**Stage 1 Chemistry – Program 3**

Semester 1 articulates with Learning and Assessment Plan 3

Semester 2 articulates with Learning and Assessment Plan 4

Unit Plan - Matter

| Timeline | Science Understanding | Learning Activities | Resources |
| --- | --- | --- | --- |
| Term 1  Week 1 | [Lesson 1]  Introduction  Claim testers  Revision, physical and chemical changes, making predictions.  [lesson 2]  Continue revision with Copper investigation. | Course outline, Quiz  Claim testers – recognising dodgy arguments  Formative Investigation – Let’s Start with Copper | Course of Studies  Laboratory Safety  Claim testers pdf  Observations Resources  Revision Worksheet  Copper Practical |
| Term 1  Week 2 | [Lesson 1]  Complete copper investigation.  Introduce sources of error.  Introduce word equations to symbols.  Macroscopic properties of materials.  [Lesson 2]  Macroscopic properties of materials. | Formative Investigation – Let’s Start with Copper  Definitions, followed by examples of materials development: Development of tennis racquets, bicycle  Introduction  Formative Research Assignment (Construction of a materials Wiki – focus on polymers) | Materials Summary Booklet  [Computer Room] |
| Term 1  Week 3 | [Lesson 1]  Macroscopic properties of materials.  [Lesson 2]  Kinetic Theory of matter. | Formative Research Assignment (Construction of a materials Wiki)  Examples: Teflon, aerogel  Formative Demonstrations and Investigation – Dry Ice, Liquid Nitrogen, Syringes, Bottles | Kinetic Theory Summary Booklet  [Computer Room] |
| Term 1  Week 4 | [Lesson 1]  Kinetic Theory of matter.  [Lesson 2]  Atomic Theory of matter.  Electronic Configuration | Formative Investigation – Cooling curve of lauric and stearic acid  Formative Investigation – Flame colours | Kinetic Theory Summary Booklet  Interactive periodic table |
| Term 1, Week 5 | [Lesson 1]  Extension – Subshell Notation  [Lesson 2]  The Periodic Table and trends. | Online Quiz: Atomic Theory    Formative Investigation – Trends in group I and II metals | Atomic Theory Summary Booklet  Periodic Table Summary Booklet |
| Term 1, Week 6 | [Lesson 1]  Balancing Equations  [Lesson 2]  Revision - Matter | Formative Investigation – Balancing Lead Iodide through ratios  Revision – Concept Map – Bonding  Formative Exercises | Balancing Equations Summary Booklet  Concept Mapping Whiteboard and use of Microsoft Office lens for capture OR  Inspiration Software |

Unit Plan - Bonding

| Timeline | Science Understanding | Learning Activities | Resources |
| --- | --- | --- | --- |
| Term 1  Week 7 | [Lesson 1]  Matter  [lesson 2]  Properties of materials, introduction to bonding | Formative SAT  Materials, Kinetic and Atomic Theory, Periodicity  Formative Investigation – Properties of Materials: Bonding | Bonding Summary Booklets  Bonding animations  Bonding online quizzes |
| Term 1  Week 8 | [Lesson 1]  Metallic bonding, structure and properties  [Lesson 2]  Ionic bonding, structure and properties  Ionic Formulae | Animations – metallic bonding model  Group activity – constructing ionic formulae  Ions Bingo | Metallic Bonding Summary Booklet  Ionic Bonding Summary Booklet  Ball bearing sandwich  Instant Lesson in  Chemistry – Formulae Cut-outs |
| Term 1  Week 9 | [Lesson 1]  Solubility, dissociation and precipitation  [lesson 2]  Precipitation | Formative Investigation – Ion Identification  SAT – Bonding and Properties  Problem Solving: Identification of Ionic Solutions | Ionic Bonding Summary Booklet  Ionic Solutions/Enthalpy Summary Booklet |
| Term 1 Week 10 | [Lesson 1]  Enthalpy  [Lesson 2]  Measuring energy changes – enthalpy of solution | Formative Instigation – endothermic or exothermic  Formative Investigation – Enthalpy of solution | Ionic Solutions/Enthalpy Summary Booklet |
| Term 1  Week 11 | [Lesson 1]  Covalent bonding, structure and properties  Molecular shape and polarity  [Lesson 2]  Molecular shape and polarity  Covalent networks  Extension - Introduction to chromatography | Formative activity – molecular shapes (model kits)  Formative activity – making diamond  Formative investigation – chromatography of M&Ms | Covalent Bonding Summary Booklet  3D Molecules app  molymod model kits  Kahn Academy – Introduction to Chromatography |
| Term 2, Week 1 | [Lesson 1]  Chromatography, molecular polarity, separating mixtures, adsorption  [Lesson 2]  Bonding | **Investigations folio:**  Covalent bonding design practical  Revision – concept map- Bonding  Formative exercises bonding | Bonding Summary Booklets  Concept Mapping – Inspiration OR Capture through Office lens |
| Term 2  Week 2 | [Lesson 1]  Bonding  [lesson 2]  Bonding | Balancing equations  Revision  Concept Map  **SAT** Materials and Matter | Balancing Equations Summary Booklet |

