Film List

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Contents

Key:

- Core Films
- Context Films
- FactPack Films
- Glossary Films
- Experiments Films

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Adaptation and Evolution

Human Body

Cells and DNA

Being Human

Biology

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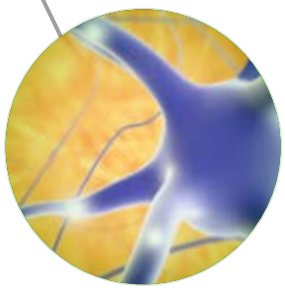
Ecosystems



Adaptation	
Adaptation	Discover how organisms thrive in particular environments due to adaptation.
Variation	See how variation allows certain organisms to thrive in different environments, and makes each individual unique.
Life in the Freezer	Find out why in even the coldest places on the planet there is life.
Life in Hot Deserts	Find out why in even the hottest, driest places on the planet there is life.
Predators and Prey	The hunters and the hunted – explore the adaptations that help them survive.
Bizarre Adaptations	A look at the weird and wonderful adaptations species have developed in order to survive.
Sexual Selection	How do individuals ensure they attract the attention of the opposite sex?
FactPack: Classification	How and why do we group life forms into classifications?
FactPack: Deadliest Animals	What is the deadliest animal on Earth?
FactPack: Super Predators	Can you guess which predator is being described?
FactPack: Super Prey	Discover the surprising ways animals can protect themselves against predators.

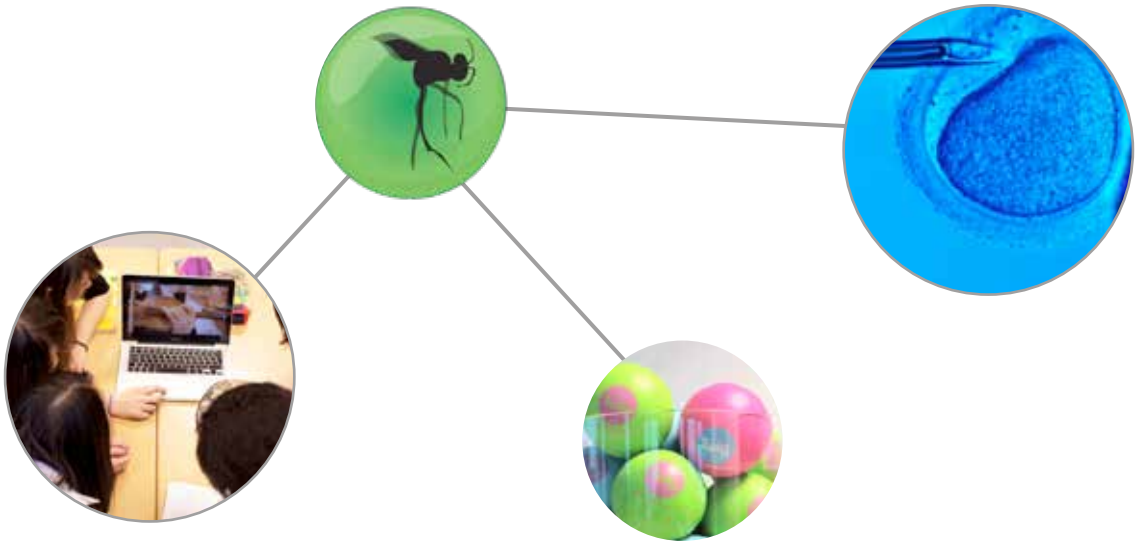
Evolutionary Theory	
Natural Selection	An introduction to the Theory of Evolution.
Mechanisms of Evolution	Explore the processes which drive evolution: mutation, natural selection and genetic drift.
Chimps: Our Closest Relatives?	How similar are humans to chimps?
Evolution: The Evidence	Do fossils provide evidence of evolution?
Origin of Species	How are new species created?
Darwin's Dilemma	The story of Charles Darwin and The Origin of the Species.
Man's First Ancestors	Which species of apeman was the first to walk on two legs, and why?
Homo Habilis and Boisei	Discover why two million years ago Africa became a crossroad in the Evolution of man.
Homo Ergaster	What was one of the most important discoveries in the evolution of man?
Homo Sapiens	Discover the great development in human evolution, which led Homo sapiens to triumph over Neanderthals.

Evolutionary Theory continued...	
Evolution of Man: The Evidence	Discover why studying the fossils of our ancestors is a crucial tool in detecting changes to the human brain.
Early Man and Agriculture	Discover why learning how to farm changed the course of human evolution forever.
FactPack: Primitive Species	Discover the species that have stopped evolving.
FactPack: Selective Breeding	Find out which vegetables have been selectively bred by man.

Extinction	
Extinction	How does a species become extinct?
Fossil Evidence	How can evidence of evolution be found in stone?
Mass Extinction: Dinosaurs	What killed the dinosaurs?
A History of Mass Extinctions	There have been five mass extinctions on Earth – will humans cause the sixth?
Endangered Species	An astounding number of animal species are under threat of extinction.
Big Al	The story of one of the most complete dinosaur skeletons ever found.
Tasmanian Devil	Find out why the Tasmanian devil is fighting for its life and facing extinction...
FactPack: Endangered Species	Where in the world are there an estimated 12,000 captive tigers?

Adaptive divergence	Or adaptive radiation, the divergence of life forms from a common ancestor, as they adapt to different environments.
Archaea	A type of prokaryotic organism lacking a cell nucleus, similar to bacteria but now considered as a domain in their own right.
Chordate	Animals that at least at some stage in their development possess a stiff, rod-like structure running along their back, called a notochord.
Classification	The grouping of organisms into categories with similar features.
Divergence	The process by which new species or variations within species evolve in populations.
Endangered	An endangered species is one that is at risk of extinction.
Eukaryote	Organisms whose cells contain complex membrane-bound structures, called organelles.
Evolution	The gradual change in living forms over successive generations, due to changes in inherited characteristics.
Extinction	The disappearance of a species so that it is lost forever.

Genus	A taxonomic category one level above species and below family in the traditional Linnaean system.
Hybridisation	The combining of genetic material from two variations within a species, or of different species, to create a hybrid individual.
Invertebrate	An animal without a backbone or spinal column.
Linnaean hierarchy	A hierarchical system for biological classification, created by Carl Linnaeus in the 18th century.
Mutation	A change in a DNA sequence.
Primeval soup	Or primordial soup, refers to the medium in which the first life on Earth may have originated.
Species	The most basic unit in the classification of types of organisms.
Taxonomy	The science of organising and categorising different things into groups based on similarity.
Vertebrate	Animals with bony spinal columns or backbones, a spinal cord, and a skull enclosing the brain and eyes.



Amphibians	
What is an Amphibian?	What makes an amphibian, an amphibian?
How Did Amphibians Evolve?	The moment of divergence between fish and amphibians, the first land animals.
Marbled Salamanders	Why does this amphibian mother abandon her eggs?
Red-Eyed Tree Frog	The young of this frog species face a life-or-death decision at birth...
Poison Arrow Frog	How do these frogs transport their young from the forest floor to treetop nurseries?
Midwife Toads	Discover the role the male midwife toad plays in raising its young...
The Waxy Monkey Frog	Meet the amphibian species with a peculiar way of staying moist.
Giant Salamander	Meet the largest amphibians in the world.
Gliding Leaf Frog	Frogs like to jump, but meet the species that jumps incredible lengths between trees.

Birds	
What is a Bird?	Discover the characteristics common to the 9000 bird species living on Earth today.
How Did Birds Evolve?	Learn how birds evolved from feathered dinosaurs.
Kakapo	Meet the heaviest parrot in the world: the flightless kakapo of New Zealand.
Great Grey Owl	Follow a great grey owl through the seasons, from winter hunts to summer parenting.
Marvellous Spatuletail	Discover a tiny hummingbird with very unusual tail feathers.
Andean Condor	Follow a scavenging Andean condor as it soars over the Andes in search of food.
Albatross	Did you know that albatrosses spend most of their lives at sea?
Malleefowl	Find out why this unassuming bird is one of nature's master architects.

Fish	
What is a Fish?	What are the unique characteristics shared by all fish?
How Did Fish Evolve?	Around 550 million years ago, life in the sea entered a new evolutionary phase...
Remora Fish	Is this the world's laziest fish?
Barracuda	Discover that fish have a sixth sense...
Humphead Parrotfish	Meet the fish that builds beaches.
Seahorse	An introduction to amazing characteristics and life cycle of the seahorse family.
Splash Tetras	Discover the unique egg-laying technique of these amazing fish.
Great White Sharks	How have great white sharks evolved to become apex predators?
Deep Sea Angler Fish	How does this fish survive in crushing pressures and total darkness?
Basking Shark	Discover how one of the world's biggest fish survives on a diet of the tiniest creatures.

Invertebrates	
What is an Invertebrate?	Invertebrates are animals without a backbone – but that's the only thing they all have in common!
What is an Arthropod?	What are the unique characteristics shared by all arthropods?
Velvet Worm	Discover the bizarre hunting habits of the mucus-slinging velvet worm.
Robber Crab	Meet the robber crab: the largest land invertebrate in the world.
Damselfly	From egg to nymph to adult: an introduction to the life cycle of the damselfly.
Golden Jellyfish	Welcome to Jellyfish Lake – a home to the unusual golden jellyfish.
Sea Stars	An introduction to sea stars, including one that's a metre wide!
Wolf Spider	From draglines to egg sacs, find out about the many ways that spiders use silk.
Dawson's Bee	For this large burrowing bee, mating season isn't just competitive – it's deadly.
Southern Reef Squid	Visit the shallow spawning grounds of the colour-changing reef squid.

Mammals	
What is a Mammal?	What are the unique characteristics shared by all mammals?
How Did Mammals Evolve?	Discover the prehistoric ancestors of modern-day mammals.
Marsupials	What are the unique characteristics of marsupials and where do they live?
Koala	Discover the sleeping, eating and social habits of koalas.
Humpback Whales	Discover the amazing hunting technique of the humpback whale.
Elephants	Discover the lives of Asian and African elephants.
Forest Elephants	Why does this elephant species eat clay?
African Elephants	Find out how one matriarchal elephant leads an entire herd...
Grizzly Bears	How much do grizzly bears need to eat to survive hibernation?
Sloth	What is it about the sloth that makes it so slow-moving?
Gelada Baboons	How gelada baboons interact among themselves and with other species.
Cheetah	Discover how the cheetah is perfectly evolved for extreme speed.
Snow Leopard	How does the snow leopard survive in extreme cold and high altitudes?
African Lions	How do lions communicate while hunting?
Echidnas	Discover an extraordinary egg-laying mammal... the echidna.
Duck-Billed Platypus	Discover an extraordinary egg-laying mammal... the duck-billed platypus.

Reptiles	
What is a Reptile?	Discover the five defining features of the class of vertebrates known as reptiles.
How Did Reptiles Evolve?	Discover the adaptations that enabled reptiles to dominate life on land for millions of years.
Tortoises	An introduction to two very different types of tortoise.
Python	How is a python able to swallow prey larger than its own head?
Komodo Dragon	Meet the komodo dragon – a powerful lizard with a formidable appetite.
Caiman	Discover the extraordinary parenting techniques of the broad-snouted and spectacled caimans.
Labord's Chameleon	Find out how a short life cycle helps the Labord's chameleon survive Madagascar's dry season.
Thorny Devil	Discover the remarkable characteristics that make this odd-looking reptile well adapted for life in the desert.

Brain	
Introduction to the Brain	It controls our bodies, our thoughts, our dreams – but what do we know about how the brain works?
Neurons as Cells	Find out how 100 billion cells communicate to form the basis of all our thoughts.
Neurons as Networks	How neurons work and how they help us learn.
The Nervous System	How the various components of the nervous system interact.
Developing Brain: Baby Brain	Babies' brains are a work-in-progress. Find out how they are shaped by the world around them.
Developing Brain: That's Me!	The development of self-awareness: when are we able to recognise ourselves?
Developing Brain: Theory of Mind	Discover the theory behind our unique ability to understand the thoughts and feelings of others.
Developing Brain: Tantrums	Why do toddlers throw temper tantrums? The answer is in the brain.
Developing Brain: Teenage Brain	See how the teenage brain rewires for adulthood.
The First Brain Surgeon	An introduction to the work and legacy of Dr Harvey Cushing, the world's first brain surgeon.
The Curious Case of Phineas Gage	Discover how a freak accident allowed scientists to study the function of the brain.
The Lobotomist	The history of the 'ice-pick lobotomy'.
What is a Memory?	How does the brain store memories?
Intuition	How does intuition save us from danger?
How We Learn	Discover the best way to learn a new skill.
Can We Control Pain?	If we expect pain, does this change what we feel?
FactPack: Reflex Arcs	What are reflex arcs and how do they work?
FactPack: The Spinal Cord	What is the spinal cord and what does it do?

Hormones	
Introduction to Hormones	Find out how hormones affect the body and mind.
Winning and Losing	Discover how biology can dictate whether we win or lose.
Fight or Flight	What happens to our bodies when we sense danger?
Melatonin and Sleep	Does an imbalance of melatonin make teenagers moody?
Cortisol and Chronic Stress	Explore how a hormone designed to help us cope with stress could damage our bodies.

Pregnancy	
Fertilisation	Find out why the egg and sperm have to race against time to begin a new life.
Pregnancy: First Trimester	What happens in the first three months of pregnancy?
Pregnancy: Second Trimester	What happens between the third and the sixth month of pregnancy?
Pregnancy: Third Trimester	What happens in the last three months of pregnancy?
Birth	After nine months of pregnancy, how does the body prepare for and endure labour?
Sperm	Discover the trials sperm face getting to the egg.
Egg	What are human eggs and how are they released?
Placenta	What is the placenta and what does it do?
Medical Marvels: IVF	What is IVF and how does it work?
Medical Marvels: Ultrasound	What is ultrasound and how was it discovered?
War in the Womb	Witness the fight for nutrition between a mother and her unborn child.
Why Are We Born So Helpless?	Baby elephants can walk at birth – why can't we?
Contraception: History of the Pill	Learn how the pill has changed through time from invention to modern-day.
Chemical Contraception	Learn how chemical contraception, such as the pill or IUS, works.
Contraception: Barrier Methods	Learn how barrier methods, such as condoms and coils, work.
Factpack: Pregnancy Timeline	Find out what happens at every stage of pregnancy?

Puberty	
Introduction to Puberty	Find out how hormones affect teenage bodies and minds.
Puberty in Girls	Which hormones are responsible for changing the female body during puberty?
Puberty in Boys	Which hormones are responsible for changing the male body during puberty?
Growing Pains	How bones grow and change through puberty, and the impact this has on teenagers.
FactPack: Why Do Teens Get Spots?	Discover the biology behind spots and boils.

Senses	
How We See Part 1: Eyes	A look at the structure of the human eye.
How We See Part 2: Brain	A look at how the brain functions to create focused vision.
The Senses	An introduction to the five senses and how we use them.
How We Smell	An introduction to the structure of the nose and how we use it to smell.
How We Taste	An introduction to the structure of the tongue and how we use it to taste.
How We Touch	An introduction to how skin helps us feel pressure, pain, heat and cold.
How We Hear	An introduction to the structure of the ear and how we use it to hear.
How We Balance: Part 1	An introduction to how our ears help us balance.
How We Balance: Part 2	Find out how the brain, eyes, skin and muscles help us balance.
Looking into the Future	Sometimes we can see things before they have happened – is this down to instinct?
Animal Senses	Animals share many of our senses, but use them in very different ways – why?
Synaesthesia	Why do some people see smells and hear colours?
Test Your Vision	Can you pass the vision test?
Why Do I Get Travel Sick?	Learn how the brain and the senses detect motion.
What Are Goosebumps?	An introduction to the body's in-built thermostat system.

