub>O → .....Ba(OH)<sub>2</sub> + .....H<sub>2</sub>
- .....C<sub>2</sub>H<sub>6</sub> + .....O<sub>2</sub> → .....CO<sub>2</sub> + .....H<sub>2</sub>O
- .....HCl + .....Mg(OH)<sub>2</sub> → .....MgCl<sub>2</sub> + H<sub>2</sub>O
- .....N<sub>2</sub> + .....O<sub>2</sub> → .....NO
- .....Fe<sub>2</sub>O<sub>3</sub> + .....C → .....Fe + .....CO<sub>2</sub>
- .....CH<sub>3</sub>CH<sub>2</sub>OH + .....[O] → .....CH<sub>3</sub>COOH + .....H<sub>2</sub>O
- .....HNO<sub>3</sub> + .....CuO → .....Cu(NO<sub>3</sub>)<sub>2</sub> + H<sub>2</sub>O
- .....Al<sup>3+</sup> + .....e<sup>-</sup> → .....Al
- .....[Fe(H<sub>2</sub>O)<sub>6</sub>]<sup>3+</sup> + .....CO<sub>3</sub><sup>2-</sup> → .....Fe(OH)<sub>3</sub>(H<sub>2</sub>O)<sub>3</sub> + .....CO<sub>2</sub> + .....H<sub>2</sub>O

(10 marks)

Score	/1 0
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### Skill 3: Chemical formulae

A chemical formula is a useful shorthand method for describing the atoms in a chemical. Sometimes you will see the formula used instead of the name, but you should not do this if you are asked for a name.

Use the data in the table Symbols and charges of common elements and ions at the back of this booklet to write the formulae of the following.

1. Sodium hydroxide

.....

2. Lithium carbonate

.....

3. Potassium sulfate

.....

4. Barium nitrate

.....

5. Calcium nitride

.....

6. Iron(III) oxide

.....

7. Ammonium chloride

.....

8. Potassium manganate(VII)

.....

9. Potassium chlorate(I)

.....

10. Sodium dichromate(VI)

.....

Score	/10
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**Skill 4: Significant figures, decimal places and rounding**

For each of the numbers in questions 1–6, state the number of significant figures and the number of decimal places.

		<b>Significant figures</b>	<b>Decimal places</b>
<b>1</b>	3.131 88		
<b>2</b>	1000		
<b>3</b>	0.000 65		
<b>4</b>	1006		
<b>5</b>	560.0		
<b>6</b>	0.000 480		

(6 marks)

Round the following numbers to (i) 3 significant figures and (ii) 2 decimal places.

1. 0.075 84

2. 231.456

(4 marks)

Score	/1 0
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### Skill 5: Rearranging equations and converting units

1. The amount of substance in moles ( $n$ ) in a solution can be calculated when the concentration given in  $\text{mol/dm}^3$  ( $c$ ) and volume ( $v$ ) in  $\text{dm}^3$  are known by using the equation:

$$n = cv$$

- a. Rearrange this equation making  $c$  the subject of the equation. (1 mark)
- b. Rearrange this equation making  $v$  the subject of the equation. (1 mark)

2. The density of a substance can be calculated from its mass ( $m$ ) and volume ( $v$ ) using the equation:

$$\text{density} = \frac{\text{mass}(g)}{\text{volume}(cm^3)}$$

- a. Rearrange this equation so that the mass of a substance can be calculated given its density and volume. (1 mark)
- b. Determine the units for density (1 mark)
3. A block of iron has a length of 1.2 cm. Calculate its length in metres (1 mark)
4. The width of the classroom is 7200 cm. Calculate its length in metres. (1 mark)
5. A reaction reaches completion after 4.5 minutes. Convert this time into seconds. (1 mark)
6. The stop clock reads 2 min 34 s. Convert this time into seconds. (1 mark)
7. A paper reports that 0.0265 kg of copper oxide was added to an excess of sulfuric acid. Convert this mass of copper oxide into grams. (1 mark)
8. A packet of aspirin tablets states that each tablet contains 75 mg of aspirin. Calculate the minimum number of tablets that contain a total of 1 g of aspirin. (1 mark)

Score	/1 0
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### Calculation 1: Moles and mass

From this point on you need to be using an A level periodic table, not a GCSE one. You can find one at the back of this pack.

