

|                                         |                                             |                                       |
|-----------------------------------------|---------------------------------------------|---------------------------------------|
| <div>T1</div> <div>atom</div>           | <div>T1</div> <div>compound</div>           | <div>T1</div> <div>mixture</div>      |
| <div>T1</div> <div>filtration</div>     | <div>T1</div> <div>crystallisation</div>    | <div>T1</div> <div>distillation</div> |
| <div>T1</div> <div>chromatography</div> | <div>T1</div> <div>plum pudding model</div> | <div>T1</div> <div>neutron</div>      |

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|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <p>T1</p> <p>A combination of substances that are not chemically bonded together in fixed proportions.</p>                  | <p>T1</p> <p>A substance containing two or more different elements chemically bonded in fixed proportions.</p>                                             | <p>T1</p> <p>The smallest unit of an element that retains its chemical identity, consisting of a nucleus and electrons.</p>    |
| <p>T1</p> <p>Separating substances by vaporising and condensing them, using differences in volatility or boiling point.</p> | <p>T1</p> <p>Dissolved solid forms crystals when a concentrated solution cools; recover salt from solution.</p>                                            | <p>T1</p> <p>Separating insoluble particles from a fluid by passing the mixture through a porous barrier.</p>                  |
| <p>T1</p> <p>An electrically neutral subatomic particle found in most atomic nuclei.</p>                                    | <p>T1</p> <p>The early model of the atom as a ball of positive charge with electrons scattered in it, disproved by Rutherford's scattering experiment.</p> | <p>T1</p> <p>A separation technique based on different affinities of substances for a stationary phase and a mobile phase.</p> |

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|---------------------------------------|--------------------------------------|------------------------------------------|
| <p>T1</p> <p>isotope</p>              | <p>T1</p> <p>atomic number</p>       | <p>T1</p> <p>displacement</p>            |
| <p>T1</p> <p>catalyst</p>             | <p>T1</p> <p>simple distillation</p> | <p>T1</p> <p>fractional distillation</p> |
| <p>T1</p> <p>outer shell electron</p> | <p>T1</p> <p>element</p>             | <p>T1</p> <p>chemical reaction</p>       |

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|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <p>T1</p> <p>A reaction in which one element replaces another in a compound.</p>                                                             | <p>T1</p> <p>The number of protons in the nucleus of an atom.</p>                                                                  | <p>T1</p> <p>An atom of an element with the same proton number but a different neutron number from another atom of that element.</p> |
| <p>T1</p> <p>Separating components of a liquid mixture through repeated evaporation and condensation based on differences in volatility.</p> | <p>T1</p> <p>A liquid evaporates and then condenses; recover water from salt solution. Non-volatile salt remains in the flask.</p> | <p>T1</p> <p>A substance that increases a reaction rate without being used up overall.</p>                                           |
| <p>T1</p> <p>A process in which substances are transformed into new substances by rearranging atoms and electrons.</p>                       | <p>T1</p> <p>A substance made of atoms with the same proton number.</p>                                                            | <p>T1</p> <p>An electron in an atom's outermost occupied shell, involved in its reactions.</p>                                       |

|                                |                                       |                                |
|--------------------------------|---------------------------------------|--------------------------------|
| <p>T1</p> <p>word equation</p> | <p>T1</p> <p>symbol equation</p>      | <p>T1</p> <p>model</p>         |
| <p>T1</p> <p>nuclear model</p> | <p>T1</p> <p>proton</p>               | <p>T1</p> <p>electron</p>      |
| <p>T1</p> <p>mass number</p>   | <p>T1</p> <p>Relative atomic mass</p> | <p>T1</p> <p>energy levels</p> |

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|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| <p>T1</p> <p>A simplified representation of a system used to explain, analyse or predict its behaviour.</p> | <p>T1</p> <p>A reaction written with balanced formulae: <math>2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}</math>.</p> | <p>T1</p> <p>A reaction written in names: magnesium + oxygen <math>\rightarrow</math> magnesium oxide.</p>                             |
| <p>T1</p> <p>A negatively charged subatomic particle found outside an atom's nucleus.</p>                   | <p>T1</p> <p>A positively charged subatomic particle found in an atom's nucleus.</p>                                      | <p>T1</p> <p>The model of the atom with a tiny dense positive nucleus surrounded by electrons, from the alpha-scattering evidence.</p> |
| <p>T1</p> <p>Allowed electron energies in an atom, represented by shells in the GCSE model.</p>             | <p>T1</p> <p>The average mass of an element's atoms compared with 1/12 of carbon-12, weighted by isotope abundance.</p>   | <p>T1</p> <p>The total number of protons and neutrons in an atomic nucleus.</p>                                                        |

|                                            |                                      |                                        |
|--------------------------------------------|--------------------------------------|----------------------------------------|
| <div>T1</div> <div>periodic table</div>    | <div>T1</div> <div>period</div>      | <div>T1</div> <div>group</div>         |
| <div>T1</div> <div>Mendeleev</div>         | <div>T1</div> <div>Noble gases</div> | <div>T1</div> <div>Alkali metals</div> |
| <div>T1</div> <div>transition metals</div> | <div>T2</div> <div>ionic bond</div>  | <div>T2</div> <div>covalent bond</div> |

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|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>T1</p> <p>A vertical column in the periodic table whose elements have related outer-electron configurations and chemical properties.</p> | <p>T1</p> <p>A horizontal row of the periodic table, corresponding to the principal shell occupied by the outer electrons of its elements.</p> | <p>T1</p> <p>An arrangement of chemical elements by atomic number that displays recurring patterns in their properties.</p>                                  |
| <p>T1</p> <p>Group 1 metals: soft, reactive, reacting more vigorously down the group as the outer electron is lost more easily.</p>         | <p>T1</p> <p>Group 0 elements with full outer shells, very unreactive.</p>                                                                     | <p>T1</p> <p>The chemist who ordered the elements by atomic weight and properties, leaving gaps that predicted undiscovered elements.</p>                    |
| <p>T2</p> <p>A chemical bond involving a shared pair of electrons attracted to the nuclei of bonded atoms.</p>                              | <p>T2</p> <p>The electrostatic attraction between oppositely charged ions.</p>                                                                 | <p>T1</p> <p>Metals such as chromium, manganese, iron, cobalt, nickel and copper; these examples typically form coloured compounds and useful catalysts.</p> |

|                                               |                                       |                                       |
|-----------------------------------------------|---------------------------------------|---------------------------------------|
| <p>T2</p> <p>metallic bond</p>                | <p>T2</p> <p>delocalised electron</p> | <p>T2</p> <p>intermolecular force</p> |
| <p>T2</p> <p>giant covalent<br/>structure</p> | <p>T2</p> <p>fullerene</p>            | <p>T2</p> <p>carbon nanotube</p>      |
| <p>T2</p> <p>nanoparticle</p>                 | <p>T2</p> <p>alloy</p>                | <p>T2</p> <p>lone pair</p>            |

