



NCEA Science

EP Curriculum Map

NCEA Level 2

Biology

2.1 Biology Investigation

Topics	Lesson Names
Learning Material	<ul style="list-style-type: none">● Introduction: Biology 2.1● Graph Conventions● Types of Graphs● Using Excel to Draw Graphs● Writing Conclusions● Discussion● Discussion● Forming a Hypothesis● Independent and Dependent Variables● Controlled Variables● Fair-Test Investigation● Pattern-Seeking Investigation● Methods● Sources of Error● Making Results Tables
Practice Tasks	<ul style="list-style-type: none">● AS91153: Hydrogen Peroxide Concentration Investigation● AS91153: Mg + HCl Concentration Investigation● AS91153: Mg + HCl Temperature Investigation
Assessments	<ul style="list-style-type: none">● AS91153: Blank Template● AS91153: Hydrogen Peroxide Concentration Investigation● AS91153: Mg + HCl Concentration Investigation● AS91153: Mg + HCl Temperature Investigation

2.4 Life Processes at the Cellular Level

Topics	Lesson Names
Cell Structure and Function	<ul style="list-style-type: none"> • Animal Cell Organelles • Plant Cell Organelles • Animal and Plant Cell Comparison
Enzymes	<ul style="list-style-type: none"> • Enzyme Structure and Function • Factors Affecting Enzyme Activity
DNA	<ul style="list-style-type: none"> • The Cell Cycle • The Structure of DNA • DNA Replication • Mitosis
Photosynthesis	<ul style="list-style-type: none"> • Chloroplasts and Photosynthesis • Factors Affecting the Rate of Photosynthesis • Maximising the Rate of Photosynthesis
Respiration	<ul style="list-style-type: none"> • Mitochondria and Respiration • Aerobic and Anaerobic Respiration • Respiration Specialisation • Factors Affecting Respiration Rate • Photosynthesis vs. Respiration
Transport Across Membranes	<ul style="list-style-type: none"> • The Cell Membrane and Diffusion • Osmosis • Active Transport and Cytosis
Revision Lessons	<ul style="list-style-type: none"> • Enzymes Revision • DNA Revision • Photosynthesis Revision • Respiration Revision • Transport Across Membranes Revision • Cell Respiration and Metabolism Revision
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> • Cell Structure and Function • Enzymes • DNA • Photosynthesis • Respiration • Transport Across Membranes <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> • 2012 - 2.4 Life Processes at the Cellular Level - Exam Mode • 2013 - 2.4 Life Processes at the Cellular Level - Exam Mode • 2014 - 2.4 Life Processes at the Cellular Level -



	<p>Exam Mode</p> <ul style="list-style-type: none">● 2015 - 2.4 Life Processes at the Cellular Level - Exam Mode● 2016 - 2.4 Life Processes at the Cellular Level - Exam Mode● 2017 - 2.4 Life Processes at the Cellular Level - Exam Mode● 2018 - 2.4 Life Processes at the Cellular Level - Exam Mode● 2019 - 2.4 Life Processes at the Cellular Level - Exam Mode● 2020 - 2.4 Life Processes at the Cellular Level - Exam Mode● 2021 - 2.4 Life Processes at the Cellular Level - Exam Mode● 2022 - 2.4 Life Processes at the Cellular Level - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none">● 2012 - 2.4 Life Processes at the Cellular Level - Practice Mode● 2013 - 2.4 Life Processes at the Cellular Level - Practice Mode● 2014 - 2.4 Life Processes at the Cellular Level - Practice Mode● 2015 - 2.4 Life Processes at the Cellular Level - Practice Mode● 2016 - 2.4 Life Processes at the Cellular Level - Practice Mode● 2017 - 2.4 Life Processes at the Cellular Level - Practice Mode● 2018 - 2.4 Life Processes at the Cellular Level - Practice Mode● 2019 - 2.4 Life Processes at the Cellular Level - Practice Mode● 2020 - 2.4 Life Processes at the Cellular Level - Practice Mode● 2021 - 2.4 Life Processes at the Cellular Level - Practice Mode● 2022 - 2.4 Life Processes at the Cellular Level - Practice Mode
Spelling and Vocabulary	<ul style="list-style-type: none">● Life Processes at the Cellular Level Definitions List● Life Processes at the Cellular Level Spelling List● Life Processes at the Cellular Level Terms and Definitions Quiz

2.5 Genetic Variation and Change

Topics	Lesson Names
Prior Knowledge Review	<ul style="list-style-type: none"> • DNA, Inheritance and Variation Review • Prior Knowledge Review Quiz • Prior Knowledge Pre-Built Assessment
Genetic Variation	<ul style="list-style-type: none"> • Genetic Diversity • Mutations and Variation • Meiosis • Meiosis as a Source of Variation
Monohybrid Inheritance	<ul style="list-style-type: none"> • Monohybrid Inheritance • The Test Cross (NEW) • Pedigree Charts • Incomplete Dominance and Co-dominance • Multiple Alleles and Lethal Alleles
Dihybrid Inheritance	<ul style="list-style-type: none"> • Dihybrid Inheritance - Unlinked Genes • Dihybrid Inheritance - Linked Genes
Mechanisms of Evolution	<ul style="list-style-type: none"> • Genetic Change • Mechanisms of Evolution - Mutations • Mechanisms of Evolution - Gene Flow
Revision Lessons	<ul style="list-style-type: none"> • Genetic Variation Revision • Monohybrid Inheritance Revision • Dihybrid Inheritance Revision • Mechanisms of Evolution Revision
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> • Mutations • Phenotype Ratios • Population Change • Punnett Squares and Dominance <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> • 2012 - 2.5 Genetic Variation and Change - Exam Mode • 2013 - 2.5 Genetic Variation and Change - Exam Mode • 2014 - 2.5 Genetic Variation and Change - Exam Mode • 2015 - 2.5 Genetic Variation and Change - Exam Mode • 2016 - 2.5 Genetic Variation and Change - Exam Mode • 2017 - 2.5 Genetic Variation and Change - Exam Mode

	<ul style="list-style-type: none"> ● 2018 - 2.5 Genetic Variation and Change - Exam Mode ● 2019 - 2.5 Genetic Variation and Change - Exam Mode ● 2020 - 2.5 Genetic Variation and Change - Exam Mode ● 2021 - 2.5 Genetic Variation and Change - Exam Mode ● 2022 - 2.5 Genetic Variation and Change - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> ● 2012 - 2.5 Genetic Variation and Change - Practice Mode ● 2013 - 2.5 Genetic Variation and Change - Practice Mode ● 2014 - 2.5 Genetic Variation and Change - Practice Mode ● 2015 - 2.5 Genetic Variation and Change - Practice Mode ● 2016 - 2.5 Genetic Variation and Change - Practice Mode ● 2017 - 2.5 Genetic Variation and Change - Practice Mode ● 2018 - 2.5 Genetic Variation and Change - Practice Mode ● 2019 - 2.5 Genetic Variation and Change - Practice Mode ● 2020 - 2.5 Genetic Variation and Change - Practice Mode ● 2021 - 2.5 Genetic Variation and Change - Practice Mode ● 2022 - 2.5 Genetic Variation and Change - Practice Mode
Spelling and Vocabulary	<ul style="list-style-type: none"> ● Genetic Variation and Change Definitions List ● Genetic Variation and Change Spelling List ● Genetic Variation and Change Terms and Definitions Quiz

2.6 Ecological Communities

Topics	Lesson Names
Learning Material	<ul style="list-style-type: none"> ● An Introduction to Biology 2.6 ● Species Interrelationships ● Species Distributions

	<ul style="list-style-type: none"> • Adaptations • Aims and Hypotheses • Sampling Methods • Tables, Graphs and Results • Writing a Discussion • Putting it all Together
Practice Tasks	<ul style="list-style-type: none"> • AS91158: Alpine Zones - 2.6 Ecological Communities • AS91158: Estuaries - 2.6 Ecological Communities • AS91158: New Zealand Forest - 2.6 Ecological Communities • AS91158: Shore Life - 2.6 Ecological Communities
Assessments	<ul style="list-style-type: none"> • AS91158: Alpine Zones - 2.6 Ecological Communities • AS91158: Blank Template - 2.6 Ecological Communities • AS91158: Estuaries - 2.6 Ecological Communities • AS91158: New Zealand Forest - 2.6 Ecological Communities • AS91158: Shore Life - 2.6 Ecological Communities

