EducationPerfect

Australian Curriculum - Year 10

Introduction:

This document maps Education Perfect lessons to the Australian Curriculum. When a lesson covers both science understanding standards and science as a human endeavour or science inquiry skills standards, it will be listed in both sections.

Contents:

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Science Understanding

Key:

📖   Lessons that address the science understanding standard.

💡   Lessons that elaborate or extend above and beyond the curriculum.

🔴   Lessons that also fulfil science as a human endeavour standards.

🔍   Lessons that also fulfil science inquiry skills standards.

Biological Sciences

Relevant section of the science achievement standard:

By the end of Year 10, students … explain the processes that underpin heredity and evolution. They evaluate the evidence for scientific theories that explain … the diversity of life on Earth. Students analyse how the models and theories they use have developed over time and discuss the factors that prompted their review.

Standards:

Transmission of heritable characteristics from one generation to the next involves DNA and genes. (ACSSU184)

📖	**Basics of DNA**	This lesson provides an introduction to DNA suitable for complete beginners. It introduces what DNA, genes and chromosomes are and explains where DNA is located.
📖	**Structure of DNA**	This lesson explains the key concepts about the structure of DNA. It teaches students about the double helix, sugar phosphate backbone and nucleotides. It also introduces nitrogenous bases.
📖	**Nitrogenous Bases**	This lesson expands upon information from Structure of DNA. It explains the four types of nitrogenous bases and the complementary base pair rule.
📖	**Genes and Genetic Information**	This lesson explains, in simple terms, that the nucleotide sequence of a gene codes for a protein.
📖	**Homologous Chromosomes**	This lesson defines and explains the terms homologous chromosome, haploid and diploid.
📖	**Sex Chromosomes**	This lesson introduces the sex chromosomes and autosomes.

	DNA Replication	This lesson teaches the steps of DNA replication as well as explains some key ideas around it. It explains why cells replicate their DNA before dividing, introduces mutations and defines sister chromatids.
	Mitosis	This lesson teaches the steps of mitosis.
	Gametes and Fertilisation	This lesson explains what gametes are used for and how their genetic content differs from normal cells. It then explains the process of fertilization and why it is important that gametes are haploid.
	Meiosis	This lesson teaches the steps of meiosis.
	Mitosis vs. Meiosis	This lesson highlights key differences between mitosis and meiosis. It is a revision lesson that assumes prior knowledge of the steps of mitosis and meiosis, either from teaching in the classroom or from completing previous smart lessons.
	Mendel	In this lesson students learn about Mendel's experiments breeding peas. They learn what Mendel did during his experiments as well as what his key observations and conclusions were.
	Alleles	This lesson explains what alleles are and how they are different from genes. It also explains why we have two alleles and the terms genotype, phenotype, heterozygous and homozygous.
	Inheriting Alleles and Punnett Squares	This lesson teaches how meiosis and fertilization act together to pass alleles from parent to offspring. It then teaches students how to read Punnett squares and calculate probabilities and ratios from them.
	Making Punnett Squares	This lesson explains how to find the genotypes of the parents, make a Punnett square and then find probabilities and genotypic and phenotypic ratios.
	Allele Interactions	This lesson teaches about three types of allele interactions: dominant/recessive, incomplete dominance and codominance.
	Pedigrees	In this lesson students learn how to make and read pedigrees. This lesson assumes a basic understanding of dominant and recessive alleles. It does not cover pedigrees of sex-linked genes.
	Sex Linkage	This lesson explains the concept of sex linkage and that males are more likely to have recessive X-linked phenotypes than females.
	Sex Linkage, Punnett Squares and Pedigrees	This lesson describes how to make Punnett squares for sex-linked genes, and how to read Punnett squares and pedigrees for sex-linked genes.
	Asexual and Sexual Reproduction	This lesson teaches about sexual and asexual reproduction, and how they differ from one another. It includes a brief explanation of the advantages and disadvantages of the two types of reproduction.
	Chromosomal Abnormalities	This lesson explains how chromosomal abnormalities can arise from meiosis, and that these abnormalities can result in chromosomal disorders such as Down syndrome.
	Proteins	An introduction to proteins. Students learn that proteins are made of amino acids and coded for by alleles. Students also learn about the roles of different types of proteins, including enzymes, antibodies, structural proteins and transport proteins.

	Discovering the Double Helix	A history lesson on how the double helix was discovered. It includes Watson, Crick and Franklin. Emphasis is put on the ethical concerns around how Franklin's data was obtained and credited.
	Genomics	This lesson explains the human genome project, and the implications that genomic research has for treating diseases and researching evolution.
	The Ethics of Genomics	This lesson explores ethical concerns and implications of genetic testing in embryos. It also explores the potential for genetically modifying embryos in the future, and whether this would be morally acceptable.
	The History of Genetic Thought	This history lesson explores how society's understanding of genetics has grown over the past several centuries, and how it has contributed to the theory of evolution.
	Extracting DNA	In this investigation, students extract DNA from plant or animal tissue samples.
	Modelling Inheritance of Alleles	In this investigation, students are given cards that represent the alleles of two parents. They randomly select and combine alleles in order explore how the processes of meiosis and fertilisation promote diversity among offspring.
	Observing Mitosis	In this investigation, students observe cells from an onion root tip through a microscope. They attempt to identify cells in different stages of mitosis.
	Background Information – The Consequences of Inbreeding	Students will learn about how dog breeders use inbreeding to maintain purebred dog lineages, and what health consequences this can have for the animals. This provides background information for "Research Project - Researching Inbreeding in Dogs."
	Research Project - Researching Inbreeding in Dogs	Students research inbreeding in purebred dogs and write an essay explaining their findings. More information on inbreeding can be found in the Smart Lesson "Background Information - The Consequences of Inbreeding".
	Attraction: It's all in the Armpits	This science comprehension lesson contains a passage about the major histocompatibility complex (MHC) and the role it plays in human mate choice.
	Epigenetics: Inheritance is Strange	This science comprehension lesson contains a passage about epigenetics and the current thinking surrounding inheritance.
	DNA Fingerprinting: Thirsty Thievery	This data interpretation lesson guides students through the interpretation of DNA profiles.
	The Blue People of Troublesome Creek	This data interpretation lesson guides students through the interpretation of family pedigrees.

The theory of evolution by natural selection explains the diversity of living things and is supported by a range of scientific evidence. (ACSSU185)

📖	**Geological Time**	The concept of deep time and the Geological Timescale.
📖	**Theories and Evidence**	This topic provides an overview of all the types of evidence for evolution covered in the upcoming lessons. Included are brief overviews and introductions for the fossil record, comparative techniques in living species and geographical distributions.
📖	**Fossils and the Fossil Record**	This topic examines the fossil evidence in support of Darwin's theory of evolution, including the fossil record.
📖	**Evidence from Living Species**	This topic explains the similarities among living species which provide evidence for evolution. These similarities can be examined through comparative anatomy, comparative embryology, and chemical comparisons.
📖	**Geographical Distribution**	This topic examines the geographical distribution of species and how this provides evidence for evolution.
📖	**Biodiversity**	Smart Lesson that introduces students to the concept of biodiversity and its importance.
📖	**Extinction**	Smart Lesson that teaches students what extinction is and how it comes about.
📖	**Darwin's Theory of Evolution**	Describes how Darwin came to propose his Theory of Evolution.
📖	**Mechanisms of Evolution**	Describes the mechanisms of evolutionary change. These include mutations, gene flow, genetic drift and natural selection.
📖	**Natural Selection**	A smart lesson discussing natural selection, and the processes required for it to occur.
📖	**Artificial Selection**	Smart Lesson that explains what artificial selection is, how it relates to genetic diversity and how it provides a model for evolution.
💡	**Bacterial Resistance**	This extension lesson looks at bacteria and how they evolve antibiotic resistance.
💡	**Coevolution**	Extension lesson that examines how two species influence each other's evolution.
💡	**Mimicry**	This extension lesson describes the different forms of mimicry: Mullerian, Batesian and Aggressive.
💡	**Sexual Selection**	How and why male competition and female choice can influence the evolution of species.
🔴	**Artificial Selection: The Good, the Bad and the Downright Strange**	This lesson reviews some examples of good, bad, and strange artificial selection.
🔴	**Back to the Sea: Cetacean Evolution**	This lesson examines cetaceans and their evolution from terrestrial four-legged mammals.
🔴	**Our Evolution**	An introduction to human evolution as an extension to the evolution topic.
🔴	**The History of Evolutionary Thought**	This lesson provides an overview on the history of evolutionary thought, from Lyell to Lamarck.