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| <p>T2</p> <p>Attractive forces between separate molecules, generally weaker than the covalent bonds within those molecules.</p> | <p>T2</p> <p>Electrons spread over several atoms rather than confined to one atom or one bond.</p>                                                              | <p>T2</p> <p>The attraction between positive metal ions and the sea of delocalised electrons.</p>                         |
| <p>T2</p> <p>A cylindrical carbon structure with atoms arranged in a network resembling a rolled sheet of graphene.</p>         | <p>T2</p> <p>A molecule of carbon atoms arranged in a hollow sphere or tube, such as C<sub>60</sub>.</p>                                                        | <p>T2</p> <p>An extensive network of atoms joined by covalent bonds, as in diamond or the layers of graphite.</p>         |
| <p>T2</p> <p>A pair of valence electrons associated with an atom and not shared in a covalent bond.</p>                         | <p>T2</p> <p>A metallic material made by combining a metal with other elements; many alloys are harder because different-sized atoms hinder layer movement.</p> | <p>T2</p> <p>A particle 1–100 nm across, with a very high surface-area-to-volume ratio and size-dependent properties.</p> |

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|----------------------------------------------|----------------------------------------------|-----------------------------------------|
| <div>T2</div> <div>line representation</div> | <div>T2</div> <div>electrostatic force</div> | <div>T2</div> <div>ionic lattice</div>  |
| <div>T2</div> <div>graphene</div>            | <div>T2</div> <div>diamond</div>             | <div>T2</div> <div>graphite</div>       |
| <div>T2</div> <div>surface area</div>        | <div>T2</div> <div>volume</div>              | <div>T2</div> <div>charge carrier</div> |

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| <p>T2</p> <p>A regular giant structure of oppositely charged ions.</p>                                                                        | <p>T2</p> <p>The attraction or repulsion between charged particles; it holds ionic lattices together.</p>                  | <p>T2</p> <p>A structural drawing in which each line stands for a covalent bond between atoms.</p> |
| <p>T2</p> <p>A form of carbon with layers of bonded atoms, used in pencils and able to conduct electricity through delocalised electrons.</p> | <p>T2</p> <p>A form of carbon in which each atom bonds to four others in a three-dimensional giant covalent structure.</p> | <p>T2</p> <p>A single layer of carbon atoms in hexagons, strong and conducting.</p>                |
| <p>T2</p> <p>A charged particle, such as an electron or ion, whose movement contributes to an electric current.</p>                           | <p>T2</p> <p>The amount of three-dimensional space occupied.</p>                                                           | <p>T2</p> <p>The total area of the outer surfaces of a three-dimensional object.</p>               |

|                                        |                                     |                                            |
|----------------------------------------|-------------------------------------|--------------------------------------------|
| <p>T3</p> <p>conservation of mass</p>  | <p>T3</p> <p>balanced</p>           | <p>T3</p> <p>subscript</p>                 |
| <p>T3</p> <p>relative formula mass</p> | <p>T3</p> <p>percentage by mass</p> | <p>T3</p> <p>thermal<br/>decomposition</p> |
| <p>T3</p> <p>carbonate</p>             | <p>T3</p> <p>uncertainty</p>        | <p>T3</p> <p>range</p>                     |

|                                                                                                                    |                                                                                                                                          |                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <p>T3</p> <p>A small number written below a symbol, showing how many atoms of that element occur in a formula.</p> | <p>T3</p> <p>Describing a chemical equation with the same number of atoms of each element on both sides and consistent total charge.</p> | <p>T3</p> <p>The principle that total mass remains unchanged in an ordinary chemical reaction within a closed system.</p> |
| <p>T3</p> <p>The breakdown of a compound into simpler substances when heated.</p>                                  | <p>T3</p> <p>The mass of the specified element divided by the compound's total mass, multiplied by one hundred.</p>                      | <p>T3</p> <p>The sum of the relative atomic masses of the atoms in a formula, written Mr.</p>                             |
| <p>T3</p> <p>The largest value in a data set minus the smallest value.</p>                                         | <p>T3</p> <p>An estimate of the possible range of error in a measurement.</p>                                                            | <p>T3</p> <p>A salt containing the carbonate ion, <math>\text{CO}_3</math> with a two-minus charge.</p>                   |

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|--------------------------------------------|-------------------------------------|----------------------------------------|
| <div>T3</div> <div>mean</div>              | <div>T3</div> <div>oxidation</div>  | <div>T3</div> <div>mole</div>          |
| <div>T3</div> <div>Avogadro constant</div> | <div>T3</div> <div>molar mass</div> | <div>T3</div> <div>mole ratios</div>   |
| <div>T3</div> <div>limiting reactant</div> | <div>T3</div> <div>excess</div>     | <div>T3</div> <div>concentration</div> |

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|------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <p>T3</p> <p>The SI unit of amount of substance, containing exactly <math>6.02214076 \times 10^{23}</math> specified entities.</p> | <p>T3</p> <p>Gain of oxygen or loss of electrons in the GCSE redox models.</p>                          | <p>T3</p> <p>The sum of a set of values divided by the number of values.</p>                                                       |
| <p>T3</p> <p>The relative amounts in moles shown by the coefficients in a balanced equation.</p>                                   | <p>T3</p> <p>The mass of one mole of a substance.</p>                                                   | <p>T3</p> <p>The number of specified elementary entities in one mole, exactly <math>6.02214076 \times 10^{23}</math> per mole.</p> |
| <p>T3</p> <p>The amount of a substance per unit volume of a mixture or solution.</p>                                               | <p>T3</p> <p>Present in more than the amount needed to react completely with the limiting reactant.</p> | <p>T3</p> <p>The reactant that is used up first and therefore limits the amount of product formed.</p>                             |

|                               |                                      |                                     |
|-------------------------------|--------------------------------------|-------------------------------------|
| <p>T3</p> <p>solute</p>       | <p>T3</p> <p>percentage yield</p>    | <p>T3</p> <p>reversible</p>         |
| <p>T3</p> <p>atom economy</p> | <p>T3</p> <p>theoretical mass</p>    | <p>T3</p> <p>by-product</p>         |
| <p>T3</p> <p>titration</p>    | <p>T3</p> <p>molar concentration</p> | <p>T3</p> <p>mass concentration</p> |

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|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| T3                                                                             | T3                                                                                                      | T3                                                                                                                                                 |
| Describing a reaction whose products can react to form the original reactants. | Actual product yield divided by the theoretical maximum yield, multiplied by one hundred.               | A substance dissolved in a solvent to form a solution.                                                                                             |
| T3                                                                             | T3                                                                                                      | T3                                                                                                                                                 |
| A secondary product formed alongside the main intended product of a process.   | The maximum mass of the chosen product predicted from the balanced equation and limiting amount.        | The percentage of reactant mass allocated to the desired product by the balanced equation; multiply each formula mass by its equation coefficient. |
| T3                                                                             | T3                                                                                                      | T3                                                                                                                                                 |
| The mass of a dissolved substance per unit volume of solution.                 | The amount of dissolved substance in moles per unit volume of solution, commonly in $\text{mol/dm}^3$ . | A method of finding an unknown concentration by measuring the volume needed to react with a solution of known concentration.                       |

|                                                        |                                            |                                       |
|--------------------------------------------------------|--------------------------------------------|---------------------------------------|
| <div>T3</div> <div>room temperature and pressure</div> | <div>T4</div> <div>reactivity series</div> | <div>T4</div> <div>positive ion</div> |
| <div>T4</div> <div>soluble</div>                       | <div>T4</div> <div>hydroxide</div>         | <div>T4</div> <div>salt</div>         |
| <div>T4</div> <div>displacement</div>                  | <div>T4</div> <div>oxide</div>             | <div>T4</div> <div>oxidation</div>    |

