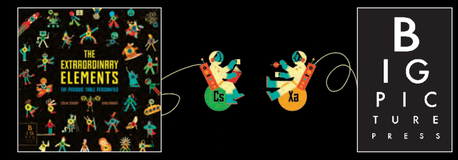
THE PERIODIC TABLE OF ELEMENTS

With well over one hundred elements, scientists organise them into groups based on the way they behave. This is called the periodic table. It is just one of several ways that the elements can be arranged, and makes navigating the building blocks of the Universe simpler. Each tile on this table represents one of the 118 elements that we know of so far, colour-coded into groups that have similar properties. Vertical columns in the table are known as 'groups' (numbered 1-18) with the mass of an atom increasing as you move down a group. Horizontal rows are known as 'periods' (labelled I - VII). Elements get heavier as you move from left to right along each period. A new electron shell is added each time you move down a period.

You may have noticed that the colour of some of the elements at the end of the table don't match any of the colours in the key. This is because they are so unstable they disappear in the blink of an eye after being created! This makes it incredibly difficult to study their properties and accurately identify which group they should belong to.

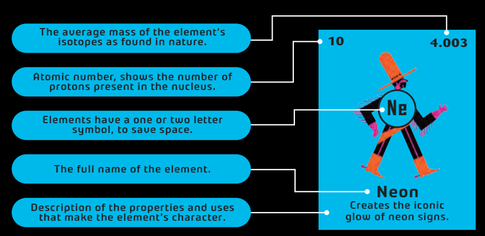


Discover more in The Extraordinary Elements © Big Picture Press 2020 Written by Colin Stuart, with illustrations by Ximo Abadia

KEY TO GROUPS:

- Alkali Metals
- Alkali-Earth Metals
- Transition Metals
- Post-Transition Metals
- Metalloids
- Reactive Non-metals
- Halogens
- Noble Gases
- Lanthanides
- Actinides

HOW TO USE THE TABLE:



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
I	1 H 1.008 Hydrogen — The element that fuels the majority of stars.																	2 He 4.003 Helium — Lighter than air, this makes zeppelins float.
II	3 Li 6.94 Lithium — Creates the red colour in fireworks.	4 Be 9.012 Beryllium — Used in weather monitoring satellites.											5 B 10.81 Boron — Used in armour plating and bulletproof vests.	6 C 12.011 Carbon — One arrangement creates pencil leads.	7 N 14.007 Nitrogen — Crucial to fertilisers used in crop growth.	8 O 15.999 Oxygen — Three minutes without oxygen is fatal.	9 F 18.998 Flourine — Used in toothpaste and water sanitation.	10 Ne 20.18 Neon — Creates the iconic red glow of neon signs.
III	11 Na 22.99 Sodium — Used in baking as sodium bicarbonate.	12 Mg 24.305 Magnesium — A key component of chlorophyll in plants.											13 Al 26.982 Aluminium — Found in cars, cans and white paints.	14 Si 28.085 Silicon — A key material used in computer chips.	15 P 30.974 Phosphorus — Makes the flammable head of matches.	16 S 32.06 Sulfur — One of the fundamental elements in alchemy.	17 Cl 35.45 Chlorine — Used to clean pools and water sources.	18 Ar 39.95 Argon — Found in fluorescent and incandescent lighting.
IV	19 K 39.098 Potassium — Found in bananas and vital to human life.	20 Ca 40.078 Calcium — Medics use calcium sulfate as plaster.	21 Sc 44.956 Scandium — Used in lightweight sports equipment.	22 Ti 47.867 Titanium — Super strong and light, used in aircraft.	23 V 50.942 Vanadium — An alloy of vanadium is found in jet engines.	24 Cr 51.996 Chromium — Chromium compounds come in a rainbow of colours.	25 Mn 54.938 Manganese — Manganese pigments were used in cave paintings.	26 Fe 55.845 Iron — Super strong and found in red blood cells.	27 Co 58.933 Cobalt — Considered a 'goblin' by miners who often mistook it for silver.	28 Ni 58.693 Nickel — Found in electric guitar strings, creating a distinctive sound.	29 Cu 63.546 Copper — A good conductor of electricity, often found in wires.	30 Zn 1.008 Zinc — Combined with copper, this forms brass.	31 Ga 4.003 Gallium — Named after Gallia, the Latin name for France.	32 Ge 4.003 Germanium — Named after Germany and used in optical devices.	33 As 4.003 Arsenic — Infamously toxic and associated with many famous deaths.	34 Se 4.003 Selenium — The ingredient that makes skunk spray so potent.	35 Br 4.003 Bromine — Found in seawater and used in firefighter uniforms.	36 Kr 4.003 Krypton — A gas that shares a similar name to Superman's kryptonite.
V	37 Rb 85.468 Rubidium — An excellent detector of cancerous cells.	38 Sr 87.62 Strontium — A silvery metal often used in TV sets.	39 Y 88.906 Yttrium — Known as the 'oxygen thief' for dissolving oxygen.	40 Zr 91.224 Zirconium — Resistant to corrosion, this is often used in surgeons' tools.	41 Nb 92.906 Niobium — Named after the Greek goddess Niobe. Often found with tantalum.	42 Mo 95.95 Molybdenum — It is impossible to digest food without this.	43 Tc 98 Technetium — The first element to be manufactured by humans.	44 Ru 101.07 Ruthenium — Sourced in Russia, it is one of the rarest metals	45 Rh 102.906 Rhodium — Named after the Greek word for 'rose' due to its pink hue.	46 Pd 106.42 Palladium — Named after Pallas, one of the largest asteroids.	47 Ag 107.868 Silver — One of the first precious metals often used in cameras.	48 Cd 112.414 Cadmium — Gives its name to cadmium pigments used in paint.	49 In 114.818 Indium — Important for touchscreen technology and LCDs.	50 Sn 118.71 Tin — In folklore, tin whistles are associated with witches.	51 Sb 121.76 Antimony — Used as black kohl eyeliner in ancient Egypt.	52 Te 127.6 Tellurium — Named after the Latin word for 'Earth' and highly toxic.	53 I 126.904 Iodine — Discovered among seaweed, and essential to human diets.	54 Xe 131.293 Xenon — A common component used to power spacecraft engines.
VI	55 Cs 132.905 Caesium — Atomic caesium clocks are the most accurate on Earth.	56 Ba 137.327 Barium — When swallowed, abnormalities on X-rays appear clearly.	57–71	72 Hf 178.49 Hafnium — Useful for space rocket engines due to its high melting point.	73 Ta 180.948 Tantalum — Named after the unfortunate Greek god Tantalus.	74 W 183.84 Tungsten — The chemical symbol 'W' comes from the German word for wolf.	75 Re 186.207 Rhenium — Difficult to find, this is known as the 'invisible element'.	76 Os 190.23 Osmium — Used in pacemakers and replacement heart valves.	77 Ir 192.217 Iridium — Geologists use this to evidence mass extinction.	78 Pt 195.084 Platinum — An expensive metal is used in jewellery and dental fillings.	79 Au 196.967 Gold — One of the most desirable metals on Earth.	80 Hg 200.592 Mercury — Liquid at room temperature, suited for use in thermometers.	81 Tl 204.38 Thallium — Often used in infrared optics, such as night vision goggles.	82 Pb 207.2 Lead — This toxic element was used as makeup by Queen Elizabeth I.	83 Bi 208.98 Bismuth — Shimmery, pearl-like powder often found in cosmetics.	84 Po 209 Polonium — Its radioactive heat is used to power Mars rovers.	85 At 210 Astantine — Dangerously radioactive, and the rarest natural element.	86 Rn 222 Radon — Radiation from this element can damage DNA.
VII	87 Fr 223 Francium — Discovered by French physicist, Marguerite Perey.	87 Ra 226 Radium — Its radiance was often used for glow-in-the-dark objects.	89–103	104 Rf 267 Rutherfordium — Named after Ernest Rutherford, who studied atomic structure.	105 Db 268 Dubnium — Named after Russian town Dubna, home to Joint Institute for Nuclear Research.	106 Sg 269 Seaborgium — Named after Glenn Seaborg, who in part discovered ten transuranic elements.	107 Bh 270 Bohrium — Named after physicist Niels Bohr who studied atomic structure.	108 Hs 269 Hassium — Named for the German state of Hesse where the Heavy Ion Research centre is based.	109 Mt 278 Meitnerium — Named after the Austrian physicist Lise Meitner.	110 Ds 281 Darmstadtium — Named after Darmstadt, Germany, where the element was first produced.	111 Rg 280 Roentgenium — Named after German physicist Wilhelm Conrad Röntgen.	112 Cn 285 Copernicium — Named after the Renaissance scientist Nicolaus Copernicus.	113 Nh 286 Nihonium — The name refers to the Japanese name for Japan.	114 Fl 289 Flerovium — Named after Georgy Flerov who founded the Joint Institute for Nuclear Research.	115 Mc 289 Moscovium — Its name refers to Moscow, where the Joint Institute of Nuclear Research is based.	116 Lv 293 Livermorium — Named after the Lawrence Livermore National Laboratory, USA.	117 Ts 294 Tennessine — The name refers to the US state of Tennessee.	118 Og 294 Oganesson — Named for Russian nuclear physicist Yuri Oganessian.

