

**SUBSTANCES AND PROPERTIES**

*Materials are either made of a single chemical substance or a mixture of substances which each have distinctive properties*

**PARTICLES AND STRUCTURE**

*All matter is made up of atoms. The behaviour and structural arrangement of atoms explains the properties of different materials*

**CHEMICAL REACTIONS**

*During chemical reactions, atoms are rearranged and new substances are formed.*

**EARTH CHEMISTRY**

*Substances can move within and between the atmosphere. Hydrosphere, geosphere and biosphere as part of large-scale Earth systems*

**DYNAMIC EARTH**

*The Earth’s crust is constantly changing as new rocks are formed and older rock is worn away*

**7C1: PARTICLES AND THEIR BEHAVIOUR = 10**

- The particle model
- States of matter
- Melting and Freezing

Boiling

Diffusion

Gas pressure

**7C2: ELEMENTS, ATOMS, COMPOUNDS = 7**

- Elements, Atoms and molecules
- Forming compounds
- Word equations
- Symbols and formulae

**7C4: SEPARATION TECHNIQUES = 10**

- Substance - Pure vs Impure
- Comparing solubility
- Solutions
- Separating solutions—filtration, evapor

**7C3: ACIDS AND ALKALIS = 4**

- pH Scale
- Neutralisation
- Indicators
- Metals and acids

SUBSTANCES AND PROPERTIES
<i>Materials are either made of a single chemical substance or a mixture of substances which each have distinctive properties</i>
<div><ul style="list-style-type: none"><li>Trends in physical properties</li><li>Development of Periodic table</li></ul></div>

PARTICLES AND STRUCTURE
<i>All matter is made up of atoms. The behaviour and structural arrangement of atoms explains the properties of different materials</i>
<div><div>8C2: PERIODIC TABLE =11</div><div>Atomic model</div></div> <div><div>8C1: Reactions = 10</div><div>Rearrangement of atoms</div><div>Representing reactions</div><div>Conservation of mass</div><div>Exothermic and endothermic</div></div>

CHEMICAL REACTIONS
<i>During chemical reactions, atoms are rearranged and new substances are formed.</i>
<div>Periodic patterns</div> <div>Formation of new substance</div> <div>Reactions in solutions</div> <div>Oxidation/Combustion</div> <div>Thermal Decomposition</div> <div><div>8C3: METALS AND ACIDS = 8</div><div><ul style="list-style-type: none"><li>Displacement</li><li>Reactivity series</li><li>Reactions of; Metals/Metal Oxides/Metal carbonates and Acids</li></ul></div></div>

EARTH CHEMISTRY
<i>Substances can move within and between the atmosphere. Hydrosphere, geosphere and biosphere as part of large-scale Earth systems</i>
<div><div>8C4: THE EARTH = 7</div><div><ul style="list-style-type: none"><li>Chemical weathering</li><li>Greenhouse gases</li><li>Global Warming</li><li>Finite resources</li></ul></div></div>

DYNAMIC EARTH
<i>The Earth’s crust is constantly changing as new rocks are formed and older rock is worn away</i>
<div>Current Atmosphere</div> <div>Earth’s structure</div> <div>Rock Types</div> <div>Rock cycle</div> <div>Physical weathering and erosion</div> <div>Making fossil fuels</div>

## SUBSTANCES AND PROPERTIES

*Materials are either made of a single chemical substance or a mixture of substances which each have distinctive properties*

## 9C1: ATOMIC STRUCTURE = 13

- Atoms
- Chemical equations
- Separating mixtures
- Fractional distillation and paper chromatography
- History of the atom
- Structure of the atom
- Ions, atoms and isotopes
- Electronic structures
- Development of the periodic table
- Electronic structures and the periodic table
- Group 1—the alkali metals
- Group 7—the halogens
- Explaining trends
- *The transition metals (yr 10 sep)*

## PARTICLES AND STRUCTURE

*All matter is made up of atoms.  
The behaviour and structural  
arrangement of atoms explains  
the properties of different  
materials*

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## CHEMICAL REACTIONS

*During chemical reactions, atoms are rearranged and new substances are formed.*

## 9C3 CHEMICAL CHANGES = 14

- The reactivity series
- Displacement reactions
- Extracting metals
- Salts from metals
- Salts from insoluble bases
- Making more salts
- Neutralisation and the pH scale
- Oxidation/Reduction
- Strong and weak acids HT

## EARTH CHEMISTRY

*Substances can move within and between the atmosphere.*

*Hydrosphere, geosphere and biosphere as part of large-scale Earth systems*

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**DYNAMIC EARTH**

*The Earth's crust is constantly changing as new rocks are formed and older rock is worn away*