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|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <p>T4</p> <p>An atom or group of atoms with a net positive electrical charge.</p>                                          | <p>T4</p> <p>The ordering of metals by how easily they react, from potassium down to gold.</p>                               | <p>T3</p> <p>The stated room conditions used here, where one mole of gas occupies approximately 24 dm<sup>3</sup>.</p> |
| <p>T4</p> <p>An ionic compound formed when hydrogen ions in an acid are replaced by metal ions or other positive ions.</p> | <p>T4</p> <p>A compound containing hydroxide ions, each consisting of oxygen and hydrogen with a single negative charge.</p> | <p>T4</p> <p>Able to dissolve in a specified solvent under the stated conditions.</p>                                  |
| <p>T4</p> <p>Gain of oxygen or loss of electrons in the GCSE redox models.</p>                                             | <p>T4</p> <p>A compound containing oxygen bonded to another element.</p>                                                     | <p>T4</p> <p>A reaction in which one element replaces another in a compound.</p>                                       |

|                                    |                                         |                                    |
|------------------------------------|-----------------------------------------|------------------------------------|
| <div>T4</div> <div>reduction</div> | <div>T4</div> <div>compound</div>       | <div>T4</div> <div>electron</div>  |
| <div>T4</div> <div>base</div>      | <div>T4</div> <div>neutralisation</div> | <div>T4</div> <div>carbonate</div> |
| <div>T4</div> <div>chloride</div>  | <div>T4</div> <div>nitrate</div>        | <div>T4</div> <div>sulfate</div>   |

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|----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <p>T4</p> <p>A negatively charged subatomic particle found outside an atom's nucleus.</p>                | <p>T4</p> <p>A substance containing two or more different elements chemically bonded in fixed proportions.</p>  | <p>T4</p> <p>Loss of oxygen or gain of electrons in the GCSE redox models.</p>                                             |
| <p>T4</p> <p>A salt containing the carbonate ion, <math>\text{CO}_3</math> with a two-minus charge.</p>  | <p>T4</p> <p>A reaction between an acid and a base that forms a salt, usually with water.</p>                   | <p>T4</p> <p>A substance that reacts with an acid to form a salt, usually with water.</p>                                  |
| <p>T4</p> <p>A salt containing the sulfate ion, <math>\text{SO}_4</math> with a charge of two minus.</p> | <p>T4</p> <p>A compound containing the nitrate ion, <math>\text{NO}_3</math> with a single negative charge.</p> | <p>T4</p> <p>A compound containing chlorine as chloride ions or as part of a named chlorine-containing chemical group.</p> |

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|------------------------------|----------------------------|--------------------------------------|
| <p>T4</p> <p>filter</p>      | <p>T4</p> <p>insoluble</p> | <p>T4</p> <p>filtrate</p>            |
| <p>T4</p> <p>crystallise</p> | <p>T4</p> <p>crystal</p>   | <p>T4</p> <p>universal indicator</p> |
| <p>T4</p> <p>titration</p>   | <p>T4</p> <p>pipette</p>   | <p>T4</p> <p>conical flask</p>       |

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|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| <p>T4</p> <p>The fluid that passes through a filter, separated from the retained material.</p>           | <p>T4</p> <p>Having very low solubility in a specified solvent under the stated conditions.</p>                | <p>T4</p> <p>To separate material from a fluid by passing it through a barrier that retains some particles.</p>                               |
| <p>T4</p> <p>A mixture of indicators that shows different colours over a range of pH values.</p>         | <p>T4</p> <p>A solid whose particles have a regular, repeating arrangement.</p>                                | <p>T4</p> <p>To form a solid with an ordered internal structure, for example from a cooling or concentrating solution.</p>                    |
| <p>T4</p> <p>A laboratory vessel with a wide base and narrow neck, allowing solutions to be swirled.</p> | <p>T4</p> <p>An instrument used to transfer a measured volume of liquid, such as a fixed titration sample.</p> | <p>T4</p> <p>A method of finding an unknown concentration by measuring the volume needed to react with a solution of known concentration.</p> |

|                                      |                                         |                                            |
|--------------------------------------|-----------------------------------------|--------------------------------------------|
| <div>T4</div> <div>burette</div>     | <div>T4</div> <div>meniscus</div>       | <div>T4</div> <div>concordant titres</div> |
| <div>T4</div> <div>strong acid</div> | <div>T4</div> <div>ionised</div>        | <div>T4</div> <div>weak acid</div>         |
| <div>T4</div> <div>electrolyte</div> | <div>T4</div> <div>ionic compound</div> | <div>T4</div> <div>molten</div>            |

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|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| <p>T4</p> <p>Titration volumes within a small agreed range of each other; only these are averaged.</p> | <p>T4</p> <p>The curved upper surface of a liquid in a container.</p>                                      | <p>T4</p> <p>A graduated tube with a tap used to deliver accurately measured volumes of liquid.</p>                      |
| <p>T4</p> <p>An acid that only partially ionises in aqueous solution.</p>                              | <p>T4</p> <p>Changed into ions; an acid forms hydrogen ions when it ionises in water.</p>                  | <p>T4</p> <p>An acid that essentially completely ionises in aqueous solution at the concentrations being considered.</p> |
| <p>T4</p> <p>In the liquid state after being melted by heating.</p>                                    | <p>T4</p> <p>A substance made of positive and negative ions held together by electrostatic attraction.</p> | <p>T4</p> <p>A substance that conducts electricity when molten or dissolved because it contains mobile ions.</p>         |

|                                   |                                       |                                  |
|-----------------------------------|---------------------------------------|----------------------------------|
| <div>T4</div> <div>lattice</div>  | <div>T4</div> <div>electrolysis</div> | <div>T4</div> <div>cation</div>  |
| <div>T4</div> <div>cathode</div>  | <div>T4</div> <div>anion</div>        | <div>T4</div> <div>anode</div>   |
| <div>T4</div> <div>cryolite</div> | <div>T4</div> <div>halide</div>       | <div>T4</div> <div>halogen</div> |

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|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| T4                                              | T4                                                                                                        | T4                                                                                                                                        |
| An ion with a positive electric charge.         | The decomposition of an electrolyte by an electric current passing through its molten form or a solution. | A regular, repeating arrangement of particles or points in a solid.                                                                       |
| T4                                              | T4                                                                                                        | T4                                                                                                                                        |
| An electrode at which oxidation occurs.         | An ion with a negative electric charge.                                                                   | An electrode at which reduction occurs.                                                                                                   |
| T4                                              | T4                                                                                                        | T4                                                                                                                                        |
| The elements in group 17 of the periodic table. | A compound or ion of a halogen, such as sodium chloride or a chloride ion.                                | A substance used as a molten solvent for aluminium oxide, allowing aluminium extraction by electrolysis at a lower operating temperature. |

|                                  |                                    |                                 |
|----------------------------------|------------------------------------|---------------------------------|
| <p>T4</p> <p>inert electrode</p> | <p>T4</p> <p>lighted splint</p>    | <p>T4</p> <p>glowing splint</p> |
| <p>T4</p> <p>litmus paper</p>    | <p>T4</p> <p>half equation</p>     | <p>T5</p> <p>hand warmer</p>    |
| <p>T5</p> <p>surroundings</p>    | <p>T5</p> <p>instant cold pack</p> | <p>T5</p> <p>half-equation</p>  |