One mole of a substance is equal to  $6.02 \times 10^{23}$  atoms, ions or particles of that substance. This number is called the **Avogadro constant**.

The value of the Avogadro constant was chosen so that the relative formula mass of a substance weighed out in grams is known to contain exactly  $6.02 \times 10^{23}$  particles. We call this mass its **molar mass**.

We can use the equation below when calculating an amount in moles:

$$\begin{array}{c} \text{amount of substance} \\ \text{(mol)} \end{array} = \frac{\text{mass (g)}}{\text{molar mass} \\ \text{(g mol}^{-1}\text{)}}$$

Use the equation above to help you answer the following questions.

1. Calculate the amount of substance, in moles, in: (3 marks)
- 32 g of methane,  $\text{CH}_4$  (molar mass,  $16.0 \text{ g mol}^{-1}$ )
  - 175 g of calcium carbonate,  $\text{CaCO}_3$
  - 200 mg of aspirin,  $\text{C}_9\text{H}_8\text{O}_4$

2. Calculate the mass in grams of: (3 marks)
- 20 moles of glucose molecules (molar mass,  $180 \text{ g mol}^{-1}$ )
  - $5.00 \times 10^{-3}$  moles of copper ions,  $\text{Cu}^{2+}$
  - 42.0 moles of hydrated copper sulfate,  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$

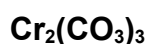
3. 3.09 g of a transition metal carbonate was known to contain 0.0250 mol. (1 mark)
- a. Determine the molar mass of the transition metal carbonate.

b. Choose the most likely identity for the transition metal carbonate from the list below:



(1 mark)

4. 4.26 g of a sample of chromium carbonate was known to contain 0.015 mol. (2 marks)
- Which of the following is the correct formula for the chromium carbonate?



Score	/10
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## Calculation 2: Moles and concentration

To calculate the concentration of a solution we use the equation:

$$\text{concentration (mol dm}^{-3}\text{)} = \frac{\text{amount of substance (mol)}}{\text{volume (dm}^3\text{)}}$$

Use the equation to help you complete each of the statements in the questions below.

1. 1.5 mol of NaCl dissolved in 0.25 dm<sup>3</sup> of water produces a solution with a concentration of \_\_\_\_\_ mol dm<sup>-3</sup>. (1 mark)
2. 250 cm<sup>3</sup> of a solution of HCl(aq) with a concentration of 0.0150 mol dm<sup>-3</sup> contains \_\_\_\_\_ moles. (1 mark)
3. A solution with a concentration of 0.85 mol dm<sup>-3</sup> that contains 0.125 mol has a volume of \_\_\_\_\_ dm<sup>3</sup>. (1 mark)

In this question you will need to convert between an amount in moles and a mass as well as using the equation above.

4. 5.0 g of NaHCO<sub>3</sub> dissolved in 100 cm<sup>3</sup> of water produces a solution with a concentration of mol dm<sup>-3</sup>. (2 marks)
5. 25.0 cm<sup>3</sup> of a solution of NaOH(aq) with a concentration of 3.8 mol dm<sup>-3</sup> contains g of NaOH. (2 marks)
6. The volume of a solution of cobalt(II) chloride, CoCl<sub>2</sub>, with a concentration of 1.3 mol dm<sup>-3</sup> that contains 2.5 g of CoCl<sub>2</sub> is cm<sup>3</sup>. (3 marks)

Score	/10
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## Calculation 3: Titrations

One key skill in A level chemistry is the ability to carry out accurate titrations. You may well have carried out a titration at GCSE, at A level you will have to carry them out very precisely and be able to describe in detail how to carry out a titration - there will be questions on the exam paper about how to carry out practical procedures.

<http://bit.ly/pixlchem11>

[http://www.bbc.co.uk/schools/gcsebitesize/science/triple\\_aqa/further\\_analysis/analysing\\_substances/revision/4/](http://www.bbc.co.uk/schools/gcsebitesize/science/triple_aqa/further_analysis/analysing_substances/revision/4/)

Remember for any titration calculation you need to have a balanced symbol equation; this will tell you the ratio in which the chemicals react.

### Worked example

E.g. a titration of an unknown sample of sulfuric acid with sodium hydroxide.

A 25.00 cm<sup>3</sup> sample of the unknown sulfuric acid was titrated with 0.100 mol dm<sup>-3</sup> sodium hydroxide and required exactly 27.40 cm<sup>3</sup> for neutralisation. What is the concentration of the sulfuric acid?

