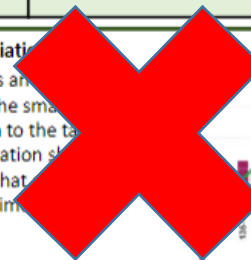
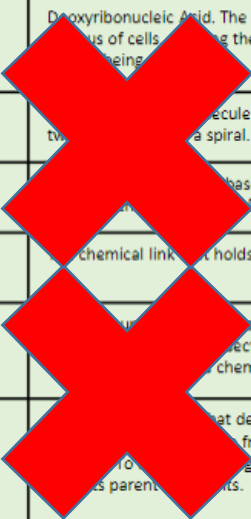


Year 8 Achievement check 1 resources

Please don't worry if you haven't covered some of
this in lessons you will get to it soon.

Biology

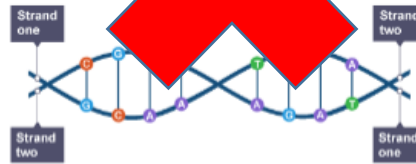
Keyword	Definition
Nucleus	Controls what happens inside the cell. Chromosomes are structures found in the nucleus of most cells.
DNA	Deoxyribonucleic Acid. The material inside the nucleus of cells that carries the genetic information of an organism.
Double Helix	A molecule with two strands twisted around each other in a spiral.
Base Pair	Chemical bases that connects the two strands of DNA.
Bond	Chemical link that holds molecules together.
Gene	A section of DNA which carries the instructions for making a particular protein or molecule.
Heredity	The passing on of characteristics from one generation to the next. Genes are passed from parents to offspring.
Variation	Difference between individuals.
Continuous Variation	Variation that shows a wide range of intermediate values between two extremes. They can be measured. E.g. Hand Span
Discontinuous Variation	Differences between individuals in a characteristic that can only be put into different categories. E.g. Eye colour
Environmental Variation	Differences between individuals of a species due to factors in their surroundings.



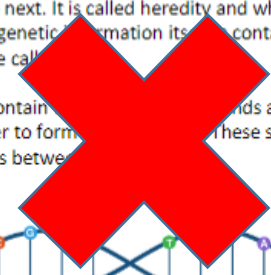
DNA

DNA is found in the nuclei of cells and organized into chromosomes. This genetic information is passed from one generation to the next. It is called heredity and why we resemble our parents. The genetic information is contained in a complex molecule called DNA.

DNA molecules contain two strands that are twisted around each other to form a double helix. These strands are held together by bonds between chemical bases.



A DNA molecule showing its base pairs, G-C and A-T



Inherited Variation

Variation in characteristics that is a result of genetic information passed from parents.

Examples include:

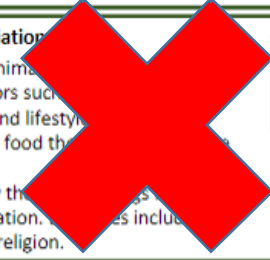
- Eye colour
- Hair colour
- Lobed or lobeless ears
- Ability to roll your tongue



Environmental Variation

Characteristics of animals that can be affected by factors such as accidents, culture and lifestyle.

If you eat too much food then you will become heavier. Variation caused by the environment. Examples include your language and religion.

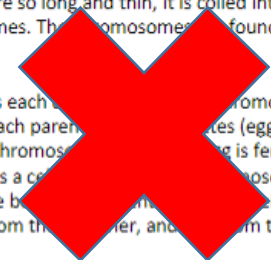


Chromosomes and Genes

DNA molecules are so long and thin, it is coiled into structures called chromosomes. These chromosomes are found in the nucleus of each cell.

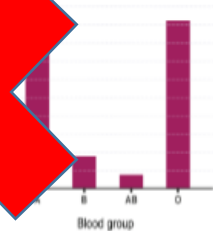
Human body cells each contain 46 chromosomes, half of which are from each parent. When an egg (egg and sperm) each contain 23 chromosomes. When an egg is fertilized by a sperm, it becomes a cell with 46 chromosomes. This is why children resemble both their mother and their father. Their chromosomes and DNA come from their mother, and half from their father.

A gene is a section of DNA that is responsible for characteristics such as eye colour. Humans have around 20,000 genes. One copy of all your chromosomes is called your genome.