2.7 Gene Expression

Topics	Lesson Names
Prior Knowledge Review	<ul style="list-style-type: none"> • DNA, Genes, Alleles and Chromosomes • Prior Knowledge Review Quiz • Prior Knowledge Prebuilt Assessment
Protein Synthesis	<ul style="list-style-type: none"> • Proteins and Enzymes • Protein Synthesis and RNA • Transcription • Translation
Mutations and Mutagens	<ul style="list-style-type: none"> • Mutations and Mutagens • The "Redundant" Code • Gene Mutations
Factors Affecting Gene Expression	<ul style="list-style-type: none"> • Metabolic Pathways and Mutations • Metabolic Pathways, Genotype and Phenotype • Environmental Effects on Phenotype
Revision Lessons	<ul style="list-style-type: none"> • Protein Synthesis Revision • Mutations and Mutagens Revision • Factors Affecting Gene Expression Revision
Exam Questions	How to Mark NCEA Exams



	<p><i>Questions by Topic</i></p> <ul style="list-style-type: none">● Gene/Environment Interaction● Metabolic Pathways● Mutation● Protein Synthesis <p><i>Exam Mode</i></p> <ul style="list-style-type: none">● 2012 - 2.7 Gene Expression (AS91159)● 2013 - 2.7 Gene Expression (AS91159)● 2014 - 2.7 Gene Expression (AS91159)● 2015 - 2.7 Gene Expression (AS91159)● 2016 - 2.7 Gene Expression (AS91159)● 2017 - 2.7 Gene Expression - Exam Mode● 2018 - 2.7 Gene Expression - Exam Mode● 2019 - 2.7 Gene Expression - Exam Mode● 2020 - 2.7 Gene Expression - Exam Mode● 2021 - 2.7 Gene Expression - Exam Mode● 2022 - 2.7 Gene Expression - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none">● 2012 - 2.7 Gene Expression - Practice Mode● 2013 - 2.7 Gene Expression - Practice Mode● 2014 - 2.7 Gene Expression - Practice Mode● 2015 - 2.7 Gene Expression - Practice Mode● 2016 - 2.7 Gene Expression - Practice Mode● 2017 - 2.7 Gene Expression - Practice Mode● 2018 - 2.7 Gene Expression - Practice Mode● 2019 - 2.7 Gene Expression - Practice Mode● 2020 - 2.7 Gene Expression - Practice Mode● 2021 - 2.7 Gene Expression - Practice Mode● 2022 - 2.7 Gene Expression - Practice Mode
Spelling and Vocabulary	<ul style="list-style-type: none">● Gene Expression Definitions List● Gene Expression Spelling List● Gene Expression Terms and Definitions Quiz

Chemistry

2.1 Investigate a Substance in a Consumer Product

Topics	Lesson Names
Investigate a Substance in a Consumer Product	<ul style="list-style-type: none"> ● Introduction to Chemistry 2.1 ● Moles and Molar Mass ● Titration Calculations ● Developing a Method ● Evaluating the Investigation ● Moles and Balanced Equations (Stoichiometry) ● Water of Crystallisation ● Solutions and Concentration ● Other Measures of Concentration ● Dilutions ● Standard Solutions ● Performing a Titration ● Key Terms and Definitions: Quantitative Analysis ● Vocabulary: Quantitative Analysis

2.2 Investigate a Chemical Species in a Sample

Topics	Lesson Names
Investigate a Chemical Species in a Sample	<ul style="list-style-type: none"> ● Solutions and Solubility ● Organic Reaction Schemes ● Precipitation Reactions ● Describing and Predicting Precipitates ● Complex Ions ● Common Reagents ● Testing for Cations ● Testing for Anions ● Functional Groups Summary ● Distinguishing Organic Compounds

2.4 Structure and Bonding

Topics	Lesson Names
Prior Learning	<ul style="list-style-type: none"> ● The Structure of an Atom ● Atomic Symbols ● Electron Configurations of Atoms ● Organisation of the Periodic Table ● Trends in the Periodic Table ● Introduction to Ions

	<ul style="list-style-type: none"> • Electron Configuration of Ions • Ionic Compounds • Polyatomic Ions and Compounds
Introduction to Bonding	<ul style="list-style-type: none"> • Introduction to Bonding
Ionic Substances	<ul style="list-style-type: none"> • Ionic Substances • Physical Properties of Ionic Substances
Metallic Substances	<ul style="list-style-type: none"> • Metallic Substances • Physical Properties of Metallic Substances
Molecular Substances	<ul style="list-style-type: none"> • Covalent Bonding • Electron Dot Diagrams of Atoms • Lewis Structures of Molecules • Physical Properties of Molecular Substances • Shapes of Molecules • Polarity of Molecules • Skill: Constructing Molecular Models
Covalent Network Substances	<ul style="list-style-type: none"> • Covalent Network Substances • Allotropes of Carbon • Physical Properties of Covalent Network Substances
Comparing Substances	<ul style="list-style-type: none"> • Comparing Substances
Energy Changes	<ul style="list-style-type: none"> • Exothermic and Endothermic Processes • Energy Level Diagrams • State Changes • Moles and Molar Mass • Thermochemical Equations • Mole Ratios • Stoichiometry and Energy Calculations • Bond Enthalpies of Molecules • Bond Enthalpies of Reactions
Revision Lessons	<ul style="list-style-type: none"> • Types of Bonding Revision • Physical Properties Revision • Molecular Shape and Polarity Revision • Exothermic and Endothermic Processes Revision • Thermochemical Equations and Calculations Revision
Key Terms and Definitions	<ul style="list-style-type: none"> • Key Terms and Definitions: Bonding • Key Terms and Definitions: Covalent Network Substances • Key Terms and Definitions: Energy Changes • Key Terms and Definitions: Ionic Substances • Key Terms and Definitions: Metallic Substances • Key Terms and Definitions: Molecular Substances • Key Terms and Definitions: Properties of Substances

Key Terms and Definitions	<ul style="list-style-type: none"> ● Vocabulary: Bonding ● Vocabulary: Covalent Network Substances ● Vocabulary: Energy Changes ● Vocabulary: Ionic Substances ● Vocabulary: Metallic Substances ● Vocabulary: Molecular Substances ● Vocabulary: Properties of Substances
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> ● Bonding ● Energy ● Structure <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> ● 2012 - 2.4 Structure and Bonding - Exam Mode ● 2013 - 2.4 Structure and Bonding - Exam Mode ● 2014 - 2.4 Structure and Bonding - Exam Mode ● 2015 - 2.4 Structure and Bonding - Exam Mode ● 2016 - 2.4 Structure and Bonding - Exam Mode ● 2017 - 2.4 Structure and Bonding - Exam Mode ● 2018 - 2.4 Structure and Bonding - Exam Mode ● 2019 - 2.4 Structure and Bonding - Exam Mode ● 2020 - 2.4 Bonding and Structure - Exam Mode ● 2021 - 2.4 Bonding and Structure - Exam Mode ● 2022 - 2.4 Bonding and Structure - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> ● 2012 - 2.4 Bonding and Structure - Practice Mode ● 2013 - 2.4 Bonding and Structure - Practice Mode ● 2014 - 2.4 Bonding and Structure - Practice Mode ● 2015 - 2.4 Bonding and Structure - Practice Mode ● 2016 - 2.4 Bonding and Structure - Practice Mode ● 2017 - 2.4 Structure and Bonding - Practice Mode ● 2018 - 2.4 Structure and Bonding - Practice Mode ● 2019 - 2.4 Structure and Bonding - Practice Mode ● 2020 - 2.4 Structure and Bonding - Practice Mode ● 2021 - 2.4 Structure and Bonding - Practice Mode ● 2022 - 2.4 Structure and Bonding - Practice Mode

2.5 Organic Chemistry

Topics	Lesson Names
Introduction to Organic Chemistry	<ul style="list-style-type: none"> ● Introduction to Organic Chemistry ● Structural Isomers ● Geometric Isomers

Alkanes	<ul style="list-style-type: none"> • Naming Alkanes • Alkane Isomers • Molecular and Structural Formulas of Alkanes • Properties of Alkanes • Substitution Reactions of Alkanes
Haloalkanes	<ul style="list-style-type: none"> • Naming Haloalkanes • Haloalkane Classification and Isomerism • Properties of Haloalkanes • Substitution Reactions of Haloalkanes • Elimination Reactions of Haloalkanes
Alkenes	<ul style="list-style-type: none"> • Naming Alkenes • Alkene Isomerism • Properties of Alkenes • Alkene Reactions • Polymers
Alkynes	<ul style="list-style-type: none"> • Naming Alkynes • Properties of Alkynes
Alcohols	<ul style="list-style-type: none"> • Naming Alcohols • Alcohol Isomerism • Properties of Alcohols • Substitution Reactions of Alcohol • Elimination Reactions of Alcohols • Oxidation Reactions of Alcohols
Carboxylic Acids	<ul style="list-style-type: none"> • Naming Carboxylic Acids • Properties of Carboxylic Acids
Amines	<ul style="list-style-type: none"> • Naming Amines • Primary Amine Isomerism • Properties of Primary Amines • Reactions of Primary Amines
Exam-Style Questions	<ul style="list-style-type: none"> • Functional Groups Summary • Distinguishing Organic Compounds • Reaction Schemes
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> • Identification • Reaction Schemes • Structural Formulae <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> • 2012 - 2.5 Organic Chemistry - Exam Mode • 2013 - 2.5 Organic Chemistry - Exam Mode • 2014 - 2.5 Organic Chemistry - Exam Mode • 2015 - 2.5 Organic Chemistry - Exam Mode • 2016 - 2.5 Organic Chemistry - Exam Mode