**Step 1:** the equation  $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$

**Step 2:** the ratios  $2 : 1$

**Step 3:** how many moles of sodium hydroxide 27.40 cm<sup>3</sup> = 0.0274 dm<sup>3</sup>  
number of moles = c x v = 0.100 x 0.0274 = 0.00274 moles

**Step 4:** using the ratio, how many moles of sulfuric acid  
for every 2 moles of NaOH there is 1 mole of H<sub>2</sub>SO<sub>4</sub> so, we must have 0.00274/2 = 0.00137 moles of H<sub>2</sub>SO<sub>4</sub>

**Step 5:** calculate concentration.  
concentration = moles/volume in dm<sup>3</sup> = 0.00137/0.025 = 0.0548 mol dm<sup>-3</sup>

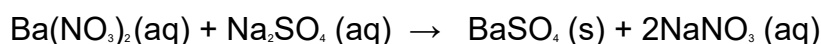
Here are some additional problems which are harder, ignore the questions about colour changes of indicators.

<http://bit.ly/pixlchem12>

<http://www.docbrown.info/page06/Mtestsnotes/ExtraVolCalcs1.htm>

Use the steps above to help you.

**Q1.** A solution of barium nitrate will react with a solution of sodium sulfate to produce a precipitate of barium sulfate.



What volume of 0.25 mol dm<sup>-3</sup> sodium sulfate solution would be needed to precipitate all of the barium from 12.5 cm<sup>3</sup> of 0.15 mol dm<sup>-3</sup> barium nitrate?

Score	/5
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#### Calculation 4: Gas volumes

Equal amounts in moles of any gas occupy the same volume under the same conditions of temperature and pressure.

The volume of 1 mole of any gas is 24 dm<sup>3</sup> or 24 000 cm<sup>3</sup> at room temperature and pressure (20 °C and 1 atmosphere).

Knowing this fact we can say that

$$\text{number of moles of gas} = \frac{\text{volume (dm}^3\text{)}}{24 \text{ dm}^3} \text{ or } \frac{\text{volume (cm}^3\text{)}}{24\,000 \text{ cm}^3}$$

1. Calculate the number of moles of gas present in each of the following volumes:

a. 96 dm<sup>3</sup> of helium, He (1 mark)

b. 0.06 dm<sup>3</sup> of argon, Ar (1 mark)

c. 48 000 cm<sup>3</sup> of hydrogen, H<sub>2</sub> (1 mark)

2. Calculate the following:

a.  $\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$  (2 marks)

the volume of H<sub>2</sub> produced in cm<sup>3</sup> when 0.5 mol of Mg reacts with excess acid

b.  $\text{CuCO}_3 \rightarrow \text{CuO} + \text{CO}_2$  (2 marks)

the volume of CO<sub>2</sub> produced in dm<sup>3</sup> when 2.5 mol of CuCO<sub>3</sub> undergoes thermal decomposition

c.  $\text{H}_2(\text{g}) + \text{Cl}_2(\text{g}) \rightarrow 2\text{HCl}(\text{g})$  (3 marks)

the volume of HCl produced in dm<sup>3</sup> from the reaction of 36 dm<sup>3</sup> of H<sub>2</sub> with an excess of Cl<sub>2</sub>

Score	/10
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## Transition 1: Oxidation and reduction

At GCSE you learnt that oxidation is adding oxygen to an atom or molecule and that reduction is removing oxygen, or that oxidation is removing hydrogen and reduction is adding hydrogen. You may have also learnt that oxidation is removing electrons and reduction is adding electrons.

At A level we use the idea of oxidation number a lot!

You know that the metals in group 1 react to form ions that are +1, i.e.  $\text{Na}^+$  and that group 7, the halogens, form -1 ions, i.e.  $\text{Br}^-$ .

We say that sodium, when it has reacted, has an oxidation number of +1 and that bromide has an oxidation number of -1. All atoms that are involved in a reaction can be given an oxidation number.

An element, Na or  $\text{O}_2$ , is always given an oxidation state of zero (0). Any element that has reacted has an oxidation state of + or -.

As gaining electrons is reduction, if, in a reaction the element becomes more negative it has been reduced, if it becomes more positive it has been oxidised.