Addiction	A physical or psychological dependence, leading to symptoms of withdrawal when the substance is removed.
Adrenaline	Also called epinephrine, a hormone produced by the adrenal glands, which are found just above the kidneys.
Amniotic fluid	A clear, yellowish fluid that surrounds the developing foetus in the amniotic sac within the mother's womb.
Axon	The long projecting part of a nerve cell that transmits impulses away from the body of the nerve cell, to the synapse at its tip.
Blastocyst	An early stage in the development of a mammalian embryo, consisting of a hollow ball of cells that will later form the embryo and the placenta.
Conception	Another word for fertilisation - when two sex cells combine to create a new organism.
Cortisol	An important hormone in the human body, produced by the adrenal glands.
Embryo	An animal foetus in the earliest stages of development - in humans, in the first eight weeks after fertilisation.
Fertilisation	The fusion of two sex cells to create a new organism.
Foetus	The stage of development an organism goes through inside the womb, following the initial development of the embryo.
Gamete	A reproductive cell, such as a sperm or egg cell.
Gland	An organ that produces a specific substance the body needs, such as a hormone.
Hormones	Chemical substances produced in our bodies that act as messengers, communicating between our different cells and organs.
Hypothalamus	A small but important region of the brain that monitors and regulates many body systems that we do not control consciously.
Ovum	Or egg, is the unfertilised female reproductive cell.
Pregnancy	The carrying of one or more developing foetuses in the womb of a female, from conception to birth.
Receptor	In living organisms, receptors are proteins, often found on the surface of a cell, which can bind to a specific signalling molecule or external stimulus, triggering a response.
Reflex arc	A neural pathway involved in a reflex response.
Sensory	Relating to the senses or to sensation.
Sperm	Male reproductive cells, also referred to as the male gametes.
Uterus	Also known as the womb, the uterus is a pear-shaped, hollow, muscular organ in mammals.
Zygote	The cell produced by the fusion of an egg and a sperm at fertilisation. The zygote contains DNA from both the male and female parents, providing all the genetic information required for a new individual.

DNA	
What is DNA?	Find out how DNA makes us unique.
How Does DNA Make Protein?	The function of DNA – to carry genetic code that makes proteins.
DNA and Crime	Find out how DNA profiling helps solves crimes.
Discovery of DNA	Learn how the race to discover the structure of DNA was won.
Forensics: DNA Profiling	The revolutionary technique that can prove innocence, or catch a killer.
FactPack: DNA	Find out why DNA is the blueprint for life.

Genetics	
Inheritance: Part 1	The genes we inherit make us who we are – how does this happen?
Inheritance: Part 2	Discover the difference between dominant and recessive genes.
Dogs and Wolves: Nature or Nurture?	Can wolf cubs be raised to behave like domestic dogs?
Breeding and Behaviour	Can Russian silver foxes be domesticated?
Mendel and Inheritance	Learn how an Austrian monk laid the foundations for modern genetic science.
Huntington's: The Disease	Discover the cause and symptoms of the degenerative neurological illness Huntington's disease.
Huntington's: The Dilemma	Would you want to know if you were at risk of developing Huntington's disease?
Cystic Fibrosis	How does a single genetic mutation cause the immune disease cystic fibrosis?
FactPack: Hybrid Animals	Ever heard of a zorse? Discover the breeds created by man, not nature.
FactPack: Fruit Flies	Discover why the fruit fly is used in scientific experiments.

Immune Defence

Immune Defence: Part 1	What is your immune system and how does it work?
Immune Defence: Part 2	What are antibodies?
HIV/AIDS: Immune Evaders	What makes HIV/AIDS such a deadly virus?
Smallpox: The First Vaccine	Introducing the science behind the eradication of one of the world's most lethal diseases.
Pandemic Viruses	How do viruses invade our bodies and spread through communities?
Pandemic Viruses: SARS	This contagious disease caused worldwide panic – but what is SARS?
Bee Stings	What happens in the human body after a bee sting?
Tumours: The Kill or Cure Virus	Can we use a virus as a cure? An extraordinary story of pioneering medical research.
FactPack: Bacteria	How can a single cell kill or cure?
FactPack: Viruses	Are viruses alive?

The Cell

What is a Cell?	An introduction to the building blocks of life – cells.
Cell Division: Mitosis	Where do new cells come from?
Cell Division: Meiosis	How are sex cells formed?
What is Cancer?	Find out why cancer causes more deaths worldwide than any other disease.
The Cell Membrane	How do cells protect themselves from the external environment and take the nutrients they need?
The History of the Microscope	How were microscopes invented?
The Very First Cell	How did life on Earth begin billions of years ago?
Different Types of Cell	How many types of cell are there, and what do they do?
FactPack: Enzymes	What are enzymes?

Using Genetics	
Genetic Modification	Should scientists manipulate the genetic information of cells?
Cloning	Discover the process of making identical genetic copies.
Stem Cells	What are stem cells and what makes them unique?
Therapeutic Stem Cells	An introduction to the science and controversy surrounding stem cell therapy.
The First Human Clone	When will we see the first human clone, and should we make one at all?
The Genius Sperm Bank: Part 1	Meet the American millionaire behind the Genius Sperm Bank.
The Genius Sperm Bank: Part 2	Meet the babies created by Robert Graham's Genius Sperm Bank.
Saviour Siblings	Should we create a new life in order to save an existing one?
Dolly the Sheep	Controversial birth of the world's first cloned animal.
FactPack: Twins	Learn why not all twins are identical.

Active transport	The use of energy to move particles across a cell membrane from a lower concentration to a higher concentration.
Allele	Alternative forms of a gene, which affect the expression of a particular trait, such as eye colour or blood type.
Amino acid	The building blocks of proteins and polypeptides.
Amplification of DNA	Producing many identical copies of a DNA sequence, by laboratory processes, such as the polymerase chain reaction.
Anaerobic respiration	Cellular respiration in the absence of oxygen. Like aerobic respiration, it converts glucose into usable energy, in the form of ATP.
Antibiotic	Drugs used to treat bacterial infections by killing or inhibiting the growth of bacteria. They do not work against viruses or fungi, and so cannot treat many other infections.
Antibiotic resistance	The ability of bacteria to survive exposure to an antibiotic, often by producing a protein that disables or prevents transport of the antibiotic into the cell.
Antibody	A protein produced by the immune system that attacks a harmful agent, such as a virus or bacteria.
Antigen	A molecule or fragment of a molecule that triggers an immune response, causing the body to produce specific antibodies against it.
Apoptosis	Programmed cell death, which is the body's normal method of disposing of damaged, unwanted, or unneeded cells.
Asexual reproduction	Reproduction involving just one parent, without the mixing of genetic material with another individual.
Autoimmune disease	A condition in which the body's immune system attacks it's own healthy cells, tissues or organs.
Autosomal	Any chromosome that is not a sex chromosome.
Base (biology)	In the DNA double helix, the links between the two strands are formed by pairs of much smaller molecules called bases.

Biochemistry	The study of chemical reactions in living organisms, the chemistry of life.
Cell	The basic structural and functional unit of life.
Cell cycle	The cycle of events involved in normal cell growth and division, in multicellular organisms.
Cell division	The process by which a single parent cell divides into two or more daughter cells.
Cell wall	A flexible or rigid boundary protecting a cell, outside the cell membrane.
Chromatin	The basic substance of chromosomes, in which DNA is wrapped around structural proteins called histones.
Chromosome	A threadlike strand of DNA and associated proteins in the nucleus of eukaryotic cells, and the functional units of inheritance.
Cilia	Tiny, hair-like projections from the surface of a cell that wave in unison to cause movement.
Clone	A genetically identical copy of a piece of DNA, or an entire organism.
Compound microscope	An optical microscope which uses two sets of lenses, called the objective and the eyepiece, to gather and magnify light.
Cytoplasm	The thick liquidy medium that fills all cells, and is contained by the cell membrane. The cytoplasm is where most of the cell's chemical reactions, such as glycolysis, take place.
Diabetes	A long-term medical condition that affects the body's blood sugar levels, due to a defect in the production of the hormone insulin.
Diffusion	The spread of particles from an area of high concentration to an area of low concentration.
Diploid	Diploid cells have two sets of chromosomes, one from the male parent and one from the female parent.
DNA	Deoxyribonucleic Acid, the molecule that stores and passes on genetic information that determines how an organism develops and functions.
DNA profile	A distinctive pattern or set of numbers that represents a much larger DNA sequence, usually of an individual person though the technique can be applied to any type of DNA sample.
DNA replication	An essential stage in cell division and reproduction, allowing genetic material to be copied into a new cell.
Dominant allele	The version of a particular gene that takes precedence over other variants, being expressed even if only one copy is present.
Endocytosis	The process by which a cell can take in material from its environment by first engulfing it with its cell membrane.
Epidemiology	The study of health and disease at the level of populations.
Gene	The unit of inheritance in organisms, generally consisting of a piece of DNA that encodes the production of a specific protein.
Genetic engineering	A group of techniques used to manipulate an organism's DNA.
Genotype	The genetic makeup of an individual.
Haemoglobin	A protein found in red blood cells that binds and transports oxygen in the blood.

Haploid	A cell that has half the number of chromosomes as normal body cells, containing a single set of unpaired chromosomes.
Homeostasis	The maintenance of a stable internal environment.
Infectious	An infectious disease is one caused by a biological agent such as a virus, bacterium, or fungi, that can be passed from one organism to another.
Inherited	A characteristic that is passed down to an organism from its parents, being encoded in DNA.
Lymphocyte	A type of white blood cell vital to the immune system.
Meiosis	A type of cell division important to produce sex cells such as eggs and sperm.
Mitosis	The process by which cells can divide to produce two genetically identical cells.
Multicellular	Made up of more than one cell.
Nephrons	Microscopic structures in the kidney that filter blood and produce urine.
Nucleic acid	A class of large polymer molecules consisting of repeating units called nucleotides.
Nucleus (biology)	In biology, the nucleus is the membrane-bound structure inside eukaryotic cells that contains most of the genetic material.
Osteocyte	A type of bone cell.
Phagocyte	A white blood cell that helps protect the body by engulfing and absorbing harmful bacteria, dead or dying cells, waste material, or other foreign bodies in the bloodstream and tissues.
Phenotype	The observable physical and behavioural characteristics of an organism.
Phospholipid	A lipid that contains a phosphate group. Lipid molecules are normally hydrophobic, which means they repel water.
Protein	Large molecules that are polymers of amino acids, linked in long chains by peptide bonds, and usually folded into a rough ball.
Recessive allele	A recessive allele is the version of a gene that will only be expressed if two copies are present, one from each set of chromosomes.
Recombination	The process of moving a section of DNA from one DNA molecule to another.
Ribosomes	The structures inside cells that synthesize proteins.
RNA	Or ribonucleic acid, is a nucleic acid, similar to DNA.
Stem cells	Unspecialised cells that can divide repeatedly and develop into different types of specialised cell.
Symptom	A characteristic indication of a disease or illness felt by someone afflicted by it.
Vaccine	A preparation that can protect against a specific disease.
Vacuole	A fluid-filled compartment inside a cell, surrounded by a membrane.

Vesicle	Usually referring to a pocket of liquid within the cytoplasm of a cell, which is used to enclose and transport chemicals.
Virus	A very small infectious agent that can reproduce only inside other cells.

Kiwi Fruit DNA	We extract the DNA from a kiwi fruit by mashing it with detergent liquid, salt and water. The mixture is then filtered and incubated before a layer of chilled ethanol is added. The jelly-like DNA can then be extracted.
Osmosis and Volume	We look at the effects of osmosis on the volume of potato and the appearance of red onion cells. Two cylinders of potato are measured and weighed before one is placed in salt water and the other in fresh water. We can see how osmosis affects the different samples. We also use a microscope to look at how onion cells change when they are exposed to salt water or fresh water.
Agar Cube Diffusion	We use coloured agar cubes to see how different shapes change the rate of diffusion. The cubes are made using sodium hydroxide and phenolphthalein indicator to give them a pink colour. When these are added to hydrochloric acid, the colour fades as the acid diffuses through the cube. We see how the shape affects the speed of this process.
Enzyme Action: Trypsin	We demonstrate denaturing by adding the enzyme trypsin to photographic film. Strips of photographic film are added to trypsin solution at different temperatures to determine the optimum conditions for the enzyme. In the right conditions the enzyme strips the coating from the film.
Plant vs Animal Cells	We compare plant cells and animal cells under a microscope to see how they differ. Cheek cells are dyed with methylene blue to make the observations possible.
Aerobic Respiration	We use maggots to let us observe aerobic respiration. The maggots are placed over sodium hydroxide in a specimen tube. A bung and delivery tube are attached to the specimen tube that feed into a boiling tube of coloured water. In the sealed system the water is sucked up the tube as the maggots use oxygen from the air to respire while the carbon dioxide they produce is absorbed by the sodium hydroxide.
Anaerobic Respiration	We use yeast to let us observe anaerobic respiration. The yeast is added to warm water and glucose. A layer of oil is placed over the solution so that no oxygen is available. The solution starts to bubble and the gas produced passes along a delivery tube into a test tube containing lime water. The lime water turns cloudy. This shows that the bubbles of gas are carbon dioxide and that respiration has occurred in the absence of oxygen.
Microbes in Milk	We examine the number of microorganisms in different types of milk using resazurin indicator. Samples of pasteurised milk, UHT milk and powdered milk are left in the open for three days before resazurin indicator is added and the samples are heated in a water bath. The colour change in each type of milk is examined to determine the different amounts of bacteria present.

Changing Ecosystems	
What is an Ecosystem?	Learn about the interdependence of living and non-living things.
What is Biodiversity?	Find out why biodiversity is vital to life on Earth.
Algae	Did you know algae are one of the most important plant species on Earth?
Lichen: Indicator Species	Discover why lichens can indicate the good or poor health of ecosystems.
Migration: Reproduction	Take the epic journey from the Pacific to Alaska with the Great Salmon Run.
Migration: Predation	Take the epic journey from the Antartic to Africa with the Great Sardine Run.
Migration: Seasons	Follow the Great Wildebeest Migration across the Serengeti.
Biotic Factors in Ecosystems	What happens if you introduce a new species into an ecosystem?
Abiotic Factors in Ecosystems	What happens if you alter the non-living factors of an ecosystem?
Conservation	Why is conservation important?
Invading Plant Species	Discover the potential devastation caused by invading plants.
Invading Animals: The Cane Toad	Witness the impact the South American cane toad has on Australian life.
Endangered Species	Find out why an astounding number of animal species are under threat of extinction.
FactPack: Bird Migrations	Just how far do some birds fly?
FactPack: Amazing Migrations	Why do animals and insects migrate?

Ecosystems	
What is an Ecosystem?	Learn about the interdependence of living and non-living things.
What is Biodiversity?	Find out why biodiversity is vital to life on Earth.
The Taiga Forest	What lives in the largest land ecosystem on Earth?
Redwoods	Discover some of the oldest and largest organisms on Earth.
Deciduous Forests	Discover the dramatic seasonal changes that occur in this habitat.
Tropical Rainforests	From forest floor to canopy, discover one of the world's most diverse ecosystems.

Ecosystems continued...	
Tundra	Find out what animals and plants do to survive in Earth's coldest biome.
Savannah	Life in the extreme climates of the savannah.
Oceans: Sunlight Zone	Discover the abundance of life near the surface of the ocean.
Oceans: Coral Seas	Discover the largest living structures on our planet.
Oceans: The Deep Blue	What strange creatures live in the dark depths of the ocean?
Oceans: The Abyss	How does life exist in the most inhospitable habitat on Earth?
Oceans: The Intertidal Zone	Meet the plants and animals which live in the ever-changing intertidal zone.
Oceans: Frozen Seas	Meet the creatures living above and below the ice in our planet's polar seas.

Food Chains	
What is a Food Chain?	Journey through a food chain, from primary producers to consumers.
The Nitrogen Cycle	Learn how nitrogen is recycled between the atmosphere, the ground and living things.
Fungi	Neither plant nor animal discover why fungi are a separate classification of living organism.
Oceanic Food Chain	Explore the cycle of marine life, from the smallest animal to the biggest.
Bioaccumulation in Food Chains	Investigate the effects of industry on the food chain of the peregrine falcon.
Symbiosis: Mutualism	Find out how different species of animal depend on each other.
Symbiosis: Parasitism	Discover how lice and tapeworms use the human body.
FactPack: Mercury in Food Chains	How does mercury fit in the food chain?