🔴	**The Wallace Line**	This lesson looks at the faunal boundary line between Asia and Australasia, and why it exists.
🔍	**Assessing Biodiversity**	In this investigation, students make pitfall traps and identify the invertebrates caught in them.
🔍	**Building an Evolutionary Timeline**	In this investigation, students are given a list of major dates in the evolution of life on Earth. Using these dates, they make and interpret a timeline.
🔍	**Great Ape Genealogy**	Students use coloured paperclips to model nucleotide sequences from human, chimp and gorilla DNA. Using these models, they compare the nucleotide sequences of the three different species and from this infer how they are related.
🔍	**Survival of the Mutants**	Students explore the process of natural selection by competing to collect and store the most candy. Different groups have different traits, such as being blind or having their hands tied together, which will affect their fitness.
🔴	**Evolution and Extinction**	This science comprehension lesson describes how human actions are causing rapid changes in the environment. These changes are typically too fast for species to adapt to and, as a result, many species are going extinct.
🔴	**The Ancestor of All Things**	This science comprehension lesson contains a passage about the Last Universal Common Ancestor (LUCA).
🔍	**Natural Selection in Action!**	This data interpretation lesson guides students through the interpretation of column graphs, pie graphs and line graphs.
🔍	**The Biodiversity Gradient**	This data interpretation lesson guides students through the interpretation of scatterplots, pie graphs and line graphs.

Chemical Sciences

Relevant section of the science achievement standard:

By the end of Year 10, students analyse how the periodic table organises elements and use it to make predictions about the properties of elements. They explain how chemical reactions are used to produce particular products and how different factors influence the rate of reactions. Students analyse how the models and theories they use have developed over time and discuss the factors that prompted their review.

Standards:

The atomic structure and properties of elements are used to organise them in the Periodic Table. (ACSSU186)

	What are Atoms, Elements and Compounds	A review lesson, covering Year 8 concepts of atoms, elements, and compounds.
	The Structure of an Atom	A review lesson, covering content from Year 9 on the structure of atoms and properties of subatomic particles.
	Atomic Symbols	A review lesson, describing how to determine the number of each subatomic particle in an atom by using atomic and mass numbers.
	History of the Atomic Model	This lesson introduces students to the model of the atom, and the models that came before it.
	Electron Configuration	This lesson explains how electrons are configured in an atom.
	The Periodic Table	This lesson introduces students to the periodic table.
	Trends in the Periodic Table	This lesson describes the trends in the periodic table.
	Quiz- First 20 Elements (Name to Symbol)	Students identify the correct symbol for the first 20 elements in the Periodic Table.
	Quiz- First 20 Elements (Symbol to Name)	Students identify what element a symbol represents, for the first 20 elements in the Periodic Table.
	Introduction to Bonding	This lesson introduces students to the concept of chemical bonding.
	Metals in the Periodic Table	This lesson describes the properties of group 1 and 2 metals in the periodic table.
	Metallic Bonding	This lesson describes metallic bonding.
	What are Ions?	Introduction to ions including what they are, how they form, and how to name them.
	Ionic Compounds	Smart Lesson introducing ionic bonds and the structure and properties of ionic compounds.

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	Ions in Solution	Smart Lesson on how ions behave in solution, including solubility, recrystallisation and electrical conductivity.
	Naming Ionic Compounds	Smart Lesson on how to name ionic compounds and write ionic formulae.
	Ionic Bonding	This lesson describes ionic bonding.
	Covalent Bonding	This lesson describes covalent bonding.
	Groups 1 and 2	This lesson describes the properties of group 1 and 2 metals in the periodic table.
	Group 14	This lesson describes the properties of group 14 elements in the periodic table.
	Group 17	This lesson describes the properties of group 17 elements in the periodic table.
	Group 18	This lesson describes the properties of group 18 elements in the periodic table.
	Other Groups	This lesson briefly describes the groups 15, 16 and the transition metals, and introduces the lanthanides and actinides.
	Chemicals: Friend or Foe?	This lesson introduces some dangerous chemicals and explains proper handling and clean up procedures around them.
	Spectroscopy	This lesson explains how spectroscopy was developed, and what some different types of spectroscopy are.
	Flame Test	In this investigation, students observe the different coloured flames produced by different elements.
	Ionic Bonding Card Game	In this investigation, students have cards that represent different cations and anions. They must match the cards in their hand in order to make balanced ionic compounds and gain points.
	Modelling Bonding using Tennis Balls	In this investigation, tennis balls are used to represent electrons, while students represent atoms. To model metallic, ionic and covalent bonding, students must obtain or get rid of tennis balls in various ways.
	Metallic Hydrogen or: How I Learned to Stop Worrying and Love the Scientific Process	This Science Comprehension lesson discusses the recent discovery of metallic hydrogen, including the criticisms of how the discovery was carried out.

Different types of chemical reactions are used to produce a range of products and can occur at different rates. (ACSSU187)

	Chemical vs. Physical	This Smart Lesson helps students learn to identify whether a chemical or physical reaction has taken place.
	Chemical Reactions	This lesson introduces the chemical reactions that students will be learning about in this module.
	Combination and Decomposition Reactions	This lesson teaches students about combination and decomposition reactions.
	Acid Reactions	This Smart Lesson helps students learn all they need to know about acid reactions.

	Precipitation Reactions	This lesson teaches students about precipitation reactions.
	Oxidation and Reduction	This lesson teaches students about oxidation and reduction reactions.
	Rate of Reaction	This lesson teaches students about the different ways to control the rate of a reaction.
	Agitation, Concentration and Surface Area	This lesson teaches students how agitation, concentration and surface area can affect the rate of a reaction.
	Activation Energy, Temperature and Catalysts	This lesson teaches students about how temperature and catalysts relate to activation energy, and how this affects the rate of a reaction.
	Reaction Equations	In this lesson, students write chemical equations. They include the phase (solid, aqueous or gaseous) of the different reactants and products.
	The Mole	This lesson explains what a mole is. Students perform various calculations, including finding a molar mass, number of atoms or number of moles.
	Empirical and Molecular Formulae	This lesson teaches the difference between empirical and molecular formulae, and how to convert from one to the other using molecular mass.
	Moles and Equations	This lesson teaches students how to find moles and masses of products and reactants based on their relative abundance in chemical equations.
	Collision Theory	This lesson explains that reactions occur when molecules collide with the right orientation and with sufficient energy.
	Collision Theory and Rate of Reaction	This lesson explains that, according to collision theory, the rate of reaction will be proportional with the number of effective collisions.
	Rate of Reaction Equations	In this lesson, students calculate the rate of reactions using the concentrations of its reactants and products.
	Factors Affecting Reaction Rates	This lesson explores factors that affect the rate of reaction, including surface area, concentration, temperature and the presence of catalysts.
	Analytical Chemistry	This lesson explains what an analytical chemist does, including quality assurance and forensics. It also explains how someone could go about becoming an analytical chemist.
	Extracting Metals	This lesson teaches students about how metals are extracted from their ores.
	Fuels and Pharmaceuticals	This lesson teaches students about the chemistry behind fuels and pharmaceuticals.
	Polymers	This Smart Lesson teaches students about how chemistry can be used to make the useful material we all use everyday, plastics!
	Milk Plastic	Students make plastic out of milk.

	Modelling Rate of Reaction: Concentration	Students bat different numbers of tennis balls at a target, to simulate molecules colliding and reacting. They measure the number of collisions made per minute, and infer how changing the number of tennis balls would change the reaction rate.
	Modelling Rate of Reaction: Temperature	Students explore the effects of temperature on rate of reaction by throwing tennis balls at a target. This simulates molecules colliding and reacting. They change the frequency at which they throw the balls to represent different temperatures.
	Chemical Clocks	This Science Comprehension lesson discusses how the rate of reaction can be manipulated to produce unusual results, such as a solution that flickers between colourless and purple!
	Graphing Rate of Reaction	In this lesson, students interpret graphs of reactant concentration over time.