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- Journal Pre-proof

- States of matter
- Atoms into ions
- Ionic bonding
- Giant ionic structures
- Covalent bonding
- Structure of simple molecules
- Giant covalent structures
- Fullerenes and graphene
- Bonding in metals
- Giant metallic structures
- *Nanoparticles*
- *Applications of nanoparticles*

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SUBSTANCES AND PROPERTIES	PARTICLES AND STRUCTURE	CHEMICAL REACTIONS	EARTH CHEMISTRY	DYNAMIC EARTH
<i>Materials are either made of a single chemical substance or a mixture of substances which each have distinctive properties</i>	<i>All matter is made up of atoms. The behaviour and structural arrangement of atoms explains the properties of different materials</i>	<i>During chemical reactions, atoms are rearranged and new substances are formed.</i>	<i>Substances can move within and between the atmosphere. Hydrosphere, geosphere and biosphere as part of large-scale Earth systems</i>	<i>The Earth's crust is constantly changing as new rocks are formed and older rock is worn away</i>
<div>10C2: ELECTROLYSIS = 8<ul style="list-style-type: none"><li>Electrolysis—Molten</li><li>Electrolysis—Solutions</li><li>Electrolysis—req. Prac</li><li>Extraction of Al</li><li>Ions and half equations</li></ul></div>				
<div>10C5: CRUDE OIL AND FUELS = 8<ul style="list-style-type: none"><li>Hydrocarbons</li><li>Fractional distillation of oil</li><li>Burning hydrocarbon fuels</li><li>Cracking hydrocarbons</li></ul></div>	<div>10C3: CHEMICAL CALCULATIONS = 9/12<ul style="list-style-type: none"><li>Relative masses and moles</li><li>Equations and calculations</li><li>From masses to balanced equations</li><li><i>The yield of a chemical reaction</i></li><li><i>Atom economy</i></li><li>Expressing concentrations</li><li><i>Titrations</i></li><li><i>Titration calculations</i></li><li><i>Volumes of gases</i></li></ul></div>	<div>10C2: ELECTROLYSIS = 8<ul style="list-style-type: none"><li>Electrolysis—Molten</li><li>Electrolysis—Solutions</li><li>Electrolysis—req. Prac</li><li>Extraction of Al</li><li>Ions and half equations</li></ul></div> <div>10C1: ENERGY CHANGES = 8/11<ul style="list-style-type: none"><li>Exothermic and endothermic reactions</li><li>Using energy transfers from reactions</li><li>Reaction profiles</li><li>Bond energy calculations</li><li><i>Chemical cells and batteries</i></li><li>Fuel cells</li></ul></div> <div>10C4: RATES AND EQUILIBRIUM = 13<ul style="list-style-type: none"><li>Rates of reaction</li><li>collision theory and surface area</li><li>The effect of temperature</li><li>The effect of concentration and pressure</li><li>The effect of catalysts</li><li>Reversible reactions</li><li>Energy end reversible reactions</li><li>Dynamic equilibrium</li><li>Altering conditions</li></ul></div>		

<p><b>SUBSTANCES AND PROPERTIES</b></p> <p><i>Materials are either made of a single chemical substance or a mixture of substances which each have distinctive properties</i></p>	<p><b>PARTICLES AND STRUCTURE</b></p> <p><i>All matter is made up of atoms. The behaviour and structural arrangement of atoms explains the properties of different materials</i></p>	<p><b>CHEMICAL REACTIONS</b></p> <p><i>During chemical reactions, atoms are rearranged and new substances are formed.</i></p>	<p><b>EARTH CHEMISTRY</b></p> <p><i>Substances can move within and between the atmosphere. Hydrosphere, geosphere and biosphere as part of large-scale Earth systems</i></p>	<p><b>DYNAMIC EARTH</b></p> <p><i>The Earth’s crust is constantly changing as new rocks are formed and older rock is worn away</i></p>
<p><b>11C1 Sep only: ORGANIC REACTIONS = 5</b></p> <ul style="list-style-type: none"> <li>Reactions of the alkenes</li> <li>Structures of alcohols, carboxylic acids, and esters</li> <li>Reactions and uses of alcohols</li> </ul>	<p><b>11 3 CHEMICAL ANALYSIS = 7/9</b></p> <ul style="list-style-type: none"> <li>Pure substance and mixtures</li> <li>Analysing chromatograms</li> <li>Testing for gases</li> <li>Tests for positive ions</li> <li>Tests for negative ions</li> <li>Instrumental analysis</li> </ul>		<p><b>11C4: THE EARTH’S ATMOSPHERE = 6</b></p> <ul style="list-style-type: none"> <li>History of our atmosphere</li> <li>Our evolving atmosphere</li> <li>Greenhouse gases</li> <li>Global climate change</li> <li>Atmospheric pollutants</li> </ul>	<p><b>11C5 THE EARTH’S RESOURCES = 9</b></p> <ul style="list-style-type: none"> <li>Finite and renewable resources</li> <li>Water safe to drink</li> <li>Treating waste water</li> <li>Extracting metals from ores</li> <li>Life cycle assessments</li> <li>Reduce, reuse, recycle</li> </ul>
<p><b>11C2: Sep only POLYMERS = 5</b></p> <ul style="list-style-type: none"> <li>Addition polymerisation</li> <li>Condensation polymerisation</li> <li>Natural polymers</li> <li>DNA</li> </ul>				
<p><b>11C6 Sep only: USING OUR RESOURCES 9</b></p> <ul style="list-style-type: none"> <li>Rusting</li> <li>Useful alloys</li> <li>The properties of polymers</li> <li>Glass, ceramics and composites</li> <li>Making ammonia—the Haber process</li> <li>The economics of the Haber process</li> <li>Making fertilisers in the lab</li> <li>Making fertilisers in industry</li> </ul>				