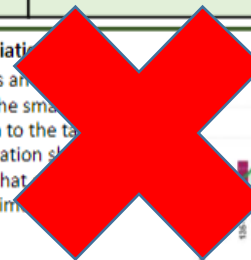
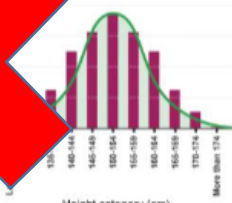
Discontinuous Variation

A characteristic of an organism that has only a limited number of possible values. Eye colour and blood group are examples.



Continuous Variation

Human height is an example of continuous variation. It ranges from the smallest person on Earth to the tallest. Continuous variation shows characteristics that change gradually over time.



Further Reading:

- <https://www.bbc.co.uk/bitesize/guides/zw9jq6f/revision/1>
- <https://www.bbc.co.uk/bitesize/guides/zp7thyc/revision/1>
- <https://www.bbc.co.uk/bitesize/guides/z9gk87h/revision/1>

Evolution

Extinction

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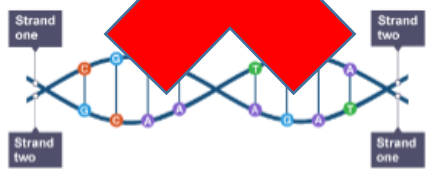
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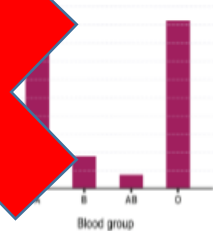
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A characteristic of an organism that has only a limited number of possible values. Eye colour and blood group are examples.



Further Reading:

- <https://www.bbc.co.uk/bitesize/guides/zw9jq6f/revision/1>
- <https://www.bbc.co.uk/bitesize/guides/zp7thyc/revision/1>
- <https://www.bbc.co.uk/bitesize/guides/z9gk87h/revision/1>

Inherited Variation

Variation in characteristics that is a result of genetic information from parents.

Examples include:

- Eye colour
- Hair colour
- Lobed or leafless ears
- Ability to roll your tongue

Environmental Variation

Characteristics of animals that can be affected by factors such as accidents, culture and lifestyle.

If you eat too much food that you are heavier.

Variation caused by the environment is called environmental variation. Examples include your language and religion.

Evolution

Change in the inherited characteristics of a population over time through a process of natural selection, which may result in the formation of a new species.

The theory of evolution by natural selection states that all species of living things have evolved from simple life forms that first developed more than three billion years ago.

Natural selection of variants that give rise to phenotypes best suited to their environment.

- Variation (mutation)
- Adaptation
- Survival & Reproduction

Extinction

The permanent loss of all the members of a species

Reasons for extinction:

- Introduction of a NEW disease
- Introduction of a NEW competitor
- Introduction of a NEW predator / overhunting
- Lack of food / prey
- Environmental change (temp., rainfall, loss of habitat etc.)
- Natural disaster

What is Biodiversity and how is it Maintained?

Biodiversity is

Deforestation and its Effect on Global Warming

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What is Biodiversity and how is it Maintained?

Biodiversity is the variety of all the different species of organisms on earth, or within an ecosystem.

The future of the human species on Earth relies on us maintaining a good level of biodiversity. Many human activities are reducing biodiversity and only recently have measures been taken to try to stop this reduction.

These include:

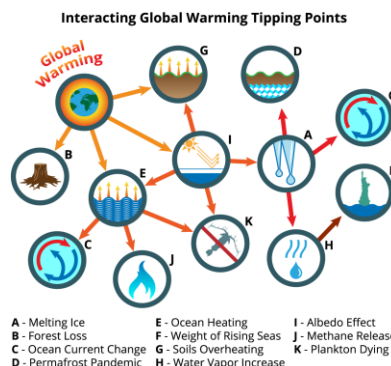
- breeding programmes for endangered species
- protection and regeneration of rare habitats
- reintroduction of field margins and hedgerows in agricultural areas where farmers grow only one type of crop
- reduction of deforestation and carbon dioxide emissions by some governments
- recycling resources rather than dumping waste in landfill.

Deforestation and its Effect on Global Warming

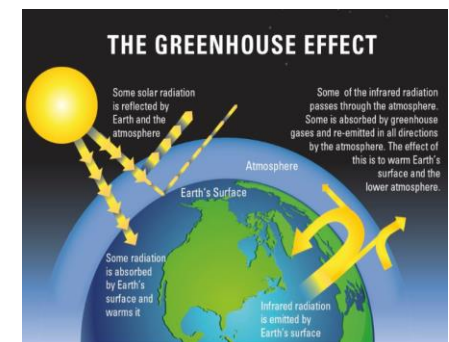
Large-scale deforestation in tropical areas has occurred to:

- provide land for **cattle** and **rice fields**
- grow crops for **biofuels**

You should be able to describe some of the biological consequences of global warming.