	<ul style="list-style-type: none"> • 2017 - 2.5 Organic Chemistry - Exam Mode • 2018 - 2.5 Organic Chemistry - Exam Mode • 2019 - 2.5 Organic Chemistry - Exam Mode • 2020 - 2.5 Organic Chemistry - Exam Mode • 2021 - 2.5 Organic Chemistry - Exam Mode • 2022 - 2.5 Organic Chemistry - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> • 2012 - 2.5 Organic Chemistry - Practice Exam • 2013 - 2.5 Organic Chemistry - Practice Exam • 2014 - 2.5 Organic Chemistry - Practice Exam • 2015 - 2.5 Organic Chemistry - Practice Exam • 2016 - 2.5 Organic Chemistry - Practice Exam • 2017 - 2.5 Organic Chemistry - Practice Exam • 2018 - 2.5 Organic Chemistry - Practice Exam • 2019 - 2.5 Organic Chemistry - Practice Exam • 2020 - 2.5 Organic Chemistry - Practice Exam • 2021 - 2.5 Organic Chemistry - Practice Exam • 2022 - 2.5 Organic Chemistry - Practice Exam
Spelling and Vocabulary	<ul style="list-style-type: none"> • Naming Organic Molecules Definitions List • Naming Organic Molecules Spelling List
Spelling and Vocabulary	<ul style="list-style-type: none"> • Characteristics and Properties Definitions List • Characteristics and Properties Spelling List
Spelling and Vocabulary	<ul style="list-style-type: none"> • Reactions of Organic Molecules Definitions List • Reactions of Organic Molecules Spelling List

2.6 Chemical Reactivity

Topics	Lesson Names
Rates of Reaction	<ul style="list-style-type: none"> • Introduction to Rates of Reaction • Collision Theory • Temperature and Reaction Rate • Concentration and Reaction Rate • Surface Area and Reaction Rate • Catalysts and Reaction Rate
Equilibrium Principles	<ul style="list-style-type: none"> • Introduction to Equilibrium • Equilibrium Constants • Equilibrium Constant Calculations
Changes to Equilibrium Systems	<ul style="list-style-type: none"> • Equilibrium and Changing Concentration • Equilibrium and Changing Pressure • Equilibrium and Changing Temperature • Equilibrium and Catalysts

<p>Acids and Bases</p>	<ul style="list-style-type: none"> ● Introduction to Acids and Bases ● Strong and Weak Acids and Bases ● Monoprotic, Polyprotic, Amphiprotic ● Conjugate Acid-Base Pairs ● pH Scale and Indicators ● pH Calculations
<p>Revision Lessons</p>	<ul style="list-style-type: none"> ● Reaction Rates Revision ● Equilibrium Principles Revision ● Changes to Equilibrium Systems Revision ● Acids and Bases Revision ● Skills
<p>Exam Questions</p>	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> ● Acids, Bases and pH ● Equilibrium ● Rates of Reaction <ul style="list-style-type: none"> ● <i>Exam Mode</i> ● 2012 - 2.6 Chemical Reactivity - Exam Mode ● 2013 - 2.6 Chemical Reactivity - Exam Mode ● 2014 - 2.6 Chemical Reactivity - Exam Mode ● 2015 - 2.6 Chemical Reactivity - Exam Mode ● 2016 - 2.6 Chemical Reactivity - Exam Mode ● 2017 - 2.6 Chemical Reactivity - Exam Mode ● 2018 - 2.6 Chemical Reactivity - Exam Mode ● 2019 - 2.6 Chemical Reactivity - Exam Mode ● 2020 - 2.6 Chemical Reactivity - Exam Mode ● 2021 - 2.6 Chemical Reactivity - Exam Mode ● 2022 - 2.6 Chemical Reactivity - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> ● 2012 - 2.6 Chemical Reactivity - Practice Mode ● 2013 - 2.6 Chemical Reactivity - Practice Mode ● 2014 - 2.6 Chemical Reactivity - Practice Mode ● 2015 - 2.6 Chemical Reactivity - Practice Mode ● 2016 - 2.6 Chemical Reactivity - Practice Mode ● 2017 - 2.6 Chemical Reactivity - Practice Mode ● 2018 - 2.6 Chemical Reactivity - Practice Mode ● 2019 - 2.6 Chemical Reactivity - Practice Mode ● 2020 - 2.6 Chemical Reactivity - Practice Mode ● 2021 - 2.6 Chemical Reactivity - Practice Mode ● 2022 - 2.6 Chemical Reactivity - Practice Mode

2.7 Oxidation and Reduction

Topics	Lesson Names
Oxidation and Reduction	<ul style="list-style-type: none"> • Introduction to Oxidation-Reduction • Introduction to Oxidation Numbers • Introduction to Oxidation-Reduction Reactions • Balancing Redox Half-Equations • Balancing Overall Redox Equations
Terms and Definitions	<ul style="list-style-type: none"> • Key Terms and Definitions: Introduction to Redox • Vocabulary: Introduction to Redox

NZ Chemistry Olympiad

Topics	Lesson Names
Past Exams	<p><i>Exam Mode</i></p> <ul style="list-style-type: none"> • 2019 Chemistry Olympiad Assessment • NZ Chemistry Olympiad - 2016 Multichoice Questions - Exam Mode • NZ Chemistry Olympiad - 2017 Multichoice Questions - Exam Mode • NZ Chemistry Olympiad - 2018 Multichoice Questions - Exam Mode • NZ Chemistry Olympiad - 2019 Multichoice Questions - Exam Mode • NZ Chemistry Olympiad - 2020 Multichoice Questions - Exam Mode • NZ Chemistry Olympiad - 2021 Multichoice Questions - Exam Mode • NZ Chemistry Olympiad - 2022 Multichoice Questions - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> • NZ Chemistry Olympiad - 2016 Multichoice Questions - Practice Mode • NZ Chemistry Olympiad - 2017 Multichoice Questions - Practice Mode • NZ Chemistry Olympiad - 2018 Multichoice Questions - Practice Mode • NZ Chemistry Olympiad - 2019 Multichoice Questions - Practice Mode • NZ Chemistry Olympiad - 2020 Multichoice Questions - Practice Mode • NZ Chemistry Olympiad - 2021 Multichoice Questions - Practice Mode • NZ Chemistry Olympiad - 2022 Multichoice Questions - Practice Mode

Physics

2.1 Non-Linear Investigation

Topics	Lesson Names
Investigating	<ul style="list-style-type: none"> • Introduction and Aims • Measurement • Methods
Processing and Concluding	<ul style="list-style-type: none"> • Recording and Graphing Data • Processing Non-Linear Data • Concluding and Discussing
Practice Tasks	<ul style="list-style-type: none"> • AS91168: Pendulum Investigation • AS91168: Simple Circuit Investigation
Assessments	<ul style="list-style-type: none"> • AS91168: Blank Template • AS91168: Pendulum Investigation • AS91168: Simple Circuit Investigation

2.3 Waves

Topics	Lesson Names
Properties of Waves	<ul style="list-style-type: none"> • Transfer of Energy Through Waves • Transverse and Longitudinal Waves • Wave Graphs • Wave Frequency and Wavefronts • Wave Speed • Context Lesson: Earthquakes and Tsunamis
Mechanical Waves	<ul style="list-style-type: none"> • Sound Waves • Wave Behaviour • Superposition and String Waves • Interference
Light	<ul style="list-style-type: none"> • Introduction to the Ray Model • Reflection at a Straight Boundary • Refraction of Light • Introduction to Snell's Law • Total Internal Reflection
Ray Model for Curved Optics	<ul style="list-style-type: none"> • Reflection of Light from a Concave Mirror - Real Images • Refraction of Light Through a Curved Lens - Magnification Equation • Descartes' Mirror/Lens Equation and Magnification • Reflection of Light from a Concave Mirror - Virtual Images • Reflection of Light from a Convex Mirror • Reflection of Light from a Curved Mirror - Descartes' Mirror Equation