Unit Plan – Organic Chemistry

| Timeline | Science Understanding | Learning Activities | Resources |
| --- | --- | --- | --- |
| Term 2  Week 3 | [lesson 1]  Introduction to Organic Chemistry  Fractional distillation  Saturated/unsaturated  Alkanes/alkenes/alkynes  [Lesson 2]  Nomenclature  Isomers  Addition Polymers | Demonstration – combustion of hydrocarbons/addition of oxygen (propan-1-ol).  Activity – molymod  Formative Investigation – Test for Saturation  Formative activity – polymer properties | Organic Chemistry Summary Booklet |
| Term 2  Week 4 | [Lesson 1]  Alcohols  [Lesson 2]  Fermentation and distillation | Formative Investigation – Solubility  CRAAP Article Analysis – Food v Fuel  Demonstration – Distillation  Demonstration – Wine making  Formative Investigation – Distillation of Wine | Organic Chemistry Summary Booklet  Infographic – Food v Fuel |
| Term 2  Week 5 | [Lesson 1]  Oxidation of alcohols  [lesson 2]  Esters  Condensation polymers - polyesters | Formative Investigation – Oxidation of Alcohols  Formative Investigation – Making Simple Esters  Formative Investigation – Reflux | Organic Chemistry Summary Booklet |
| Term 2  Week 6 | [Lesson 1]  Organic Chemistry  [Lesson 2]  Organic Chemistry | Revision – Concept Map – Organic Chemistry  Formative Exercises – Organic Chemistry  **SHE** Investigation: Bioethanol/Food v Fuel, in class task [OR advantages/disadvantages polymers]  Formative Activity – Making Slime | Concept Mapping – Inspiration OR Capture through Office lens |

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| Term 2, Week 7 | [Lesson 1]  Revision  End of Semester Exams Commence |  | Chapter Reviews and Revision Program |
| Term 2, Week 8 | **End of Semester** Exams are concluded |  |  |

Semester 2 Articulates with LAP 4

Unit Plan - Acids

| Timeline | Science Understanding | Learning Activities | Resources |
| --- | --- | --- | --- |
| Term 2  Week 10 | [Lesson 1]  Introduction to acids and bases (Bonsted –Lowry)  Reactions of Acids  [Lesson 2]  Acid reactions  Formulae of ions and acids  Acid rain | Formative Investigation – Reactions of Acids  Ions Bingo and Quiz  Exercises – writing equations  Introduction to the Issues Investigation  **SHE** Investigation: Acids in the Environment | Acids Summary Booklet |
| Term 3  Week 1 | [Lesson 1]  Ionisation  Conjugate pairs  [lesson 2]  pH and H+ Concentration  Strength and Concentration | Formative Investigation – Evidence for Ionisation  Formative Investigation – Complete & Incomplete Ionisation  Exercises – Conjugate pairs  Exercises – log and pH calculations | Acids Summary Booklet |
| Term 3  Week 2 | [Lesson 1]  Acids  [Lesson 2]  Acids | Revision -  Concept Map - Acids  PracticalProblem Solving: Identification of Unknown Acids & Bases, acids questions | Acids Summary Booklet |