Levels of **carbon dioxide** and **methane** in the atmosphere are increasing, and contribute to 'global warming'.



Useful links for Biology:

- These are more general links for Year 8 students, as they should be connecting content from last year to this year
- <https://www.bbc.co.uk/bitesize/topics/zxhhvcw>
- <https://www.bbc.co.uk/bitesize/topics/zpffr82>
(ignore DNA section)
- <https://www.bbc.co.uk/bitesize/topics/zhssgk7>

Chemistry

Keyword	Definition
Periodic Table	
Atomic Number	
Periods	
Groups	
Element	
Compound	
Mixture	
Reactive	

The periodic table is arranged in rows called periods and columns called groups. Groups contain elements with similar chemical properties.

Group 1 – Alkali Metals

Group 2 – Alkali Earth Metals

Further Reading:

<https://www.bbc.com/bitesize/guides/z3vwxnb/revision/5>

<https://www.bbc.com/bitesize/guides/z84wjxs/revision/1>

Keyword	Definition
Periodic Table	A tabular representation of all known elements in order based on atomic number.
Atomic Number	The number of protons in the nucleus of an atom. Also called the proton number.
Periods	A horizontal row in the periodic table.
Groups	A vertical column in the periodic table containing elements with similar chemical properties.
Element	A substance made of only one type of atom.
Compound	A Substance where two or more elements have chemically joined together.
Mixture	Two or more substances that are not joined together. The substances can be elements, compounds or both.
Reactive	The tendency of a substance to undergo a chemical reaction.

Further Reading:

<https://www.bbc.com/bitesize/guides/z3vwxnb/revision/5>

<https://www.bbc.com/bitesize/guides/z84wjxs/revision/1>

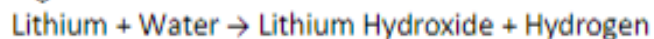
The periodic table is arranged in rows called periods and columns called groups. Groups contain elements with similar chemical properties.

Group 1 – Alkali Metals

Group 1 metals are very soft metals which can be cut with a knife. They have very low melting and boiling points and are very reactive compared to other metals. The elements become more reactive as you go down group 1.

When the group 1 metals react in water they produce a metal hydroxide and hydrogen gas.

E.g.



Group 2 – Alkali Earth Metals

Group 2 metals are reactive, but less reactive than group 1 elements.

Group 2 metals react with acids to produce a salt and hydrogen. The name of the salt depends on the acid used.

Hydrochloric Acid – Chloride

Sulfuric Acid – Sulfate

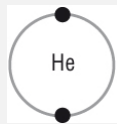
Nitric Acid - Nitrate

E.g.

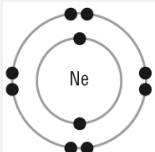


Group 2 metals become more reactive when you go down group 2.

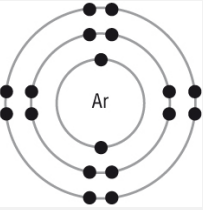
Group 0: The noble gases



All have full outer _____, which means ___ electrons in their outer shell apart from Helium which only has ___.



Full outer shell means they are _____ and do not easily form _____.



The _____ points of the noble gases _____ with increasing relative atomic mass (as you go _____ the group)

AQA
The Periodic Table of Elements

Colour in the correct groups

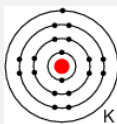
1	2											3	4	5	6	7	8	
Key																		
7	9	relative atomic mass															20	
Li	Be	atomic symbol															Ne	
3	4	atomic (proton) number															10	
11	12	Hydrogen 1															2	
23	24																35.5	40
Na	Mg																Ar	K
19	20																39	39
39	40	45	48	51	52	55	59	59	63.5	65	70	73	79	80	84	88		
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br		
85	88	89	91	93	96	101	103	106	108	112	115	119	122	128	127	131		
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I		
133	137	139	179	181	184	186	190	192	195	197	201	204	207	209	[209]	[210]		
Cs	Ba	La*	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At		
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85		
223	[226]	[227]	[261]	[262]	[266]	[264]	[277]	[268]	[271]	[272]	[285]	[286]	[289]	[293]	[294]	[294]		
Fr	Ra	Ac*	Rf	Rt	Dt	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv		
87	88	89	104	105	106	107	108	109	110	111	112	113	114	115	116	117		

* The Lanthanides (atomic numbers 58 – 71) and the Actinides (atomic numbers 90 – 103) have been omitted.
Relative atomic masses for Cu and Cl have not been rounded to the nearest whole number.