Agar	An extract of certain species of red seaweed that's used as a gelling agent in microbiology and food preparation.
Bacteria	Single-celled microorganisms, which do not have a nucleus, and reproduce by simple cell division.
Biodiversity	The variation of life forms within an ecosystem or across the planet.
Biomass	The total mass of living organisms in an area or ecosystem.
Biosphere	All the parts of the earth and its atmosphere in which living organisms can exist.
Carnivore	An animal that gets most or all of its energy from eating other animals.
Decomposition	The process by which dead organic matter is broken down into simpler chemicals and dispersed.
Denitrification	The process by which nitrate compounds in the soil are converted to free nitrogen in the atmosphere.
Ecosystem	A living community of organisms along with their physical environment, functioning as a unit.
Eutrophication	An overabundance of nutrients in a body of water, causing excessive plant growth.
Food chain	A food chain simply states which organisms consume each other, and shows how energy moves through living things in an ecosystem.
Herbivore	An animal that gets its energy from eating plant materials.
Indicator species	An organism whose presence or absence indicates a particular environmental condition.
Interdependence of living things	Mutual dependence between organisms or systems.
Leaching	In agriculture, the loss of important nutrients from the soil, carried away when too much water flows through it.
Microorganism	Or microbe, is an organism too small to be seen by the human eye.
Migration	The movement of organisms from one place to another at certain times of the year, or at certain points in their life cycle.
Niche	The position or role of a species within a particular ecosystem.
Omnivore	An animal that eats both meat and plant materials.
Predator	A predator species is one that kills and eats other organisms for food.
Prey	An animal that is hunted and killed for food by a predator.
Pyramid of numbers	A diagram used to represent the number of individual organisms occupying each feeding level of a food chain.
Symbiosis	When individuals of different species live together in a close and long-term relationship.
Urea	An organic compound containing nitrogen that plays an important role in animal metabolism, and is excreted in the urine of mammals.

Fitness	
Insulin and Diabetes	What is diabetes and how does it affect the body's insulin supply?
What is Fitness?	Discover the three methods used to measure our levels of fitness.
Obesity	What is obesity and how can you tackle it?
Why is Fat So Hard to Shift?	Why is it easier to put on weight than to lose it?

Health and Disease	
Healthy Teeth	What causes tooth decay and how can you avoid it?
Germs and Hygiene	Germs are all around us – what are the risks and how can we protect ourselves?
Antibiotics	How do antibiotics protect us from harmful bacteria?
Sexually Transmitted Infections	Discover the dangers and symptoms of sexually transmitted infections.
Eradication of Polio	The story of how two men developed a vaccine that would save thousands of children's lives worldwide.

Nutrition	
Balanced Diet	Which foods should form part of a healthy diet?
Healthy Beauty	How does your diet affect your appearance?
Malnutrition	Discover the biggest risk to health worldwide.
Life Cycle Nutrition	What key nutrients are required by our bodies at each stage in life?
Vitamin Deficiencies	The investigation which revealed the shocking impacts of a vitamin deficient diet.

Substance Misuse	
Harmful Drugs	Find out why recreational drugs can be very harmful.
Alcohol and the Brain	In what ways can alcohol damage the brain, and who is likely to be affected?
Drugs and the Brain	How do psychoactive drugs affect brain function?
Harmful Drugs: Cannabis	What are the hidden dangers of cannabis?
Harmful Drugs: Cocaine	How does cocaine affect the mind and body, and why is it so dangerous?
Harmful Drugs: Heroin	Why is heroin considered the most harmful drug of all?

Substance Misuse continued...	
Harmful Drugs: LSD	What is LSD, and what does it do to our senses?
Harmful Drugs: Ecstasy	How does Ecstasy affect our bodies, and what are the implications?
Alcohol: The Poison	Alcohol is toxic to humans. How does this poison affect our bodies?
What's in a Cigarette?	Discover the effects of the 4000 chemicals contained in cigarettes.
Science of Addiction	Why do some people become addicted to drugs?

"Twig's aimed at the teenage mind – short, sharp, high impact – it keeps them interested"

- Teacher

Digestion

Introduction to Digestion	Follow the journey of food through your digestive system.
Stomach	The digestive journey – how does your stomach break down your food?
Small Intestine	The digestive journey – what happens to food in the small intestine?
Large Intestine	The digestive journey: what happens to food in the large intestine?
Beef Tapeworms: Part 1	Beef tapeworms can grow up to 12 metres inside our bodies – what do they do to us?
Beef Tapeworms: Part 2	Meet the biologist who volunteered to grow a tapeworm in his intestines.
Burps and Farts	Find out how air, gas and bacteria make us burp and fart.
Kidneys	Discover the lifesaving work of our kidneys.
FactPack: Digestion	Learn about the weird and wonderful world of the digestive organs.
FactPack: Teeth	Learn some fun facts about a human's 32 teeth.
FactPack: The Liver	Find out about the liver and its ability to regenerate.

Heart and Blood

Blood	What blood actually does and why we can't live without it.
Heart	What does the heart look like, and how does it work?
Blood Transfusion: Vietnam	What did the Vietnam War teach doctors about blood clotting?
Blood Transfusion: Falklands	What did the Falklands War teach doctors about blood clotting?
Healthy Heart	Find out why fatty foods harm your heart.
Why is Blood Red?	Some animals have pink or blue blood. Why is ours red?
FactPack: Heart	How do human and animal hearts compare?

Lungs

Lungs	A journey through the lungs, the vital organs which allow you to breathe.
Big Breathers	Find out what happens when marine mammals hold their breath.
Little Breathers	Can we train ourselves to hold our breath for longer?
Terrible TB: Part 1	Is the terrible lung disease tuberculosis making a comeback?
Terrible TB: Part 2	Introducing the ethical debate surrounding the treatment of tuberculosis patients in the US.
The Dark Side of Oxygen	How oxygen is vital for life, but corrodes the human body.
Smoking: The Damage	Witness the effect smoking has on the lungs.
Factpack: Lungs	Discover the amazing inner workings of the lungs.

Muscles and Bones

Bones	Find out how bones develop with age.
Cardiac and Smooth Muscles	Find out how these involuntary muscles work and why you can't control them.
Skeletal Muscles	Find out how skeletal muscles help you control your body.
An Ancient Olympian	Discover how the remains of an ancient olympian athlete reveal his training techniques.
Clever Thumbs	Could opposable thumbs be the key to our intelligence?
Joints	An introduction to the movements different types of joint can make.
What Happens When I Crack My Knuckles?	What happens between your joints to cause the cracking noise?

Absorption	In digestion, absorption is the movement of nutrients and other food chemicals from the gut into the bloodstream, which takes place in the small intestine.
Aerobic respiration	Respiration that uses oxygen. This is the main chemical reaction that occurs in all our cells to release energy that our bodies can use.
Alveoli	Microscopic air sacs in the lungs where gas exchange takes place between blood and the atmosphere.
Amylase	An important digestive enzyme which breaks down starch into sugar.
Antagonistic muscles	Opposing pairs of muscles that move the same bone in opposite directions.
Antioxidant	A substance that can protect against damage caused by free radicals.
Aorta	The biggest artery in the body.
Appendix	A small, tube-like organ in the human body, attached to the start of the large intestine, and which appears to serve no useful function.
ATP	Adenosine Triphosphate, a molecule that acts as an energy store in all living cells.
Bile	A bitter, dark green to yellow liquid produced by the liver, and stored in the gall bladder.
Blood pressure	The pressure that blood exerts against the walls of blood vessels.
Bronchi	The two large tubes that branch from the single windpipe, or trachea, to carry air to and from the lungs.
Bronchiole	The last and smallest stage of branching airway tubes in the lungs. The bronchioles are microscopic and end in air sacs called alveoli.
Catabolism	One of the major processes in metabolism, involving the breakdown of large molecules to smaller ones with the release of energy.
Core (biology)	The body's core temperature means the temperature of the internal organs.
Cholesterol	A type of lipid found in the tissues of humans and other animals.
Deoxygenated	A substance that has had oxygen removed from it in some way.
Digestion	The mechanical and chemical breakdown of food in the body into simpler chemicals that can be absorbed and used in its metabolism.
Enzyme	A biological catalyst. Enzymes are specialised proteins that speed up biochemical reactions.
Hyperventilating	Breathing faster or deeper than necessary. It can happen voluntarily, or as a result of panic or excitement, or due to a medical condition.
Involuntary	As opposed to voluntary, an involuntary action is one that happens without any conscious control - for example a reflex response, or anything that someone does in their sleep.
Metabolism	The chemical reactions that occur in all living cells to extract, convert, and use the energy from food, to fuel all other cell processes.
Mineral (biology)	An inorganic chemical element necessary for human growth and health, such as iron, sodium, potassium, or magnesium.
Myoglobin	A protein found in muscle tissue that performs a similar role to haemoglobin in the blood, as a carrier of oxygen that releases it to cells when required
Nutritional value	A measure of the nutritional content of food, including the vitamins, minerals and other essential nutrients needed for a healthy diet.

Organ	In medicine and biology, a distinct part of the body that performs a specialised function, such as the lungs, heart, liver or kidneys.
Peptide	A molecule made up of a relatively short chain of amino acid building blocks.
Peristalsis	Wave-like muscle contractions, such as those used to move food through the digestive system.
Plasma (biology)	In biology, plasma refers to the liquid component of blood, in which blood cells are suspended.
Respiration	The chemical reaction that takes place in all living cells to release energy from glucose.
Substrate	In materials science, the substrate is the surface on which a coating is deposited.
Tissue	A collection of cells in an organism that have similar appearance, structure and function.
Villi	Tiny outgrowths from the surface of some tissues and organs which serve to increase the surface area.
Vitamin	An organic compound required by organisms in very small quantities for growth and to maintain good health.

Asellus Blood Flow	We use a microscope to examine the blood flow in the open circulatory system of asellus aquaticus. We are able to see the haemolymph moving through its limbs in different directions.
Stimulating Daphnia	We examine the effects of different temperatures and chemicals on the heart rate of Daphnia. A microscope is used to let us see the Daphniaâ€™s heart and establish the heart rate under normal conditions. The heart rate is recorded again when cold water and then warm water is added. This is repeated with tea and with ethanol, to see how stimulants and depressants can affect heart rate.
Dissection: Leg	We dissect and examine a frog's leg and muscles. The skin is removed and the leg is bent back and forth to see how pairs of antagonistic muscles work.
Stomach Acid and Antacid	We use the enzyme pepsin and hydrochloric acid to simulate the conditions within the stomach in two boiling tubes. Cooked egg whites are ground and added to two boiling tubes of hydrochloric acid, but one is mixed with a crushed antacid tablet first. We see how the antacid neutralises the hydrochloric acid and prevents the egg from breaking down. Then pH paper is used to see how the acidity of the mixtures changes.
Effects of Smoking	We test the effects of smoking by drawing first air and then cigarette smoke through apparatus that contains mineral wool and universal indicator. The air has no effect, but the smoke discolours the wool and changes the colour of the indicator. This shows that there are acidic chemicals in the smoke.
Dissection: Heart	We dissect and examine a cowâ€™s heart to show the position and function of different parts. This includes the coronary artery, ventricles, atria, pericardium and the thickness of the muscle tissue.
Dissection: Lungs	We dissect and examine a cowâ€™s lungs. Before the dissection, the lungs are inflated to show the changes in volume that occur when mammals breathe. During the dissection the position and function of different parts are examined, including the trachea, bronchi, bronchioles and pleural membrane.
Dissection: Eye	We dissect and examine the different parts of a sheep's eye. These include the iris, retina, aqueous humour, vitreous humour, optic nerve and the lens. The lens is also used to distort the pattern on a piece of card to demonstrate how it bends light.

Energy and Growth	
Photosynthesis	How do plants convert sunlight into usable energy and form the basis of all food chains on Earth?
Plant Transport	From roots to leaves, discover the water and mineral transport systems in plants.
Parasitic Plants	Discover the plants that steal from other plants in the fight for survival.
Carnivorous Plants	The extraordinary meat-eating plants which consume animal prey.
Plants and Medicine	Discover how plants can be used to ease pain and treat disease.
Plants and Medicine: Aspirin	Discover the long history of the 'wonder drug' aspirin.
Tropisms and Hormones	Plants grow towards light or water – how?
What Plants Need to Grow	We know plants need water and sunlight, but what other nutrients are vital for survival?
FactPack: Non-Edible Crops	Find out which common plant crops are not destined for your plate.

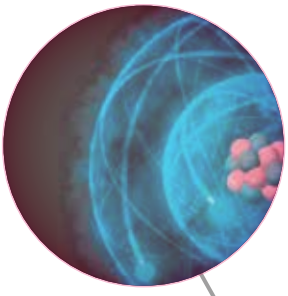
Plant Life Cycles	
Sexual Reproduction in Plants	How does pollen travel between flowers?
Asexual Reproduction in Plants	Discover the plants that can reproduce by themselves.
Plant and Animal Mutualism	Witness the unlikely relationships between plants and animals, and how it helps them survive.
Plant Mimics	The ingenious plant species that mimic other life forms in order to survive.
Oak Life Cycle	Witness 1000 years in the life of an oak tree.

Plant Structure	
Parts of the Plant: Leaves	Discover the role leaves play in the life cycle of plants.
Parts of the Plant: Flowers	What role do flowers play in plant reproduction?
Defensive Plants	Plants cannot run away from predators – so how do they protect themselves?
Plants in Extreme Environments	Discover how some plants have adapted to live in the world's most extreme environments.
Root Hairs	Find out how remarkable adaptations allow the spinifex plant to thrive in the desert.
FactPack: Amazing Plants	What are the smallest, biggest and oldest plants in the world?
FactPack: Power of Plants	Discover the unlikely sources that provide medical cures.

Algae	Very simple organisms that can photosynthesise like plants, but do not have complex features such as roots, stems, or leaves.
Angiosperm	Flowering plants, or more precisely plants whose seeds are enclosed in a fleshy fruit, rather than being naked at pollination.
Anther	The part of the stamen that produces pollen.
Artificial propagation	Producing new plants by human intervention and artificial methods.
Autotroph	An organism that can make its own food, being able to produce complex organic compounds, such as proteins and carbohydrates.
Auxin	A type of plant hormone that affects growth and development, often encouraging root or stem growth.
Carpel	The female part of a flowering plant, consisting of the ovaries, ovules, a stalk-like tube called the style, and its sticky surface called the stigma.
Chlorophyll	A green pigment found in all plants and algae, that enables energy from sunlight to be converted to chemical energy through the process of photosynthesis.
Chloroplast	The organelles within plant cells where photosynthesis takes place, harnessing energy from sunlight to make sugars.
Germination	The early stages of growth of a plant or fungus from a dormant seed or spore.
Ovule	The gamete of a flowering plant, similar to an egg cell in animals.
Phloem	The tube-like tissue in plants that carries nutrients, including sugar and proteins, from cells in which they are made to where they are needed elsewhere in the plant.
Photosynthesis	The process that plants use to convert energy from the Sun into chemical energy.
Pollen	Tiny particles produced by male plants that contain the male reproductive cells enclosed in a protective shell.
Pollination	The transfer of pollen from an anther to a stigma, enabling sexual reproduction in flowering plants.
Stamen	The male reproductive organ of a flower.
Transpiration	The loss of water vapour from plants to the atmosphere.
Tropism	When a plant grows in a particular direction in response to an external stimulus.
Xylem	The system of tubes inside plants that transport water and dissolved minerals from the roots up to the leaves.
Xerophyte	A plant that has adapted to survive in very dry environments.

Leaf Chromatography	We separate the different pigments in a beech leaf using chromatography. The leaf is broken up and ground with sand and propanone before being transferred to some chromatography paper. This is then lowered into pigment solvent and we can see the different pigments spread up the paper.
Water Uptake in Plants	We place two privet hedge shoots under different conditions to see how the amount of water they draw up will change. They are both placed in measuring cylinders with the same amount of water and a layer of oil is added to the top to prevent water loss through evaporation. A third cylinder is filled with water only as a control. The first shoot is left out in the open, while the second is placed in front of a warm lamp. The changes in water levels are then compared.

Capillary Action	Water is added to dry and bent matchsticks to let us see capillary action at work. The wood absorbs the water causing the matchsticks to straighten.
Photosynthesis and Starch	We put three different plants under different conditions to demonstrate that both light and carbon dioxide are needed for photosynthesis to occur. A leaf from each plant is taken and heated in ethanol to remove the pigment. These are then cleaned before iodine solution is added to them to see if starch has been produced and photosynthesis has occurred.