Earth and Space Sciences

Relevant section of the science achievement standard:

By the end of Year 10, students … describe and analyse interactions and cycles within and between Earth's spheres. They evaluate the evidence for scientific theories that explain the origin of the universe ... Students analyse how the models and theories they use have developed over time and discuss the factors that prompted their review.

Standards:

The universe contains features including galaxies, stars and solar systems, and the Big Bang theory can be used to explain the origin of the universe. (ACSSU188)

	Universe Introduction	Introduction to the main components of the universe, including stars and the planets surrounding our sun.
	Scientific Theory	A basic introduction to what scientific theories are and how, unlike hypotheses, they are heavily supported by evidence.
	Scientific Notation	A Smart Lesson explaining how to perform scientific notation on both very large and very small numbers.
	Gravity	Smart lesson describing the effect gravity has on the universe, and the cosmological principle.
	Light and Light Speed	Smart lesson explaining the speed of light and light years.

	Radar Ranging	Smart lesson explaining how we can measure distances in space using radar.
	The Life Cycle of Stars	A Smart Lesson explaining how stars are formed, and the various stages they go through as they die. The lesson also introduces supernovae and black holes.
	Distances between Stars, Parallax and Parsecs	A Smart Lesson explaining how the parallax phenomenon can be used to measure how far stars are from Earth.
	Properties of Stars	A Smart Lesson explaining how a star's brightness and colour can be used to determine its distance from Earth, when it is too far to use the parallax method.
	Hertzsprung-Russell Diagrams	An explanation for how Hertzsprung-Russell diagrams can be used to find the absolute magnitude of a star's brightness when its distance from Earth is unknown, and how this can be used to calculate how far away the star is.
	The Big Bang Theory	An introduction to what The Big Bang Theory is, and how The Big Bang would have progressed.
	Cosmic Background Radiation	A Smart Lesson explaining the alternate theory of the original of the universe, the Steady State Theory. The lesson goes on to explain what background radiation is and why it provides evidence for the Big Bang Theory over the Steady State Theory.
	Red Shift	A Smart Lesson explaining what the Doppler effect and red shift are, and how red shift provides evidence that the universe is expanding.
	Relativity	A brief introduction to Einstein's theory of relativity, and some of the mind-boggling conclusions that can be drawn from it.
	End of the Universe	A Smart Lesson explaining that the expansion of the universe is increasing, not decreasing, and what this means for the future of the universe. It also includes how dark matter may explain this accelerated rate of expansion.
	Life	A history lesson on the conditions on early Earth, and the many theories for how life eventually appeared.
	Observing Space	Smart lesson explaining how we use radio telescopes and satellites to study and measure the stars.
	Flame Tests	An investigation where students burn different substances to see what colour flame they produce. This is linked with the concept that astronomers use the colour of stars to determine what materials they are made of.
	Measuring Parallax	An investigation where students use parallax to measure the distance of far-away objects.

Global systems, including the carbon cycle, rely on interactions involving the biosphere, lithosphere, hydrosphere and atmosphere.
(ACSSU189)

📖	**Spheres**	A Smart Lesson that defines and explains the four biospheres of earth: biosphere, lithosphere, atmosphere and hydrosphere. It then introduces a case study of the ozone layer.
📖	**Water Cycle**	A Smart Lesson that explains the steps of the water cycle, and analyses how human activity has come to affect steps of the water cycle and the consequences of these impacts.
📖	**Carbon Cycle**	A Smart Lesson that explains the steps of the carbon cycle, and analyses how human activity has come to affect carbon levels in the atmosphere.
📖	**Nitrogen Cycle**	A Smart Lesson that explains the steps of the nitrogen cycle, and analyses how human activity has come to affect nitrogen levels in the four spheres of Earth and the consequences of these changes.
📖	**Phosphorus Cycle**	A Smart Lesson that explains the steps of the phosphorus cycle, how human activity has come to affect hydrospheric phosphorus levels and the consequences of this change in hydrospheric phosphorus.
📖	**Climate and Weather**	This Smart Lesson describes the difference between weather and climate. It then introduces the concept of climate change and how scientists known that the climate has changed in the past.
📖	**Ocean Currents**	This Smart Lesson introduces ocean currents and their effect on the climate.
📖	**El Niño and La Niña**	This Smart Lesson introduces El Niña, La Niña and the Southern Oscillation.
📖	**The Greenhouse Effect**	This Smart Lesson explains the natural process of the greenhouse effect and how it maintains a comfortable temperature on Earth.
📖	**The Enhanced Greenhouse Effect**	This Smart Lesson describes the enhanced greenhouse effect and how human activity is intensifying the natural warming process.
📖	**Human Influences on Climate**	This Smart Lesson describes some of the ways humans influence the climate, including deforestation, agriculture, burning fossil fuels and using fertilisers.
📖	**Climate Change and Biodiversity**	This Smart Lesson introduces the concept of biodiversity, its importance and how it is affected by climate change.
📖	**It's Getting Hot in Here**	This Smart Lesson describes the effect of the greenhouse effect on global temperatures and permafrosts.
📖	**Disappearing Polar Ice**	This Smart Lesson investigates the effects of the enhanced greenhouse effect on land and sea ice in polar regions.
💡	**Pollution**	This Smart Lesson explains the different types of pollution, including air, land, light, noise and water pollution.
💡	**Where Have all the Turtles Gone?**	This Smart Lesson describes some ways that climate change is threatening sea turtles, including producing a skewed sex ratio and killing eggs.

🔴	**Carbon Capture**	This Smart Lesson introduces carbon capture as a way that humans may be able to reduce climate change. It explains why carbon capture is important and what important carbon sinks are.
🔴	**Carbon Footprints**	This Smart Lesson explains what a carbon footprint is and how it can be measured and reduced.
🔴	**CFC's and the Ozone Layer**	This Smart Lesson explains how CFCs have led to the hole in the ozone layer. As a result, the chemicals have been banned. This teaches an important lesson about how scientific research can have a positive and meaningful impact on society.
🔴	**Computer Modelling and the Environment**	This Smart Lesson explains what computer modelling is, and how it can be used to study the weather, ocean conditions, pollution and climate change. It also explores the downsides of computer modelling.
🟢	**Climate Change**	A research based investigation on the effects of the enhanced greenhouse effect on the climate.
🟢	**Convection Currents**	In this investigation, students will create an observable convection current in the lab to better understand the nature of convection currents in the environment.
🟢	**Polar Ice**	An investigation into the effects of land ice and sea ice on sea levels.
🟢	**The Greenhouse Effect**	This investigation examines the factors that contribute to the greenhouse effect in different model environments.
🔴	**If Climate Change is Real, How Come…?**	This Smart Lesson takes students through some arguments against climate change, and explains why each argument fails to grasp what is occurring under climate change. This lesson can be used to improve reading comprehension in students.
🔴	**Troubled Waters**	This Smart Lesson explains how climate change is affecting marine habitats, including coral reefs. This lesson can be used to improve reading comprehension in students.
🟢	**Examining Past Climate**	This Smart Lesson presents temperature and greenhouse gas composition data from ice cores for students to interpret.
🟢	**Reading a Weather Map**	This Smart Lesson teaches students how to identify key features on weather maps, including pressure and temperature.
🟢	**The Southern Oscillation Index**	This Smart Lesson presents data on La Niña and El Niño conditions using the Southern Oscillation Index for students to interpret.

Physical Sciences

Relevant section of the science achievement standard:

By the end of Year 10, students … explain the concept of energy conservation and represent energy transfer and transformation within systems. They apply relationships between force, mass and acceleration to predict changes in the motion of objects. Students analyse how the models and theories they use have developed over time and discuss the factors that prompted their review.