Group 1: The alkali metals



_____ reactive
All of the elements in group 1 have ___ electron in their outer shell this means they have _____ properties.



The reactivity of the elements _____ going down the group because the atoms get _____ and their outer electrons are _____ from the positive nucleus so they are more easily lost

Reaction with oxygen

Example word equation: _____ + oxygen → lithium oxide
Example symbol equation: $4\text{Li} + \text{O}_2 \rightarrow 2\text{Li}_2\text{O}$

Observations: Freshly cut metal tarnishes/ goes from _____ to _____.

Reaction with water

Example word equation: _____ + water → _____ hydroxide + _____
Example symbol equation: $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$

Observations: All _____ / bubble and move around the _____ of the water. All produce an _____ solution with the water. Potassium catches fire and has a _____ flame

Reaction with chlorine

Example word equation: _____ + chlorine → potassium chloride
Example symbol equation: $2\text{K} + \text{Cl}_2 \rightarrow 2\text{KCl}$

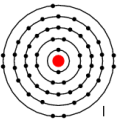
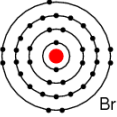
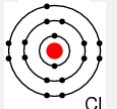
Colour in the correct group

AQA
The Periodic Table of Elements

Group 7: The halogens



_____ reactive
All of the elements in group 7 have ___ electrons in their outer shell this means they have similar _____.



The reactivity _____ going down the group because the atoms get bigger and it is _____ for them to gain an electron to fill their outer shell because the outer shell is further from the _____

_____ reactive Non-metals

All exist as _____ molecules eg Cl_2

As you go down the group the relative molecular mass, _____ point and _____ point increase

A more reactive halogen can _____ a less reactive halogen from an _____ solution of its salt.

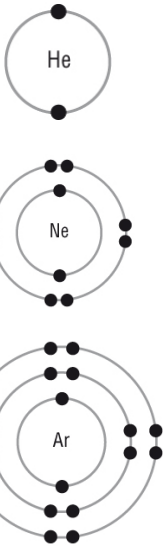
Eg) Chlorine + sodium bromide → bromine + sodium chloride

But ... Iodine + sodium bromide = no reaction

Colour in the correct group

AQA
The Periodic Table of Elements

Group 0: The noble gases



All have full outer shells, which means 8 electrons in their outer shell apart from Helium which only has 2.

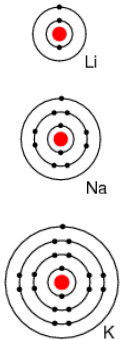
Full outer shell means they are unreactive and do not easily form molecules

The boiling points of the noble gases increase with increasing relative atomic mass (as you go down the group)

AQA The Periodic Table of Elements

* The Lanthanides (atomic numbers 58 – 71) and the Actinides (atomic numbers 90 – 103) have been omitted. Relative atomic masses for Cl and Cr have not been rounded to the nearest whole number.

Group 1: The alkali metals



Least reactive
All of the elements in group 1 have 1 electron in their outer shell this means they have similar properties.

Most reactive
The reactivity of the elements increases going down the group because the atoms get bigger and their outer electrons are further from the positive nucleus so they are more easily lost

Reaction with oxygen

Example word equation: Lithium + oxygen → lithium oxide
Example symbol equation: $4\text{Li} + \text{O}_2 \rightarrow 2\text{Li}_2\text{O}$

Observations: Freshly cut metal tarnishes/ goes from shiny to dull

Reaction with water

Example word equation: Sodium + water → sodium hydroxide + hydrogen
Example symbol equation: $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$

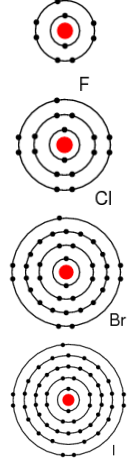
Observations: All fizz/ bubble and move around the surface of the water. All produce an alkaline solution with the water. Potassium catches fire and has a purple flame

Reaction with chlorine

Example word equation: potassium + chlorine → potassium chloride
Example symbol equation: $2\text{K} + \text{Cl}_2 \rightarrow 2\text{KCl}$

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Group 7: The halogens



Most reactive
All of the elements in group 7 have 7 electrons in their outer shell this means they have similar reactions.