SUPER HEAVY ELEMENTS

	3	4	5	6	7	8	9	10	11	12
VI	57 La 138.905 Lanthanum — Extensively used in cinema projectors.	58 Ce 140.116 Cerium — This sparks when heated and is therefore used in lighters.	59 Pr 140.908 Praseodymium — A key ingredient in some lamps used by film studios.	60 Nd 144.242 Neodymium — Neodymium alloy magnets are the strongest in the world.	61 Pm 145 Promethium — Named after Prometheus, who stole fire in Greek mythology.	62 Sm 150.36 Samarium — Used to motor the first solar-powered plane.	63 Eu 151.964 Europium — Used in printing euro bank notes to prevent counterfeiting.	64 Gd 157.25 Gadolinium — Found in components used in nuclear reactors.	65 Tb 158.925 Terbium — The control rods in nuclear submarines are made of this.	66 Dy 162.5 Dysprosium — Commonly used for wind turbine engines.
VII	89 Ac 227 Actinium — This rare element glows blue in the dark.	90 Th 232.038 Thorium — Named after Thor, Norse god of war and thunder.	91 Pa 231.036 Protactinium — Useful for various geological processes.	92 U 238.029 Uranium — Named after the planet Uranus, used in nuclear weapons.	93 Np 237 Neptunium — Named after the planet Neptune, can spontaneously catch fire.	94 Pu 244 Plutonium — Named after the planet Pluto and used as fuel for robotic spacecraft.	95 Am 243 Americium — Named after the Americas, used in smoke detectors.	96 Cm 247 Curium — Named after Pierre and Marie Curie who researched radioactivity.	97 Bk 247 Berkelium — Named after Berkeley, the Californian city where it was discovered.	98 Cf 251 Californium — Also discovered at Berkeley, and used in some cancer treatments.

	11	12
VI	67 Ho 164.93 Holmium — Named after Stockholm, it has the highest magnetic strength.	68 Er 167.259 Erbium — Commonly used in fibre optic cables to amplify broadband.
VII	99 Es 252 Einsteinium — Named in honour of Albert Einstein and incredibly rare.	100 Fm 257 Fermium — Named after Enrico Fermi, who designed the first nuclear reactor.

	13	14	15
VI	69 Tm 168.934 Thulium — Discovered in Viking heartland, and named by Per Teodor Cleve.	70 Yb 173.045 Ytterbium — Named after Ytterby, where four elements were found.	71 Lu 174.967 Lutetium — Named after Lutetia, the Latin word for Paris.
VII	101 Md 258 Mendelevium — Named after Mendeleev, father of the periodic table.	102 No 259 Nobelium — Named after Alfred Nobel, the creator of the Nobel Prize.	103 Lr 262 Lawrencium — Named after American physicist Ernest Lawrence.

There are so many elements in two periods (VI and VII) that a group from each of these periods has been moved to the bottom of the table to stop it becoming too wide. This makes it much easier to fit onto posters just like this one! The groups that are moved to the bottom are called the lanthanides and actinides (named after the first element in each group).

This group of elements are super heavy (hence the heavy metal reference) they are difficult to produce, dangerous and unstable so they have few practical uses outside of research.