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|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <p>T4</p> <p>A wooden strip glowing without a flame, which relights in oxygen.</p>                                  | <p>T4</p> <p>A small wooden strip with a flame, used in the hydrogen gas test.</p>                                  | <p>T4</p> <p>An electrode that conducts without taking part in the intended reaction under the stated electrolysis conditions.</p> |
| <p>T5</p> <p>A portable product that releases energy to warm the hands, often using an exothermic change.</p>       | <p>T4</p> <p>An equation showing the electron gain or loss at one electrode or in one half of a redox reaction.</p> | <p>T4</p> <p>Indicator paper that changes colour with acidity and is bleached by damp chlorine.</p>                                |
| <p>T5</p> <p>An equation showing the electron gain or loss at one electrode or in one half of a redox reaction.</p> | <p>T5</p> <p>A pack that cools when its contents undergo an endothermic change after activation.</p>                | <p>T5</p> <p>Everything outside the chosen reacting system that can exchange energy with it.</p>                                   |

|                                 |                                |                                            |
|---------------------------------|--------------------------------|--------------------------------------------|
| <p>T5</p> <p>exothermic</p>     | <p>T5</p> <p>combustion</p>    | <p>T5</p> <p>oxidation</p>                 |
| <p>T5</p> <p>neutralisation</p> | <p>T5</p> <p>endothermic</p>   | <p>T5</p> <p>thermal<br/>decomposition</p> |
| <p>T5</p> <p>dissolving</p>     | <p>T5</p> <p>best-fit line</p> | <p>T5</p> <p>reaction profile</p>          |

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|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <p>T5</p> <p>Gain of oxygen or loss of electrons in the GCSE redox models.</p>                           | <p>T5</p> <p>An exothermic reaction of a fuel with an oxidising agent, usually oxygen.</p>                  | <p>T5</p> <p>Describing a process that transfers heat to its surroundings.</p>                |
| <p>T5</p> <p>The breakdown of a compound into simpler substances when heated.</p>                        | <p>T5</p> <p>Describing a process that takes in heat from its surroundings.</p>                             | <p>T5</p> <p>A reaction between an acid and a base that forms a salt, usually with water.</p> |
| <p>T5</p> <p>A diagram showing how the energy of a reacting system changes along a reaction pathway.</p> | <p>T5</p> <p>A line representing the overall pattern of data, rather than joining every measured point.</p> | <p>T5</p> <p>Mixing a solute into a solvent to form a solution.</p>                           |

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|--------------------------------------------|--------------------------------------|-------------------------------------------|
| <div>T5</div> <div>activation energy</div> | <div>T5</div> <div>catalyst</div>    | <div>T5</div> <div>bond energy</div>      |
| <div>T5</div> <div>mole</div>              | <div>T5</div> <div>double bond</div> | <div>T5</div> <div>cell</div>             |
| <div>T5</div> <div>electrode</div>         | <div>T5</div> <div>electrolyte</div> | <div>T5</div> <div>external circuit</div> |

|                                                                                                           |                                                                                                                  |                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <p>T5</p> <p>The energy required to break one mole of a specified covalent bond in gaseous molecules.</p> | <p>T5</p> <p>A substance that increases a reaction rate without being used up overall.</p>                       | <p>T5</p> <p>The minimum energy that reacting particles need for a successful reaction.</p>                                      |
| <p>T5</p> <p>A device that converts chemical energy into electrical energy.</p>                           | <p>T5</p> <p>A covalent bond in which two atoms share two pairs of electrons.</p>                                | <p>T5</p> <p>The SI unit of amount of substance, containing exactly 6.02214076 times ten to the power 23 specified entities.</p> |
| <p>T5</p> <p>The conducting path outside a cell through which electrons flow between its electrodes.</p>  | <p>T5</p> <p>A substance that conducts electricity when molten or dissolved because it contains mobile ions.</p> | <p>T5</p> <p>A conductor through which charge enters or leaves an electrochemical system.</p>                                    |

|                                       |                                   |                                   |
|---------------------------------------|-----------------------------------|-----------------------------------|
| <p>T5</p> <p>potential difference</p> | <p>T5</p> <p>voltmeter</p>        | <p>T5</p> <p>battery</p>          |
| <p>T5</p> <p>series</p>               | <p>T5</p> <p>non-rechargeable</p> | <p>T5</p> <p>alkaline battery</p> |
| <p>T5</p> <p>rechargeable</p>         | <p>T5</p> <p>fuel cell</p>        | <p>T5</p> <p>oxidised</p>         |

|                                                                                                                                       |                                                                                                                                            |                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <p>T5</p> <p>Two or more electrochemical cells connected to supply electrical energy.</p>                                             | <p>T5</p> <p>An instrument connected across two points to measure their potential difference.</p>                                          | <p>T5</p> <p>The energy transferred per unit charge between two points.</p>                  |
| <p>T5</p> <p>An electrochemical power source using an alkaline electrolyte; ordinary primary alkaline cells are non-rechargeable.</p> | <p>T5</p> <p>Designed for one discharge only, as an ordinary alkaline cell.</p>                                                            | <p>T5</p> <p>An arrangement in which components lie along a single electrical path.</p>      |
| <p>T5</p> <p>Having gained oxygen or lost electrons in the GCSE redox models.</p>                                                     | <p>T5</p> <p>An electrochemical device that converts the chemical energy of a continuously supplied fuel and oxidant into electricity.</p> | <p>T5</p> <p>Able to be used again after an external current reverses the cell reaction.</p> |

|                                       |                                  |                                           |
|---------------------------------------|----------------------------------|-------------------------------------------|
| <div>T5</div> <div>anode</div>        | <div>T5</div> <div>cathode</div> | <div>T5</div> <div>reduced</div>          |
| <div>T5</div> <div>electrolysis</div> | <div>T6</div> <div>yield</div>   | <div>T6</div> <div>rate of reaction</div> |
| <div>T6</div> <div>mean rate</div>    | <div>T6</div> <div>tangent</div> | <div>T6</div> <div>gradient</div>         |

|                                                                                                            |                                                                                                                           |                                                                                                                            |
|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <p>T5</p> <p>Having lost oxygen or gained electrons in the GCSE redox models.</p>                          | <p>T5</p> <p>An electrode at which reduction occurs.</p>                                                                  | <p>T5</p> <p>An electrode at which oxidation occurs.</p>                                                                   |
| <p>T6</p> <p>The change in the amount or concentration of a reactant or product per unit time.</p>         | <p>T6</p> <p>The amount of product obtained in a reaction, often expressed as a percentage of the theoretical amount.</p> | <p>T5</p> <p>The decomposition of an electrolyte by an electric current passing through its molten form or a solution.</p> |
| <p>T6</p> <p>The change in the vertical coordinate divided by the change in the horizontal coordinate.</p> | <p>T6</p> <p>A straight line that touches a curve at a point and has the same direction there.</p>                        | <p>T6</p> <p>The change in quantity divided by the time interval:<br/>amount <math>\div</math> time.</p>                   |