Standards:

Energy conservation in a system can be explained by describing energy transfers and transformations. (ACSSU190)

	Types of Energy	A recap of the most common types of kinetic and potential energy.
	Conservation of Energy	Smart Lesson on the all-important Law of Conservation of Energy.
	Energy Transfer	Smart Lesson on energy transfer, with a focus on the transfer of heat.
	Energy Transformations	Smart Lesson on energy transformations, with plenty of real-life examples!
	Work and Power	Smart Lesson on the concepts of work and power, with calculations.
	Useful and Wasted Energy	An introduction to the concepts of useful energy, wasted energy and efficiency.
	Energy Efficiency	Smart Lesson on energy efficiency, with calculations.
	Energy Calculations	Smart Lesson designed to help students practice using the energy, work and power formulae. Also includes video tutorials!
	Electricity Generation	Smart Lesson all about electricity and where it comes from in Australia. Including discussion of innovative designs and future challenges.
	Energy in Food	Smart Lesson about how our body transforms the chemical potential energy in food into kinetic and heat energy.
	Steam Engines	Smart Lesson about the energy transformations used to power steam engines.
	Building an Electromagnet	Investigations into electromagnets and how electrical currents can induce magnetic fields.
	Energy Efficiency of Bouncy Balls	Investigation into the energy efficiency of bouncy balls.
	Energy in Food	An investigation into the amount of chemical potential energy stored in food.
	Energy in Skate Parks	An investigation into energy transformations and waste energy using a PhET Skate Park simulation.

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Roller Coasters — An investigation into the energy transformations in a roller coaster.

The motion of objects can be described and predicted using the laws of physics. (ACSSU229)

Distance and Time	An introduction to two key ideas in physics: distance and time.
Displacement	Explanation of distance and displacement, with calculations involving addition, subtraction and the use of Pythagoras' Theorem.
Speed	Explanation of speed and velocity, with calculation questions.
Acceleration	Explanation of acceleration with calculations.
Using the Acceleration Formula	Practice rearranging the formula for acceleration to find the formulae for final velocity, initial velocity and time.
Distance-Time Graphs	Explanation of distance-time graphs and displacement-time graphs, and how to calculate speed and velocity from them.
Velocity-Time Graphs	Smart Lesson on velocity-time graphs including how to use them to find acceleration and distance travelled.
Acceleration-Time Graphs	Smart Lesson on acceleration-time graphs and how we can use them to find the change in velocity of an object.
Summary of Motion Graphs	Revision of displacement-time graphs, velocity-time graphs and acceleration-time graphs.
Introduction to Forces	Recap of the concepts learnt in Year 7 forces, including how objects are affected by forces and the difference between balanced and unbalanced forces.
Types of Forces	Recap of the difference between contact and non-contact forces and some common forces, focussing on gravity, magnetism and friction.
Newton's First Law	An introduction to Newton's First Law of Motion and the concept of inertia.
Newton's Second Law	An explanation of Newton's Second Law and how the F=ma law can be used to find force, acceleration, and mass of an object.
Newton's Third Law	An introduction to Newton's Third Law of Motion that every force is countered by an equal and opposite reaction force.
Investigating Car Safety Systems	A Smart Lesson guiding students through an investigation into a car safety system of their choice.
Planetary Motion	Smart Lesson on how gravity causes planets to orbit the Sun.
Tides	A Smart Lesson on how the tides are caused by the gravitational forces of the Sun and the Moon.

	Car Safety Systems	A Smart Lesson on how seatbelts, head rests, crumple zones and airbags use the laws of physics to protect people during car crashes.
	How BB-8 Works	A Smart Lesson which uses BB-8 to explain the difference between weight and mass, and also outlines a theory which explains how BB-8 can roll without anything pushing it.
	Rockets	An explanation of the forces acting on rockets during launch and of the Space Race.
	Sports Science	Smart Lesson on how sports science is used to develop new techniques and materials which improve athletes' performances.
	Balloon Rocket	An investigation into Newton's Third Law using a balloon rocket.
	Egg Drop	An egg drop investigation into Newton's First Law.
	Gravity	Investigation into the effects of gravity and air resistance on falling objects.
	Reaction Times	Investigation into reaction times and how they change when a person is distracted.
	Ticker Timers	Investigation that uses ticker timers to gather data on the motion of a toy car.
	Truckapults	An investigation into Newton's Second Law using trucks of varying masses.
	History of Rockets	A Smart Lesson on the history of rockets to improve reading comprehension.

Science as a Human Endeavour

Relevant section of the science achievement standard:

By the end of Year 10, students … analyse how the models and theories they use have developed over time and discuss the factors that prompted their review.

Nature and Development of Science

Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community. (ACSHE191)

Discovering the Double Helix	A history lesson on how the double helix was discovered. It includes Watson, Crick and Franklin. Emphasis is put on the ethical concerns around how Franklin's data was obtained and credited.
The History of Genetic Thought	This history lesson explores how society's understanding of genetics has grown over the past several centuries, and how it has contributed to the theory of evolution.
Attraction: It's all in the Armpits	This science comprehension lesson contains a passage about the major histocompatibility complex (MHC) and the role it plays in human mate choice.
Epigenetics: Inheritance is Strange	This science comprehension lesson contains a passage about epigenetics and the current thinking surrounding inheritance.
Back to the Sea: Cetacean Evolution	This lesson examines cetaceans and their evolution from terrestrial four-legged mammals.
Our Evolution	An introduction to human evolution as an extension to the evolution topic.
The History of Evolutionary Thought	This lesson provides an overview on the history of evolutionary thought, from Lyell to Lamarck.
The Wallace Line	This lesson looks at the faunal boundary line between Asia and Australasia, and why it exists.
The Ancestor of All Things	This science comprehension lesson contains a passage about the Last Universal Common Ancestor (LUCA).
Spectroscopy	This lesson explains how spectroscopy was developed, and what some different types of spectroscopy are.
Metallic Hydrogen or: How I Learned to Stop Worrying and Love the Scientific Process	This Science Comprehension lesson discusses the recent discovery of metallic hydrogen, including the criticisms of how the discovery was carried out.
Chemical Clocks	This Science Comprehension lesson discusses how the rate of reaction can be manipulated to produce unusual results, such as a solution that flickers between colourless and purple!

End of the Universe	A Smart Lesson explaining that the expansion of the universe is increasing, not decreasing, and what this means for the future of the universe. It also includes how dark matter may explain this accelerated rate of expansion.
Life	A history lesson on the conditions on early Earth, and the many theories for how life eventually appeared.
Computer Modelling and the Environment	This Smart Lesson explains what computer modelling is, and how it can be used to study the weather, ocean conditions, pollution and climate change. It also explores the downsides of computer modelling.
If Climate Change is Real, How Come…?	This Smart Lesson takes students through some arguments against climate change, and explains why each argument fails to grasp what is occurring under climate change. This lesson can be used to improve reading comprehension in students.
What is Science?	Smart lesson introducing science and the related sub-fields.

Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries. (ACSHE192)

Genomics	This lesson explains the human genome project, and the implications that genomic research has for treating diseases and researching evolution.
Spectroscopy	This lesson explains how spectroscopy was developed, and what some different types of spectroscopy are.
Metallic Hydrogen or: How I Learned to Stop Worrying and Love the Scientific Process	This Science Comprehension lesson discusses the recent discovery of metallic hydrogen, including the criticisms of how the discovery was carried out.
End of the Universe	A Smart Lesson explaining that the expansion of the universe is increasing, not decreasing, and what this means for the future of the universe. It also includes how dark matter may explain this accelerated rate of expansion.
Life	A history lesson on the conditions on early Earth, and the many theories for how life eventually appeared.
Observing Space	Smart lesson explaining how we use radio telescopes and satellites to study and measure the stars.
Computer Modelling and the Environment	This Smart Lesson explains what computer modelling is, and how it can be used to study the weather, ocean conditions, pollution and climate change. It also explores the downsides of computer modelling.
Rockets	An explanation of the forces acting on rockets during launch and of the Space Race.
History of Rockets	A Smart Lesson on the history of rockets to improve reading comprehension.

