

Year 10

Science Understanding

Biological sciences

Content Descriptor	Lesson Names
Transmission of heritable characteristics from one generation to the next involves DNA and genes	<p><i>DNA the Molecule</i></p> <ul style="list-style-type: none"> • Basics of DNA • The History of Genetic Thought • Discovering the Double Helix • Structure of DNA • Nitrogenous Bases • The Knotty New DNA Structure! • DNA Fingerprinting: Thirsty Thievery • Proteins <p><i>Genes and Chromosomes</i></p> <ul style="list-style-type: none"> • Genes and Genetic Information • Homologous Chromosomes • Genomics • Sex Chromosomes • Attraction: It's all in the Armpits • Chromosomal Abnormalities • The Ethics of Genetics <p><i>Cell Division</i></p> <ul style="list-style-type: none"> • DNA Replication • Mitosis • Gametes and Fertilisation • Meiosis • Mitosis vs. Meiosis • Asexual and Sexual Reproduction <p><i>Inheritance</i></p> <ul style="list-style-type: none"> • Mendel • Sex Linkage, Punnett Squares and Pedigrees • Alleles • Inheriting Alleles and Punnett Squares • Making Punnett Squares • Dominant/Recessive Interactions • Incomplete Dominance • Codominance • Pedigrees • Sex Linkage

	<ul style="list-style-type: none"> • Epigenetics: Inheritance is Strange • The Blue People of Troublesome Creek
The theory of evolution by natural selection explains the diversity of living things and is supported by a range of scientific evidence	<p><i>The Theory of Evolution</i></p> <ul style="list-style-type: none"> • Darwin's Theory of Evolution • Theories and Evidence • Geological Time • The History of Evolutionary Thought <p><i>Evidence of Evolution</i></p> <ul style="list-style-type: none"> • Evidence from Living Species • Fossils and the Fossil Record • Geographical Distribution • The Evidence for Evolution • The Wallace Line <p><i>Mechanisms of Evolution</i></p> <ul style="list-style-type: none"> • Biodiversity • Mechanisms of Evolution • Natural Selection • Artificial Selection • Focus on Data: Natural Selection in Action! • Artificial Selection: The Good, the Bad and the Downright Strange • Coevolution • Sexual Selection • The Biodiversity Gradient • The Mechanisms of Evolution <p><i>Explaining Evolution</i></p> <ul style="list-style-type: none"> • Extinction • The Science of Puppy Dog Eyes • Back to the Sea: Cetacean Evolution • Bacterial Resistance • Evolution and Extinction • Feathery Dinosaurs • Mimicry • Our Evolution • Rewriting Human History • The Ancestor of All Things

Chemical sciences

Content Descriptor	Lesson Names
The atomic structure and properties of elements are used to organise them in the Periodic Table	<p><i>Structure of Atoms</i></p> <ul style="list-style-type: none"> • What are Atoms, Elements and Compounds? • The Structure of an Atom • Atomic Symbols

	<ul style="list-style-type: none"> • History of the Atomic Model • Electron Configuration • Chemicals: Friend or Foe? <p><i>The Periodic Table</i></p> <ul style="list-style-type: none"> • Trends in the Periodic Table • Groups 1 and 2 • Group 14 • Group 17 • Group 18 • Other Groups • The Periodic Table • Quiz- First 20 Elements (Name to Symbol) • Quiz- First 20 Elements (Symbol to Name) • Designing the Periodic Table • Helium: More Than a Bit of Squeaky Fun • Metallic Hydrogen or: How I Learned to Stop Worrying and Love the Scientific Process • Understanding the Periodic Table <p><i>Bonding</i></p> <ul style="list-style-type: none"> • Introduction to Bonding • Types of Bonding • Introduction to Ions • Electron Arrangement of Ions • Ionic Compounds • Ions in Solution • Naming Ionic Compounds • Ionic Bonding • Polyatomic Ions and Compounds • Metals in the Periodic Table • Metallic Bonding • Covalent Bonding <p><i>Spectroscopy</i></p> <ul style="list-style-type: none"> • Analysing the Structure of Materials • Spectroscopy
Different types of chemical reactions are used to produce a range of products and can occur at different rates	<p><i>The Law of Conservation of Mass</i></p> <ul style="list-style-type: none"> • Breaking the Law (of Conservation of Mass)? • Chemical Reactions and Equations • Conservation of Mass • Reactants and Products • Writing Chemical Equations 1 • Writing Chemical Equations 2 • Balancing Chemical Equations • Reaction Equations • Chemical Reactions Basics • Chemistry: Glorified Baking?