SUBSTANCES AND PROPERTIES	PARTICLES AND STRUCTURE	CHEMICAL REACTIONS	EARTH CHEMISTRY	DYNAMIC EARTH
Materials are either made of a single chemical substance or a mixture of substances which each have distinctive properties	All matter is made up of atoms. The behaviour and structural arrangement of atoms explains the properties of different materials	During chemical reactions, atoms are rearranged and new substances are formed.	Substances can move within and between the atmosphere. Hydrosphere, geosphere and biosphere as part of large-scale Earth systems	The Earth's crust is constantly changing as new rocks are formed and older rock is worn away
<b>7C1: PARTICLES AND THEIR BEHAVIOUR = 10</b> <ul style="list-style-type: none"> <li>The particle model</li> <li>States of matter</li> <li>Melting and Freezing</li> </ul>	Boiling Diffusion Gas pressure			
	<b>7C2: ELEMENTS, ATOMS AND COMPOUNDS = 7</b> <ul style="list-style-type: none"> <li>Elements, Atoms and molecules</li> <li>Forming compounds</li> <li>Word equations</li> <li>Symbols and formulae</li> </ul>			
<b>7C4: SEPARATION TECHNIQUES = 10</b> <ul style="list-style-type: none"> <li>Substance - Pure vs Impure</li> <li>Comparing solubility</li> <li>Solutions</li> <li>Separating solutions—filtration, evaporation</li> </ul>				
<b>7C3: ACIDS AND ALKALIS = 4</b> <ul style="list-style-type: none"> <li>pH Scale</li> <li>Neutralisation</li> <li>Indicators</li> <li>Metals and acids</li> </ul>				
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	<b>8C1: Reactions = 10</b> Rearrangement of atoms Representing reactions Conservation of mass Exothermic and endothermic	Formation of new substance Reactions in solutions Oxidation/Combustion Thermal Decomposition		
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**10C2: ELECTROLYSIS = 8**

- Electrolysis—Molten
- Electrolysis—Solutions
- Electrolysis—req. Prac
- Extraction of Al
- Ions and half equations

**10C5: CRUDE OIL AND FUELS = 8**

- Hydrocarbons
- Fractional distillation of oil
- Burning hydrocarbon fuels
- Cracking hydrocarbons

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- Structures of alcohols, carboxylic acids, and esters*
- Reactions and uses of alcohols*

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- Addition polymerisation*
- Condensation polymerisation*
- Natural polymers*
- DNA*

**11C6 Sep only: USING OUR RESOURCES 9**

- Rusting
- Useful alloys
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**9C2: Structure and bonding= 17**

- States of matter
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- Nanoparticles*
- Applications of nanoparticles*

**10C3: CHEMICAL CALCULATIONS = 9/12**

- Relative masses and moles
- Equations and calculations
- From masses to balanced equations
- The yield of a chemical reaction*
- Atom economy*
- Expressing concentrations
- Titration*
- Titration calculations*
- Volumes of gases*

**11 3 CHEMICAL ANALYSIS = 7/9**

- Pure substance and mixtures
- Analysing chromatograms
- Testing for gases
- Tests for positive ions*
- Tests for negative ions*
- Instrumental analysis*

**9C3 CHEMICAL CHANGES = 14**

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- Exothermic and endothermic reactions
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- Reaction profiles
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- Chemical cells and batteries*
- Fuel cells

**10C4: RATES AND EQUILIBRIUM = 13**

- Rates of reaction
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**11C4: THE EARTH’S ATMOSPHERE = 6**

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- Atmospheric pollutants

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- Finite and renewable resources
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