Use and Influence of Science

People use scientific knowledge to evaluate whether they accept claims, explanations or predictions, and advances in science can affect people's lives, including generating new career opportunities. (ACSHE194)

The Ethics of Genomics	This lesson explores ethical concerns and implications of genetic testing in embryos. It also explores the potential for genetically modifying embryos in the future, and whether this would be morally acceptable.
Background Information – The Consequences of Inbreeding	Students will learn about how dog breeders use inbreeding to maintain purebred dog lineages, and what health consequences this can have for the animals. This provides background information for "Research Project - Researching Inbreeding in Dogs."
Attraction: It's all in the Armpits	This science comprehension lesson contains a passage about the major histocompatibility complex (MHC) and the role it plays in human mate choice.
Epigenetics: Inheritance is Strange	This science comprehension lesson contains a passage about epigenetics and the current thinking surrounding inheritance.
Artificial Selection: The Good, the Bad and the Downright Strange	This lesson reviews some examples of good, bad, and strange artificial selection.
Evolution and Extinction	This science comprehension lesson describes how human actions are causing rapid changes in the environment. These changes are typically too fast for species to adapt to and, as a result, many species are going extinct.
Chemicals: Friend or Foe?	This lesson introduces some dangerous chemicals and explains proper handling and clean up procedures around them.
Metallic Hydrogen or: How I Learned to Stop Worrying and Love the Scientific Process	This Science Comprehension lesson discusses the recent discovery of metallic hydrogen, including the criticisms of how the discovery was carried out.
Analytical Chemistry	This lesson explains what an analytical chemist does, including quality assurance and forensics. It also explains how someone could go about becoming an analytical chemist.
Extracting Metals	This lesson teaches students about how metals are extracted from their ores.
Fuels and Pharmaceuticals	This lesson teaches students about the chemistry behind fuels and pharmaceuticals.
Polymers	This Smart Lesson teaches students about how chemistry can be used to make the useful material we all use everyday, plastics!
End of the Universe	A Smart Lesson explaining that the expansion of the universe is increasing, not decreasing, and what this means for the future of the universe. It also includes how dark matter may explain this accelerated rate of expansion.
Observing Space	Smart lesson explaining how we use radio telescopes and satellites to study and measure the stars.

Carbon Capture	This Smart Lesson introduces carbon capture as a way that humans may be able to reduce climate change. It explains why carbon capture is important and what important carbon sinks are.
Carbon Footprints	This Smart Lesson explains what a carbon footprint is and how it can be measured and reduced.
CFC's and the Ozone Layer	This Smart Lesson explains how CFCs have led to the hole in the ozone layer. As a result, the chemicals have been banned. This teaches an important lesson about how scientific research can have a positive and meaningful impact on society.
Computer Modelling and the Environment	This Smart Lesson explains what computer modelling is, and how it can be used to study the weather, ocean conditions, pollution and climate change. It also explores the downsides of computer modelling.
If Climate Change is Real, How Come…?	This Smart Lesson takes students through some arguments against climate change, and explains why each argument fails to grasp what is occurring under climate change. This lesson can be used to improve reading comprehension in students.
Troubled Waters	This Smart Lesson explains how climate change is affecting marine habitats, including coral reefs. This lesson can be used to improve reading comprehension in students.
Electricity Generation	Smart Lesson all about electricity and where it comes from in Australia. Including discussion of innovative designs and future challenges.
Steam Engines	Smart Lesson about the energy transformations used to power steam engines.
Car Safety Systems	A Smart Lesson on how seatbelts, head rests, crumple zones and airbags use the laws of physics to protect people during car crashes.
How BB-8 Works	A Smart Lesson which uses BB-8 to explain the difference between weight and mass, and also outlines a theory which explains how BB-8 can roll without anything pushing it.
Rockets	An explanation of the forces acting on rockets during launch and of the Space Race.
Sports Science	Smart Lesson on how sports science is used to develop new techniques and materials which improve athletes' performances.
History of Rockets	A Smart Lesson on the history of rockets to improve reading comprehension.
Careers in Science	Smart lesson detailing the variety of careers that use science.

Values and needs of contemporary society can influence the focus of scientific research. (ACSHE230)

Genomics	This lesson explains the human genome project, and the implications that genomic research has for treating diseases and researching evolution.
The Ethics of Genomics	This lesson explores ethical concerns and implications of genetic testing in embryos. It also explores the potential for genetically modifying embryos in the future, and whether this would be morally acceptable.
Background Information – The Consequences of Inbreeding	Students will learn about how dog breeders use inbreeding to maintain purebred dog lineages, and what health consequences this can have for the animals. This provides background information for "Research Project - Researching Inbreeding in Dogs."
Artificial Selection: The Good, the Bad and the Downright Strange	This lesson reviews some examples of good, bad, and strange artificial selection.
Evolution and Extinction	This science comprehension lesson describes how human actions are causing rapid changes in the environment. These changes are typically too fast for species to adapt to and, as a result, many species are going extinct.
Chemicals: Friend or Foe?	This lesson introduces some dangerous chemicals and explains proper handling and clean up procedures around them.
Analytical Chemistry	This lesson explains what an analytical chemist does, including quality assurance and forensics. It also explains how someone could go about becoming an analytical chemist.
Fuels and Pharmaceuticals	This lesson teaches students about the chemistry behind fuels and pharmaceuticals.
Polymers	This Smart Lesson teaches students about how chemistry can be used to make the useful material we all use everyday, plastics!
Carbon Capture	This Smart Lesson introduces carbon capture as a way that humans may be able to reduce climate change. It explains why carbon capture is important and what important carbon sinks are.
Carbon Footprints	This Smart Lesson explains what a carbon footprint is and how it can be measured and reduced.
CFC's and the Ozone Layer	This Smart Lesson explains how CFCs have led to the hole in the ozone layer. As a result, the chemicals have been banned. This teaches an important lesson about how scientific research can have a positive and meaningful impact on society.
If Climate Change is Real, How Come…?	This Smart Lesson takes students through some arguments against climate change, and explains why each argument fails to grasp what is occurring under climate change. This lesson can be used to improve reading comprehension in students.
Troubled Waters	This Smart Lesson explains how climate change is affecting marine habitats, including coral reefs. This lesson can be used to improve reading comprehension in students.

Electricity Generation	Smart Lesson all about electricity and where it comes from in Australia. Including discussion of innovative designs and future challenges.
Energy in Food	Smart Lesson about how our body transforms the chemical potential energy in food into kinetic and heat energy.
Steam Engines	Smart Lesson about the energy transformations used to power steam engines.
Car Safety Systems	A Smart Lesson on how seatbelts, head rests, crumple zones and airbags use the laws of physics to protect people during car crashes.
Rockets	An explanation of the forces acting on rockets during launch and of the Space Race.
Sports Science	Smart Lesson on how sports science is used to develop new techniques and materials which improve athletes' performances.
History of Rockets	A Smart Lesson on the history of rockets to improve reading comprehension.

Science Inquiry Skills

Relevant section of the science achievement standard:

By the end of Year 10, students … develop questions and hypotheses and independently design and improve appropriate methods of investigation, including field work and laboratory experimentation. They explain how they have considered reliability, safety, fairness and ethical actions in their methods and identify where digital technologies can be used to enhance the quality of data. When analysing data, selecting evidence and developing and justifying conclusions, they identify alternative explanations for findings and explain any sources of uncertainty. Students evaluate the validity and reliability of claims made in secondary sources with reference to currently held scientific views, the quality of the methodology and the evidence cited. They construct evidence-based arguments and select appropriate representations and text types to communicate science ideas for specific purposes.

Questioning and Predicting

Formulate questions or hypotheses that can be investigated scientifically. (ACSIS198)

Research Project - Researching Inbreeding in Dogs	Students research inbreeding in purebred dogs and write an essay explaining their findings. More information on inbreeding can be found in the Smart Lesson "Background Information - The Consequences of Inbreeding".
DNA Fingerprinting: Thirsty Thievery	This data interpretation lesson guides students through the interpretation of DNA profiles.
Climate Change	A research based investigation on the effects of the enhanced greenhouse effect on the climate.
Polar Ice	An investigation into the effects of land ice and sea ice on sea levels.
The Greenhouse Effect	This investigation examines the factors that contribute to the greenhouse effect in different model environments.
Energy Efficiency of Bouncy Balls	Investigation into the energy efficiency of bouncy balls.
Energy in Food	An investigation into the amount of chemical potential energy stored in food.
Energy in Skate Parks	An investigation into energy transformations and waste energy using a PhET Skate Park simulation.
Gravity	Investigation into the effects of gravity and air resistance on falling objects.
Reaction Times	Investigation into reaction times and how they change when a person is distracted.
Truckapults	An investigation into Newton's Second Law using trucks of varying masses.
Scientific Method	Smart Lesson on the scientific method and how to write a scientific report.