	<ul style="list-style-type: none"> ● Reflection of Light from a Curved Mirror - Magnification Equation ● Refraction of Light Through a Convex Lens - Real Images ● Refraction of Light Through a Convex Lens - Virtual Images ● Refraction of Light Through a Concave Lens ● Refraction of Light Through a Curved Lens - Thin Lens Equation
Diffraction and Interference	<ul style="list-style-type: none"> ● Diffraction Around a Barrier ● Huygens' Principle ● Phase of Waves ● Superposition Principle ● Two Source Interference of Waves
Supporting Resources	<ul style="list-style-type: none"> ● Solving Simultaneous Equations Using Substitution ● Understanding and Graphing Sine ● Understanding and Graphing Cosine
Exam Questions	<p>How to Mark NCEA Exams</p> <ul style="list-style-type: none"> ● <i>Questions by Topic</i> ● Lenses ● Reflection ● Refraction ● Total Internal Reflection ● Wave Behaviour <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> ● 2012 - 2.3 Waves - Exam Mode ● 2013 - 2.3 Waves - Exam Mode ● 2014 - 2.3 Waves - Exam Mode ● 2015 - 2.3 Waves - Exam Mode ● 2016 - 2.3 Waves - Exam Mode ● 2017 - 2.3 Waves - Exam Mode ● 2018 - 2.3 Waves - Exam Mode ● 2019 - 2.3 Waves - Exam Mode ● 2020 - 2.3 Waves - Exam Mode ● 2021 - 2.3 Waves - Exam Mode ● 2022 - 2.3 Waves - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> ● 2012 - 2.3 Waves - Practice Mode ● 2013 - 2.3 Waves - Practice Mode ● 2014 - 2.3 Waves - Practice Mode ● 2015 - 2.3 Waves - Practice Mode ● 2016 - 2.3 Waves - Practice Mode ● 2017 - 2.3 Waves - Practice Mode ● 2018 - 2.3 Waves - Practice Mode ● 2019 - 2.3 Waves - Practice Mode ● 2020 - 2.3 Waves - Practice Mode

	<ul style="list-style-type: none"> • 2021 - 2.3 Waves - Practice Mode • 2022 - 2.3 Waves - Practice Mode
Key Terms and Definitions	<ul style="list-style-type: none"> • Key Terms and Definitions: Curved Optics • Key Terms and Definitions: Diffraction & Interference • Key Terms and Definitions: Properties of Waves • Key Terms and Definitions: Ray Model of Light • Vocabulary: Curved Optics • Vocabulary: Diffraction & Interference • Vocabulary: Properties of Waves • Vocabulary: Ray Model of Light
Revision Resources	<ul style="list-style-type: none"> • Diffraction and Interference Revision Questions • Ray Model of Light Revision Questions

2.4 Mechanics

Topics	Lesson Names
Motion	<ul style="list-style-type: none"> • Distance and Displacement • Velocity • Kinematics • Motion under Gravity • Projectile Motion
Forces	<ul style="list-style-type: none"> • Forces • Torque • Torque from Force at an Angle • Vector Forces • Net Torque • Equilibrium
Circular Motion	<ul style="list-style-type: none"> • Circular Motion • Centripetal Force
Springs	<ul style="list-style-type: none"> • Spring Forces • Spring Energy
Momentum	<ul style="list-style-type: none"> • Momentum • Impulse
Work and Energy	<ul style="list-style-type: none"> • Energy, Work, and Power • Conservation of Energy
Extended Questions	<ul style="list-style-type: none"> • Nerf Dart • Bungy Jump • Trolley Problem • Lunar Landing • Space Station • Cycling
Key Terms and Definitions	<ul style="list-style-type: none"> • Definitions and Key Terms

	<ul style="list-style-type: none"> ● Symbols and Key Terms ● Units and Key Terms ● Identifying Key Terms from Definitions ● Identifying Key Terms from Symbols ● Identifying Symbols from Key Terms
Revision	<ul style="list-style-type: none"> ● Motion Revision ● Forces and Torque Revision ● Circular Motion Revision ● Momentum Revision ● Springs Revision ● Work and Energy Revision
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> ● Circular Motion ● Equilibrium ● Hooke's Law ● Motion and Energy ● Newton's Laws ● Vectors <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> ● 2012 - 2.4 Mechanics - Exam Mode ● 2013 - 2.4 Mechanics - Exam Mode ● 2014 - 2.4 Mechanics - Exam Mode ● 2015 - 2.4 Mechanics - Exam Mode ● 2016 - 2.4 Mechanics - Exam Mode ● 2017 - 2.4 Mechanics - Exam Mode ● 2018 - 2.4 Mechanics - Exam Mode ● 2019 - 2.4 Mechanics - Exam Mode ● 2020 - 2.4 Mechanics - Exam Mode ● 2021 - 2.4 Mechanics - Exam Mode ● 2022 - 2.4 Mechanics - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> ● 2012 - 2.4 Mechanics - Practice Mode ● 2013 - 2.4 Mechanics - Practice Mode ● 2014 - 2.4 Mechanics - Practice Mode ● 2015 - 2.4 Mechanics - Practice Mode ● 2016 - 2.4 Mechanics - Practice Mode ● 2017 - 2.4 Mechanics - Practice Mode ● 2018 - 2.4 Mechanics - Practice Mode ● 2019 - 2.4 Mechanics - Practice Mode ● 2020 - 2.4 Mechanics - Practice Mode ● 2021 - 2.4 Mechanics - Practice Mode ● 2022 - 2.4 Mechanics - Practice Mode

2.5 Atomic & Nuclear Physics

Topics	Lesson Names
Atomic & Nuclear Physics	<ul style="list-style-type: none"> • Atomic Models • Radiation Types • Radioactive Decay • Radiation • Energy • Nuclear Fission • Nuclear Fusion • Half-Lives

2.6 Electricity & Electromagnetism

Topics	Lesson Names
Static Electricity	<ul style="list-style-type: none"> • Electric Charge • Electric Fields • Electric Field Strength • Electrostatic Forces • Millikan's Drop • Electric Potential Energy and Work • Cathode Ray Tube
DC Electricity	<ul style="list-style-type: none"> • Electric Current • Voltage • Ohm's Law
DC Electricity	<ul style="list-style-type: none"> • Circuits • Series Circuits • Parallel Circuits • Complex Circuits
DC Electricity	<ul style="list-style-type: none"> • Power • Energy
DC Electricity	<ul style="list-style-type: none"> • Conductors • Electrical Safety
Electromagnetism	<ul style="list-style-type: none"> • Magnetic Forces • Magnetic Fields • Magnetic Field of a Current-Carrying Wire • Solenoids • Force on a Current in a Magnetic Field • Force on a Charge in a Magnetic Field • Electromagnetic Induction
Revision Lessons	<ul style="list-style-type: none"> • Electric Charge and Electric Fields Revision • Electrostatic Forces and Potential Energy Revision

	<ul style="list-style-type: none"> • DC Electricity Revision • DC Circuits Revision • Power and Energy Revision • Magnetic Forces and Fields Revision • Electromagnetism Revision
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> • Circuits • Electromagnetism • Statics <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> • 2012 - 2.6 Electricity and Electromagnetism - Exam Mode • 2013 - 2.6 Electricity and Electromagnetism - Exam Mode • 2014 - 2.6 Electricity and Electromagnetism - Exam Mode • 2015 - 2.6 Electricity and Electromagnetism - Exam Mode • 2016 - 2.6 Electricity and Electromagnetism - Exam Mode • 2017 - 2.6 Electricity and Electromagnetism - Exam Mode • 2018 - 2.6 Electricity and Electromagnetism - Exam Mode • 2019 - 2.6 Electricity and Electromagnetism - Exam Mode • 2020 - 2.6 Electricity and Electromagnetism - Exam Mode • 2021 - 2.6 Electricity and Electromagnetism - Exam Mode • 2022 - 2.6 Electricity and Electromagnetism - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> • 2012 - 2.6 Electricity and Electromagnetism - Practice Mode • 2013 - 2.6 Electricity and Electromagnetism - Practice Mode • 2014 - 2.6 Electricity and Electromagnetism - Practice Mode • 2015 - 2.6 Electricity and Electromagnetism - Practice Mode • 2016 - 2.6 Electricity and Electromagnetism - Practice Mode • 2017 - 2.6 Electricity and Electromagnetism - Practice Mode • 2018 - 2.6 Electricity and Electromagnetism - Practice Mode • 2019 - 2.6 Electricity and Electromagnetism - Practice Mode • 2020 - 2.6 Electricity and Electromagnetism - Practice Mode • 2021 - 2.6 Electricity and Electromagnetism - Practice Mode • 2022 - 2.6 Electricity and Electromagnetism - Practice Mode