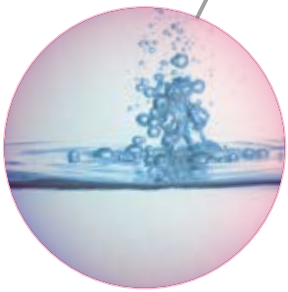
Atoms and Bonding

Chemistry

Reactions

Chemical Industries

Periodic Table



Atoms

What is an Atom?	Everything is made of atoms – but what are atoms made of?
Atom Structure: Electron Shells	How does the atomic structure of elements affect their reactivity?
Flame Colours and Fireworks	How are different colours of fireworks created?
Flame Colours and Spectroscopy	How can looking through a prism help us identify elements?
Northern Lights	What causes the Northern Lights?
Heavy Water	Why did World War Two allies sabotage the Nazi's use of heavy water?
Discovery of the Atom	Who discovered the structure of the atom?
FactPack: Scale of the Atom	How small is an atom?
FactPack: Structure of the Atom	How has our understanding of atomic structure changed over time?

Chemical Bonds

Introduction to Chemical Bonding	An introduction to how elements combine.
Ionic Bonding	Discover how metals and non-metal elements form compounds.
Covalent Bonding	Discover how non-metal elements form compounds.
Metallic Bonding	Discover how metal elements form compounds.
Carbon: Introduction	What are the different forms of carbon and how are they created?
Carbon: Synthetic Diamonds	Is it possible to create diamonds in a laboratory?
Carbon: Buckminsterfullerene	Introducing a little known natural form of carbon.
Nanotechnology: What is It?	An explanation of a revolutionary technology.
Nanotechnology: Is It Safe?	Is there a dark side to nanotechnology?
Carbon Monoxide Poisoning	What makes carbon monoxide the 'silent killer'?
FactPack: Elements, Compounds and Mixtures	What makes something a compound, an element or a mixture?

States of Matter	
Changing States of Matter	How does matter change into different states?
Solids, Liquids and Gases	Discover the three states in which all matter on Earth exists.
Solutions	Discover how the physical process of dissolving happens and why.
Salt: Salt and Ice	Discover why salt is used to treat icy roads.
Intermolecular Forces	Discover the hidden forces fundamental to the state of matter.
Salt: Separating Mixtures	How is salt collected from the oceans and Earth?
Non-Newtonian Liquids	Discover the extraordinary liquids which defy explanation.
How Do Snowflakes Form?	How do water molecules form these beautiful, delicate structures?
How to Make Fake Snow	An introduction to the technology that makes snow indoors.
Water Forces	Discover the special forces that allow some animals to walk on water.
Forensics: Tools of CSI	How forensic scientists can link a criminal to a crime scene using only broken glass, fibres and a footprint.
Forensics: Bog Bodies	Discover how preserved bodies can help forensic scientists understand our ancient past.
Forensics: Chromatography	How can colours help us solve crimes?
FactPack: Forensics	How do detectives discover the identity of victims?
Atom	The building blocks of all matter, being the smallest unit that retains the chemical properties of an element.
Atomic mass	The mass of a specific atom, given for the specific isotope of an element.
Avogadro's constant	The number of particles in 1 mole of a substance, which is 6.022 times 10 to the power of 23.
Brownian motion	The random movement of small, visible particles suspended in a liquid or gas, when viewed under a microscope.
Chain reaction	A series of reactions, each the result of a preceding reaction.
Chemical bond	Bonds between atoms that allow the formation of chemical compounds.
Compound	A substance composed of more than one chemical element, whose atoms are held together by strong chemical bonds and are combined in a fixed ratio.
Covalent bond	A strong chemical bond formed when atoms share pairs of electrons, forming molecules.
Cracking	Reactions used in the oil industry to break down large hydrocarbon molecules.
Delocalised electrons	In a metal, each metal atom readily gives up its outer shell electrons, resulting in a sea of free electrons flowing throughout a lattice of positively charged metal ions.

Diatomic	Refers to molecules that contain only two atoms.
Electron	The tiny particles within all atoms that carry a negative electric charge.
Electron shell	An orbit around the nucleus of an atom that can be occupied by one or more electrons.
Empirical formula	A formula that shows the simplest whole number ratio of atoms in a compound.
Energy level	Electrons within atoms are arranged in specific energy states, called energy levels.
Fluid	A substance that is able to flow freely.
Formulae	A chemical formula is a way of writing the composition of a compound.
Hydroxide	Refers to the hydroxide ion, which is a negative ion consisting of an oxygen atom covalently bonded to a hydrogen atom.
Intermolecular force	A weak attractive force between molecules, much weaker than the chemical bonds that hold atoms together within molecules.
Ion	An atom or molecule that has gained or lost one or more electrons, and so has an electrical charge.
Ionic bond	Very strong chemical bonds between oppositely charged ions.
Ionic compound	A chemical compound typically formed from metal and non-metal elements combining.
Ionisation	The process of stripping electrons from, or adding them to, atoms or molecules to produce charged ions.
Isomers	Molecules with identical molecular formulas but in which the atoms are arranged differently.
Isotope	Atoms of the same element with different numbers of neutrons.
Lattice	A regular pattern of points repeating in an identical way, and often referring to the arrangement of ions or molecules in a crystalline solid.
Line spectra	A set of well-defined lines within the electromagnetic spectrum, emitted by hot or excited matter.
Mass spectrometer	An instrument that analyses characteristics of atoms and molecules, including their mass.
Metallic bond	A metallic bond is the attractive force that exists between positively charged ions and the ‘sea’ of negative electrons in a metal element.
Molecule	Two or more atoms held strongly together by covalent bonds.
Molecular formula	A formula that shows the actual numbers of atoms of each element in one molecule of a compound.
Nanomaterial	A substance with properties that arise from extremely small structures, of the order of 1 to 100 nanometres.
Nanometre	One billionth of a metre.
Nanotechnology	The study and engineering of materials and devices at extremely small scales, in the region of 1 to 100 nanometres.
Negative charge	The charge that an object has as a result of an excess of electrons.

Neutron	Particles found in the nuclei of atoms, which have a similar mass to a proton, but no electric charge.
Nucleus (chemistry)	In an atom, the small, dense, positively charged structure at its centre, containing the protons and neutrons.
Organic molecule	Generally refers to a compound that contains carbon bonded to hydrogen and is usually associated with the carbon molecules made by living organisms.
Particle(s)	Used as a general term for the atoms and molecules that make up all matter.
Proton	A positively charged particle found in the nucleus of all atoms.
Salt	In chemistry, an ionic compound containing positive metal ions and negative non-metal ions.
Spectroscopy	A technique that uses a prism to split the light coming off an object or atom.
Spontaneous emission	The process in which an atom or molecule produces a photon of light when it undergoes a spontaneous transition from an excited state to a lower energy level.
Stimulated emission	As distinct from spontaneous emission, stimulated emission is the process in which a photon is emitted from an atom or molecule when hit by another photon of the right energy.
Subatomic particles	Particles that make up the structure of atoms, such as neutrons, protons and electrons.
Sublimation	When a solid changes directly into a gas, without passing through a liquid stage.
Van der Waals Force	A type of intermolecular force that causes attraction between molecules.
Viscosity	The measure of a liquid's resistance to flow.

Instant Crystals	We use a supersaturated solution of sodium ethanoate to demonstrate instant crystallisation. Sodium ethanoate is added to water and is then heated to allow all of the crystals to dissolve. When it is cooled it forms a supersaturated solution. This solution is poured onto some more solid sodium ethanoate on a Petri dish and crystals begin to form on top of each other, creating a stalagmite structure.
Liquid Nitrogen Demos	We look at how different materials change when they are exposed to liquid nitrogen. Flowers become frozen and stiff and the petals snap. A banana hardens and is strong enough to be used as a hammer and a squash ball becomes very brittle and shatters when it is hit.
Chemical Filtration	We look at how chemical filtration can be used to remove contaminants from water. Potassium permanganate is used as the contaminant. First, we try to remove it using physical filtration, with filter paper and a funnel. This does not work. We then add activated charcoal, which the potassium permanganate bonds with. When the contaminated water is filtered again only the water passes through, so the contaminant has been removed by chemical filtration.
Precipitate Formation	We add potassium iodide and lead(II) nitrate to the opposite sides of a Petri dish filled with water to see how quickly they diffuse. When added to the water, the chemicals spread through the dish and when they meet they react to form lead iodide, which precipitates out of the solution. The position of the precipitate lets us see how quickly they diffused relative to each other.

Fire Extinguisher Sublimation	We release carbon dioxide from a fire extinguisher against a dark cloth to see what happens. The expanding gas cools as it leaves the extinguisher, forming a visible dry ice solid on the cloth. As it warms, the carbon dioxide vanishes and the solid turns to gas without going through a liquid stage, demonstrating sublimation.
Filtration and Evaporation	We use filtration and evaporation to separate out a mixture of water, sand and salt. The sand is removed using filtration, as it did not dissolve in the water. The remaining solution is heated until the water evaporates, leaving behind the salt.
Making Slime	We make slime using borax, water and food colouring. The slime is a non-Newtonian liquid. A non-Newtonian liquid can behave like a liquid or a solid depending on the pressure applied to it.
Felt Tip Chromatography	We use chromatography to see what colours make up the ink in different coloured felt tip pens. Different coloured dots are drawn on a piece of chromatography paper and this is lowered into a chromatography jar containing water. We watch as the ink climbs up the paper and separates into different colours.

"It's good watching Twig at home... you can watch again and again... and tell your Mum and Dad and they're like 'How did you know that?'"

- Pupil

Food Basics

Food Basics: Carbohydrates	Why are carbohydrates such a good source of energy for our bodies?
Food Basics: Fats	Did you know that fats can be good as well as bad?
Food Basics: Proteins	Find out why almost most every process in your body involves protein.
Fermentation	Did you know bacteria, yeast and mould are vital in the production of common foods?
Omega-3: Healthy Fat?	Learn how one man's extreme diet led to an important discovery about omega-3 fatty acids.
What is a Calorie?	What are calories, and why do we need them to survive?
How Do Carb-Free Diets Work?	Can we survive without carbohydrates?
Ripening Fruit	How do supermarkets ripen green bananas?
Salt: Food Preservative	Find out why an ancient discovery is still used in food preservation today.
Natural versus Artificial	Are all natural chemicals good for us, and all artificial chemicals bad?
Nitrates: Food Preservatives	Learn how one chemical can have two very different uses.
FactPack: Energy Drinks	Find out about the ingredients and effects of energy drinks.

Oil Products

Fractional Distillation	How is crude oil converted into valuable products?
Plastics and Polymers	How are different plastics, from shopping bags to dustbins, made?
Esters and Perfumes	Discover the science behind pleasant smells.
Recycling Plastics	An introduction to the different methods for recycling plastics.
Vegetable Oils as Fuel	How can the oil we cook with also be used as fuel to run a car engine?
Leaded and Unleaded Petrol	Why was lead banned from petrol?
Invention of Nylon	An introduction to the discovery and uses of nylon.
FactPack: Hydrocarbons	The difference between alkanes and alkenes.

Alcohol	An organic compound containing a hydroxyl group (OH) bound to a carbon atom.
Bunsen burner	A small gas burner commonly used in laboratories for heating and sterilising.
Carbohydrate	Molecules such as sugar and starch, which form an important energy source for living organisms.
Crude oil	A naturally occurring thick brown liquid, composed of a mix of hydrocarbons, and usually found deep underground.
Denature	To change the shape of a protein or amino acid molecule, disrupting its normal biological activity, but without changing it chemically.
Distillation	A way of separating liquids that have different boiling points from a mixture.
E-Number	Food additives that have been approved for safe use in the European Union.
Fatty acid	Naturally occurring carboxylic acids with long, unbranched hydrocarbon chains.
Fermentation	The process by which microorganisms can convert carbohydrates into other products.
Glucose	A simple sugar that plays a very important role in all living things.
Hydrocarbons	Any organic compound composed only of carbon and hydrogen.
Hydrophilic	Meaning water-loving, a hydrophilic substance is one that readily associates with water.
Hydrophobic	Meaning water-fearing, a hydrophobic substance is one that repels water.
Lipids	Organic molecules that contain long carbon chains or rings and which tend to be insoluble in water, though soluble in organic solvents.
Methane	A colourless and odorless gas that belongs to the alkane group of hydrocarbons.
Monomer	A small molecule that can chemically bond in chains or groups to other similar molecules, to form larger molecules called polymers.
Omega-3	A type of unsaturated fatty acid, essential for human health.
Pigment	A dry coloured substance that can be used to give colour to paints, plastics and other materials.
Polymer	A large molecule consisting of many recurring units, or monomers, generally linked in long chains that may contain thousands of links.
Polyunsaturated	Chains of carbon atoms, especially in fats and oils, that contain two or more double bonds between carbon atoms.
Potash	The traditional name for water-soluble salts and minerals that contain potassium.
Preservative	A substance that is added to a product in order to prevent decomposition or undesirable chemical changes.
Pure	Free of any unwanted substances or contaminants.
Saturated fats	A saturated fat or fatty acid is one in which there are no double bonds between carbon atoms in the carbon chain.

Starch	A carbohydrate made of long chains of repeated glucose building blocks.
Synthetic	Prepared or artifically made by a chemical or industrial process.
Unsaturated fats	Fats in which there is at least one double bond between carbon atoms in the carbon chain.

Hydrogels	We use a disposable nappy to examine the superabsorbent properties of hydrogels. We add water to grains of hydrogel and watch them swell before adding salt to see the water escape.
Clearing Oil Spills	We investigate the effectiveness of different methods to clear oil spills from water. First, we try to burn the oil in a sample of water using a gas lighter but there is no effect. Next, we break the oil up using detergent but this does not remove it from the water. Finally, we add a long-chain polymer that absorbs oil. This can then be removed by hand.
Screaming Jelly Baby	We add a jelly baby to a boiling tube containing potassium chlorate. When the chemicals react, gas is rapidly produced. The screaming sound is created as the gas escapes from the tube. The sweet burns brightly as the reaction occurs.
Distillation of Ink	We use distillation to remove the water from ink. The ink is heated in a conical flask with a delivery tube running to a beaker. The water has a lower boiling point and so it evaporates before the ink. The water condenses as it travels along the delivery tube and we end up with separate samples of water and much more concentrated ink.
Cola Volcano	We add mints to diet cola in order to produce a fountain. When we add the mints to the diet cola, the porous surface of the mint causes the carbon dioxide trapped within the drink to be released rapidly, resulting in a cola volcano.
Measuring Food Energy	We investigate the amount of energy stored in maize snacks and peanuts by burning them. The food is placed under an aluminium beaker of water before being set alight and the temperature change of the water is recorded. We can compare the temperature changes to see which type of food stores more energy.

Discovering Elements

Introduction to the Periodic Table	An introduction to the method of ordering of the elements according to their properties.
Atomic Structure	Explore the Periodic Table and discover what it tells us about each element.
Mendeleev's Prophecy	Find out why the element gallium had been predicted even before it was discovered.
Discovery of Phosphorus	Witness the unusual experiments which led to the discovery of phosphorus.
The Curse of Phlogiston	Discover the theory which hindered Chemistry for centuries.
Phlogiston and Oxygen	How the discovery of phlogiston and oxygen changed chemical theory forever.
The Legacy of John Newlands	Introducing the scientist who found music in the elements.
We Are All Made of Stars	Discover how all the elements on Earth were created.
FactPack: How to Make a Human	What elements are needed to make a human?

Metals

Transition Metals	What are the unique properties of metals in the transition group?
Alkali Metals	Alkali metals have distinct properties – what are they?
Reactivity Series	How has man discovered and used reactive metals through history?
Metals in Medicine	Discover the metals used to heal the human body.
Alloys	How do we use alloys in everyday life?
The Elements: Copper	An introduction to copper and its uses.
The Elements: Mercury	An introduction to mercury and its unique properties.
The Elements: Potassium	An introduction to potassium and its unique properties.
The Elements: Silicon	An introduction to silicon and its uses.
The Elements: Iron	An introduction to iron and its uses.
The Elements: Lead	An introduction to lead and its role throughout human history.
The Elements: Uranium	An introduction to uranium and its uses.
The Elements: Plutonium	An introduction to plutonium and its unique properties.
The Elements: Radium	An introduction to radium and its uses.

The Elements: Aluminium	Learn about the most abundant metal in Earth's crust.
The Elements: Magnesium	Find out why magnesium is important for life.
The Elements: Silver	Learn about silver and why it is so valuable.
The Elements: Sodium	Find out why sodium is highly reactive and highly useful!
The Elements: Gold	Find out why gold is a valuable metal element.

Non-Metals

The Halogens	What are the unique properties and uses of the halogen elements?
The Noble Gases	Discover the properties and uses of the noble gases.