Hypothesising and Predicting	A lesson on how to make a scientific hypothesis and predicting results of experiments.

Planning and Conducting

Plan, select and use appropriate investigation types, including field work and laboratory experimentation, to collect reliable data; assess risk and address ethical issues associated with these methods. (ACSIS199)

Extracting DNA	In this investigation, students extract DNA from plant or animal tissue samples.
Modelling Inheritance of Alleles	In this investigation, students are given cards that represent the alleles of two parents. They randomly select and combine alleles in order explore how the processes of meiosis and fertilisation promote diversity among offspring.
Observing Mitosis	In this investigation, students observe cells from an onion root tip through a microscope. They attempt to identify cells in different stages of mitosis.
Research Project - Researching Inbreeding in Dogs	Students research inbreeding in purebred dogs and write an essay explaining their findings. More information on inbreeding can be found in the Smart Lesson "Background Information - The Consequences of Inbreeding".
Assessing Biodiversity	In this investigation, students make pitfall traps and identify the invertebrates caught in them.
Building an Evolutionary Timeline	In this investigation, students are given a list of major dates in the evolution of life on Earth. Using these dates, they make and interpret a timeline.
Flame Test	In this investigation, students observe the different coloured flames produced by different elements.
Ionic Bonding Card Game	In this investigation, students have cards that represent different cations and anions. They must match the cards in their hand in order to make balanced ionic compounds and gain points.
Modelling Bonding using Tennis Balls	In this investigation, tennis balls are used to represent electrons, while students represent atoms. To model metallic, ionic and covalent bonding, students must obtain or get rid of tennis balls in various ways.
Milk Plastic	Students make plastic out of milk.
Modelling Rate of Reaction: Concentration	Students bat different numbers of tennis balls at a target, to simulate molecules colliding and reacting. They measure the number of collisions made per minute, and infer how changing the number of tennis balls would change the reaction rate.
Modelling Rate of Reaction: Temperature	Students explore the effects of temperature on rate of reaction by throwing tennis balls at a target. This simulates molecules colliding and reacting. They change the frequency at which they throw the balls to represent different temperatures.
Flame Tests	An investigation where students burn different substances to see what colour flame they produce. This is linked with the concept that astronomers use the colour of stars to determine what materials they are made of.

Measuring Parallax	An investigation where students use parallax to measure the distance of far-away objects.
Climate Change	A research based investigation on the effects of the enhanced greenhouse effect on the climate.
Convection Currents	In this investigation, students will create an observable convection current in the lab to better understand the nature of convection currents in the environment.
Polar Ice	An investigation into the effects of land ice and sea ice on sea levels.
The Greenhouse Effect	This investigation examines the factors that contribute to the greenhouse effect in different model environments.
Building an Electromagnet	Investigations into electromagnets and how electrical currents can induce magnetic fields.
Energy Efficiency of Bouncy Balls	Investigation into the energy efficiency of bouncy balls.
Energy in Food	An investigation into the amount of chemical potential energy stored in food.
Energy in Skate Parks	An investigation into energy transformations and waste energy using a PhET Skate Park simulation.
Balloon Rocket	An investigation into Newton's Third Law using a balloon rocket.
Egg Drop	An egg drop investigation into Newton's First Law.
Gravity	Investigation into the effects of gravity and air resistance on falling objects.
Reaction Times	Investigation into reaction times and how they change when a person is distracted.
Ticker Timers	Investigation that uses ticker timers to gather data on the motion of a toy car.
Truckapults	An investigation into Newton's Second Law using trucks of varying masses.
Safety Equipment	Smart Lesson about the different types of safety equipment and when to use them.
Safety Guidelines	Smart lesson discussing safety instructions for the lab, including what to wear and what to do when things go wrong.
Equipment Types	A Smart Lesson going through basic laboratory equipment and its uses.
Bunsen Burner	A Smart Lesson instructing students on the design and makeup of the Bunsen burner.
Separating Substances and Other Equipment	Introduction to some important pieces of scientific equipment and their uses with a focus on equipment needed to separate mixtures.
Equipment Quiz	A quiz testing the ability of students to name scientific equipment.
Reading the Meniscus	Smart Lesson on the way to read a measurement from a fluid which has a meniscus.
Magnification	How magnification can be calculated and changed and how this relates to the field of view and resolution.
Parts and Function of a Microscope	A Smart Lesson explaining how optical microscopes work and what they are.
Types of Microscopes	A lesson on the different types of microscopes that can be used.
Using a Microscope	How to prepare wet mounts and use a microscope.
Variables	Smart Lesson about independent variables, dependent variables and control variables.
Control Variables and Control Groups	A Smart Lesson on the importance of control variables and control groups, and the importance of using these for results to be meaningful.

Accuracy	Smart Lesson on accuracy and selecting measuring equipment which will give a more accurate result.
Repeatability and Reliability	An introduction to repeatability and reliability and their importance when carrying out experiments.
Validity	Smart Lesson on validity when performing an experiment, and how changing variables can invalidate an experiment.
Fair Tests	Smart Lesson on fair tests and how to control variables.
Sample Size	A Smart Lesson on the importance of large sample sizes in collecting accurate results.
Scientific Method	Smart Lesson on the scientific method and how to write a scientific report.
Observations and Inferences	How to make observations and inferences using qualitative and quantitative methods.
Introduction to Ethics	A Smart Lesson explaining what ethics is, and how ethics an be influenced by a variety of cultural factors.
Ethics Around the World	Smart Lesson exploring the history of ethics in Europe, India, China, Japan and America.
Different Views	A Smart Lesson exploring how ethics is subjective, and how something can be considered ethical in one culture and unethical in another.
Ethical Issues of Organ Transplants	A Smart Lesson explaining what ethical dilemmas are using organ transplants as examples.
The Ethics of Genetics	A Smart Lesson exploring the ethical dilemma of genetic testing of embryos.

Select and use appropriate equipment, including digital technologies, to collect and record data systematically and accurately. (ACSIS200)

Observing Mitosis	In this investigation, students observe cells from an onion root tip through a microscope. They attempt to identify cells in different stages of mitosis.
Measuring Parallax	An investigation where students use parallax to measure the distance of far-away objects.
Polar Ice	An investigation into the effects of land ice and sea ice on sea levels.
The Greenhouse Effect	This investigation examines the factors that contribute to the greenhouse effect in different model environments.
Energy Efficiency of Bouncy Balls	Investigation into the energy efficiency of bouncy balls.
Energy in Food	An investigation into the amount of chemical potential energy stored in food.
Reaction Times	Investigation into reaction times and how they change when a person is distracted.
Ticker Timers	Investigation that uses ticker timers to gather data on the motion of a toy car.
Truckapults	An investigation into Newton's Second Law using trucks of varying masses.
Equipment Types	A Smart Lesson going through basic laboratory equipment and its uses.
Measuring in Science	Smart Lesson on how to read different measuring tools. The tools discussed are rulers, measuring cylinders, protractors, thermometers and scales.
Reading the Meniscus	Smart Lesson on the way to read a measurement from a fluid which has a meniscus.

Measuring Electricity	A lesson describing how to measure voltage, current and resistance using ammeters, voltmeters and multimeters.
Magnification	How magnification can be calculated and changed and how this relates to the field of view and resolution.
Parts and Function of a Microscope	A Smart Lesson explaining how optical microscopes work and what they are.
Types of Microscopes	A lesson on the different types of microscopes that can be used.
Using a Microscope	How to prepare wet mounts and use a microscope.
Accuracy	Smart Lesson on accuracy and selecting measuring equipment which will give a more accurate result.
Repeatability and Reliability	An introduction to repeatability and reliability and their importance when carrying out experiments.
Scientific Method	Smart Lesson on the scientific method and how to write a scientific report.
Observations and Inferences	How to make observations and inferences using qualitative and quantitative methods.
Organising Data into a Data Table from an Experiment	How to format data tables using scientific conventions, and how to create and input data into data tables.