Least reactive
The reactivity decreases going down the group because the atoms get bigger and it is harder for them to gain an electron to fill their outer shell because the outer shell is further from the nucleus

Non-metals
All exist as diatomic covalent molecules eg Cl_2

As you go down the group the relative molecular mass, boiling point and melting point increase

A more reactive halogen can displace a less reactive halogen from an aqueous solution of its salt.

Eg) Chlorine + sodium bromide → bromine + sodium chloride

But ... Iodine + sodium bromide = no reaction

AQA The Periodic Table of Elements

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Useful links for Chemistry:

- <https://www.bbc.co.uk/bitesize/topics/z9r4jxs>
- <https://www.bbc.co.uk/bitesize/topics/zstp34j/articles/zngddp3>
- <https://www.bbc.co.uk/bitesize/topics/zstp34j/articles/zc86m39>
- <https://www.bbc.co.uk/bitesize/topics/zstp34j/articles/zmsk4xs>
- <https://www.bbc.co.uk/bitesize/topics/zstp34j/articles/zqr4tv4>
- <https://www.bbc.co.uk/bitesize/topics/zych6g8>
- <https://www.bbc.co.uk/bitesize/topics/zv9nhcw/articles/zf4pp4j>
- <https://www.bbc.co.uk/bitesize/topics/zv9nhcw/articles/z8qrr2p>

Physics

Keyword	Definition
Ammeter	
Ampere	
Cell	
Conductor	
Electron	
Series Circuit	
Parallel Circuit	
Insulator	
Ohms	
Resistance	
Potential Difference	
Volt	
Voltmeter	

Circuit Symbols

Potential Difference

Series Circuit

Electric Charge

Parallel Circuit

Current

Equations To Remember

Resistance

Further Reading:

<https://www.bbc.co.uk/bitesize/guides/zsfgr82/revision/1>

Use the following link to set up some circuits using the simulation.

<https://phet.colorado.edu/en/simulation/circuit-construction-kit-dc-virtual-lab>

Keyword	Definition
Ammeter	A device used to measure electric charge.
Ampere	Unit of current. E.g. The current in the bulb is 4 amps or amperes (A).
Cell	A store of internal energy that can be transferred as an electric current in a circuit.
Conductor	A material which allows charge to move easily through it.
Electron	Sub atomic particle which flows in a circuit carrying a negative charge.
Series Circuit	A circuit connected in a way that the same current flows through each component in turn.
Parallel Circuit	In a parallel circuit, the current divides into two or more paths before recombining to complete the circuit.
Insulator	A material that does not allow charge or heat to pass through it easily.
Ohms	The unit of electrical resistance. Unit is Ω
Resistance	The opposition in an electrical component to the movement of electrical charge through it. Resistance is measured in ohms.
Potential Difference	The potential difference (or voltage) of a supply is a measure of the energy given to the charge carries in a circuit.
Volt	Unit of voltage. E.g. the voltage across the lamp was 6 volts (V).
Voltmeter	A device used to measure potential difference or voltage.

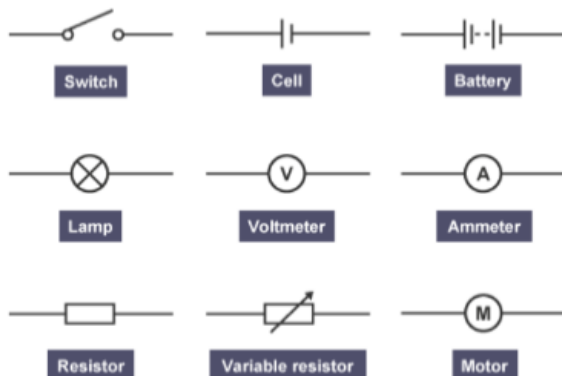
Further Reading:

<https://www.bbc.co.uk/bitesize/guides/zsfgr82/revision/1>

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<https://phet.colorado.edu/en/simulation/circuit-construction-kit-dc-virtual-lab>

Circuit Symbols



Electric Charge

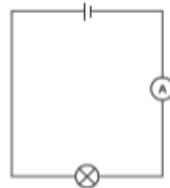
Some particles carry an electric charge. In electric wires these particles are called electrons. An electric current is a flow of charge, and in a wire this will be a flow of electrons.

For an electric current to flow we need:

- Something to transfer the energy to the electrons, such as a cell, battery or power pack.
- A complete path for the electrons to flow through (a complete circuit).

Current

Current is measured in amperes (A). 20A is a bigger current than 10A. An ammeter is used to measure the current. The ammeter must be connected in series.