The Elements: Oxygen	An introduction to oxygen and its uses.
The Elements: Phosphorus	The unusual experiments which led to the discovery of phosphorus.
The Elements: Hydrogen	An introduction to hydrogen and its uses.
Hard and Soft Water	Discover the hidden minerals in water that affect its usefulness.
The Elements: Chlorine	Find out why chlorine is used in swimming pools.
The Elements: Helium	Find out why helium balloons float away.
The Elements: Iodine	Learn about iodine and its use in medicine.
The Elements: Neon	Learn about the noble gas Neon and its uses.
The Elements: Nitrogen	Find out why nitrogen is a useful food preservative.
The Elements: Sulfur	Find out what's responsible for the smell of rotten eggs - compounds of sulfur!
The Elements: Carbon	Learn about carbon - the basis of life on Earth.

FactPack: Atmospheric Gases	What gases make up Earth's atmosphere?

Alkali metal	A highly reactive group of metals that make up group one in the periodic table.
Alkaline earth metal	A group of metals that form group two of the periodic table.
Alloy	A mixture containing a metal element, made by melting the different elements together.
Atomic number	The number of protons in the nucleus of an atom.

Periodic Table

Atomic weight	The average mass of atoms of an element.
Element	An element is a pure substance that cannot be broken down any further by chemical means.
Energy resources	Usable sources or stores of energy.
Extraction	The process of deriving metals from their naturally-occurring ores.
Hydrated compound	A solid compound that contains water molecules in a defined ratio.
Metal	The elements in the middle and left side of the Periodic Table are all metals.
Metalloid	While most elements can easily be categorised as either metals or non-metals, a few have physical and chemical properties that are in between, which makes them harder to classify.
Mineral (chemistry)	A naturally occurring element or compound that has a crystalline form and has been produced by geological processes.
Molecular mass	The mass of one molecule of a substance.
Molecular weight	The sum of the atomic masses of all the atoms in a molecule, usually expressed in atomic mass units.
Noble gases	Elements in group 8, also called group 0, of the periodic table.
Non-metals	The non-metal elements are found to the right of the Periodic Table.
Ore	A type of rock containing minerals from which a useful substance can be extracted.
Periodic table	A systematic arrangement of the chemical elements.
Toxic	Poisonous, capable of causing death or serious illness by chemical means.
Transition element	Any of the metallic elements from the central block of the periodic table.

Burning Bubbles	We investigate the properties of two types of gas bubbles: methane gas bubbles and bubbles of the gas we breathe out. The air-filled bubbles sink and we are unable to set them alight, while the methane bubbles float upwards and are highly combustible.
Reactivity Series	We compare the reactivity of Group 1 and Group 2 metals. We add sodium and then potassium to water. We observe the reactions. Next we add magnesium and then calcium to hydrochloric acid and observe the reactions. The results let us put the metals in order of reactivity â€“ potassium, sodium, calcium and then magnesium.
Incandescent Light Bulb	We look at how an incandescent light bulb can be made. First we attach a tungsten wire to electrodes in a flask of air and pass a current through the wire. The wire glows briefly before burning and breaking. Next we fill the flask with the non-reactive, noble gas argon. This time the wire glows for a much longer time as the wire is heated without burning.
Flame Test	We use a Bunsen burner to burn different chemical salts to see how the flame colour changes. This shows that sodium burns with a yellow flame, lithium burns with a red flame, barium burns with a yellow-green flame and copper burns with a blue-green flame.
Iron and Luminol	We use potassium ferricyanide and luminol indicator to show how forensic scientists detect blood at crime scenes. The luminol indicator contains luminol, sodium hydroxide and hydrogen peroxide. When luminol comes into contact with the iron in potassium ferricyanide, the iron acts as a catalyst and the chemicals in the solution react to produce light.

Elements vs Alloys	We compare melting points of lead and tin to the melting point of their alloy, solder. By timing how long it takes samples of each to melt, we discover that the melting point of solder is actually lower than those of both lead and tin.
Silver Tree	We demonstrate a displacement reaction using silver nitrate and copper. A tree-shaped piece of copper is submerged in silver nitrate solution. The silver ions displace the copper and the tree slowly becomes coated with silver metal. At the same time the solution turns blue as the amount of copper ions increases.
Forming Iron Sulfide	We examine the different properties of iron and sulfur when they are mixed and when they are chemically combined. When iron and sulfur are mixed they retain their individual properties. When they react chemically to form iron sulfide some of their individual properties change. But, even though it was formed using magnetic iron, iron sulfide is not magnetic.

"It is a fun website that teaches you facts as well as entertains you"

- Pupil

Acids and Bases

Acids and Alkalis: Part 1	What are acids and alkalis? Explore the extremes of the pH scale.
Acids and Alkalis: Part 2	Discover the importance and uses of neutralisation reactions.
Crystals in Caves	What role does rain water play in creating crystals in caves?
First Synthetic Pigment	How were synthetic paints first created?
Why Do Leaves Change Colour?	What are the chemical reactions that produce vibrant leaf colours throughout the seasons?
FactPack: pH Scale	Can you guess the acidity or alkalinity of five solutions?

Energy Changes

Energy Change of Reactions	What are exothermic and endothermic reactions, and how do they differ?
Rates of Reaction: Basics	How is the speed of a chemical reaction measured and changed?
Collision Theory	How do particle collisions affect the rate of chemical reactions?
Electrolysis	What is electrolysis, and how does it work?
Redox Reactions	Discover how metals are extracted from their natural ores.
Oxidation Reactions	Find out how oxidation can be useful as well as harmful.
Nobel and Dynamite	Did you know the man who famously founded the Nobel Peace Prize also invented dynamite?
Oxygen and Combustion	What is combustion and why is it essential to life on Earth?
Extraction of Aluminium	Discover the immense power and heat needed to extract aluminium from its ore.
How Do Fireworks Work?	Discover the various chemical reactions at play in the creation of spectacular fireworks.
The Hindenburg Disaster	What caused the famous airship to explode?

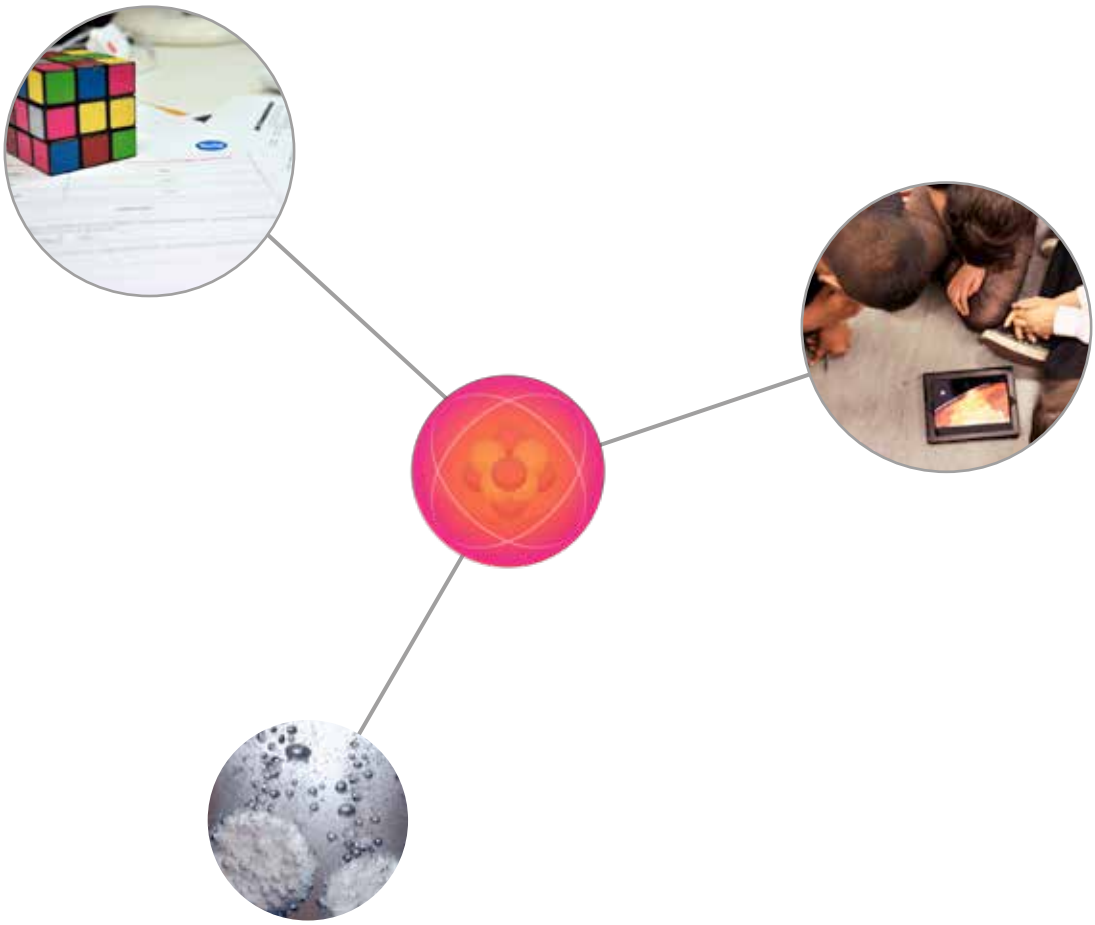
Acid	A compound which dissolves in water to form a solution with a pH of less than 7.
Activation energy	The minimum amount of energy needed to initiate a chemical reaction.
Alkali	An alkali is a solution with a pH greater than 7.
Base (chemistry)	A substance that reacts with an acid to form a salt and water.
Buffer	A substance that maintains a solution in a narrow range of pH.
Carbonate	A salt or other compound containing a carbonate ion CO₃²⁻.
Catalyst	A substance that increases the rate of a chemical reaction without itself being permanently changed or used up.
Cathode	A cathode is the terminal from which electrons enter a system.
Chemical energy	Chemical energy is stored in all compounds, and can be released in chemical reactions.
Chemical reaction	Any process in which one or more chemicals are changed into different products, by the breaking and formation of chemical bonds.
Chemical synthesis	The process of carrying out a set of chemical reactions to create a chemical product or products, often one not found in nature such as, a synthetic drug.
Chemiluminescence	The release of light with very little heat as the result of a chemical reaction.
Combustion	Or burning, a chemical reaction that requires an initial source of heat, a fuel, and an oxidising agent such as oxygen, and releases energy as heat, and often light.
Complete combustion	A combustion reaction in which all of the products are fully oxidised and the maximum amount of energy is released.
Concentration	A measure of how much of one substance is dissolved or dispersed in another, for example salt in water, or oxygen in the atmosphere.
Condensing	The change of state from a gas to a liquid.
Corrosion	Commonly called rusting, the degrading of the exposed surface of materials, in particular metals.
Coulomb	The international standard unit of electric charge.
Crystal	A solid consisting of atoms, molecules, or ions arranged in a highly ordered, repetitive, three-dimensional lattice.
Displacement reaction	A reaction in which a more reactive element replaces a less reactive element in a compound.
Dissociate	To break apart an ionic compound into its constituent ions.
Electrode	An electrical conductor that connects to a non-metallic part of a circuit.
Electrolysis	The process of using a direct electric current passing through a conductive liquid to drive a chemical reaction.
Electrolyte	A substance that when molten or dissolved in solution, releases free ions that make it electrically conductive
Electrolytic cell	An electrolytic cell is a system that breaks down chemical compounds by electrolysis.

Endothermic	A chemical reaction or process that absorbs heat from the surrroundings.
Equilibrium	A reversible chemical reaction reaches equilibrium when the concentrations of the reactants and products are constant.
Exothermic	A chemical reaction or process that releases heat.
Flammable	Easily ignited, able to catch fire easily. Flammable materials may be solids, liquids, or gases.
Indicator	A substance that provides a visual indication of the pH of a test material.
Inert	Unreactive, and resistant to change by any chemical means.
Irritant	A substance that produces inflammation or pain on contact with skin, eyes, the respiratory system or other membranes such as stomach linings.
Molten	A substance that has been converted to liquid form by heating.
Neutral	In between two extremes, neither one thing nor another.
Neutralisation	The chemical process by which a base neutralises an acid, producing a salt and water.
Non-flammable	A substance that is not readily ignited or rapidly burned is said to be non-flammable.
Oxidation	The process of gaining oxygen in a chemical reaction, or more generally of losing electrons.
Oxide	Any compound in which oxygen is combined with another element.
Oxidiser	A chemical agent that readily releases oxygen atoms, or that readily gains electrons in a redox reaction.
pH	The pH scale measures the acidity or alkalinity of a solution.
Product	A substance produced as the result of a chemical reaction.
Rate of reaction	A measure of how fast a reaction is taking place.
Reactant	Or reagent, the material that is consumed in a chemical reaction to create new products.
Reaction	A chemical change in which chemical bonds are broken, and new bonds are formed, to produce a new chemical substance.
Reactivity	The tendency of a substance to undergo chemical reactions.
Redox reaction	A reaction in which oxidation and reduction occur together.
Reduction	Any chemical reaction in which oxygen is removed from a substance.
Reversible reaction	A reversible reaction is one where the products of the initial reaction themselves react, producing a reverse reaction.
Spontaneous	Occurring without any external influence or trigger, entirely by its own means.
Strong acid	A strong acid is one that is fully ionised in solution.

Substitution reaction	A reaction in which one functional group in a molecule is replaced by another functional group.
Thermal decomposition	The chemical breakdown of a compound into simpler substances when heated.
Vaporise	To change, or cause something to change, into gas or vapour.
Volatile	A substance which turns easily to a vapour at normal temperatures and pressures.

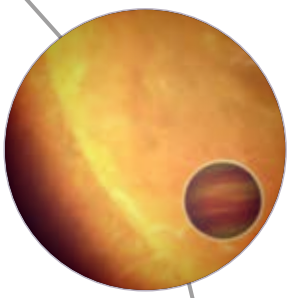
Bouncing Eggs	We use vinegar to remove the shells from eggs without breaking them. Two eggs are placed in a beaker of vinegar, but one is half coated with clear nail polish. The exposed shells dissolve over time and the eggs swell as more water moves through their semipermeable membranes. In the areas not protected by nail polish, the shell of the egg completely dissolves so that it can be examined using a torch and bounced gently.
Orange Tornado	We use mercury(II) chloride solution and potassium iodide to demonstrate a precipitation reaction. Saturated potassium iodide solution is placed on a magnetic stirrer and the speed is set so that a vortex is created. Mercury(II) chloride is then added and an orange precipitate, mercury iodide, forms. This precipitate then vanishes as a further reaction occurs.
Oscillating Colour	We use three chemical solutions to create an oscillating reaction. The three different solutions are mixed using a magnetic stirrer and the colour changes from clear to amber to dark blue. This pattern repeats as the concentrations of iodine, iodide ions and starch change within the beaker. Eventually the reaction stops, leaving the solution dark blue.
Acidification of Water	We use a drinking straw, some water and universal indicator to show that breathing out creates acid. Universal indicator is added to the water to show its pH value. When we blow into the water the indicator changes colour showing that the pH has decreased and is acidic.
Inflating Glove	We inflate a rubber glove using the gas produced during a neutralisation reaction. Bicarbonate of soda is added to vinegar in a beaker covered by a rubber glove and it expands. The gas is used to extinguish a flame, showing that it is carbon dioxide.
Rusting Nails	We investigate the conditions needed for rust to form. Four iron nails are placed under different conditions. One is half submerged in water. Another is completely submerged in boiled water. One is half submerged in salt water. The final one is sealed in a boiling tube with anhydrous calcium chloride. The results show that both oxygen and water are required for rusting to occur.
Electrolysis of Water	We use electrolysis to break water molecules down into hydrogen and oxygen. This is done using the Hoffman apparatus. Water is added to the apparatus along with some dilute sulfuric acid. When a current is passed through the water, hydrogen is collected in one column and oxygen in the other. The presence of hydrogen is tested using a lit splint, which burns with a pop. While the presence of oxygen is tested using a glowing splint which relights.
Ion Migration	We separate the ions in copper dichromate gel using electrolysis. We see the positive blue copper ions move to the negative electrode and the negative yellow chromate ions move to the positive electrode.
Dry Ice and Magnesium	We use magnesium and blocks of dry ice to show how a redox reaction occurs. A cavity in a block of dry ice is filled with coils of magnesium ribbon, which are set alight. A second block is then placed on top, but instead of this putting out the flames, the reaction intensifies as the magnesium strips oxygen from the dry ice and the block glows brightly.
Metal Extraction	We extract copper metal from copper chloride solution using electrolysis. The electric current causes copper to form at one electrode and chlorine gas to form at the other. The presence of chlorine is tested using blue litmus paper.

