**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 |
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| Term 1 Week 1 | [Lesson 1]IntroductionClaim testersRevision, physical and chemical changes, making predictions.[lesson 2]Continue revision with Copper investigation. | Course outline, QuizClaim testers – recognising dodgy argumentsFormative Investigation – Let’s Start with Copper | Course of StudiesLaboratory SafetyClaim testers pdfObservations ResourcesRevision WorksheetCopper Practical |
| Term 1Week 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 CopperDefinitions, followed by examples of materials development: Development of tennis racquets, bicycleIntroduction Formative Research Assignment (Construction of a materials Wiki – focus on polymers) | Materials Summary Booklet[Computer Room] |
| Term 1Week 3 | [Lesson 1]Macroscopic properties of materials.[Lesson 2]Kinetic Theory of matter. | Formative Research Assignment (Construction of a materials Wiki)Examples: Teflon, aerogelFormative Demonstrations and Investigation – Dry Ice, Liquid Nitrogen, Syringes, Bottles | Kinetic Theory Summary Booklet[Computer Room] |
| Term 1Week 4 | [Lesson 1]Kinetic Theory of matter.[Lesson 2]Atomic Theory of matter.Electronic Configuration | Formative Investigation – Cooling curve of lauric and stearic acidFormative Investigation – Flame colours | Kinetic Theory Summary BookletInteractive 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 BookletPeriodic Table Summary Booklet |
| Term 1, Week 6 | [Lesson 1]Balancing Equations[Lesson 2]Revision - Matter | Formative Investigation – Balancing Lead Iodide through ratiosRevision – Concept Map – BondingFormative Exercises | Balancing Equations Summary BookletConcept Mapping Whiteboard and use of Microsoft Office lens for capture ORInspiration 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, PeriodicityFormative Investigation – Properties of Materials: Bonding | Bonding Summary BookletsBonding animationsBonding online quizzes |
| Term 1Week 8 | [Lesson 1]Metallic bonding, structure and properties [Lesson 2]Ionic bonding, structure and propertiesIonic Formulae | Animations – metallic bonding modelGroup activity – constructing ionic formulaeIons Bingo | Metallic Bonding Summary BookletIonic Bonding Summary BookletBall bearing sandwichInstant Lesson in Chemistry – Formulae Cut-outs |
| Term 1Week 9 | [Lesson 1]Solubility, dissociation and precipitation[lesson 2]Precipitation | Formative Investigation – Ion IdentificationSAT – Bonding and PropertiesProblem Solving: Identification of Ionic Solutions | Ionic Bonding Summary BookletIonic Solutions/Enthalpy Summary Booklet |
| Term 1 Week 10 | [Lesson 1]Enthalpy[Lesson 2]Measuring energy changes – enthalpy of solution | Formative Instigation – endothermic or exothermicFormative Investigation – Enthalpy of solution | Ionic Solutions/Enthalpy Summary Booklet |
| Term 1Week 11 | [Lesson 1]Covalent bonding, structure and propertiesMolecular shape and polarity [Lesson 2]Molecular shape and polarityCovalent networksExtension - Introduction to chromatography | Formative activity – molecular shapes (model kits)Formative activity – making diamondFormative investigation – chromatography of M&Ms | Covalent Bonding Summary Booklet3D Molecules appmolymod model kitsKahn Academy – Introduction to Chromatography |
| Term 2, Week 1 | [Lesson 1]Chromatography, molecular polarity, separating mixtures, adsorption [Lesson 2]Bonding | **Investigations folio:**Covalent bonding design practicalRevision – concept map- BondingFormative exercises bonding | Bonding Summary BookletsConcept Mapping – Inspiration OR Capture through Office lens  |
| Term 2 Week 2 | [Lesson 1]Bonding[lesson 2]Bonding | Balancing equationsRevisionConcept 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 ChemistryFractional distillationSaturated/unsaturatedAlkanes/alkenes/alkynes[Lesson 2]NomenclatureIsomersAddition Polymers | Demonstration – combustion of hydrocarbons/addition of oxygen (propan-1-ol).Activity – molymodFormative Investigation – Test for SaturationFormative activity – polymer properties | Organic Chemistry Summary Booklet |
| Term 2Week 4 | [Lesson 1]Alcohols[Lesson 2]Fermentation and distillation | Formative Investigation – SolubilityCRAAP Article Analysis – Food v FuelDemonstration – DistillationDemonstration – Wine makingFormative Investigation – Distillation of Wine  | Organic Chemistry Summary BookletInfographic – Food v Fuel |
| Term 2Week 5 | [Lesson 1]Oxidation of alcohols[lesson 2] EstersCondensation polymers - polyesters | Formative Investigation – Oxidation of AlcoholsFormative Investigation – Making Simple EstersFormative Investigation – Reflux | Organic Chemistry Summary Booklet |
| Term 2Week 6 | [Lesson 1]Organic Chemistry[Lesson 2]Organic Chemistry | Revision – Concept Map – Organic ChemistryFormative 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]RevisionEnd 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 2Week 10 | [Lesson 1]Introduction to acids and bases (Bonsted –Lowry)Reactions of Acids [Lesson 2]Acid reactions Formulae of ions and acidsAcid rain | Formative Investigation – Reactions of AcidsIons Bingo and QuizExercises – writing equationsIntroduction to the Issues Investigation**SHE** Investigation: Acids in the Environment | Acids Summary Booklet |
| Term 3Week 1 | [Lesson 1]IonisationConjugate pairs[lesson 2]pH and H+ ConcentrationStrength and Concentration | Formative Investigation – Evidence for IonisationFormative Investigation – Complete & Incomplete IonisationExercises – Conjugate pairsExercises – log and pH calculations | Acids Summary Booklet |
| Term 3Week 2 | [Lesson 1]Acids[Lesson 2]Acids | Revision -Concept Map - AcidsPracticalProblem 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 BookletsOnline quizzes |
| Term 3Week 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 3Week 5 | [Lesson 1]Mole calculations[lesson 2] Mass stoichiometryLimiting/excess reagents | Group construction – mole calculations in excel | Moles/Stoichiometry/Volumetric Analysis Summary Booklets |
| Term 3Week 6 | [Lesson 1]Concentration calculationsStandard solutions[Lesson 2]Solution stoichiometryTitrations  | Formative Practical – Preparing a standard solution of sodium carbonateFormative Practical – Standardising HCl | Moles/Stoichiometry/Volumetric Analysis Summary BookletsInteractive Lab Primer – Volumetric analysis |
| Term 3, Week 7 | [Lesson 1]Solution stoichiometryTitrations [Lesson 2]Solution stoichiometryTitrations  | Formative Practical – Standardising NaOHFormative 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 tableFormative Activity – Dilution of potassium chromate | Moles/Stoichiometry/Volumetric Analysis Summary Booklets |
| Term 3, Week 9 | [Lesson 2]Solution stoichiometryTitrations [Lesson 2]Moles/Stoichiometry | FormativeTitration Investigation: Ammonia Content Revision – Concept Map – Moles/StoichiometryFormative 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 RedoxOxidation 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 SeriesFormative 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 cellsDemonstration: different cells and batteries, fuel cell carDVD: 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 SeriesFormative 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]RevisionEnd of Semester Exams Commence |  | Chapter Reviews and Revision Program  |
| Term 4, Week 7 | **End of Semester** Exams are concluded |  |  |