Equations To Remember

Current

$$\text{Current} = \frac{\text{Charge}}{\text{time}} \quad I = \frac{Q}{t}$$

Current in Amps (A), Charge in Coulombs (C), Time in Seconds (s).

Potential Difference:

Potential Difference = Current x Resistance
 $V = I \times R$

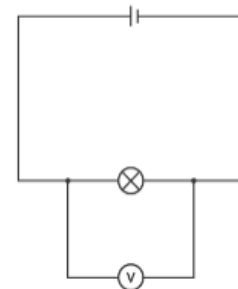
Potential difference in Volts (V), Resistance in Ohms (Ω), Current in Amps (A)

Potential Difference

Potential difference is a measure of the difference in energy between two parts of a circuit. The bigger the difference in energy, the bigger the potential difference.

Potential difference is measured in volts. A 230V is a bigger potential difference than 12V.

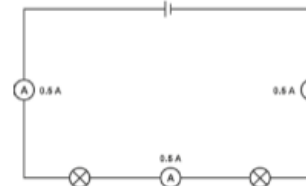
A voltmeter is used to measure the potential difference, and must be in parallel.



Series Circuit

In series circuits:

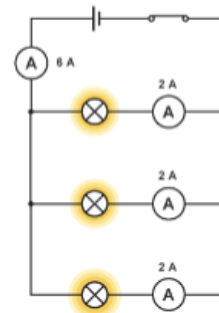
- You get several components one after another.
- If a component breaks, the circuit is broken and all the other components stop working.
- The current is the same everywhere in a series circuit no matter where you put the ammeter – it will give the same reading.



Parallel Circuit

In parallel circuits:

- Different components are connected on different branches.
- If a component breaks, the components on the different branches keep working.
- Unlike series, the lamps stay bright if you add more lamps in parallel.
- Current is shared between the components.



Resistance

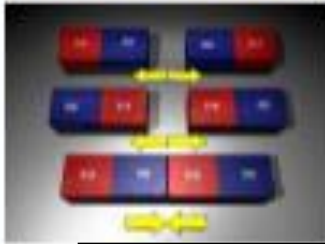
The wires and other components in a circuit reduce the flow of charge through them – this is resistance.

The resistance increases when you add more components in series.

The resistance of two lamps is greater than the resistance of one lamp, so less current will flow through them.

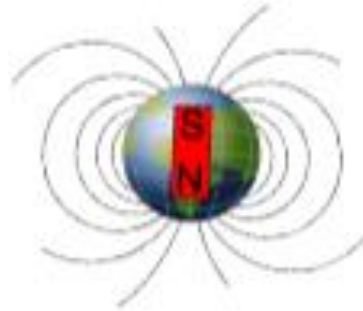


Magnetic materials ...

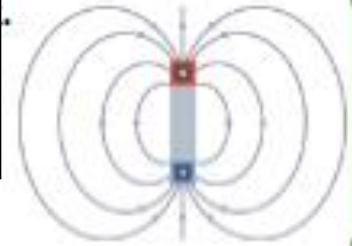


Unlike poles will . . .

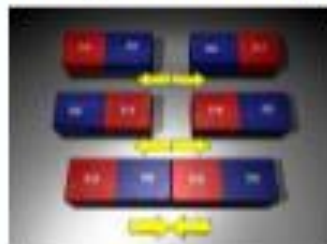
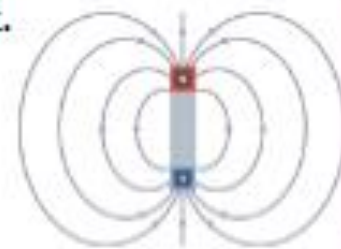
Like poles will ...



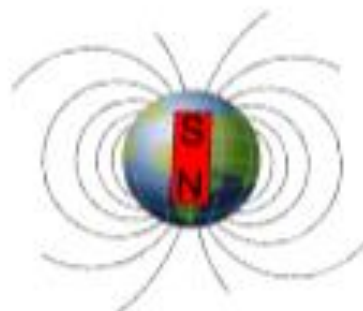
The Earth is a big . . .



Magnetic material can be magnetised or will be attracted to a magnet.
These metals are magnetic: *iron, cobalt, nickel and steel.*
A magnet creates a magnetic field around it. The magnetic field is strongest at the poles, where the field lines are most concentrated.



Unlike poles will attract.
Like poles will repel.



The *Earth* behaves as if it contains a giant magnet.