You can read about the rules for assigning oxidation numbers here:

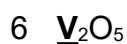
<http://www.dummies.com/how-to/content/rules-for-assigning-oxidation-numbers-to-elements.html>

Elements that you expect to have a specific oxidation state actually have different states, so for example you would expect chlorine to be -1. It can have many oxidation states:  $\text{NaClO}$ , in this compound it has an oxidation state of +1.

There are a few simple rules to remember:

- Metals have a + oxidation state when they react.
- Oxygen is 'king', it always has an oxidation state of -2 (except in hydrogen peroxide  $\text{H}_2\text{O}_2$ , when it has an oxidation number -1)
- Hydrogen has an oxidation state of +1 (except metal hydrides).
- The charges in a molecule must cancel.

Work out the oxidation state of the **underlined** atom in the following:



Score	/10
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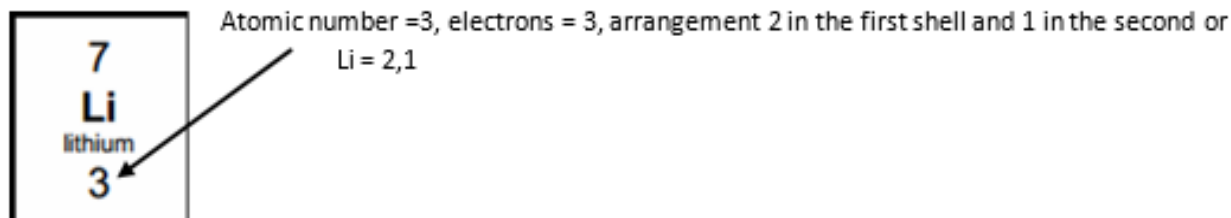
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## Transition 2: Electronic structure - how electrons are arranged around the nucleus

A periodic table can give you the proton / atomic number of an element, this also tells you how many electrons are in the atom.

You will have used the rule of electrons shell filling, where:

The first shell holds up to 2 electrons, the second up to 8, the third up to 8 and the fourth up to 18 (or you may have been told 8).



At A level you will learn that the electron structure is more complex than this and can be used to explain a lot of the chemical properties of elements.

The 'shells' can be broken down into 'orbitals', which are given letters: 's' orbitals, 'p' orbitals and 'd' orbitals.

You can read about orbitals here:

<http://bit.ly/pixlchem1>

<http://www.chemguide.co.uk/atoms/properties/atomorbs.html#top>

Now that you are familiar with s, p and d orbitals try these problems. Write your answer in the format:  $1s^2$ ,  $2s^2$ ,  $2p^6$  etc.

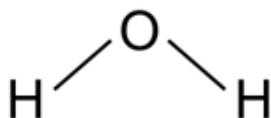
**Q1.** Write out the electron configuration of:

- a) Ca
- b) Al
- c) S
- d) Cl
- e) Ar
- f) Fe
- g) V
- h) Ni
- i) Cu

Score	/10
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### Transition 3: The shapes of molecules and bonding

Have you ever wondered why your teacher drew a water molecule like this?



The lines represent a covalent bond, but why draw them at an unusual angle? If you are unsure about covalent bonding, read about it here:

<http://bit.ly/pixlchem5>

<http://www.chemguide.co.uk/atoms/bonding/covalent.html#top>

At A level you are also expected to know how molecules have certain shapes and why they are the shape they are. You can read about shapes of molecules here:

<http://bit.ly/pixlchem6>

<http://www.chemguide.co.uk/atoms/bonding/shapes.html#top>

**Q1.** Draw a dot and cross diagram to show the bonding in a molecule of aluminium chloride ( $\text{AlCl}_3$ ).

**Q2.** Draw a dot and cross diagram to show the bonding in a molecule of ammonia ( $\text{NH}_3$ ).

**Q3.** Draw a dot and cross diagram to show the bonding in a molecule of methane ( $\text{CH}_4$ )?

**Q4.** What is the shape and the bond angles in a molecule of aluminium chloride ( $\text{AlCl}_3$ )?

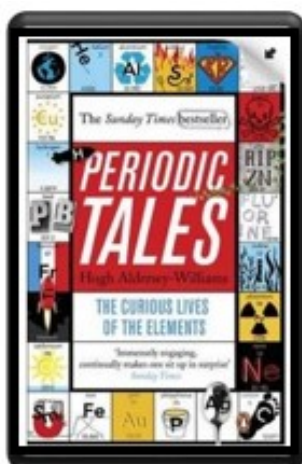
**Q5.** What is the shape and the bond angles in a molecule of ammonia ( $\text{NH}_3$ )?