|                                                   |                                   |                                    |
|---------------------------------------------------|-----------------------------------|------------------------------------|
| <p>T6</p> <p>instantaneous rate</p>               | <p>T6</p> <p>collision theory</p> | <p>T6</p> <p>activation energy</p> |
| <p>T6</p> <p>concentration</p>                    | <p>T6</p> <p>pressure</p>         | <p>T6</p> <p>kinetic energy</p>    |
| <p>T6</p> <p>surface-area-to-volume<br/>ratio</p> | <p>T6</p> <p>catalyst</p>         | <p>T6</p> <p>enzyme</p>            |

|                                                                                                             |                                                                                                                     |                                                                                             |
|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| <p>T6</p> <p>The minimum energy that reacting particles need for a successful reaction.</p>                 | <p>T6</p> <p>The explanation that reactions require collisions with sufficient energy and suitable orientation.</p> | <p>T6</p> <p>The rate at one moment, found from the gradient of a tangent to the curve.</p> |
| <p>T6</p> <p>The energy an object has because of its motion.</p>                                            | <p>T6</p> <p>Force acting normally per unit area.</p>                                                               | <p>T6</p> <p>The amount of a substance per unit volume of a mixture or solution.</p>        |
| <p>T6</p> <p>A biological catalyst that increases the rate of a reaction without being used up overall.</p> | <p>T6</p> <p>A substance that increases a reaction rate without being used up overall.</p>                          | <p>T6</p> <p>An object's total surface area divided by its volume.</p>                      |

|                                |                                     |                                               |
|--------------------------------|-------------------------------------|-----------------------------------------------|
| <p>T6</p> <p>hypothesis</p>    | <p>T6</p> <p>magnesium ribbon</p>   | <p>T6</p> <p>dilute hydrochloric<br/>acid</p> |
| <p>T6</p> <p>delivery tube</p> | <p>T6</p> <p>measuring cylinder</p> | <p>T6</p> <p>gas syringe</p>                  |
| <p>T6</p> <p>turbidity</p>     | <p>T6</p> <p>sodium thiosulfate</p> | <p>T6</p> <p>sulfur</p>                       |

|                                                                                                                    |                                                                                                                                                     |                                                                                           |
|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <p>T6</p> <p>Hydrogen chloride dissolved in water at a relatively low concentration.</p>                           | <p>T6</p> <p>A thin strip of magnesium metal used in reaction investigations.</p>                                                                   | <p>T6</p> <p>A proposed explanation or prediction that can be tested using evidence.</p>  |
| <p>T6</p> <p>A device with a moving plunger used to collect gas and measure its volume.</p>                        | <p>T6</p> <p>A graduated container used to measure the volume of a liquid.</p>                                                                      | <p>T6</p> <p>A tube carrying gas from a reaction vessel to a collecting device.</p>       |
| <p>T6</p> <p>The non-metal element S; its solid particles make the reaction mixture cloudy in this experiment.</p> | <p>T6</p> <p>The compound <math>\text{Na}_2\text{S}_2\text{O}_3</math>, whose reaction with acid produces cloudy sulfur in the rate experiment.</p> | <p>T6</p> <p>Cloudiness of a mixture, used in the disappearing-cross rate experiment.</p> |

|                                      |                                    |                                              |
|--------------------------------------|------------------------------------|----------------------------------------------|
| <p>T6</p> <p>sulfur dioxide</p>      | <p>T6</p> <p>ventilation</p>       | <p>T6</p> <p>anomaly</p>                     |
| <p>T6</p> <p>reversible reaction</p> | <p>T6</p> <p>ammonium chloride</p> | <p>T6</p> <p>hydrated copper<br/>sulfate</p> |
| <p>T6</p> <p>anhydrous</p>           | <p>T6</p> <p>dehydration</p>       | <p>T6</p> <p>hydration</p>                   |

|                                                                                                                             |                                                                                                                                   |                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>T6</p> <p>A result that differs markedly from the overall pattern and needs investigation before possible exclusion.</p> | <p>T6</p> <p>Movement and replacement of air that helps remove gases from a working area.</p>                                     | <p>T6</p> <p>A compound of sulfur and oxygen with formula <math>\text{SO}_2</math>, formed in processes such as burning sulfur-containing fuels.</p> |
| <p>T6</p> <p>Copper sulfate containing water in its crystal structure; the familiar pentahydrate is blue.</p>               | <p>T6</p> <p>The salt <math>\text{NH}_4\text{Cl}</math>, which can reversibly form ammonia and hydrogen chloride when heated.</p> | <p>T6</p> <p>A reaction whose products can react to form the original reactants under suitable conditions.</p>                                       |
| <p>T6</p> <p>Association or reaction of a substance with water, including water molecules surrounding dissolved ions.</p>   | <p>T6</p> <p>The removal or loss of water from a substance or organism.</p>                                                       | <p>T6</p> <p>Containing no water, especially no water of crystallisation.</p>                                                                        |

|                                                 |                                                  |                                               |
|-------------------------------------------------|--------------------------------------------------|-----------------------------------------------|
| <div>T6</div> <div>closed system</div>          | <div>T6</div> <div>dynamic equilibrium</div>     | <div>T6</div> <div>equilibrium position</div> |
| <div>T6</div> <div>Le Chatelier principle</div> | <div>T7</div> <div>crude oil</div>               | <div>T7</div> <div>hydrocarbon</div>          |
| <div>T7</div> <div>alkane</div>                 | <div>T7</div> <div>fractional distillation</div> | <div>T7</div> <div>fraction</div>             |

|                                                                                                              |                                                                                                                                              |                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <p>T6</p> <p>The relative amounts of reactants and products present when a reaction reaches equilibrium.</p> | <p>T6</p> <p>A state in which opposing processes continue at equal rates, so there is no overall change in composition.</p>                  | <p>T6</p> <p>A container in which no substances can enter or leave, so a reversible reaction can reach equilibrium.</p> |
| <p>T7</p> <p>A compound containing only carbon and hydrogen atoms.</p>                                       | <p>T7</p> <p>A naturally occurring liquid mixture containing many hydrocarbons and smaller amounts of other substances.</p>                  | <p>T6</p> <p>A system at equilibrium responds to a change in conditions by shifting to oppose that change.</p>          |
| <p>T7</p> <p>A mixture collected over a boiling range in the fractional distillation of crude oil.</p>       | <p>T7</p> <p>Separating components of a liquid mixture through repeated evaporation and condensation based on differences in volatility.</p> | <p>T7</p> <p>A saturated hydrocarbon containing only single bonds between carbon atoms.</p>                             |

|                                      |                                       |                                           |
|--------------------------------------|---------------------------------------|-------------------------------------------|
| <div>T7</div> <div>viscosity</div>   | <div>T7</div> <div>flammability</div> | <div>T7</div> <div>feedstock</div>        |
| <div>T7</div> <div>cracking</div>    | <div>T7</div> <div>alkene</div>       | <div>T7</div> <div>functional group</div> |
| <div>T7</div> <div>unsaturated</div> | <div>T7</div> <div>addition</div>     | <div>T7</div> <div>alcohol</div>          |