Mass of Wire Wool	We look at how the mass of wire wool changes when it is burned. Wire wool is almost 99% iron. When we burn it, it combines chemically with oxygen from the air to form iron(III) oxide. The mass of the product is more than the mass of the wire wool that we started with.
Extracting Lead	We discover how to extract lead from lead(II) oxide. We mix lead(II) oxide with charcoal powder and then heat the mixture using a Bunsen burner. It glows bright red as a reaction occurs and after a few minutes we are left with pure lead.
Elephant's Toothpaste	We create a rapidly expanding column of foam by mixing chemicals. Hydrogen peroxide and detergent are added to potassium iodide and food colouring to set off a reaction that creates vibrant expanding foam.

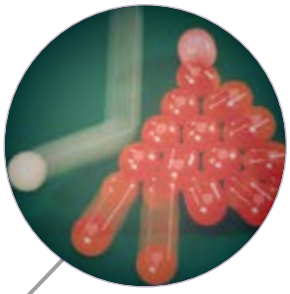


Physics

Electricity and Circuits

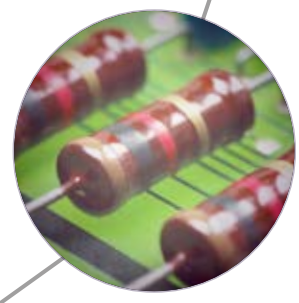


Energy and Radioactivity



Universe

Waves



Our Solar System

Forces

Circuits	
Circuits	Why are circuits vital for electrical currents?
Resistance	What is resistance, and why is it both useful and a hindrance?
Diodes and Transistors	Introducing the simple devices that have revolutionised technology.
Moore's Law	Was the rapid advancement in computing power predicted?
Hi-Fi Engineering	How do hi-fi speakers convert electrical signals into sound waves?
Rock Star Shock	Revealing the potentially deadly dangers of electricity through the story of a tragic accident.
Electric Eels	How does the eel harness the power of electricity?
FactPack: How to Draw a Circuit	Discover the universal symbols used in circuit design.

Electricity	
What is Electricity?	We all use electricity every day but what exactly is it?
AC, DC and Transformers	Discover why power is lost from electricity lines, and how transformers tackle this problem.
Electrical Safety	How can you protect yourself against electric shocks?
Static Electricity	Discover the hidden dangers of static electricity.
War of the Currents	Find out how a battle to supply electricity across the USA led to the invention of the electric chair.
Electricity in Medicine	Witness how electricity is used to save lives.
Thermal Imaging	How can a heat-seeking camera and helicopter help keep your lights on?
FactPack: Global Electricity Supply	How do different countries around the world generate their electricity?

Magnets	
What Are Magnets?	Explore the many uses of magnets.
What Are Electromagnets?	Discover how combining electricity with magnetism can create a useful tool.
How Do Generators Work?	Explore the simple principle that brought electricity into everyday use.
Maglev Trains	Discover the train that defies gravity.
MRI	See how a magnetic machine allows doctors to see inside us.
Earth's Wandering Poles	What would happen if the North and South Poles switched?

Anode	An anode is the terminal from which electrons leave a system.
Circuit breaker	A safety device used to prevent an overload of current in an electrical circuit.
Diode	An electronic component that allows current to flow in only one direction.
Direct current (DC)	An electric current in which the flow of electric charge is consistently in one direction.
Electric Current	Electrical current is the flow of electric charge.
Electric force	The fundamental force that occus between two or more charged particles.
Electrical charge	A fundamental property of matter that means all particles are either positive, negative, or neutral.
Electrostatic attraction	The attraction between two bodies with opposite electric charges due to the charge alone.
Electrical resistance	Opposition to the flow of a current within a circuit, measured in ohms.
Insulator	Material that conducts heat or electricity very poorly, and so can be used to provide some measure of protection.
Magnetic field	A field of force produced by a magnetic object or a changing electrical field.
Magnetic force	A force acting between magnets or moving electric charges.
Motor effect	The force experienced by a current-carrying wire when placed within a magnetic field.
Polarity	Electrical polarity is the arrangement of positive and negative charge in an electrical circuit, or distribution of positive and negative charge in, for example, a chemical bond.
Pole	Orbital poles are the two regions of a planet at the extremes of its rotational axis.
Semiconductor	A material whose electrical conductivity is in between that of a conductor and an insulator.
Static electricity	The accumulation of electric charge, positive or negative, on the surface of an object.

Superconductivity	The flow of electricity with almost no resistance.
Volt (V)	The SI unit of electric potential or electromotive force.

Ferrofluids	We compare the properties of three iron mixtures: iron and water, iron and oil and a ferrofluid - a mixture of compounds containing iron and oil. First, we look at how iron filings behave when mixed with water and then oil. We then hold a magnet under a sample of ferrofluid to demonstrate that the liquid behaves as though it is a magnetic solution, when in fact it is a colloid.
Balloon and Treacle	We investigate the effect that unbalanced charge has on polar molecules. We rub a balloon against hair to build up a negative charge and then hold this near a stream of water and then a stream of treacle. They both bend towards the balloon as the positively charged sides of the polar molecules in the liquids are attracted towards the negatively charged balloon.
Van de Graaff Generator	We use a Van de Graaff generator to investigate static electricity. The generator is turned on and we see a spark move between the two domes. We then place a wig on the main dome and see the hair rise as the charge builds and the hairs repel each other. Then a stack of metal dishes is placed on the dome and when the Van de Graaff generator is turned on they fly off one by one.
Citrus Fruit Battery	We use lemons and strips of zinc and copper to make a battery. First, strips of copper and zinc are added to one lemon and they are connected across a voltmeter. This is repeated, this time with more lemons and metal plates, until a series circuit is created and the voltage recorded increases. The voltmeter is replaced by a digital clock, which the circuit is able to power.
Magnetic Strength	We use two magnets and a set of scales to examine magnetic field and strength. One magnet is attached to the scales and a second is lowered towards it. When opposite poles are facing each other, the weight on the scales decreases as the magnet is lifted. When like poles are facing each other, the weight increases as the magnets repel each other.
Making an Electromagnet	We create a simple electromagnet by coiling wire around a nail and passing current through it. The magnetic field around the electromagnet creates similar patterns in iron fillings to a permanent magnet.

Energy

Forms of Energy	What forms does energy take?
Energy Transformation	Discover how energy is recycled into different forms.
Potential Energy	Discover the three ways in which energy can be stored.
Steam Power	How do steam engines use heat to produce motion?
The Energy of Formula 1	Introducing the energy-converting engine that powers Formula 1 cars around the track.
Perpetual Motion	Is there a machine that can power itself forever?
FactPack: Horsepower	Find out how one man used horses to measure energy use.

Heat

Heat Transport	Discover the three ways heat energy can travel.
Laws of Thermodynamics	Discover the fundamental principles of energy use.
Expansion and Contraction	Why does heat cause objects to change shape?
Red Hot: Emergency Stop	Find out how the everyday process of braking uses extraordinary energy conversion.
Hot Air Balloons	How is flight made possible with little more than hot air?
Cavitation	Witness the tremendous damage that can be caused by tiny air bubbles.
The Race for Absolute Zero: Liquefying Gas	Discover how scientists reached supercool temperatures in the race to liquefy gases.
The Race for Absolute Zero: Laser Cooling	Discover how lasers were used to create the coldest temperature ever recorded.
FactPack: Extreme Temperatures	What are the hottest and coldest temperatures on Earth?

Radioactivity

Radioactive Substances	What makes a material radioactive?
Radioactive Half-Life	Will a radioactive material always be radioactive?
Reducing Radiation Risk	How can we work safely with radioactive materials?
Nuclear Fusion: The Hot and Cold Science	Can nuclear fusion be achieved through two methods?
Nuclear Weapons	Witness the science behind the most destructive weapons ever created.
Nuclear Fission	How can energy be released from within atoms?
FactPack: Background Radiation	What radiation do we live with every day?

Absolute zero	The lowest temperature theoretically possible, at which particles would stop vibrating.
Acceleration	The rate of change of velocity with time, measured in metres per second squared.
Alpha particle	A type of particle produced in some types of radioactive decay, being one of the most widespread forms of ionising radiation.
Antimatter	Matter composed of antiparticles. For every particle of ordinary matter there is a corresponding antiparticle which has the same mass but the opposite charge.
Beta particles	High-energy electrons emitted by nuclei during radioactive decay.
Cathode ray	Or electron beam, a stream of electrons emitted from the negative terminal of a vacuum tube.
Conduction	The transfer of heat energy due to a difference in temperature, always from a hotter to cooler area.
Convection	The transfer of heat in a fluid by movement of the fluid itself.
Efficiency	The proportion of energy supplied to a device or process that is converted into a useful form.
Energy	The capacity of a system or a body to do work.
Fahrenheit (Â°F)	A temperature scale, used largely in the USA, on which water freezes at 32 degrees and water boils at 212 degrees.
Gamma ray	High energy electromagnetic radiation, with extremely short wavelengths, often smaller than an atom.
Half-life	Originally used in relation to radioactivity, describing the time required for half the atoms of a radioactive substance to decay.
Heat	The transfer of thermal energy.
Heat resistant	The ability of a substance to withstand the effects of high temperature without being permanently changed.
Kinetic energy	The energy of movement. It is equal to half the moving object's mass, multiplied by its velocity.
Nuclear	Relating to the nucleus of an atom. The 'nuclear model' of the atom is one that describes a system of a nucleus surrounded by electrons.
Nuclear fission	The splitting of an atomic nucleus into lighter fragments.
Nuclear fusion	A nuclear reaction in which two atomic nuclei fuse to form a larger one.
Nucleosynthesis	The formation of atomic nuclei from neutrons, protons and smaller nuclei.
Potential energy	Energy that is stored by an object because of its position.
Power	The rate of doing work, or of converting energy.
Quark	A fundamental particle, and the components from which protons and neutrons in atomic nuclei are made.
Radiation	Though often used more narrowly to refer to ionising radiation, the term radiation refers to any form of energy that travels through a medium, radiating outwards from a source.

Radioactivity	The emission of particles as a result of the spontaneous decay of atomic nuclei.
Scalar	A quantity that has magnitude, or size, but not direction.
Stable	Not susceptible to any process of decay or change in the long term.
Temperature	A measurement related to the average kinetic energy of the particles contained in a system.
Thermal	Relating to heat or temperature.
Transducer	A device that converts one form of energy into another.
Vector	A quantity that has both magnitude, or size, and direction.
Watt (W)	The SI unit of power, the rate at which energy is converted or work is done.

Underwater Volcano	We create an underwater volcano by placing a conical flask of hot coloured water in a tank of cold water. The hot coloured water rises through the cold, demonstrating convection.
Cloud in a Bottle	We create a cloud in a bottle using warm water and smoke. Some warm water is placed in a plastic bottle and then some smoke is drawn in using a glowing splint. The bottle is sealed and then squeezed and released. The change in pressure causes the water vapour inside to condense on the smoke particles, forming a cloud.
Heat Absorption	We use two cans, one painted black and the other painted white, to investigate heat absorption. The containers are placed in front of a heat source and the temperature change is recorded. This shows that the black container absorbs heat faster than the white container.
Ingenhousz's Heat Conductors	We use a metal box holding rods of different materials to test their ability to conduct heat. The box is filled with boiling water and a paperclip is attached to the end of each rod using petroleum jelly. As the heat moves through the rods, the jelly melts and the paperclips fall off. The different amounts of time taken for each paperclip to fall show which materials are better conductors. The materials used are copper, aluminium, steel, glass and plastic.
Ball and Hoop	We use a metal ball and hoop to demonstrate heat expansion. When cool, the ball fits through the hoop, but there is little extra space. The ball is then heated over a Bunsen burner. When hot, the ball doesn't fit through the hoop. We see how the size of the metal ball changes as it is heated.
Heat Loss	We compare two cans, one painted black and the other painted white, to see how quickly they lose heat. The containers are placed in front of a heat source and heated to the same temperature. The temperature in each container is recorded over time as they cool. This shows that the black container cools faster as it doesn't reflect the heat back inside as well as the white container.

Applying Force

Forces of Nature	Discover the four fundamental forces of nature which hold our Universe together.
Friction	Learn about friction, and how it affects us. Too little and we fall – too much and we struggle to move.
Centripetal Force	Discover the forces that control turning and rotation.
Streamlined: Dolphins vs People	Discover how streamlining affects animals' ability to swim.
Aerodynamics in Cycling	Discover how cyclists can manipulate forces to help them to win a race.
Friction in Curling	Discover the ingenious ways curlers use friction in their sport.
Rollercoasters	How do forces combine to create a thrill-packed ride?
Levers, Wheels, Pulleys	How do these simple machines work?
Planes, Wedges, Screws	How do these simple machines work?
Machines: Building the Pyramids	What machines did the Ancient Egyptians use to build the Pyramids of Giza?
Fighter Pilots: G-Force	Learn why fighter pilots must undergo special training to cope with acceleration.
FactPack: Experience Friction	Play along and experience friction first hand.
FactPack: G-Force	How much G-force can a human stand?

Newton's Laws

Newton's Laws of Motion	Discover the physical rules which dictate how objects move.
Speed, Velocity, Acceleration	What is the difference between speed, velocity and acceleration?
Momentum	Discover why some moving objects won't stop.
Terminal Velocity	What happens when you accelerate in freefall?
How Do Animals Fly?	Discover why some animals are able to fly.
How Do Planes Fly?	Discover how planes are engineered to stay in the air.
Body Crash	Discover how airbags and seatbelts can save your life.
FactPack: Acceleration	Which can accelerate faster: man-made objects or living organisms?

Pressure	
Gas Laws	What happens when gases expand?
Buoyancy	Why do objects float or sink?
Pressure and Surface Area	Discover the relationship between pressure and surface area.
The Bends	Discover the potentially lethal dangers of changing pressure.
FactPack: Pressure and Altitude	Discover the effects of extreme changes in pressure with altitude.

Air resistance	The frictional force exerted on a moving object by air.
Buoyancy	The upward force exerted on an object by the fluid which surrounds it.
Calibrate	A process of comparing sets of measurements with reliable reference measurements, in order to check the accuracy of an instrument, or adjust for a change in a measurement system.
Centre of gravity	The point from which the whole weight of an object appears to act.
Density	Mass per unit of volume.
Force	A ‘push’ or a ‘pull’ on an object.
Gravitational field	The field around a body of significant mass that exerts a gravitational pull on all other objects in that field.
Gravity	An attractive force that acts between all matter that has mass, and is proportional to mass.
Motion	Or, movement. In physics, motion is a change in position in space, over time.
Pressure	Pressure is defined as force per unit area, measured in newtons per square metre, or pascals.
Propulsion	The process of pushing or moving an object forwards.
Rotation	Circular movement about an axis or a point.
Stationary	Not moving, completely at rest.
Strong material	A strong material is one that is resistant to wear and physical force.
Strong nuclear force	The force that holds protons and neutrons together in the nucleus of an atom.
Tension	The strength of a pulling force, for example in a rope or cable.
Vacuum	Space which contains no matter at all.
Velocity	The speed of an object in a particular direction.

Weight	The force of gravity acting on a mass, measured in newtons. On Earth, gravity exerts a force of just under 10 newtons per kilogram.
Work	Mechanical work is the energy transferred by a force in moving through a distance.