Earth and Space Science

2.5 Extreme Earth Events in NZ

Topics	Lesson Names
Structure of the Earth	<ul style="list-style-type: none"> • Earth's Structure • The Geological Timescale • Spheres • Developing the Geological Timescale • Mechanical Layers of the Earth
Plate Tectonics	<ul style="list-style-type: none"> • Wegener's Theory of Continental Drift • Plate Tectonics • Plate Boundaries • Seafloor Spreading & Magnetic Striping • Supercontinents
Tectonic Events	<ul style="list-style-type: none"> • Earthquakes • Seismic Hazard Case Studies • Earthquake Hazards • Measuring Earthquakes • Volcanology • Formation of Volcanoes • Volcanic Eruptions • Types of Lava • Living with Volcanoes • Tsunamis
Extra Material	<ul style="list-style-type: none"> • Earth's Magnetic Field • Earthquake-proofing Buildings • Geological Time • Volcanic Ash and Airlines
Past Exams	<p>How to Mark NCEA Exams</p> <ul style="list-style-type: none"> • 2017 - 2.5 Extreme Earth Events in New Zealand - Exam Mode • 2018 - 2.5 Extreme Earth Events in New Zealand - Exam Mode • 2017 - 2.5 Extreme Earth Events in New Zealand - Practice Mode • 2018 - 2.5 Extreme Earth Events in New Zealand - Practice Mode

2.6 Stars and Planetary Systems

Topics	Lesson Names
The Solar System	<ul style="list-style-type: none"> • Our Solar System • Gravity and Orbits • Comets • Asteroids and Meteoroids
The Universe	<ul style="list-style-type: none"> • Universe Introduction • Scientific Theory
Measuring the Universe	<ul style="list-style-type: none"> • Gravity • The Speed of Light • Radar Ranging
Galaxies and Stars	<ul style="list-style-type: none"> • The Life Cycle of Stars • Distances Between Stars, Parallax and Parsecs • Properties of Stars • Hertzsprung-Russell Diagrams
Evidence for the Big Bang	<ul style="list-style-type: none"> • The Big Bang Theory • Cosmic Background Radiation • Red Shift
Observing Space	<ul style="list-style-type: none"> • Observing Space
Past Exams	<p>How to Mark NCEA Exams</p> <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> • 2017 - 2.6 Stars and Planetary Systems - Exam Mode • 2018 - 2.6 Stars and Planetary Systems - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> • 2017 - 2.6 Stars and Planetary Systems - Practice Mode • 2018 - 2.6 Stars and Planetary Systems - Practice Mode

2.7 Physical Principles Related to Earth Systems

Topics	Lesson Names
Earth's Spheres and Solar Radiation	<ul style="list-style-type: none"> • Solar Energy • Spheres • The Greenhouse Effect
Past Exams	How to Mark NCEA Exams



Exam Mode

- 2017 - 2.7 Physical Principles - Exam Mode

Practice Mode

- 2013 - 2.7 Physical Principles - Practice Mode
- 2017 - 2.7 Physical Principles - Practice Mode

NCEA Level 3

Biology

3.3 Plant and Animal Responses to the External Environment

Topics	Lesson Names
Responses to the Environment	<ul style="list-style-type: none"> • Responses to the Environment • Abiotic Factors • Biotic Factors and Competition
Plant Orientation in Space	<ul style="list-style-type: none"> • Tropisms • Nastic Responses
Animal Orientation in Space	<ul style="list-style-type: none"> • Taxes • Kineses • Homing • Migration
Orientation in Time	<ul style="list-style-type: none"> • Biological Clocks • Rhythms • Photoperiodism in Plants
Interspecific Relationships	<ul style="list-style-type: none"> • Interspecific Competition for Resources • Mutualism and Commensalism • Exploitation
Intraspecific Relationships	<ul style="list-style-type: none"> • Intraspecific Competition for Resources • Territoriality and Hierarchical Behaviour • Co-operative Interactions • Reproductive Behaviours
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> • Responses to the Environment • Plant Orientation in Space • Animal Orientation in Space • Orientation in Time • Interspecific Relationships • Intraspecific Relationships <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> • 2013 - 3.3 Plant and Animal Responses - Exam Mode • 2014 - 3.3 Plant and Animal Responses - Exam Mode • 2015 - 3.3 Plant and Animal Responses - Exam Mode • 2016 - 3.3 Plant and Animal Responses - Exam Mode • 2017 - 3.3 Plant and Animal Responses - Exam Mode • 2018 - 3.3 Plant and Animal Responses - Exam Mode

- 2019 - 3.3 Plant and Animal Responses - Exam Mode
- 2020 - 3.3 Plant and Animal Responses - Exam Mode
- 2021 - 3.3 Plant and Animal Responses - Exam Mode
- 2022 - 3.3 Plant and Animal Responses - Exam Mode

Practice Mode

- 2013 - 3.3 Plant and Animal Responses - Practice Mode
- 2014 - 3.3 Plant and Animal Responses - Practice Mode
- 2015 - 3.3 Plant and Animal Responses - Practice Mode
- 2016 - 3.3 Plant and Animal Responses - Practice Mode
- 2017 - 3.3 Plant and Animal Responses - Practice Mode
- 2018 - 3.3 Plant and Animal Responses - Practice Exam
- 2019 - 3.3 Plant and Animal Responses - Practice Exam
- 2020 - 3.3 Plant and Animal Responses - Practice Exam
- 2021 - 3.3 Plant and Animal Responses - Practice Exam
- 2022 - 3.3 Plant and Animal Responses - Practice Exam

3.4 Maintaining Homeostasis

Topics	Lesson Names
Homeostasis	<ul style="list-style-type: none"> • Basics of Homeostasis • Homeostatic Terms • Stimulus-Response Model • Negative and Positive Feedback • Control Systems • Modelling Human Thermoregulation
Nervous System	<ul style="list-style-type: none"> • Introduction To The Nervous System • Nerves and Neurons • Central and Peripheral Nervous System • Sympathetic and Parasympathetic Nervous System • Nerve Pathways • Sensory Organs • The Eye
Endocrine System	<ul style="list-style-type: none"> • Introduction to the Endocrine System • Glands of the Endocrine System • Hormones of the Endocrine System • Regulating Blood Sugar

3.5 Evolutionary Processes Leading to Speciation

Topics	Lesson Names
Processes of Evolution	<ul style="list-style-type: none"> • Natural Selection • Mutations • Genetic Drift
Speciation	<ul style="list-style-type: none"> • Sympatric vs. Allopatric Speciation • Polyploidy • Reproductive Isolating Mechanisms
Patterns of Evolution	<ul style="list-style-type: none"> • Convergent and Divergent Evolution • Co-Evolution and Parallel Evolution • Rate of Evolutionary change • Evidence for Evolution
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> • Processes of Evolution - Natural Selection • Speciation • Patterns of Evolution Convergent Evolution • Patterns of Evolution Divergent Evolution • Patterns of Evolution Co-Evolution <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> • 2013 - 3.3 Evolutionary Processes - Exam Mode • 2014 - 3.3 Evolutionary Processes - Exam Mode • 2015 - 3.3 Evolutionary Processes - Exam Mode • 2016 - 3.3 Evolutionary Processes - Exam Mode • 2017 - 3.3 Evolutionary Processes - Exam Mode • 2018 - 3.3 Evolutionary Processes - Exam Mode • 2019 - 3.3 Evolutionary Processes - Exam Mode • 2020 - 3.3 Evolutionary Processes - Exam Mode • 2021 - 3.3 Evolutionary Processes - Exam Mode • 2022 - 3.3 Evolutionary Processes - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> • 2013 - 3.3 Evolutionary Processes - Practice Mode • 2014 - 3.3 Evolutionary Processes - Practice Mode • 2015 - 3.3 Evolutionary Processes - Practice Mode • 2016 - 3.3 Evolutionary Processes - Practice Mode • 2017 - 3.3 Evolutionary Processes - Practice Mode • 2018 - 3.3 Evolutionary Processes - Practice Mode • 2019 - 3.3 Evolutionary Processes - Practice Mode • 2020 - 3.3 Evolutionary Processes - Practice Mode • 2021 - 3.3 Evolutionary Processes - Practice Mode • 2022 - 3.3 Evolutionary Processes - Practice Mode
Supporting Resources	<ul style="list-style-type: none"> • Biological Classification

	<ul style="list-style-type: none"> ● Binomial Nomenclature and Species ● Introduction to Comparative Genomics ● Comparative Genomics ● Interpreting Phylogenetic Trees
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3.6 Trends in Human Evolution

Topics	Lesson Names
Biological Evolution	<ul style="list-style-type: none"> ● Bipedalism - Lower Body Changes ● Bipedalism - Upper Body Changes ● Bipedalism Advantages and Disadvantages ● Hand Dexterity ● Nakedness ● Changes in the Brain ● Brain Selection Pressures
Cultural Evolution	<ul style="list-style-type: none"> ● Tools ● Use of Fire ● Advantages of Fire ● Agriculture ● Advantages and Disadvantages of Agriculture ● Burial ● Art ● Shelter ● Clothing
Human Dispersal Theories	<ul style="list-style-type: none"> ● Multiregional Hypothesis ● Out of Africa Theory
Species	<ul style="list-style-type: none"> ● Species Data Files ● Species Characteristics
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> ● Bipedalism ● Human Origins and Dispersal ● Skull Structure ● Tools and Cultural Evolution <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> ● 2013 - 3.6 Trends in Human Evolution - Exam Mode ● 2014 - 3.6 Trends in Human Evolution - Exam Mode ● 2015 - 3.6 Trends in Human Evolution - Exam Mode ● 2016 - 3.6 Trends in Human Evolution - Exam Mode ● 2017 - 3.6 Trends in Human Evolution - Exam Mode ● 2018 - 3.6 Trends in Human Evolution - Exam Mode ● 2019 - 3.6 Trends in Human Evolution - Exam Mode