**Q6.** What is the shape and the bond angles in a molecule of methane ( $\text{CH}_4$ )?

Score	/10
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## Additional reading

Kick back this Summer with a good read. The books below are popular science and great for extending your understanding of chemistry.

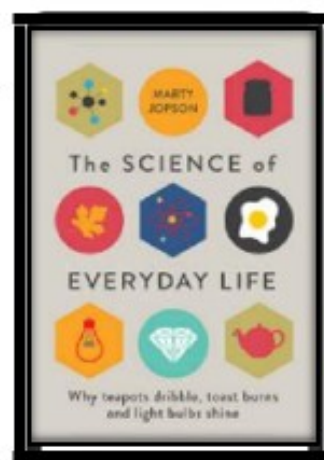


### Periodic Tales: The Curious Lives of the Elements

This book covers the chemical elements, where they come from and how they are used. There are loads of fascinating insights into uses for chemicals you would have never even thought about.

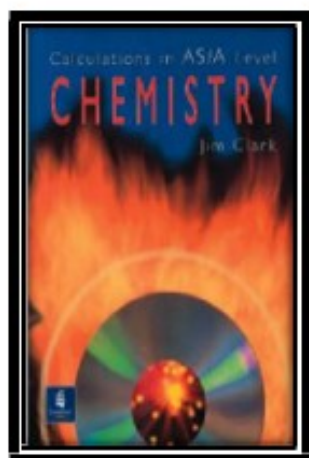
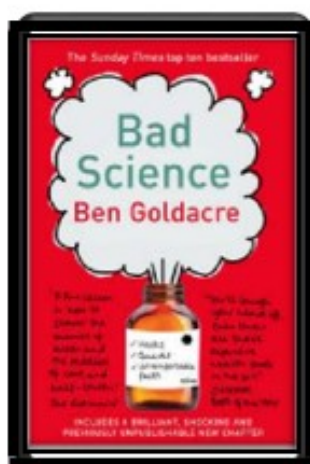
### The Science of Everyday Life: Why Teapots Dribble, Toast Burns and Light Bulbs Shine

The title says it all really, lots of interesting stuff about the things around your home!



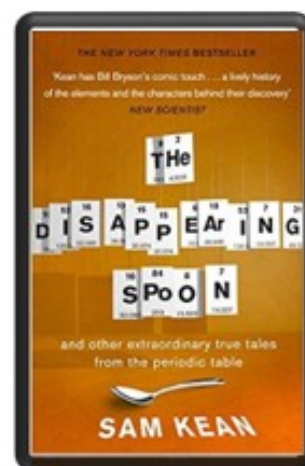
### Bad Science

Here Ben Goldacre takes apart anyone who published bad / misleading or dodgy science – this book will make you think about everything the advertising industry tries to sell you by making it sound 'sciencey'.



### Calculations in AS/A Level Chemistry

If you struggle with the calculations side of chemistry, this is the book for you. Covers all the possible calculations you are ever likely to come across. Brought to you by the same guy who wrote the excellent chemguide.co.uk website.



One of our crowning scientific achievements is also a treasure trove of passion, adventure, betrayal and obsession. **The Disappearing Spoon** follows the elements, their parts in human history, finance, mythology, conflict, the arts, medicine and the lives of the (frequently) mad scientists who discovered them.