|                                                                                                     |                                                                                                                   |                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| T7                                                                                                  | T7                                                                                                                | T7                                                                                                                                                  |
| The raw material fed into an industrial chemical process.                                           | How readily a substance ignites; in a comparable hydrocarbon series, shorter chains generally ignite more easily. | A measure of a fluid's resistance to flow or to relative motion between adjacent layers.                                                            |
| T7                                                                                                  | T7                                                                                                                | T7                                                                                                                                                  |
| An atom or group of atoms responsible for characteristic chemical reactions of an organic compound. | An unsaturated hydrocarbon containing at least one carbon-carbon double bond.                                     | Breaking large hydrocarbon molecules into smaller ones, including alkanes and alkenes, using catalytic cracking or high-temperature steam cracking. |
| T7                                                                                                  | T7                                                                                                                | T7                                                                                                                                                  |
| An organic compound with a hydroxyl group bonded to a saturated carbon atom.                        | A reaction that joins atoms across a carbon-carbon double bond.                                                   | Containing one or more carbon-carbon double or triple bonds rather than only single bonds.                                                          |

|                 |                                |                            |
|-----------------|--------------------------------|----------------------------|
| T7              | T7                             | T7                         |
| fermentation    | carboxylic acid                | ester                      |
| T7              | T7                             | T7                         |
| ethyl ethanoate | monomer                        | addition<br>polymerisation |
| T7              | T7                             | T7                         |
| repeating unit  | condensation<br>polymerisation | polyester                  |

|                                                                                                                  |                                                                               |                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| T7                                                                                                               | T7                                                                            | T7                                                                                                                                   |
| An organic compound containing a carbonyl group bonded to an oxygen atom that is bonded to another carbon group. | An organic compound containing the COOH functional group.                     | The breakdown of sugars without oxygen, often by microorganisms, to release energy and form products such as ethanol or lactic acid. |
| T7                                                                                                               | T7                                                                            | T7                                                                                                                                   |
| The joining of unsaturated monomers into a polymer without forming a separate small-molecule product.            | A molecule that can join with other molecules to form a polymer.              | The ester formed from ethanol and ethanoic acid, with a fruity smell.                                                                |
| T7                                                                                                               | T7                                                                            | T7                                                                                                                                   |
| A polymer containing repeated ester links in its main chain.                                                     | Polymerisation that releases a small molecule such as water at each new link. | The smallest structural section that repeats along a polymer chain.                                                                  |

|                                       |                                      |                                            |
|---------------------------------------|--------------------------------------|--------------------------------------------|
| <div>T7</div> <div>amino acid</div>   | <div>T7</div> <div>polypeptide</div> | <div>T7</div> <div>nucleotide</div>        |
| <div>T7</div> <div>double helix</div> | <div>T8</div> <div>mixture</div>     | <div>T8</div> <div>chemical analysis</div> |
| <div>T8</div> <div>observation</div>  | <div>T8</div> <div>conclusion</div>  | <div>T8</div> <div>pure substance</div>    |

|                                                                                                                 |                                                                                                            |                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <p>T7</p> <p>A unit of a nucleic acid containing a nitrogenous base, a pentose sugar and a phosphate group.</p> | <p>T7</p> <p>A chain of amino acids joined by peptide bonds.</p>                                           | <p>T7</p> <p>An organic molecule containing amino and carboxyl groups; these molecules join to form proteins.</p> |
| <p>T8</p> <p>Identifying or measuring the substances in a sample.</p>                                           | <p>T8</p> <p>A combination of substances that are not chemically bonded together in fixed proportions.</p> | <p>T7</p> <p>The structure formed by two strands coiled around a common axis, as in DNA.</p>                      |
| <p>T8</p> <p>A single element or compound, not mixed with another substance.</p>                                | <p>T8</p> <p>A judgement or statement drawn from evidence, results or reasoning.</p>                       | <p>T8</p> <p>Something recorded directly during an investigation, such as a colour change or measured value.</p>  |

|                              |                             |                                 |
|------------------------------|-----------------------------|---------------------------------|
| <p>T8</p> <p>element</p>     | <p>T8</p> <p>impurity</p>   | <p>T8</p> <p>melting point</p>  |
| <p>T8</p> <p>formulation</p> | <p>T8</p> <p>pigment</p>    | <p>T8</p> <p>binder</p>         |
| <p>T8</p> <p>alloy</p>       | <p>T8</p> <p>fertiliser</p> | <p>T8</p> <p>chromatography</p> |

|                                                                                                                                |                                                                                |                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>T8</p> <p>The temperature at which a solid and its liquid phase can coexist in equilibrium at a specified pressure.</p>     | <p>T8</p> <p>An unwanted substance mixed with the material being examined.</p> | <p>T8</p> <p>A substance made of atoms with the same proton number.</p>                                                                                         |
| <p>T8</p> <p>The component of paint that holds pigment particles together and attaches the paint to a surface.</p>             | <p>T8</p> <p>A substance added to give a material colour.</p>                  | <p>T8</p> <p>A mixture designed as a useful product.</p>                                                                                                        |
| <p>T8</p> <p>A separation technique based on different affinities of substances for a stationary phase and a mobile phase.</p> | <p>T8</p> <p>A material supplying mineral nutrients needed by plants.</p>      | <p>T8</p> <p>A metallic material made by combining a metal with other elements; many alloys are harder because different-sized atoms hinder layer movement.</p> |

|                                           |                                        |                                     |
|-------------------------------------------|----------------------------------------|-------------------------------------|
| <div>T8</div> <div>stationary phase</div> | <div>T8</div> <div>mobile phase</div>  | <div>T8</div> <div>solvent</div>    |
| <div>T8</div> <div>baseline</div>         | <div>T8</div> <div>solvent front</div> | <div>T8</div> <div>Rf value</div>   |
| <div>T8</div> <div>test tube</div>        | <div>T8</div> <div>limewater</div>     | <div>T8</div> <div>flame test</div> |

|                                                                                                                                                            |                                                                                               |                                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| T8                                                                                                                                                         | T8                                                                                            | T8                                                                                                              |
| The substance in which a solute dissolves to form a solution.                                                                                              | The moving solvent in chromatography that carries the mixture over the stationary phase.      | The phase that remains fixed in a chromatography system and interacts differently with components of a mixture. |
| T8                                                                                                                                                         | T8                                                                                            | T8                                                                                                              |
| In planar chromatography, the distance travelled by a substance's spot divided by the distance travelled by the solvent front from the same starting line. | The furthest position reached by the mobile solvent during a chromatographic separation.      | The starting line on a chromatogram where sample spots are placed before the solvent moves.                     |
| T8                                                                                                                                                         | T8                                                                                            | T8                                                                                                              |
| Identifying a metal ion by the colour its compound gives in a flame.                                                                                       | A solution of calcium hydroxide that turns milky when carbon dioxide forms calcium carbonate. | A narrow laboratory vessel used to hold small samples or carry out small-scale reactions.                       |

|                                      |                                 |                                  |
|--------------------------------------|---------------------------------|----------------------------------|
| <p>T8</p> <p>contamination</p>       | <p>T8</p> <p>precipitate</p>    | <p>T8</p> <p>excess</p>          |
| <p>T8</p> <p>effervescence</p>       | <p>T8</p> <p>silver nitrate</p> | <p>T8</p> <p>barium chloride</p> |
| <p>T8</p> <p>instrumental method</p> | <p>T8</p> <p>sensitivity</p>    | <p>T8</p> <p>accurate</p>        |