	<ul style="list-style-type: none"> • 2020 - 3.6 Trends in Human Evolution - Exam Mode • 2021 - 3.6 Trends in Human Evolution - Exam Mode • 2022 - 3.6 Trends in Human Evolution - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> • 2013 - 3.6 Trends in Human Evolution - Practice Mode • 2014 - 3.6 Trends in Human Evolution - Practice Mode • 2015 - 3.6 Trends in Human Evolution - Practice Mode • 2016 - 3.6 Trends in Human Evolution - Practice Mode • 2017 - 3.6 Trends in Human Evolution - Practice Mode • 2018 - 3.6 Trends in Human Evolution - Practice Mode • 2019 - 3.6 Trends in Human Evolution - Practice Mode • 2020 - 3.6 Trends in Human Evolution - Practice Mode • 2021 - 3.6 Trends in Human Evolution - Practice Mode • 2022 - 3.6 Trends in Human Evolution - Practice Mode
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3.7 Genetic Transfer

Topics	Lesson Names
Genetic Transfer	<ul style="list-style-type: none"> • Enzymes in Biotechnology • Gel Electrophoresis • Recombinant DNA • Artificial Insemination and Selective Breeding • Cut and Paste for Xenotransplantations • DNA Profiling & Forensics • Genetically Modified Organisms (GMOs) • Genomics • Social and Ethical Implications of Biotechnology • Superbugs are the Real Super Villains • Transgenesis: Food Production

Scholarship Biology

Topics	Lesson Names
Past Exams	<ul style="list-style-type: none"> • 2016 - Scholarship Biology - Practice Mode • 2017 - Scholarship Biology - Practice Mode • 2018 - Scholarship Biology - Practice Mode • 2019 - Scholarship Biology - Practice Mode • 2019 - Scholarship Biology - Exam Mode

Chemistry

3.1 Quantitative Analysis

Topics	Lesson Names
Quantitative Analysis	<ul style="list-style-type: none"> • Titration Calculations • Moles and Balanced Equations (Stoichiometry) • Moles and Molar Mass • Solutions and Concentration • Other Measures of Concentration • Dilutions • Standard Solutions • Performing a Titration

3.2 Spectroscopy

Topics	Lesson Names
Spectroscopy	<ul style="list-style-type: none"> • Mass Spectrometry • Infrared Spectroscopy • Principles of NMR Spectroscopy • Carbon-13 NMR • Structural Determination

3.3 Chemical Processes

Topics	Lesson Names
Supporting Resources	<ul style="list-style-type: none"> • Designing Chemical Synthesis Processes • The Haber-Bosch and Contact Processes • The Chemical Industry • Green Chemistry Principles • Plastics

3.4 Thermochemical Principles

Topics	Lesson Names
Atomic Structure and Periodicity	<ul style="list-style-type: none"> • Introduction to Orbitals • Electron Configuration of Atoms • Electron Configuration of Ions • Colour of Transition Metals [Optional]
Atomic Structure and Periodicity	<ul style="list-style-type: none"> • Atomic Radius • Ionisation Energy

	<ul style="list-style-type: none"> • Electronegativity
Lewis Diagrams	<ul style="list-style-type: none"> • Covalent Bonding • Electron Dot Diagrams of Atoms • Lewis Structure of Molecules and Ions
Shapes of Molecules	<ul style="list-style-type: none"> • Shapes of Molecules - Basic • Shapes of Molecules - Extended
Polarity of Molecules	<ul style="list-style-type: none"> • Polarity of Molecules
Intermolecular Forces	<ul style="list-style-type: none"> • Physical Properties of Molecular Substances • Types of Intermolecular Forces
Bonding	<ul style="list-style-type: none"> • Ionic Bonding • Covalent Bonding • Metallic Bonding
Energy in Chemical Reactions	<ul style="list-style-type: none"> • Introduction to Enthalpy • Calorimetry • Enthalpy and Heat • Standard Enthalpy Changes: Part 1 • Standard Enthalpy Changes: Part 2 • Hess's Law • Calculating Enthalpy Changes • Entropy • Spontaneity of Reactions
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> • Atomic Structure and Periodicity • Bonding • Energy • Molecule Shapes and Polarity <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> • 2013 - 3.4 Thermochemical Principles - Exam Mode • 2014 - 3.4 Thermochemical Principles - Exam Mode • 2015 - 3.4 Thermochemical Principles - Exam Mode • 2016 - 3.4 Thermochemical Principles - Exam Mode • 2017 - 3.4 Thermochemical Principles - Exam Mode • 2018 - 3.4 Thermochemical Principles - Exam Mode • 2019 - 3.4 Thermochemical Principles - Exam Mode • 2020 - 3.4 Thermochemical Principles - Exam Mode • 2021 - 3.4 Thermochemical Principles - Exam Mode • 2022 - 3.4 Thermochemical Principles - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> • 2013 - 3.4 Thermochemical Principles - Practice Mode • 2014 - 3.4 Thermochemical Principles - Practice Mode • 2015 - 3.4 Thermochemical Principles - Practice Mode

- 2016 - 3.4 Thermochemical Principles - Practice Mode
- 2017 - 3.4 Thermochemical Principles - Practice Mode
- 2018 - 3.4 Thermochemical Principles - Practice Exam
- 2019 - 3.4 Thermochemical Principles - Practice Exam
- 2020 - 3.4 Thermochemical Principles - Practice Exam
- 2021 - 3.4 Thermochemical Principles - Practice Exam
- 2022 - 3.4 Thermochemical Principles - Practice Exam

3.5 Organic Chemistry

Topics	Lesson Names
Introduction to Organic Chemistry	<ul style="list-style-type: none"> • Introduction to Organic Chemistry • Structural Isomers • Geometric Isomers • Optical Isomers
Alkanes	<ul style="list-style-type: none"> • Naming Alkanes • Alkane Isomers • Molecular and Structural Formulas of Alkanes • Properties of Alkanes • Substitution Reactions of Alkanes
Alkenes	<ul style="list-style-type: none"> • Naming Alkenes • Alkene Isomerism • Properties of Alkenes • Alkene Reactions
Haloalkanes	<ul style="list-style-type: none"> • Naming Haloalkanes • Haloalkane Classification and Isomerism • Properties of Haloalkanes • Substitution Reactions of Haloalkanes • Elimination Reactions of Haloalkanes
Amines	<ul style="list-style-type: none"> • Naming Amines • Primary Amine Isomerism • Properties of Amines • Reactions of Primary Amines
Alcohols	<ul style="list-style-type: none"> • Naming Alcohols • Alcohol Isomerism • Properties of Alcohols • Substitution Reactions of Alcohols • Elimination Reactions of Alcohols • Oxidation Reactions of Alcohols • Combustion of Alcohols
Carbonyl Compounds	<ul style="list-style-type: none"> • Naming Aldehydes • Properties of Carbonyl Compounds • Reactions of Carbonyl Compounds

	<ul style="list-style-type: none"> • Naming Ketones
Carboxylic Acids	<ul style="list-style-type: none"> • Naming Carboxylic Acids • Reactions of Carboxylic Acids with Bases and Metals • Properties of Carboxylic Acids
Acid Chlorides	<ul style="list-style-type: none"> • Acid Chloride Reactions • Acyl Chlorides Naming and Properties
Esters	<ul style="list-style-type: none"> • Naming Esters • Properties of Esters • Formation of Esters • Hydrolysis of Esters • Soap Formation
Amides	<ul style="list-style-type: none"> • Naming Amides • Properties of Amides • Formation & Hydrolysis of Amides
Amino Acids	<ul style="list-style-type: none"> • Naming Amino Acids • Optical Isomerism of Amino Acids • Physical Properties of Amino Acids • Peptide Formation
Polymers	<ul style="list-style-type: none"> • Introduction to Polymers • Addition Polymer Structure, Properties and Uses • Condensation Polymer Structure, Properties and Uses • Comparing Addition and Condensation Polymerisation • Amino Acids • Amino Acid Reactions • Protein Structure and Sequencing
Exam-Style Questions	<ul style="list-style-type: none"> • Functional Groups Summary • Distinguishing Organic Compounds • Reaction Schemes
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> • Identification of Compounds • Laboratory Procedures • Polymers • Reaction Schemes • Structural Formulae and Isomers <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> • 2013 - 3.5 Organic Chemistry - Exam Mode • 2014 - 3.5 Organic Chemistry - Exam Mode • 2015 - 3.5 Organic Chemistry - Exam Mode • 2016 - 3.5 Organic Chemistry - Exam Mode