# The Periodic Table of the Elements

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)												
		<b>Key</b> atomic number Symbol <small>name</small> relative atomic mass																											
1	2											3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
1 H hydrogen 1.0	2 He helium 4.0											3 Li lithium 6.9	4 Be beryllium 9.0											5 B boron 10.8	6 C carbon 12.0	7 N nitrogen 14.0	8 O oxygen 16.0	9 F fluorine 19.0	10 Ne neon 20.2
11 Na sodium 23.0	12 Mg magnesium 24.3											13 Al aluminum 27.0	14 Si silicon 28.1	15 P phosphorus 31.0	16 S sulfur 32.1	17 Cl chlorine 35.5	18 Ar argon 39.9												
19 K potassium 39.1	20 Ca calcium 40.1	21 Sc scandium 45.0	22 Ti titanium 47.9	23 V vanadium 50.9	24 Cr chromium 52.0	25 Mn manganese 54.9	26 Fe iron 55.8	27 Co cobalt 58.9	28 Ni nickel 58.7	29 Cu copper 63.5	30 Zn zinc 65.4	31 Ga gallium 69.7	32 Ge germanium 72.6	33 As arsenic 74.9	34 Se selenium 79.0	35 Br bromine 79.9	36 Kr krypton 83.8												
37 Rb rubidium 85.5	38 Sr strontium 87.6	39 Y yttrium 88.9	40 Zr zirconium 91.2	41 Nb niobium 92.9	42 Mo molybdenum 95.9	43 Tc technetium	44 Ru ruthenium 101.1	45 Rh rhodium 102.9	46 Pd palladium 106.4	47 Ag silver 107.9	48 Cd cadmium 112.4	49 In indium 114.8	50 Sn tin 118.7	51 Sb antimony 121.8	52 Te tellurium 127.6	53 I iodine 126.9	54 Xe xenon 131.3												
55 Cs cesium 132.9	56 Ba barium 137.3	57-71 lanthanoids	72 Hf hafnium 178.5	73 Ta tantalum 180.9	74 W tungsten 183.8	75 Re rhenium 186.2	76 Os osmium 190.2	77 Ir iridium 192.2	78 Pt platinum 195.1	79 Au gold 197.0	80 Hg mercury 200.6	81 Tl thallium 204.4	82 Pb lead 207.2	83 Bi bismuth 209.0	84 Po polonium	85 At astatine	86 Rn radon												
87 Fr francium	88 Ra radium	89-103 actinoids	104 Rf rutherfordium	105 Db dubnium	106 Sg seaborgium	107 Bh bohrium	108 Hs hassium	109 Mt meitnerium	110 Ds darmstadtium	111 Rg roentgenium	112 Cn copernicium	114 Fl flerovium	116 Lv livermorium																

57 La lanthanum 138.9	58 Ce cerium 140.1	59 Pr praseodymium 140.9	60 Nd neodymium 144.2	61 Pm promethium 144.9	62 Sm samarium 150.4	63 Eu europium 152.0	64 Gd gadolinium 157.2	65 Tb terbium 158.9	66 Dy dysprosium 162.5	67 Ho holmium 164.9	68 Er erbium 167.3	69 Tm thulium 168.9	70 Yb ytterbium 173.0	71 Lu lutetium 175.0
89 Ac actinium	90 Th thorium 232.0	91 Pa protactinium	92 U uranium 238.1	93 Np neptunium	94 Pu plutonium	95 Am americium	96 Cm curium	97 Bk berkelium	98 Cf californium	99 Es einsteinium	100 Fm fermium	101 Md mendelevium	102 No nobelium	103 Lr lawrencium

## Symbols and charges of common elements and ions

Elements	Symbol	Charge on ion	Ions	Symbol	Charge on ion
Aluminium	Al	+3	Ammonium	NH <sub>4</sub>	+1
Barium	Ba	+2	Carbonate	CO <sub>3</sub>	-2
Bromine	Br	-1	Hydrogen-carbonate	HCO <sub>3</sub>	-1
Calcium	Ca	+2	Hydrogen-sulfate	HSO <sub>3</sub>	-1
Chlorine	Cl	-1	Hydroxide	OH	-1
Cobalt	Co	+2	Nitrate	NO <sub>3</sub>	-1
Copper	Cu	+1 and 2	Nitrite	NO <sub>2</sub>	-1
Hydrogen	H	+1	Sulfate	SO <sub>4</sub>	-2
Iodine	I	-1	Sulfite	SO <sub>3</sub>	-2
Iron	Fe	+2 and 3	Chlorate(I)	ClO	-1
Lead	Pb	+2 and 4	Chlorate(V)	ClO <sub>3</sub>	-1
Magnesium	Mg	+2	Vanadate(V)	VO <sub>3</sub>	-1
Manganese	Mn	+2 and 4	Manganate(VII)	MnO <sub>4</sub>	-1
Mercury	Hg	+1 and 2	Chromate(VI)	CrO <sub>4</sub>	-2
Nitrogen	N	3 and 5	Dichromate(VI)	Cr <sub>2</sub> O <sub>7</sub>	-2
Oxygen	O	-2			
Potassium	K	+1			
Silver	Ag	+1			
Sodium	Na	+1			