Unit Plan – Moles/Stoichiometry/Volumetric Analysis

| Timeline | Science Understanding | Learning Activities | Resources |
| --- | --- | --- | --- |
| Term 3  Week 3 | [Lesson 1]  The mole  [Lesson 2]  Percentage composition | Formative Activity – Moles of substances, Measuring a dozen (balance) | Moles/Stoichiometry/  Volumetric Analysis Summary Booklets  Online quizzes |
| Term 3  Week 4 | [Lesson 1]  Empirical formula  [Lesson 2]  Mole calculations | Demonstration – copper sulfate, cobalt chloride  Formative Investigation – Formula of magnesium oxide | Moles/Stoichiometry/  Volumetric Analysis Summary Booklets |
| Term 3  Week 5 | [Lesson 1]  Mole calculations  [lesson 2]  Mass stoichiometry  Limiting/excess reagents | Group construction – mole calculations in excel | Moles/Stoichiometry/  Volumetric Analysis Summary Booklets |
| Term 3  Week 6 | [Lesson 1]  Concentration calculations  Standard solutions  [Lesson 2]  Solution stoichiometry  Titrations | Formative Practical – Preparing a standard solution of sodium carbonate  Formative Practical – Standardising HCl | Moles/Stoichiometry/  Volumetric Analysis Summary Booklets  Interactive Lab Primer – Volumetric analysis |
| Term 3, Week 7 | [Lesson 1]  Solution stoichiometry  Titrations  [Lesson 2]  Solution stoichiometry  Titrations | Formative Practical – Standardising NaOH  Formative Practical – Acid content in OJ, wine, vinegar OR carbonated soft-drinks | Moles/Stoichiometry/  Volumetric Analysis Summary Booklets |
| Term 3, Week 8 | [Lesson 2]  Conversions  [Lesson 2]  Dilution | Conversions table  Formative Activity – Dilution of potassium chromate | Moles/Stoichiometry/  Volumetric Analysis Summary Booklets |
| Term 3, Week 9 | [Lesson 2]  Solution stoichiometry  Titrations  [Lesson 2]  Moles/Stoichiometry | FormativeTitration Investigation: Ammonia Content  Revision – Concept Map – Moles/Stoichiometry  Formative Test – Moles/Stoichiometry | Moles/Stoichiometry/  Volumetric Analysis Summary Booklets |
| Term 3, Week 10 | [Lesson 2]  Introduction - Organic | **SAT** – Moles/Stoichiometry/  Volumetric Analysis |  |

Unit Plan – Redox & Electrochemistry

| Timeline | Science Understanding | Learning Activities | Resources |
| --- | --- | --- | --- |
| Term 4,  Week 1 | [lesson 1]  Definitions of Redox  Oxidation Numbers  [Lessons 2]  Balancing half equations | Demonstrations: Copper sulfate and steel wool.  Copper and silver nitrate.  Formative Investigation – Confirming redox reactions | Redox/Electrochemistry Summary Booklet |
| Term 4,  Week 2 | [Lesson 1]  Metal activity  [Lesson 2]  Displacement reactions | Formative Investigation – Metal Activity Series  Formative Practical – Metallic Trees | Redox/Electrochemistry Summary Booklet |
| Term 4,  Week 3 | [Lesson 1]  Introduction to Galvanic Cells  [lesson 2]  Galvanic Cells - Uses | Formative Practical – Making a Galvanic Cell, Lemon cell, Metal cells  Demonstration: different cells and batteries, fuel cell car  DVD: Wet Cells, Dry Cells, Fuel Cells VEA | Redox/Electrochemistry Summary Booklet |
| Term 4,  Week 4 | [Lesson 1]  Galvanic Cells  [Lesson 2]  Electrolytic Cells | **Investigations Folio:** Design Investigation – Galvanic Cells & Electrochemical Series  Formative Investigation – Copper/Nickel Plating, Hoffman Voltameter, CuCl2 | Redox/Electrochemistry Summary Booklet |
| Term 4, Week 5 | [Lesson 1]  Electrochemistry  [Lesson 2]  Test | Revision – Concept Map  **SAT:** Topic Test – Redox & Electrochemistry | Redox/Electrochemistry Summary Booklet |
| Term 4, Week 6 | [Lesson 1]  Revision  End of Semester Exams Commence |  | Chapter Reviews and Revision Program |
| Term 4, Week 7 | **End of Semester** Exams are concluded |  |  |