	<ul style="list-style-type: none"> • 2017 - 3.5 Organic Chemistry - Exam Mode • 2018 - 3.5 Organic Chemistry - Exam Mode • 2019 - 3.5 Organic Chemistry - Exam Mode • 2020 - 3.5 Organic Chemistry - Exam Mode • 2021 - 3.5 Organic Chemistry - Exam Mode • 2022 - 3.5 Organic Chemistry - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> • 2013 - 3.5 Organic Chemistry - Practice Mode • 2014 - 3.5 Organic Chemistry - Practice Mode • 2015 - 3.5 Organic Chemistry - Practice Mode • 2016 - 3.5 Organic Chemistry - Practice Mode • 2017 - 3.5 Organic Chemistry - Practice Mode • 2018 - 3.5 Organic Chemistry - Practice Mode • 2019 - 3.5 Organic Chemistry - Practice Mode • 2020 - 3.5 Organic Chemistry - Practice Mode • 2021 - 3.5 Organic Chemistry - Practice Mode • 2022 - 3.5 Organic Chemistry - Practice Mode
Spelling and Vocabulary	<ul style="list-style-type: none"> • Naming Organic Molecules Definitions List • Naming Organic Molecules Spelling List
Spelling and Vocabulary	<ul style="list-style-type: none"> • Characteristics and Properties Definitions List • Characteristics and Properties Spelling List
Spelling and Vocabulary	<ul style="list-style-type: none"> • Reactions of Organic Molecules Definitions List • Reactions of Organic Molecules Spelling List

3.6 Aqueous Systems

Topics	Lesson Names
Equilibrium in Aqueous Systems	<ul style="list-style-type: none"> • Revision: Moles, Mass and Molar Mass • Revision: Aqueous Solutions and Concentration • Introduction to Equilibrium in Aqueous Systems • Solubility Product Expressions • Calculating Solubility Products • Calculating Solubility • Saturated Solution Calculations • Factors Affecting Solubility: Common Ion Effect • Factors Affecting Solubility: Acids, Bases and Complex Ions • Predicting Precipitation
Acids and Bases	<ul style="list-style-type: none"> • Acids and Bases • pH • Kw and pOH • Weak Acids • Weak Bases • Relative Concentrations, pH and Conductivity

	<ul style="list-style-type: none"> ● Buffer Solutions ● Buffer Calculations
Titration	<ul style="list-style-type: none"> ● Introduction to Titrations ● Titration Curves ● Titration Curve Calculations: Before Equivalence ● Titration Curve Calculations: To Equivalence and Beyond
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> ● Buffers ● Conductivity ● Equilibrium ● pH ● Solubility ● Titrations <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> ● 2013 - 3.6 Aqueous Systems - Exam Mode ● 2014 - 3.6 Aqueous Systems - Exam Mode ● 2015 - 3.6 Aqueous Systems - Exam Mode ● 2016 - 3.6 Aqueous Systems - Exam Mode ● 2017 - 3.6 Aqueous Systems - Exam Mode ● 2018 - 3.6 Aqueous Systems - Exam Mode ● 2019 - 3.6 Aqueous Systems - Exam Mode ● 2020 - 3.6 Aqueous Systems - Exam Mode ● 2021 - 3.6 Aqueous Systems - Exam Mode ● 2022 - 3.6 Aqueous Systems - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> ● 2013 - 3.6 Aqueous Systems - Practice Mode ● 2014 - 3.6 Aqueous Systems - Practice Mode ● 2015 - 3.6 Aqueous Systems - Practice Mode ● 2016 - 3.6 Aqueous Systems - Practice Mode ● 2017 - 3.6 Aqueous Systems - Practice Mode ● 2018 - 3.6 Aqueous Systems - Practice Mode ● 2019 - 3.6 Aqueous Systems - Practice Mode ● 2020 - 3.6 Aqueous Systems - Practice Mode ● 2021 - 3.6 Aqueous Systems - Practice Mode ● 2022 - 3.6 Aqueous Systems - Practice Mode
Revision	<ul style="list-style-type: none"> ● Aqueous Equilibria ● Acids and Bases ● Titrations ● Buffers ● Glossaries ● Skills

3.7 Oxidation and Reduction

Topics	Lesson Names
Introduction to Redox Reactions	<ul style="list-style-type: none"> • Introduction to Oxidation-Reduction • Introduction to Oxidation-Reduction Reactions • Balancing Redox Half-Equations • Balancing Overall Redox Equations
Galvanic Cells	<ul style="list-style-type: none"> • Introduction to Galvanic Cells • Standard Reduction Potentials of Half-Cells • Calculating Cell Potentials for Galvanic Cells • Batteries
Electrolytic Cells	<ul style="list-style-type: none"> • Introduction to Electrolytic Cells and Electrolysis • Predicting Products of Electrolysis
Key Terms and Definitions	<ul style="list-style-type: none"> • Key Terms and Definitions: Electrolytic Cells • Key Terms and Definitions: Galvanic Cells • Key Terms and Definitions: Introduction to Redox • Vocabulary: Electrolytic Cells • Vocabulary: Galvanic Cells • Vocabulary: Introduction to Redox

Scholarship Chemistry

Topics	Lesson Names
Past Exams	<ul style="list-style-type: none"> • 2016 - Scholarship Chemistry - Practice Mode • 2017 - Scholarship Chemistry - Practice Mode • 2018 - Scholarship Chemistry - Practice Mode • 2019 - Scholarship Chemistry - Practice Mode • 2019 - Scholarship Chemistry - Exam Mode

Physics

3.3 Wave Systems

Topics	Lesson Names
Introduction to Wave Systems	<ul style="list-style-type: none"> • Wave Properties Recap • Phase of Waves • Superposition Principle • Diffraction Around a Barrier • The Electromagnetic Nature of Light
Interference	<ul style="list-style-type: none"> • Diffraction and Interference Patterns • Huygens' Principle • Two Source Interference of Waves • Young's Double Slit Experiment • Multi-slit Diffraction
Standing Waves	<ul style="list-style-type: none"> • Standing Waves in Strings • Standing Waves in Pipes
The Doppler Effect	<ul style="list-style-type: none"> • The Doppler Effect
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> • Diffraction • Standing Waves • The Doppler Effect <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> • 2013 - 3.3 Wave Systems - Exam Mode • 2014 - 3.3 Wave Systems - Exam Mode • 2015 - 3.3 Wave Systems - Exam Mode • 2016 - 3.3 Wave Systems - Exam Mode • 2017 - 3.3 Wave Systems - Exam Mode • 2018 - 3.3 Wave Systems - Exam Mode • 2019 - 3.3 Wave Systems - Exam Mode • 2020 - 3.3 Wave Systems - Exam Mode • 2021 - 3.3 Wave Systems - Exam Mode • 2022 - 3.3 Wave Systems - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> • 2013 - 3.3 Wave Systems - Practice Mode • 2014 - 3.3 Wave Systems - Practice Mode • 2015 - 3.3 Wave Systems - Practice Mode • 2016 - 3.3 Wave Systems - Practice Mode • 2017 - 3.3 Wave Systems - Practice Mode • 2018 - 3.3 Wave Systems - Practice Mode • 2019 - 3.3 Wave Systems - Practice Mode • 2020 - 3.3 Wave Systems - Practice Mode

	<ul style="list-style-type: none"> ● 2021 - 3.3 Wave Systems - Practice Mode ● 2022 - 3.3 Wave Systems - Practice Mode
Key Terms and Definitions	<ul style="list-style-type: none"> ● Key Terms and Definitions: Diffraction & Interference ● Key Terms and Definitions: Properties of Waves ● Vocabulary: Diffraction & Interference ● Vocabulary: Properties of Waves
Revision Resources	<ul style="list-style-type: none"> ● Diffraction and Interference Revision Questions
Revision Resources	<ul style="list-style-type: none"> ● Graphical Analysis: Intensity ● Reading Comprehension: Iridescent Chocolate ● Reading Comprehension: Petrographic Microscopes

3.4 Mechanical Systems

Topics	Lesson Names
Introduction to Mechanical Systems	<ul style="list-style-type: none"> ● Vectors Recap ● Kinematics Recap ● Forces Recap ● Energy Recap
Translational Motion	<ul style="list-style-type: none"> ● Centre of Mass ● Momentum ● Impulse ● Collisions
Rotational Motion	<ul style="list-style-type: none"> ● Angular Displacement and Velocity ● Angular Acceleration and Rotational Kinematics ● Torque ● Rotational Inertia ● Angular Momentum ● Rotational Kinetic Energy
Circular Motion	<ul style="list-style-type: none"> ● Centripetal Force ● Vertical Circular Motion ● Circular Motion on Banked Curves
Gravitation and Orbits	<ul style="list-style-type: none"> ● Newtons' Law of Universal Gravitation ● Gravitational Fields ● Kepler's Laws of Planetary Motion ● Kepler's Second Law ● Kepler's Third Law ● Satellite Motion <p><i>Key Terms and Definitions</i></p> <ul style="list-style-type: none"> ● Key Terms and Definitions: Orbital Mechanics ● Vocabulary: Orbital Mechanics