	<ul style="list-style-type: none"> • Writing Chemical Equations <p><i>Types of Chemical Reactions</i></p> <ul style="list-style-type: none"> • Chemical vs. Physical • Chemical Reactions • Combination and Decomposition Reactions • Acid Reactions • Precipitation Reactions • Oxidation and Reduction • Polymers • Types of Chemical Reaction <p><i>Types of Reactions</i></p> <ul style="list-style-type: none"> • Physical Properties of Metals • Alloys and Their Uses • Chemical Properties of Metals • Metal Reactions with Oxygen • Metal Reactions with Water • Metal Reactions with Acid • Metal Displacement Reactions <p><i>Rates of Reaction</i></p> <ul style="list-style-type: none"> • Collision Theory • Rate of Reaction • Agitation, Concentration and Surface Area • Activation Energy, Temperature and Catalysts • Rate of Reaction Equations • Factors Affecting Reaction Rates • Extension: Collision Theory and Rate of Reaction • Chemical Clocks • Graphing Rate of Reaction <p><i>Creating with Chemistry</i></p> <ul style="list-style-type: none"> • Analytical Chemistry • Fuels and Pharmaceuticals • STEM: Alternate Fuels <p><i>Stoichiometry</i></p> <ul style="list-style-type: none"> • Reaction Equations • The Mole • Empirical and Molecular Formulae • Moles and Equations
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Earth and space sciences

Content Descriptor	Lesson Names
The universe contains features including galaxies, stars	<i>Introduction to the Universe</i>

and solar systems, and the Big Bang theory can be used to explain the origin of the universe

- The Solar System and Beyond
- Models of the Solar System
- Scientific Notation
- Scientific Theory

Measuring the Universe

- Gravity
- Light Speed
- Light Years
- Seconds and Years
- Converting Light Years
- Radar Ranging
- Observing Space
- Measuring the Universe
- Relativity

Galaxies and Stars

- The Life Cycle of Stars
- Parallax and Distances Between Stars
- Distances to Stars and Parsecs
- Properties of Stars
- Reading Hertzsprung-Russell Diagrams
- Calculating Distance to Stars
- The Secret Lives of Ultra-Cool Dwarf Stars
- The James Webb Space Telescope
- Black Holes
- Life

Evidence for the Big Bang

- The Big Bang Theory
- Cosmic Background Radiation
- Red Shift
- End of the Universe
- Red Shift and the Expanding Universe
- The Cosmic Microwave Background

Global systems, including the carbon cycle, rely on interactions involving the biosphere, lithosphere, hydrosphere and atmosphere

Spheres and Global Cycles

- Spheres
- Water Cycle
- Carbon Cycle
- Nitrogen Cycle
- Phosphorus Cycle
- Carbon Capture
- Global Cycles

A Changing Climate

- Climate and Weather
- Ocean Currents
- The Enhanced Greenhouse Effect

	<ul style="list-style-type: none"> • El Nino and La Nina • The Greenhouse Effect • Human Influences on Climate • Arguing For or Against Climate Change • CFCs and the Ozone Layer • Climate Change • Examining Past Climate • If Climate Change is Real, How Come...? • The Southern Oscillation Index <p><i>Effects of Climate Change</i></p> <ul style="list-style-type: none"> • It's Getting Hot in Here • Disappearing Polar Ice • Apocalypse Now: Natural Disasters • Effects of Climate Change on Biodiversity • Carbon Footprints • Pollution • Save the Great Barrier Reef! • Troubled Waters • Where Have all the Turtles Gone? <p><i>Climate Technology</i></p> <ul style="list-style-type: none"> • Cleaning Up Our Litter • Computer Modelling and the Environment • Cool Robots • Reclaiming our Climate • STEM: Alternate Fuels
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Physical sciences

Content Descriptor	Lesson Names
Energy conservation in a system can be explained by describing energy transfers and transformations	<p><i>Types of Energy</i></p> <ul style="list-style-type: none"> • Types of Energy • Gravitational Potential Energy • Kinetic Energy <p><i>The Law of Conservation of Energy</i></p> <ul style="list-style-type: none"> • Conservation of Energy • Energy Transfer • Energy Transformations • Work and Power <p><i>Energy Efficiency</i></p> <ul style="list-style-type: none"> • Useful and Wasted Energy • Energy Efficiency • Energy Calculations • A Green Utopia

	<ul style="list-style-type: none"> • Electricity Generation <p><i>Energy Changes Around Us</i></p> <ul style="list-style-type: none"> • Electricity Generation In Australia • Energy in Food • Energy in Rockets • Levitation at UChicago! • Steam Engines • STEM: Life on Mars
The motion of objects can be described and predicted using the laws of physics	<p><i>Introduction to Motion</i></p> <ul style="list-style-type: none"> • Distance and Time • Displacement and Compass Directions • Calculating Displacement • Speed • Acceleration • Using the Acceleration Formula to Calculate Final Velocity • Using the Acceleration Formula to Calculate Initial Velocity • Using the Acceleration Formula to Calculate Time • Crashing Drones <p><i>Graphing Motion</i></p> <ul style="list-style-type: none"> • Distance-Time Graphs • Displacement-Time Graphs • Velocity-Time Graphs • Acceleration-Time Graphs • Summary of Motion Graphs • Graphing and Analysing Motion • Motion <p><i>Introduction to Forces</i></p> <ul style="list-style-type: none"> • Introduction to Forces • Types of Forces: Gravity • STEM: The Mass of an Email • Types of Forces: Magnetism and Friction • Weight and Mass • Extension: Earth's Magnetic Field • Focus on Data: Space Travel: The Weight Loss Sensation! • Friction • Pressure • Tides <p><i>Newton's Laws of Motion</i></p> <ul style="list-style-type: none"> • Newton's First Law • Comprehension: How Planes Stay Up • Newton's Second Law

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| | <ul style="list-style-type: none">• Newton's Third Law• Car Safety Systems• Car Safety Systems Investigation• History of Rockets• How BB-8 Works• Planetary Motion• Rockets• Sports Science |
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