Hero's Engine	We use a Hero's engine model to show how equal and opposite forces can cause propulsion. Two holes are pierced in a metal bottle and some water is added. This is suspended above a Bunsen burner, and as the water boils and leaves the holes, the bottle begins to spin.
Smashing Eggs	We use eggs to show how different rates of deceleration affect the outcome of collisions. One egg is dropped onto a hard surface and breaks. The second egg is dropped onto a soft surface and bounces, as the material slows its deceleration.
Liquid Density	We compare the density of oil, salt water and fresh water using displacement tanks. Equally weighted measuring cylinders are placed into the three liquids and the amount of water displaced is collected for comparison.
Can Crusher	We demonstrate the effects of imbalances of pressure. A metal can is crushed by atmospheric pressure. We add some water to a can and boil it until the can is full of water vapour. It is then sealed and left to cool and after a few minutes it collapses in on itself.
Cartesian Diver	We make a Cartesian diver using a drinking straw and sticky tack. When the diver is placed in a sealed bottle of water it can be controlled by squeezing and releasing the bottle, which makes it rise and fall within the water.
Frozen Balloon	We lower a helium-filled balloon into liquid nitrogen to see how the change in temperature affects its volume. When it hits the cool liquid nitrogen, the gas inside contracts and the volume of the balloon decreases. When it is removed and returns to room temperature, the gas inside expands and the volume of the balloon increases.
Separating Notebooks	We interleave the pages of notebooks to see how hard it is to pull them apart. As the amount of interleaving increases, we see that the force required to separate them also increases. This is because the friction between the notebooks is increasing.
Centre of Gravity	We use a plumb line and hook to find the centre of gravity of an irregularly shaped piece of card. A hole is punched in the card and it is suspended from the hook. A plumb line is used to let us draw the vertical line under the hole on which the centre of gravity lies. A second hole is made and a second line is drawn. The centre of gravity is where the two lines cross.

Solar System	
The Birth of Our Solar System	What created our Solar System?
Earth's Twin	Why did colliding with its twin prepare our planet for life?
The Goldilocks Zone	Not too hot and not too cold – why Earth is just right to support life.
How Did Saturn Get Its Rings?	Explore the mystery that plagues the brightest brains in astrophysics.
Venus 1: Atmosphere	Would probes sent to Venus discover an Earth-like planet?
Venus 2: Surface	What did the first probe find on Venus' surface?
What Are Asteroids?	An introduction to asteroids.
Mercury	An introduction to the smallest planet in our Solar System.
Venus	An introduction to the hottest planet in our Solar System.
Earth	An introduction to the planet we call home.
Mars	An introduction to our closest neighbouring planet.
Jupiter	An introduction to the biggest planet in our Solar System.
Saturn	An introduction to the Gas Giant, Saturn.
Uranus	An introduction to the seventh planet from the Sun.
Neptune	An introduction to the eighth planet from the Sun.
What is an Orbit?	All planets orbit the Sun, thanks to gravity.
FactPack: Moons	Find out about the moons of other planets.

Sun and Stars	
The Sun	Journey into the Sun and discover why all life on Earth depends upon it.
Day and Night	What makes it day or night?
What Are Stars?	Find out how stars are born, how they live and how they die.
Why is the Sky Blue?	From blue horizons to red sunsets, what creates the colour of the sky?
What Are Eclipses?	What causes solar and lunar eclipses?
Northern Lights and Solar Flares	Witness the Sun's role in creating the beautiful Northern Lights.
Shadow Chasers	Meet the party-people who gather to see and study eclipses.
Constellations	Learn how we give meaning to the patterns of stars in our sky.
Death of the Sun	Explore the future life and death of the Sun.

The Moon	
The Moon	What makes a moon?
The Moon and Its Effect on Life	Could the Moon affect reproductive cycles on Earth?
The Moon and Spring Tides	The effect of the Moon on daily and extreme tides.
Dark Side of the Moon	Journey to the mysterious unseen far side of the Moon.
Life Without the Moon?	Why the Moon is vital for life on Earth.
Man on the Moon: Part 1	The extraordinary story of the Apollo 11 lunar landing, and how 'one giant leap' nearly never happened.
Man on the Moon: Part 2	After 'one giant leap', how did man return home from the Moon?
Fly Me to the Moon	Find out how to launch into outer space.
Moon Measuring	How do we measure the distance from the Earth to the Moon?

Big Bang	
Big Bang Theory	How was our Universe created?
Big Bang Evidence	What is the evidence for the Big Bang theory?
Large Hadron Collider	Discover the machine which could recreate the Big Bang.
Nobel Prize by Chance	How a scientific 'mistake' led to one of the 20th century's greatest astronomical discoveries.
Cold War to Gamma Rays	Discover how Cold War suspicion lead the USA to discover radiation from deep space.
FactPack: Redshift	How wavelengths help measure distance in space.
FactPack: Big Bang Scientists	A brief history of the Universe through the eyes of the men who discovered it.

Life in the Universe	
Mars: Dead Planet	Discover the size our Universe from Earth to the Solar System and beyond.
Mars: The Search for Water	Is there water on Mars?
Planet Hunters	Meet the Planet Hunters.
Mars: Under the Ice	Discover why studies of Antarctica suggest there could be life on the red planet.
Next Stop Mars	As the Sun dies and gets hotter, will we need to move and bring life to the red planet?
Place Like Home: Life On a Moon	Could this moon hold the key to life on Earth?
Colonising the Moon	Could we colonise the Moon, and who would get there first?
SETI: Are We Alone?	Has the SETI project detected extraterrestrial life?
Place Like Home: Cassini	Introducing the mission to reach Saturn's moon.
Planet Kevin	The story of Kevin, a student who managed to discover his own planet.
Life in Space	Can life survive in the vacuum of space?
Place Like Home: Inside a Probe	Learn how scientists overcame the difficulties of landing a probe on Saturn's moon.

Outer Space

Scale of the Universe	Discover the size our Universe from Earth to the Solar System and beyond.
Black Holes	What are black holes and how are they formed?
Milky Way's Black Hole	Is there a supermassive black hole at the centre of our Galaxy?
Telescopes	How do telescopes work and how have they developed through history?
Hubble Space Telescope	Why did the eight year project to build the Hubble Telescope nearly fail?
How Are Mirrors Made?	The amazing techniques used to make some of the world's largest mirrors for telescopes.
The Search for Dark Matter	Why scientists are venturing underground in the hunt for particles that bind our Universe together.
What is a Light Year?	Why do we measure distance in terms of time?
Kittinger: First Man in Space?	The story of one man's quest to reach space in his hot air balloon.

Satellites

Shoemaker-Levy	The story of Shoemaker-Levy 9 – one of the most important comets in modern astronomy.
The Satellite Story	What is a satellite?
What is GPS?	Find out how Global Positioning System (GPS) satellites tell us where we are on Earth.
What Are Comets?	An introduction to the comets orbiting our Sun.
Moon Measuring	How do we measure the distance from the Earth to the Moon?

Asteroid	Objects composed of rocky or metallic materials, mainly found orbiting the Sun in a region called the asteroid belt between Mars and Jupiter.
Astronomy	The branch of science that studies the physical universe beyond Earth's atmosphere.
Aurora	Also known as the Northern or Southern Lights. Natural displays of light in the polar regions, clearly visible in the night sky.
Baryons	A class of subatomic particles that includes neutrons and protons.
Big Bang	The most widely accepted theory for the origin and development of our Universe.
Black hole	An object in space with enough mass in a relatively small region of space that nothing can escape its gravity, not even light.
Comet	A small icy body in the Solar System, with a solid nucleus of rock, dust, ice, and frozen gases such as carbon dioxide, carbon monoxide, and ammonia.

Corona	A small icy body in the Solar System, with a solid nucleus of rock, dust, ice, and frozen gases such as carbon dioxide, carbon monoxide, and ammonia.
Cosmic rays	Highly charged particles, originating from outer space.
Cosmology	The study of the Universe as a whole, rather than specific stars or celestial bodies.
Dark matter	Believed to make up most of our Universe, we cannot see dark matter, and nobody knows what it is.
Cosmic dust	Or interstellar dust, is dust in outer space, often so fine that its particles are more like smoke.
Earth	The planet we live on is the third of the four rocky planets in our Solar System.
Eclipse, lunar	An alignment of the Earth directly in between the Sun and the Moon, so that the earth's shadow falls on the Moon and obscures all or part of it.
Eclipse, solar	When the Moon is aligned directly in between the Sun and the Earth, it obscures all or part of the sun to an observer on the ground.
Elliptical orbit	An orbit in space which follows an oval-shaped path. Any small object orbiting a larger one in space will follow an elliptical orbit.
Galaxy	A collection of billions of stars, along with gas and dust, held together by its own gravity.
Gamma ray bursts	The brightest events in the Universe since the Big Bang; extremely powerful flashes of gamma rays that are believed to originate in massive supernova events.
Hale-Bopp	One of the brightest comets to be seen for many decades, reaching its peak brightness on 1st April 1997.
Halley	The most well-known comet, and brightest of the comets that have a relatively short period orbit.
Launch window	In spaceflight, the time period within which a rocket must be launched in order to achieve the desired orbit or destination.
Light year (ly)	The distance travelled by light in a vacuum in a year, equal to about 9.5 trillion kilometres.
Meteor	A brief streak of light in the night sky caused by a small object, maybe the size of a pebble or even a speck of dust, burning up as it enters the upper atmosphere from space.
Meteor shower	A celestial event in which a group of meteors appear to radiate from the same point and occur in a short period of time.
Meteorite	A rocky fragment from space that survives its fiery passage through the atmosphere and falls to Earth.
Milky Way	The name that we give to our own Galaxy.
Moon	A general name for a natural satellite of a planet, but also the specific name for Earth's only natural satellite.
Nebula	A cloud of gas and dust in space.

Neutron star	An extremely dense star formed when a giant star called a supernova explodes.
Nova	A star which suddenly increases in brightness in an explosive burst of light, and then eventually fades away.
Planet	A self-sufficient celestial body that is in orbit around a star.
Planetary nebula	A glowing cloud of dust and gas surrounding a star towards the end of its life cycle.
Plasma (physics)	A gaseous state of matter which contains a significant proportion of electrically charged particles called ions.
Red giant	A small to medium sized star late in its life, when it has used up its hydrogen in nuclear fusion and starts burning heavier elements.
Robot	A machine that's capable of performing complex tasks on its own, often under computer control.
Satellite	A small celestial body orbiting about a larger one.
Saturn's rings	A series of rings surrounding the planet Saturn.
Solar flare	A violent explosion on the surface of the Sun which affects all the layers of its atmosphere, heating plasma to tens of millions of degrees and releasing huge amounts of energy.
Solar storm	Or geomagnetic storm, a severe disruption of the Earth's magnetosphere that can cripple satellites, and even cause severe damage to electrical systems on the ground.
Solar System	Our Sun and the collection of bodies that are bound to it by gravity.
Solar wind	A stream of charged particles, mainly electrons and protons, emitted from the Sun's outer atmosphere at up to 900 kilometres per second.
Spacecraft	A manned or unmanned machine designed for space flight.
Star	A massive ball of extremely hot gases, held together by its own gravity.
Sun	The nearest star to Earth, and the centre of our Solar System.
Sunspot	Short-lived dark spots on the surface of the Sun.
Supernova	The explosion of a massive star at the end of its life.
Terrestrial planets	Also called rocky planets, the planets in our solar system composed mostly of silicate rocks, and the innermost of the eight planets in our Solar System.
Universe	Everything that exists. All physical matter and energy and the contents of the space between galaxies.
White dwarf	A small, extremely dense star characterised by high temperature and luminosity, no longer capable of nuclear fusion.
Wormhole	A theoretical curvature in space-time that would directly link two points in the Universe, and in theory provide a means of time travel.

EM Spectrum	
The Electromagnetic Spectrum?	Electromagnetic radiation is all around us, but what is it?
What Makes Up the Electromagnetic Spectrum?	What are the different types of radiation that make up the electromagnetic spectrum?
Waves in Medicine	Why the highest energy radiation in the electromagnetic spectrum can be very useful.
Infrared: Snake Hunt	Discover the extraordinary adaptation which allows snakes to hunt in near darkness.
How Do Mobile Phones Work?	Why are microwaves perfect for communication using small mobile phones?
Submarine Communication	How and why are radio waves used in underwater communication?
FactPack: Animal Vision	How do animals view the world differently?

Sound	
What is Sound?	How and why do we hear different noises?
Speed of Sound	What factors determine how fast sounds travel?
Resonance	How does sound change as it passes through different mediums?
Doppler Shift	Discover how sound changes when objects move.
Beyond Human Hearing	Discover the sounds we can't hear and why they can be useful.
Shockwaves	Witness the destructive effects of supersonic speed.
Musical Instruments	What distinguishes music from noise?
Echolocation: Dolphins	How do dolphins use sound to navigate?
FactPack: Decibel Range	How loud is too loud?

Visible Light	
What is Light?	Discover how light allows us to see the world and provides vital energy needed for life on Earth.
Colour	Red, green, yellow, blue – what makes colours different from each other?
Manipulating Light	What happens when light hits an object, or moves through different mediums?
How Do Lasers Work?	How can light be powerful enough to cut through metal?
Fibre Optics	How can light be harnessed to transport information?
Time Travel	We can move freely through space, but is it possible that we could do the same through time?
FactPack: Colour Mixing	Revealing the different ways colour can be made.

Amplify	In general, to increase in size or amount.
Amplitude	In the study of waves, amplitude is the maximum displacement of a wave from its rest position.
Analogue	An analogue signal varies continuously in amplitude, frequency or both.
Angle of incidence	When a ray or beam is reflected from a surface, the angle of incidence is the angle between the incident, or approaching, ray and a line perpendicular to the surface at this point.
Angle of reflection	When a ray or beam is reflected from a surface, the angle of reflection is the angle made between the reflected ray and a line perpendicular to the surface at the point of reflection.
Antenna	A transmitter or receiver that converts alternating electric currents into electromagnetic waves, or vice versa.
Concave	Curving inwards, like the inside of a bowl.
Convex	Curving outwards, like the outside of a ball or boundary of a circle.
Density	Mass per unit of volume.
Diffraction	The bending or spreading of waves when they encounter an obstacle.
Displacement	The shortest distance between an object's start point and end point.
Doppler shift	A change in the observed frequency of a wave when it is emitted from a moving object and observed from a stationary point, or vice versa.
Echo	The reflection of a sound wave back to a listener, so it is is heard again after the original noise.
Echolocation	A technique used by some animals to locate the position of objects around them, by producing sounds and listening to their echoes.
Electromagnetic radiation	A wave with both magnetic and electrical field components, which oscillate perpendicular to each other.

Electromagnetic spectrum	The complete range of wavelengths, considered as a continuum, of all kinds of electromagnetic radiation.
Fluorescent	A fluorescent substance is one that absorbs light at one wavelength and re-emits the energy as light at another wavelength, usually longer, a phenomenon called fluorescence.
Focus	In optics, the point at which rays of light converge after refraction or reflection, and so the point at which a sharp image will be produced.
Frequency	The rate at which a repeating event occurs, usually measured in counts per unit time.
Harmonics	When a musical note is played, we hear the note intended - the fundamental - but also other tones called harmonics that are whole number multiples of the fundamental.
Hertz (Hz)	The SI unit of frequency, one hertz is equal to one cycle per second.
Infrared light	Electromagnetic radiation with a slightly longer wavelength than visible light, between about 0.7 to 300 nanometres.
Infrasound	Sound at frequencies below 20 Hertz, the lower limit of normal human hearing.
Interference	The effect that happens when two waves travelling through the same space meet.
Kilohertz	A unit for measuring frequency, equal to one thousand hertz or cycles per second.
Laser	A laser is a type of optical amplifier that produces light within a very narrow frequency band, and with the peaks and troughs of their electromagnetic waves more or less in step.
Lens	A transparent material shaped to refract light, such that it converges or diverges from a single point.
Longitudinal wave	A waveform in which the vibrations of the medium it is propagated through are in the same direction as the wave's travel.
Luminance	A measure of the amount of light emitted from or passing through a given area.
Magnify	To make an object or image appear larger than its actual size.
Mechanical wave	A mechanical wave is one that is carried by vibrations in a physical medium, and which therefore requires a medium in which to propagate.
Medium	Matter in which something happens, is transmitted, or is stored.
Microwave	Electromagnetic radiation with a wavelength between a few millimetres to about a metre, in between radio waves and infrared.
Modulation	A term used in physics and electronics, modulation means changing some aspect of a periodic phenomenon, generally the frequency, amplitude, or phase of a waveform.
Normal	In physics, the normal is a line perpendicular to a surface.
Octave	The interval between one sound and another that has double the frequency.
Oscillate	To vary from one extreme to another, generally with a regular interval.