Processing and Analysing Data and Information

Analyse patterns and trends in data, including describing relationships between variables and identifying inconsistencies. (ACSIS203)

DNA Fingerprinting: Thirsty Thievery	This data interpretation lesson guides students through the interpretation of DNA profiles.
The Blue People of Troublesome Creek	This data interpretation lesson guides students through the interpretation of family pedigrees.
Assessing Biodiversity	In this investigation, students make pitfall traps and identify the invertebrates caught in them.
Building an Evolutionary Timeline	In this investigation, students are given a list of major dates in the evolution of life on Earth. Using these dates, they make and interpret a timeline.
Natural Selection in Action!	This data interpretation lesson guides students through the interpretation of column graphs, pie graphs and line graphs.
The Biodiversity Gradient	This data interpretation lesson guides students through the interpretation of scatterplots, pie graphs and line graphs.
Modelling Rate of Reaction: Concentration	Students bat different numbers of tennis balls at a target, to simulate molecules colliding and reacting. They measure the number of collisions made per minute, and infer how changing the number of tennis balls would change the reaction rate.

Modelling Rate of Reaction: Temperature	Students explore the effects of temperature on rate of reaction by throwing tennis balls at a target. This simulates molecules colliding and reacting. They change the frequency at which they throw the balls to represent different temperatures.
Graphing Rate of Reaction	In this lesson, students interpret graphs of reactant concentration over time.
Measuring Parallax	An investigation where students use parallax to measure the distance of far-away objects.
Polar Ice	An investigation into the effects of land ice and sea ice on sea levels.
The Greenhouse Effect	This investigation examines the factors that contribute to the greenhouse effect in different model environments.
Examining Past Climate	This Smart Lesson presents temperature and greenhouse gas composition data from ice cores for students to interpret.
Reading a Weather Map	This Smart Lesson teaches students how to identify key features on weather maps, including pressure and temperature.
The Southern Oscillation Index	This Smart Lesson presents data on La Niña and El Niño conditions using the Southern Oscillation Index for students to interpret.
Energy Efficiency of Bouncy Balls	Investigation into the energy efficiency of bouncy balls.
Energy in Food	An investigation into the amount of chemical potential energy stored in food.
Energy in Skate Parks	An investigation into energy transformations and waste energy using a PhET Skate Park simulation.
Reaction Times	Investigation into reaction times and how they change when a person is distracted.
Ticker Timers	Investigation that uses ticker timers to gather data on the motion of a toy car.
Truckapults	An investigation into Newton's Second Law using trucks of varying masses.
Scientific Method	Smart Lesson on the scientific method and how to write a scientific report.
Observations and Inferences	How to make observations and inferences using qualitative and quantitative methods.
Organising Data into a Data Table from an Experiment	How to format data tables using scientific conventions, and how to create and input data into data tables.
Interpreting Data Tables	Smart Lesson on how to interpret data tables, and the difference between directly proportional and inversely proportional relationships.
Graphs in Science	Smart Lesson on how graphs are used in science.
Bar Graphs	Smart Lesson about bar graphs, and what type of information is best represented in bar graphs.
Line Graphs	Smart Lesson explaining how to make and read a line graph.
Scatter Graphs	Explanation of scatter graphs and lines of best fit.
A Guide for Making Graphs in Excel (Mac Version)	Smart Lesson describing how to make scatter plots, histograms and column graphs in Excel, when using a Mac computer.

A Guide for Making Graphs in Excel (Windows Version)	Smart Lesson describing how to make scatter plots, histograms and column graphs in Excel, when using a Windows computer.
Matching Tables to Graphs	Smart Lesson on whether data should be presented in a table or a graph.
Algebra in Science	Introduction to how algebra is used in science with the examples of calculating net force and using Newton's Second Law.
Rearranging Equations	Introduction on how to rearrange simple algebraic equations.
Choosing Appropriate Units	Practice choosing appropriate units for volumes, distances, energies and speeds.
Units of Distance	Introduction to the SI units used to measure distance, and how to convert between the units.
Units of Energy	Introduction to the SI units used to measure energy, and how to convert between the units.
Units of Speed	Introduction to the SI units used to measure speed, and how to convert between the units.
Units of Volume	Introduction to the SI units used to measure volume, and how to convert between the units.
Food Webs	Interpreting food web diagrams to teach interpretation skills.
Interpreting Diagrams	Exercises on interpreting food chains, flow charts, dichotomous keys and force diagrams.
Water Cycle	Introduction to interpreting diagrams using the water cycle as an example.
Scientific Notation	A Smart Lesson explaining how to write large and small numbers in scientific notation.
Scientific Figures	Smart Lesson describing how to write numbers to significant figures, and how to identify significant figures.

Use knowledge of scientific concepts to draw conclusions that are consistent with evidence. (ACSIS204)

Research Project - Researching Inbreeding in Dogs	Students research inbreeding in purebred dogs and write an essay explaining their findings. More information on inbreeding can be found in the Smart Lesson "Background Information - The Consequences of Inbreeding".
DNA Fingerprinting: Thirsty Thievery	This data interpretation lesson guides students through the interpretation of DNA profiles.
The Blue People of Troublesome Creek	This data interpretation lesson guides students through the interpretation of family pedigrees.
Assessing Biodiversity	In this investigation, students make pitfall traps and identify the invertebrates caught in them.
Building an Evolutionary Timeline	In this investigation, students are given a list of major dates in the evolution of life on Earth. Using these dates, they make and interpret a timeline.
Great Ape Genealogy	Students use coloured paperclips to model nucleotide sequences from human, chimp and gorilla DNA. Using these models, they compare the nucleotide sequences of the three different species and from this infer how they are related.
Survival of the Mutants	Students explore the process of natural selection by competing to collect and store the most candy. Different groups have different traits, such as being blind or having their hands tied together, which will affect their fitness.

Natural Selection in Action!	This data interpretation lesson guides students through the interpretation of column graphs, pie graphs and line graphs.
The Biodiversity Gradient	This data interpretation lesson guides students through the interpretation of scatterplots, pie graphs and line graphs.
Flame Test	In this investigation, students observe the different coloured flames produced by different elements.
Milk Plastic	Students make plastic out of milk.
Modelling Rate of Reaction: Concentration	Students bat different numbers of tennis balls at a target, to simulate molecules colliding and reacting. They measure the number of collisions made per minute, and infer how changing the number of tennis balls would change the reaction rate.
Modelling Rate of Reaction: Temperature	Students explore the effects of temperature on rate of reaction by throwing tennis balls at a target. This simulates molecules colliding and reacting. They change the frequency at which they throw the balls to represent different temperatures.
Graphing Rate of Reaction	In this lesson, students interpret graphs of reactant concentration over time.
Flame Tests	An investigation where students burn different substances to see what colour flame they produce. This is linked with the concept that astronomers use the colour of stars to determine what materials they are made of.
Measuring Parallax	An investigation where students use parallax to measure the distance of far-away objects.
Climate Change	A research based investigation on the effects of the enhanced greenhouse effect on the climate.
Convection Currents	In this investigation, students will create an observable convection current in the lab to better understand the nature of convection currents in the environment.
Polar Ice	An investigation into the effects of land ice and sea ice on sea levels.
The Greenhouse Effect	This investigation examines the factors that contribute to the greenhouse effect in different model environments.
Examining Past Climate	This Smart Lesson presents temperature and greenhouse gas composition data from ice cores for students to interpret.
Reading a Weather Map	This Smart Lesson teaches students how to identify key features on weather maps, including pressure and temperature.
The Southern Oscillation Index	This Smart Lesson presents data on La Niña and El Niño conditions using the Southern Oscillation Index for students to interpret.
Building an Electromagnet	Investigations into electromagnets and how electrical currents can induce magnetic fields.
Energy Efficiency of Bouncy Balls	Investigation into the energy efficiency of bouncy balls.
Energy in Food	An investigation into the amount of chemical potential energy stored in food.
Energy in Skate Parks	An investigation into energy transformations and waste energy using a PhET Skate Park simulation.
Balloon Rocket	An investigation into Newton's Third Law using a balloon rocket.