|                                                                                                                    |                                                                                                                      |                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>T8</p> <p>Present in more than the amount needed to react completely with the limiting reactant.</p>            | <p>T8</p> <p>An insoluble solid formed when substances in solution react.</p>                                        | <p>T8</p> <p>Unwanted material entering a sample or apparatus and potentially affecting the result.</p>                                                               |
| <p>T8</p> <p>The salt <math>\text{BaCl}_2</math>, used with dilute hydrochloric acid to test for sulfate ions.</p> | <p>T8</p> <p>An ionic compound with formula <math>\text{AgNO}_3</math>, commonly used to test for halide ions.</p>   | <p>T8</p> <p>Bubbling caused by gas being released from a liquid.</p>                                                                                                 |
| <p>T8</p> <p>Close to the true or accepted reference value.</p>                                                    | <p>T8</p> <p>Here, the ability of an analytical method to detect small amounts or concentrations of a substance.</p> | <p>T8</p> <p>Chemical analysis using an instrument, such as a spectrometer; suitable calibration and methods can give rapid, sensitive and accurate measurements.</p> |

|                                          |                                        |                                                          |
|------------------------------------------|----------------------------------------|----------------------------------------------------------|
| <div>T8</div> <div>calibration</div>     | <div>T8</div> <div>spectroscopy</div>  | <div>T8</div> <div>flame emission<br/>spectroscopy</div> |
| <div>T8</div> <div>spectroscope</div>    | <div>T8</div> <div>line spectrum</div> | <div>T8</div> <div>wavelength</div>                      |
| <div>T8</div> <div>detection limit</div> | <div>T8</div> <div>qualitative</div>   | <div>T9</div> <div>noble gases</div>                     |

|                                                                                                                                     |                                                                                                    |                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <p>T8</p> <p>Analysing wavelengths of light emitted by excited metal atoms or ions; intensities can estimate concentration.</p>     | <p>T8</p> <p>Analysing substances from the light they emit or absorb.</p>                          | <p>T8</p> <p>Using known standards to establish the relationship between an instrument's reading and the quantity measured.</p> |
| <p>T8</p> <p>The distance between corresponding points on successive waves.</p>                                                     | <p>T8</p> <p>A spectrum of separate bright lines at exact wavelengths, unique to each element.</p> | <p>T8</p> <p>An instrument that separates light into its component wavelengths for observation.</p>                             |
| <p>T9</p> <p>The elements in Group 18 of the periodic table, whose filled outer electron shells generally make them unreactive.</p> | <p>T8</p> <p>Describing qualities or categories rather than numerical measurements.</p>            | <p>T8</p> <p>The smallest amount or concentration that a method can reliably distinguish from the background.</p>               |

|                                         |                                            |                                  |
|-----------------------------------------|--------------------------------------------|----------------------------------|
| <div>T9</div> <div>water vapour</div>   | <div>T9</div> <div>volcanic activity</div> | <div>T9</div> <div>methane</div> |
| <div>T9</div> <div>condensation</div>   | <div>T9</div> <div>sediment</div>          | <div>T9</div> <div>algae</div>   |
| <div>T9</div> <div>photosynthesis</div> | <div>T9</div> <div>respiration</div>       | <div>T9</div> <div>biomass</div> |

|                                                                                                                                   |                                                                                                                                                |                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <p>T9</p> <p>The simplest alkane, with molecular formula CH<sub>4</sub>.</p>                                                      | <p>T9</p> <p>Volcanic eruptions and related processes; release of volcanic gases is one proposed explanation for Earth's early atmosphere.</p> | <p>T9</p> <p>Water in its gaseous state.</p>                                                                                                |
| <p>T9</p> <p>A diverse group of mainly aquatic photosynthetic organisms that lack the true roots, stems and leaves of plants.</p> | <p>T9</p> <p>Solid material that settles and accumulates from water or another fluid.</p>                                                      | <p>T9</p> <p>The change of a substance from a gas to a liquid.</p>                                                                          |
| <p>T9</p> <p>The mass of living or recently living biological material, such as plant matter.</p>                                 | <p>T9</p> <p>The chemical reactions in cells that release usable energy from nutrient molecules.</p>                                           | <p>T9</p> <p>The process by which plants and other organisms use light energy to make organic substances from carbon dioxide and water.</p> |

|                                            |                                             |                                         |
|--------------------------------------------|---------------------------------------------|-----------------------------------------|
| <div>T9</div> <div>limestone</div>         | <div>T9</div> <div>coal</div>               | <div>T9</div> <div>crude oil</div>      |
| <div>T9</div> <div>natural gas</div>       | <div>T9</div> <div>fossil fuel</div>        | <div>T9</div> <div>greenhouse gas</div> |
| <div>T9</div> <div>greenhouse effect</div> | <div>T9</div> <div>infrared radiation</div> | <div>T9</div> <div>deforestation</div>  |

|                                                                                                                             |                                                                                                                                                                 |                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>T9</p> <p>A naturally occurring liquid mixture containing many hydrocarbons and smaller amounts of other substances.</p> | <p>T9</p> <p>A fossil fuel formed from compressed ancient plant material.</p>                                                                                   | <p>T9</p> <p>A rock of mainly calcium carbonate, used for building and in the blast furnace.</p>                                                   |
| <p>T9</p> <p>A gas that absorbs and emits infrared radiation, contributing to atmospheric warming.</p>                      | <p>T9</p> <p>Coal, oil and natural gas formed from ancient organic matter over millions of years.</p>                                                           | <p>T9</p> <p>A fossil fuel mixture, mainly methane.</p>                                                                                            |
| <p>T9</p> <p>The removal of forest cover, often to convert the land to another use.</p>                                     | <p>T9</p> <p>Electromagnetic radiation with wavelengths longer than visible red light; greenhouse gases absorb and emit some outgoing terrestrial infrared.</p> | <p>T9</p> <p>The warming caused when atmospheric gases absorb and emit infrared radiation, reducing the rate at which energy escapes to space.</p> |

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|------------------------------------------------|--------------------------------------------|----------------------------------------------|
| <div>T9</div> <div>landfill</div>              | <div>T9</div> <div>peer review</div>       | <div>T9</div> <div>temperature anomaly</div> |
| <div>T9</div> <div>global climate change</div> | <div>T9</div> <div>thermal expansion</div> | <div>T9</div> <div>carbon footprint</div>    |
| <div>T9</div> <div>life cycle</div>            | <div>T9</div> <div>system boundary</div>   | <div>T9</div> <div>insulation</div>          |

|                                                                                                                                |                                                                                                    |                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <p>T9</p> <p>The difference between a measured temperature and a stated reference average.</p>                                 | <p>T9</p> <p>Checking of scientific work by other experts before publication.</p>                  | <p>T9</p> <p>A site where waste is deposited and buried; decomposition of organic waste can release methane.</p>              |
| <p>T9</p> <p>The total greenhouse-gas emissions, measured as carbon dioxide equivalents, caused by an activity or product.</p> | <p>T9</p> <p>An increase in size or volume as a material becomes warmer.</p>                       | <p>T9</p> <p>Long-term changes in Earth's climate patterns, including temperature, rainfall and extreme-weather patterns.</p> |
| <p>T9</p> <p>Material or a method that reduces heat transfer.</p>                                                              | <p>T9</p> <p>The chosen limit of what is counted in a life-cycle or carbon-footprint estimate.</p> | <p>T9</p> <p>The stages of a product's existence, from obtaining raw materials to its end-of-life treatment.</p>              |

|                                           |                                                    |                                          |
|-------------------------------------------|----------------------------------------------------|------------------------------------------|
| <div>T9</div> <div>pure hydrocarbon</div> | <div>T9</div> <div>incomplete<br/>combustion</div> | <div>T9</div> <div>carbon monoxide</div> |
| <div>T9</div> <div>soot</div>             | <div>T9</div> <div>particulates</div>              | <div>T9</div> <div>nitrogen oxides</div> |
| <div>T9</div> <div>toxic</div>            | <div>T9</div> <div>acid rain</div>                 | <div>T9</div> <div>global dimming</div>  |