	<p><i>Revision Resources</i></p> <ul style="list-style-type: none"> ● Orbital Mechanics Revision Questions
Simple Harmonic Motion	<ul style="list-style-type: none"> ● Springs and Pendula ● Kinematics of SHM ● Phasor Diagrams ● Energy in SHM ● Damped and Driven Systems
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> ● Circular Motion ● Rotational Motion ● Simple Harmonic Motion <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> ● 2013 - 3.4 Mechanical Systems - Exam Mode ● 2014 - 3.4 Mechanical Systems - Exam Mode ● 2015 - 3.4 Mechanical Systems - Exam Mode ● 2016 - 3.4 Mechanical Systems - Exam Mode ● 2017 - 3.4 Mechanical Systems - Exam Mode ● 2018 - 3.4 Mechanical Systems - Exam Mode ● 2019 - 3.4 Mechanical Systems - Exam Mode ● 2020 - 3.4 Mechanical Systems - Exam Mode ● 2021 - 3.4 Mechanical Systems - Exam Mode ● 2022 - 3.4 Mechanical Systems - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> ● 2013 - 3.4 Mechanical Systems - Practice Mode ● 2014 - 3.4 Mechanical Systems - Practice Mode ● 2015 - 3.4 Mechanical Systems - Practice Mode ● 2016 - 3.4 Mechanical Systems - Practice Mode ● 2017 - 3.4 Mechanical Systems - Practice Mode ● 2018 - 3.4 Mechanical Systems - Practice Mode ● 2019 - 3.4 Mechanical Systems - Practice Mode ● 2020 - 3.4 Mechanical Systems - Practice Mode ● 2021 - 3.4 Mechanical Systems - Practice Mode ● 2022 - 3.4 Mechanical Systems - Practice Mode

3.5 Modern Physics

Topics	Lesson Names
Quantum Physics	<ul style="list-style-type: none"> ● Bohr's Model of the Hydrogen Atom ● Rutherford's Model of the Atom ● Photons ● Quantisation of Energy

	<ul style="list-style-type: none"> • Photoelectric Effect • Nuclear Reactions
Special Relativity	<ul style="list-style-type: none"> • Classical Relativity • Origins of Special Relativity • Einstein's Theory of Special Relativity • Relativity of Simultaneity • Time Dilation • Length Contraction • Twins Paradox • Evidence for Special Relativity: Muons • Relativistic Mass and Momentum • Mass-Energy Equivalence • Mass Defect in Nuclear Physics

3.6 Electrical Systems

Topics	Lesson Names
Introduction to Electrical Systems	<ul style="list-style-type: none"> • Circuit Properties Recap • Kirchhoff's Current Law • Kirchhoff's Voltage Law • EMF and Internal Resistance
Capacitors	<ul style="list-style-type: none"> • Capacitance • Equivalent Capacitance and Energy Storage • Charging and Discharging
Inductors	<ul style="list-style-type: none"> • Electromagnetism • Induction • Properties of Inductors • Behaviour of Inductors
AC Circuits	<ul style="list-style-type: none"> • Alternating Current • Energy and Power • Transformers
LCR Circuits	<ul style="list-style-type: none"> • Phasor Diagrams • Reactance • Impedance • Resonance
Electromagnetism	<ul style="list-style-type: none"> • Magnetic Flux • Faraday's Law • Electric Motors • Torque on Coils in a Magnetic Field • Trnasformers
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Exam Questions By Topic</i></p>

	<ul style="list-style-type: none"> ● AC Circuits ● Capacitors ● LCR Circuits <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> ● 2013 - 3.6 Electrical Systems - Exam Mode ● 2014 - 3.6 Electrical Systems - Exam Mode ● 2015 - 3.6 Electrical Systems - Exam Mode ● 2016 - 3.6 Electrical Systems - Exam Mode ● 2017 - 3.6 Electrical Systems - Exam Mode ● 2018 - 3.6 Electrical Systems - Exam Mode ● 2019 - 3.6 Electrical Systems - Exam Mode ● 2020 - 3.6 Electrical Systems - Exam Mode ● 2021 - 3.6 Electrical Systems - Exam Mode ● 2022 - 3.6 Electrical Systems - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> ● 2013 - 3.6 Electrical Systems - Practice Mode ● 2014 - 3.6 Electrical Systems - Practice Mode ● 2015 - 3.6 Electrical Systems - Practice Mode ● 2016 - 3.6 Electrical Systems - Practice Mode ● 2017 - 3.6 Electrical Systems - Practice Mode ● 2018 - 3.6 Electrical Systems - Practice Mode ● 2019 - 3.6 Electrical Systems - Practice Mode ● 2020 - 3.6 Electrical Systems - Practice Mode ● 2021 - 3.6 Electrical Systems - Practice Mode ● 2022 - 3.6 Electrical Systems - Practice Mode
Revision	<ul style="list-style-type: none"> ● Circuits Revision ● Capacitors Revision ● Inductors Revision ● AC Circuits Revision ● LCR Circuits Revision ● Electromagnetism Revision ● Glossaries

Scholarship Physics

Topics	Lesson Names
Past Exams	<p><i>Questions by Topic</i></p> <ul style="list-style-type: none"> ● Electricity (Circuits) ● Electromagnetism ● Light ● Mechanics (Kinematics) ● Mechanics (SHM) ● Mechanics (Springs)



- Modern Physics
- Waves

Exam Mode

- 2016 - Scholarship Physics - Exam Mode
- 2017 - Scholarship Physics - Exam Mode
- 2018 - Scholarship Physics - Exam Mode
- 2019 - Scholarship Physics - Exam Mode

Practice Mode

- 2016 - Scholarship Physics - Practice Mode
- 2017 - Scholarship Physics - Practice Mode
- 2018 - Scholarship Physics - Practice Mode
- 2019 - Scholarship Physics - Practice Mode

Earth and Space

3.4 Ocean System Processes

Topics	Lesson Names
Ocean Currents	<ul style="list-style-type: none"> • Ocean Currents • El Nino and La Nina
Exam Questions	<p>How to Mark NCEA Exams</p> <p><i>Exam Mode</i></p> <ul style="list-style-type: none"> • 2017 - 3.4 Ocean System Processes - Exam Mode • 2018 - 3.4 Ocean System Processes - Exam Mode <p><i>Practice Mode</i></p> <ul style="list-style-type: none"> • 2017 - 3.4 Ocean System Processes - Practice Mode • 2018 - 3.4 Ocean System Processes - Practice Mode

3.5 Atmosphere System Processes

Topics	Lesson Names
Solar Heat Energy	<ul style="list-style-type: none"> • The Greenhouse Effect • Climate and Weather
Spheres and Global Cycles	<ul style="list-style-type: none"> • Spheres • Water Cycle • Carbon Cycle • Nitrogen Cycle • Phosphorus Cycle
Heat Transfer on the Earth's Surface	<ul style="list-style-type: none"> • Ocean Currents • El Nino and La Nina
The Human Impact	<ul style="list-style-type: none"> • Human Influences on Climate • The Enhanced Greenhouse Effect • Causes of the Enhanced Greenhouse Effect • Effects: Temperature • Effects: Polar Ice • Effects: Biodiversity
Science in Context	<ul style="list-style-type: none"> • Carbon Capture • Carbon Footprints • CFCs and the Ozone Layer • Computer Modelling and the Environment • Pollution
Science Investigations	<p><i>Climate Change</i></p> <ul style="list-style-type: none"> • Climate Change • Laboratory Technician Guide PDF

	<ul style="list-style-type: none"> ● Student Worksheet PDF ● Teacher Guide PDF <p><i>Polar Ice</i></p> <ul style="list-style-type: none"> ● Laboratory Technician Guide PDF ● Polar Ice ● Student Worksheet PDF ● Teacher Guide PDF <p><i>The Greenhouse Effect</i></p> <ul style="list-style-type: none"> ● The Greenhouse Effect
Exam Questions	<ul style="list-style-type: none"> ● How to Mark NCEA Exams <ul style="list-style-type: none"> ● 2017 - 3.5 Atmosphere System Processes - Exam Mode ● 2018 - 3.5 Atmosphere System Processes - Exam Mode <ul style="list-style-type: none"> ● 2017 - 3.5 Atmosphere System Processes - Practice Mode ● 2018 - 3.5 Atmosphere System Processes - Practice Mode