Egg Drop	An egg drop investigation into Newton's First Law.
Gravity	Investigation into the effects of gravity and air resistance on falling objects.
Reaction Times	Investigation into reaction times and how they change when a person is distracted.
Ticker Timers	Investigation that uses ticker timers to gather data on the motion of a toy car.
Truckapults	An investigation into Newton's Second Law using trucks of varying masses.
Scientific Method	Smart Lesson on the scientific method and how to write a scientific report.
Observations and Inferences	How to make observations and inferences using qualitative and quantitative methods.
Organising Data into a Data Table from an Experiment	How to format data tables using scientific conventions, and how to create and input data into data tables.
Interpreting Data Tables	Smart Lesson on how to interpret data tables, and the difference between directly proportional and inversely proportional relationships.
Graphs in Science	Smart Lesson on how graphs are used in science.
Bar Graphs	Smart Lesson about bar graphs, and what type of information is best represented in bar graphs.
Line Graphs	Smart Lesson explaining how to make and read a line graph.
Scatter Graphs	Explanation of scatter graphs and lines of best fit.
Matching Tables to Graphs	Smart Lesson on whether data should be presented in a table or a graph.
Algebra in Science	Introduction to how algebra is used in science with the examples of calculating net force and using Newton's Second Law.
Food Webs	Interpreting food web diagrams to teach interpretation skills.
Interpreting Diagrams	Exercises on interpreting food chains, flow charts, dichotomous keys and force diagrams.
Water Cycle	Introduction to interpreting diagrams using the water cycle as an example.
Evaluating in Science	A lesson explaining how to evaluate experimental results.

Evaluating

Evaluate conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the data. (ACSIS205)

Extracting DNA	In this investigation, students extract DNA from plant or animal tissue samples.
Research Project - Researching Inbreeding in Dogs	Students research inbreeding in purebred dogs and write an essay explaining their findings. More information on inbreeding can be found in the Smart Lesson "Background Information - The Consequences of Inbreeding".
DNA Fingerprinting: Thirsty Thievery	This data interpretation lesson guides students through the interpretation of DNA profiles.
Assessing Biodiversity	In this investigation, students make pitfall traps and identify the invertebrates caught in them.
Building an Evolutionary Timeline	In this investigation, students are given a list of major dates in the evolution of life on Earth. Using these dates, they make and interpret a timeline.
Great Ape Genealogy	Students use coloured paperclips to model nucleotide sequences from human, chimp and gorilla DNA. Using these models, they compare the nucleotide sequences of the three different species and from this infer how they are related.
Survival of the Mutants	Students explore the process of natural selection by competing to collect and store the most candy. Different groups have different traits, such as being blind or having their hands tied together, which will affect their fitness.
The Biodiversity Gradient	This data interpretation lesson guides students through the interpretation of scatterplots, pie graphs and line graphs.
Flame Test	In this investigation, students observe the different coloured flames produced by different elements.
Milk Plastic	Students make plastic out of milk.
Modelling Rate of Reaction: Concentration	Students bat different numbers of tennis balls at a target, to simulate molecules colliding and reacting. They measure the number of collisions made per minute, and infer how changing the number of tennis balls would change the reaction rate.
Modelling Rate of Reaction: Temperature	Students explore the effects of temperature on rate of reaction by throwing tennis balls at a target. This simulates molecules colliding and reacting. They change the frequency at which they throw the balls to represent different temperatures.
Measuring Parallax	An investigation where students use parallax to measure the distance of far-away objects.
Climate Change	A research based investigation on the effects of the enhanced greenhouse effect on the climate.
Convection Currents	In this investigation, students will create an observable convection current in the lab to better understand the nature of convection currents in the environment.
Energy Efficiency of Bouncy Balls	Investigation into the energy efficiency of bouncy balls.

Energy in Food	An investigation into the amount of chemical potential energy stored in food.
Energy in Skate Parks	An investigation into energy transformations and waste energy using a PhET Skate Park simulation.
Balloon Rocket	An investigation into Newton's Third Law using a balloon rocket.
Egg Drop	An egg drop investigation into Newton's First Law.
Gravity	Investigation into the effects of gravity and air resistance on falling objects.
Reaction Times	Investigation into reaction times and how they change when a person is distracted.
Ticker Timers	Investigation that uses ticker timers to gather data on the motion of a toy car.
Truckapults	An investigation into Newton's Second Law using trucks of varying masses.
Measuring in Science	Smart Lesson on how to read different measuring tools. The tools discussed are rulers, measuring cylinders, protractors, thermometers and scales.
Reading the Meniscus	Smart Lesson on the way to read a measurement from a fluid which has a meniscus.
Variables	Smart Lesson about independent variables, dependent variables and control variables.
Control Variables and Control Groups	A Smart Lesson on the importance of control variables and control groups, and the importance of using these for results to be meaningful.
Accuracy	Smart Lesson on accuracy and selecting measuring equipment which will give a more accurate result.
Repeatability and Reliability	An introduction to repeatability and reliability and their importance when carrying out experiments.
Validity	Smart Lesson on validity when performing an experiment, and how changing variables can invalidate an experiment.
Fair Tests	Smart Lesson on fair tests and how to control variables.
Sample Size	A Smart Lesson on the importance of large sample sizes in collecting accurate results.
Scientific Method	Smart Lesson on the scientific method and how to write a scientific report.
Observations and Inferences	How to make observations and inferences using qualitative and quantitative methods.
Evaluating in Science	A lesson explaining how to evaluate experimental results.

Critically analyse the validity of information in primary and secondary sources and evaluate the approaches used to solve problems. (ACSIS206)

Extracting DNA	In this investigation, students extract DNA from plant or animal tissue samples.
Research Project - Researching Inbreeding in Dogs	Students research inbreeding in purebred dogs and write an essay explaining their findings. More information on inbreeding can be found in the Smart Lesson "Background Information - The Consequences of Inbreeding".
Climate Change	A research based investigation on the effects of the enhanced greenhouse effect on the climate.

Examining Past Climate	This Smart Lesson presents temperature and greenhouse gas composition data from ice cores for students to interpret.
Control Variables and Control Groups	A Smart Lesson on the importance of control variables and control groups, and the importance of using these for results to be meaningful.
Repeatability and Reliability	An introduction to repeatability and reliability and their importance when carrying out experiments.
Validity	Smart Lesson on validity when performing an experiment, and how changing variables can invalidate an experiment.
Fair Tests	Smart Lesson on fair tests and how to control variables.
Sample Size	A Smart Lesson on the importance of large sample sizes in collecting accurate results.
Scientific Method	Smart Lesson on the scientific method and how to write a scientific report.
Evaluating in Science	A lesson explaining how to evaluate experimental results.

Communicating

Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate scientific language, conventions and representations. (ACSIS208)

Research Project - Researching Inbreeding in Dogs	Students research inbreeding in purebred dogs and write an essay explaining their findings. More information on inbreeding can be found in the Smart Lesson "Background Information - The Consequences of Inbreeding".
Climate Change	A research based investigation on the effects of the enhanced greenhouse effect on the climate.
Convection Currents	In this investigation, students will create an observable convection current in the lab to better understand the nature of convection currents in the environment.
Polar Ice	An investigation into the effects of land ice and sea ice on sea levels.
The Greenhouse Effect	This investigation examines the factors that contribute to the greenhouse effect in different model environments.
Building an Electromagnet	Investigations into electromagnets and how electrical currents can induce magnetic fields.
Energy Efficiency of Bouncy Balls	Investigation into the energy efficiency of bouncy balls.
Energy in Skate Parks	An investigation into energy transformations and waste energy using a PhET Skate Park simulation.
Balloon Rocket	An investigation into Newton's Third Law using a balloon rocket.
Egg Drop	An egg drop investigation into Newton's First Law.

Gravity	Investigation into the effects of gravity and air resistance on falling objects.
Ticker Timers	Investigation that uses ticker timers to gather data on the motion of a toy car.
Truckapults	An investigation into Newton's Second Law using trucks of varying masses.
Scientific Method	Smart Lesson on the scientific method and how to write a scientific report.
Graphs in Science	Smart Lesson on how graphs are used in science.
Bar Graphs	Smart Lesson about bar graphs, and what type of information is best represented in bar graphs.
Line Graphs	Smart Lesson explaining how to make and read a line graph.
Scatter Graphs	Explanation of scatter graphs and lines of best fit.
A Guide for Making Graphs in Excel (Mac Version)	Smart Lesson describing how to make scatter plots, histograms and column graphs in Excel, when using a Mac computer.
A Guide for Making Graphs in Excel (Windows Version)	Smart Lesson describing how to make scatter plots, histograms and column graphs in Excel, when using a Windows computer.