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|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <p>T9</p> <p>A compound of carbon and oxygen with formula CO, formed for example during incomplete combustion.</p>            | <p>T9</p> <p>Burning with insufficient oxygen for complete oxidation, often producing carbon monoxide or carbon as well as other products.</p> | <p>T9</p> <p>A single substance whose molecules contain only carbon and hydrogen.</p> |
| <p>T9</p> <p>Compounds of nitrogen and oxygen, including pollutants formed in hot vehicle engines.</p>                        | <p>T9</p> <p>Small solid particles or liquid droplets suspended in air or another fluid.</p>                                                   | <p>T9</p> <p>Fine, mainly carbon particles produced by incomplete combustion.</p>     |
| <p>T9</p> <p>The reduction in sunlight reaching Earth's surface caused by airborne particles and their effects on clouds.</p> | <p>T9</p> <p>Precipitation made unusually acidic mainly by atmospheric reactions involving sulfur dioxide and nitrogen oxides.</p>             | <p>T9</p> <p>Able to harm living organisms through its chemical action.</p>           |

|                                                       |                                           |                                              |
|-------------------------------------------------------|-------------------------------------------|----------------------------------------------|
| <div>T9</div> <div>catalytic converter</div>          | <div>T10</div> <div>finite resource</div> | <div>T10</div> <div>renewable resource</div> |
| <div>T10</div> <div>sustainable<br/>development</div> | <div>T10</div> <div>potable water</div>   | <div>T10</div> <div>sterilise</div>          |
| <div>T10</div> <div>desalination</div>                | <div>T10</div> <div>reverse osmosis</div> | <div>T10</div> <div>sedimentation</div>      |

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| <p>T10</p> <p>A resource that regenerates on a human timescale, such as timber or solar energy.</p>                                          | <p>T10</p> <p>A resource with a limited stock that is not replenished on the timescale of its use.</p>                                | <p>T9</p> <p>An exhaust device using catalysts to convert some harmful pollutants into less harmful products.</p>            |
| <p>T10</p> <p>Here, disinfect water by killing or inactivating harmful microbes, for example using chlorine, ozone or ultraviolet light.</p> | <p>T10</p> <p>Water of suitable quality for drinking, with harmful contaminants sufficiently low; it need not be chemically pure.</p> | <p>T10</p> <p>Development that meets present needs while preserving future generations' ability to meet their own needs.</p> |
| <p>T10</p> <p>Letting suspended particles settle out of water by gravity.</p>                                                                | <p>T10</p> <p>Forcing water through a membrane that holds back dissolved salts, used to make fresh water from seawater.</p>           | <p>T10</p> <p>Removing dissolved salts from sea or other saline water, for example by distillation or reverse osmosis.</p>   |

|                                                            |                                                 |                                               |
|------------------------------------------------------------|-------------------------------------------------|-----------------------------------------------|
| <div>T10</div> <div>sludge</div>                           | <div>T10</div> <div>effluent</div>              | <div>T10</div> <div>anaerobic digestion</div> |
| <div>T10</div> <div>aerobic biological<br/>treatment</div> | <div>T10</div> <div>phytomining</div>           | <div>T10</div> <div>bioleaching</div>         |
| <div>T10</div> <div>leachate</div>                         | <div>T10</div> <div>life cycle assessment</div> | <div>T10</div> <div>corrosion</div>           |

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|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <p>T10</p> <p>Breaking down sewage sludge or waste without oxygen, producing biogas.</p>                                                | <p>T10</p> <p>Liquid leaving a treatment stage; here, the liquid separated from settled sludge and sent for further treatment.</p>              | <p>T10</p> <p>The settled solid waste separated during sewage treatment.</p>                  |
| <p>T10</p> <p>Using bacteria to obtain a solution containing metal compounds from ore, followed by a separate metal-recovery stage.</p> | <p>T10</p> <p>Using plants to accumulate metal compounds; harvested plants can be burned to give metal-containing ash for further recovery.</p> | <p>T10</p> <p>Treating sewage with oxygen-using microbes that digest the organic matter.</p>  |
| <p>T10</p> <p>The gradual destruction of a material through chemical or electrochemical reactions with its surroundings.</p>            | <p>T10</p> <p>An assessment of a product's environmental impacts across the stated raw-material, manufacture, use and end-of-life stages.</p>   | <p>T10</p> <p>Liquid that has washed through waste or ore, carrying dissolved substances.</p> |

|                                               |                                             |                                 |
|-----------------------------------------------|---------------------------------------------|---------------------------------|
| <p>T10</p> <p>sacrificial protection</p>      | <p>T10</p> <p>alloy</p>                     | <p>T10</p> <p>carat</p>         |
| <p>T10</p> <p>thermosoftening<br/>polymer</p> | <p>T10</p> <p>thermosetting<br/>polymer</p> | <p>T10</p> <p>composite</p>     |
| <p>T10</p> <p>matrix</p>                      | <p>T10</p> <p>reinforcement</p>             | <p>T10</p> <p>Haber process</p> |

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| <p>T10</p> <p>The purity of gold: 24 carat is pure gold.</p>                                                                                          | <p>T10</p> <p>A metallic material made by combining a metal with other elements; many alloys are harder because different-sized atoms hinder layer movement.</p> | <p>T10</p> <p>Protecting iron by electrically connecting it to a more reactive metal, such as zinc, which oxidises preferentially.</p> |
| <p>T10</p> <p>A material made by combining distinct components that retain their identities and contribute different useful properties.</p>           | <p>T10</p> <p>A polymer with a covalently cross-linked network that does not melt on reheating; strong heating can decompose it.</p>                             | <p>T10</p> <p>A polymer that softens on heating and can be remoulded, because its chains are not cross-linked.</p>                     |
| <p>T10</p> <p>The industrial production of ammonia by reacting nitrogen with hydrogen under controlled temperature and pressure using a catalyst.</p> | <p>T10</p> <p>The fibres or particles added to a matrix to strengthen a composite.</p>                                                                           | <p>T10</p> <p>The continuous material in a composite that holds the reinforcement in place.</p>                                        |

T10

NPK fertiliser

|  |  |                                                                                                         |
|--|--|---------------------------------------------------------------------------------------------------------|
|  |  | <p>T10</p> <p>A formulation of salts supplying nitrogen, phosphorus and potassium for plant growth.</p> |
|  |  |                                                                                                         |
|  |  |                                                                                                         |