Photon	A particle of light or other electromagnetic energy.
Pitch	The perceived frequency of a sound or musical note.
Polarisation	Polarisation is the process by which a transverse wave, such as a light wave is made to oscillate in one plane only.
Prism	A transparent object with flat surfaces that refracts light.
Radio waves	The lowest frequency range of electromagnetic radiation, with wavelengths from millimetres to many kilometres.
Receiver	A device that combines a detector and some kind of signal processing electronics to convert an electromagnetic signal into an electrical signal, or into a comprehensible sound or visual form.
Reflection	The change in direction of a waveform at the boundary between two different media, so the wave returns to the medium in which it started.
Refraction	The change in direction of a wave caused by its change in velocity, as it moves from one medium into another.
Refractive index	A measure of the speed of light in a medium, defined as the ratio of the speed of light in a vacuum, to its speed in the medium under consideration.
Resolution	In measurement and in display systems, resolution is a measure of how much detail can be detected or shown.
Resonance	The large vibrations of an object produced when waves matching its natural resonant frequency pass through it.
Resonant frequency	The frequency at which a material resonates, or naturally vibrates if given an initial impulse.
Shockwaves	A large amplitude compression wave, associated with a sharp change in pressure, temperature and density.
Sonic boom	The loud bang caused by a plane or other object flying faster than the speed of sound.
Source	In general, the point of origin. For example, the source of a sound wave is where it originates from.
Spectrometer	An instrument that measures the intensity of electromagnetic radiation over a range of wavelengths.
Spectrum	A continuous range of frequencies of electromagnetic radiation, such as that produced when white light is refracted through a prism.
Supersonic	Travelling faster than the speed of sound in a given medium.
Telescope	An optical device that uses lenses or mirrors to magnify and observe distant objects.
Total internal reflection	The complete reflection of a light ray within a transparent material.
Transmitter	An electronic device that produces radio waves with an antenna, usually for communication or measurement purposes.
Transparent	Capable of transmitting light, or more generally something that allows radiation to pass through relatively unhindered.

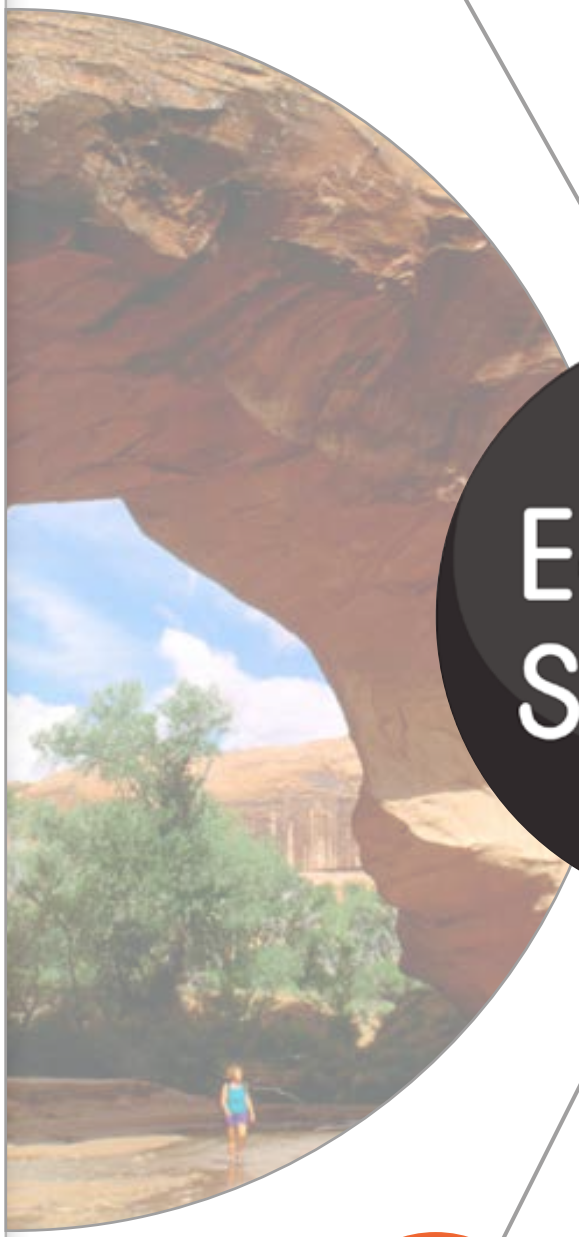
Transverse wave	A moving wave in which the oscillations of the medium are at a right angle to the direction of travel.
Ultrasound	Sound with a frequency above the normal range of human hearing, or 20,000 hertz.
Ultraviolet light	Electromagnetic radiation in the region of the spectrum between visible light and x-rays, about ten to 400 nanometres in wavelength.
Visible light	The portion of the electromagnetic spectrum that our eyes can see.
Volume	The amount of space a substance occupies.
Wavelength	The distance between corresponding points on two successive waves, and therefore the length of a complete cycle of a wave.
X-ray	Electromagnetic radiation present between ultraviolet and gamma rays on the electromagnetic spectrum, with wavelengths from about 0.01 to 10 nanometres.

Dancing Polymer	We create a polymer using cornflour and water called oobleck. Oobleck is a non-Newtonian liquid that behaves like a solid and a liquid. When placed on a speaker, the vibrations cause the polymer to constantly change its behaviour and it appears to dance.
Rubens' Tube	We create a Rubensâ€™ Tube to demonstrate the movement of sound waves. A tube lined with holes is filled with propane and connected to a speaker. We light the gas coming from the holes and play different frequencies and volumes of sound through the gas inside. This creates waves in the flames. We also play music through the tube to see the patterns that are created.
Splitting Light	We use a prism to split white light into its constituent colours. Light is passed through a slit in a screen before it hits the prism. The prism refracts the light and we can see the different colours. A second slit can be used to see the different colours clearly.
Bell in a Vacuum	We look at how a vacuum affects how sound travels. An alarm is set off and placed under a bell jar. The air is removed from the jar to create a vacuum. We can still see the hammer of the alarm clock moving, but cannot hear the sound. This demonstrates that sound cannot travel through a vacuum.
Measuring Music	We use a sounding board called a sonometer to investigate how the pitch of sound changes when the length of wire being plucked changes. We change the position of a moveable bridge to change the length of the wire and discover that different notes are mathematically related.

Earth Science

Earth's Resources

Human Impacts



Weather

Geology

Future of Energy Resources	
Nuclear Power	Is this powerful energy resource worth the risks and controversy that come with it?
Making a Star on Earth	Is large-scale nuclear fusion possible?
Eco-Transport	What will the future car run on – electricity, biofuel or hydrogen?
Chernobyl Disaster	Discover what happened in the world's worst nuclear power plant disaster.
Nuclear Waste	Find out why we can't just throw nuclear waste in the bin.

Non-Renewable Energy	
Fossil Fuels: Formation	How the fossil fuels we use today were formed over millions of years.
Fossil Fuels: Use	Why and when finite fossil fuels will be used up.
The Carbon Cycle	Learn how the constant biochemical exchange of carbon is vital to life on Earth.
Oil Shocks	What causes dramatic shifts in oil prices?
Electricity: Supply and Demand	Discover the difficult balancing act to meet energy needs.
Electricity: The Costs	Low electricity prices encourage higher consumption – but what is the true cost?
Frontier Oil Exploration	How far will we go to find oil?

Renewable Energy	
Solar Power	Can we capture the Sun's energy?
Wind Power	Why don't we use wind power more?
Biofuels	Are biofuels a green alternative to petrol and diesel?
Palm Oil: Biofuel of the Future?	Discover the positive and negative impacts of palm oil biodiesel.
Geothermal Power	How can we harness the heat produced deep within our planet?
The Wind Power Debate	An introduction to the pros and cons of wind farms.

Water as a Resource	
Hydropower	Find out how to capture the power of water.
Water as a Resource	Examine the causes and effects of water shortages.
Building the Hoover Dam	Discover how and why the Hoover Dam was built.
Bottled Water: The True Cost	Explore the monetary and environmental costs of bottling water.
Marine Renewables	How can we harness the power of the sea?

Coke	A fuel produced by heating coal in the absence of air.
Fossil fuels	Fuel formed over millions of years, in conditions of high heat and pressure, from the fossilised remains of dead organic matter such as plants and animals.
Renewable energy	Energy from natural resources that replenish or renew themselves, or we can consider inexhaustible, such as sunlight, wind, tidal and wave power.
Solar cell	Also called a photovoltaic cell, a device that converts light directly into electricity.
Sustainable	A sustainable process is one that can be continued without damaging the environment or exhausting natural resources in the long term.

"...there is so much information out there. I don't have time... collating bits of information... With Twig films, it's exactly what I need. I know I won't have to edit it. It's there. I use it. Simple. Done."

- Teacher

Coastal Erosion	
Weathering	Rocks are tough – find out why nature is tougher.
Coastal Processes: Waves	How do waves shape our coastline?
Coastal Landforms	An introduction to unusual coastal land formations and how they are created.
Coastal Processes	Find out how these geological processes shape our coastline.
Coasts: Hard Engineering	Explore the different ways in which these solutions to the problems of coastal erosion work – and the positive and negative effects.
Coasts: Soft Engineering	Explore the different ways in which these solutions to the problems of coastal erosion work and how they compliment natural processes.
How Do Caves Form?	What processes create caves?

Earth's Rocks	
Rock Cycles	Nothing stands still on Earth, not even rocks.
Rock Types	How are different rocks formed?
Earthly Treasures: Gold	Why is gold revered as a precious metal?
Earthly Treasures: Diamonds	What makes diamonds so valuable?
Earthly Treasures: Precious Gemstones	How are emeralds, rubies and sapphires formed?
Limestone: Features	Limestone is one of the most commonly found rocks on Earth and it has many unique features.
Limestone: Uses	Formed over millions of years, limestone has many forms and uses.
Quarrying: Impacts	Quarries are vital for extracting rock, but what are their impacts on the environment?
Quarrying: Managing Damage	How do we manage the negative impacts of quarrying?

Earth's Structure

Structure of the Earth	See the hidden layers deep beneath the Earth's crust.
Fold Mountains: Formation	How did mountain ranges like the Alps and the Himalayas form?
Plate Tectonics	How the Earth's moving plates cause earthquakes, volcanoes and tidal waves.
Fold Mountains: Uses	What can humans use the steep, rocky terrain of fold mountains for?
How Did the Grand Canyon Form?	How was the Grand Canyon formed, and what does it tell us about the past?
How Hot Is Earth's Core?	We can't go to the Earth's core – so how do we know how hot it is?
How Did the Continents Form?	How did early land masses change and converge to form the continents we know today?
Land Formations	An introduction to the geological forces which sculpt our landscape.
FactPack: Mountains	How tall are the tallest mountains?

Earthquakes

What is an Earthquake?	What causes earthquakes?
Tsunami	Discover the most destructive type of wave on the planet.
Living on the Edge	How can cities be protected from the effects of earthquakes?
Predicting Earthquakes	Can we predict earthquakes?
Earthquakes: LEDC Response	As an LEDC, how did Haiti respond to the devastating 2010 earthquake?
Earthquakes: MEDC Response	As an MEDC, how did Japan respond to the devastating 2011 earthquake and tsunami?
Santorini: Looking for Atlantis	Could the story of Atlantis be more than just a myth?
Christchurch Earthquake	How did an earthquake cause so much destruction?

Glacial Erosion

Weathering	Rocks are tough – find out why nature is tougher.
Glaciers	How glaciers shape the world.
Scablands: Carved By Water	Discover how a glacial flood created 40,000 km of North America.
Yosemite's Valleys	Journey to a landscape transformed by the power of ice.

River Erosion

Weathering	Rocks are tough – find out why nature is tougher.
Waterfalls and Gorges	Waterfalls and gorges are some of Earth's most impressive natural features, but how are they formed?
Meanders and Oxbow Lakes	Meanders and oxbow lakes are commonly found in the middle course of a river. What are these features and how are they linked?
Depositional Features	Explore the unique features created by flooding at the end of a river's course.
How Are Rivers Formed?	The formation of a river, from source to sea.
How Did The Grand Canyon Form?	How was the Grand Canyon formed, and what does it tell us about the past?

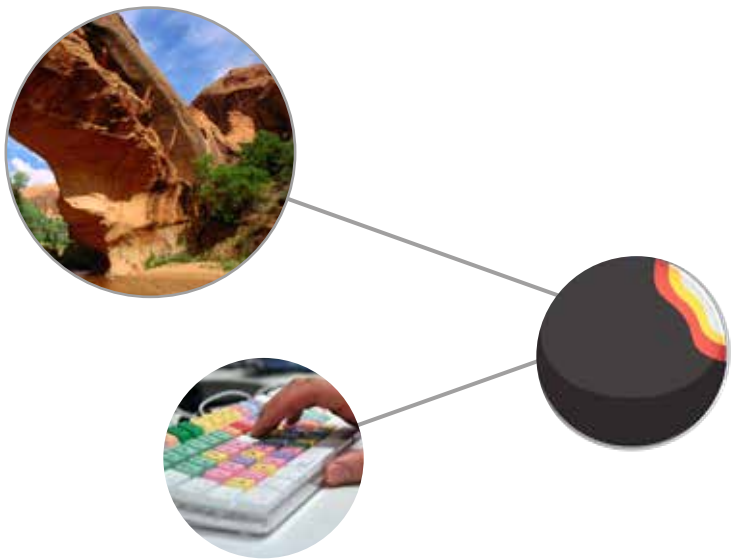
Volcanoes

What is a Volcano?	What is a volcano and what role does lava play in its construction?
Predicting Volcanic Eruptions?	Can we tell when a volcano is about to erupt?
Yellowstone: Supervolcano	What secret is hidden in Yellowstone National Park?
Danger: Volcanic Ash	A first hand account of the dangers of flying through a volcanic ash cloud.
The Last Day of Pompeii	A dramatic re-enactment of the fateful hours after the eruption of Mt. Vesuvius in 1st century AD.
Kilauea: The Island Maker	Discover the world's most active volcano.
Volcanoes: LEDC Response	As an LEDC, how did the Democratic Republic of the Congo respond to the 2002 eruption of Mt. Nyiragongo?
Volcanoes: MEDC Response	As an MEDC, how did the United States of America respond to the 1980 eruption of Mount St Helens?
FactPack: Extreme Eruptions	Extreme volcanoes from around the world that could pose a danger to humans.

Altitude	Height above sea level or other reference point on the Earth's surface.
Aquifer	An underground layer of porous rock or other material that is permeated with water.
Basalt	A dark, fine-grained igneous rock that forms most of the Earth's crust.
Caldera	A large cauldron-like volcanic feature, formed when a chamber full of magma empties and the ground above it collapses.
Continental crust	The uppermost layer of the Earth that forms the continents and coastal sea floor, sitting on top of a layer of denser rock called the mantle.
Continental Drift	The theory that the continents are not fixed in place but move around the planet.
Core (Earth sciences)	The central, usually hottest and densest, part of a larger structure, for example a star, planet or galaxy.

Crater	A bowl-shaped depression, usually circular, in the surface of a planet or moon.
Crust	The surface layer of a rocky planet or other astronomical body, usually chemically distinct from the mantle beneath it.
Delta	A geographical feature formed where a river reaches the sea or other large body of water into which it empties.
Desertification	The degradation of usable land into desert.
Earthquake	A shaking of the Earth's surface due to a release of energy within the crust that generates seismic waves.
Epicentre	The position on the Earth's surface directly above the point at which an earthquake originates.
Erosion	The wearing away of rock and the removal of weathered rock, soil, and other solid materials away from source.
Extrusion	The process of magma coming to the surface, either in steady flows or violent eruptions, and cooling to form rocks.
Floodplain	Flat land around a river or stream that is prone to occasional or frequent flooding.
Fossil	Any trace of an animal or plant that lived a very long time ago.
Glacial period	A period during a longer ice age when temperatures are particularly cold, and glaciers and ice sheets extend over a larger part of the planet.
Groundwater	Water that fills spaces in porous rocks, sediments and soil, below the level of the water table.
Hot spot	A fixed place within the mantle or oceanic lithosphere where rocks melt to generate magma.
Igneous	Rocks that form by the cooling and solidification of magma or lava.
Interglacial period	A period of warmer climate in between the glacial periods of an ice age.
Limestone	A sedimentary rock composed mostly of calcium carbonate; relatively soft, and light brown in colour.
Lithosphere	The upper layers of the Earth, consisting of the crust and upper mantle, as opposed to the more fluid lower mantle and core.
Long-period events	Earthquakes with relatively low-frequency vibration, caused by sudden changes of pressure inside volcanoes and magma channels.
Magma	Molten rock below the surface of the Earth.
Mantle	The middle portion of the Earth's interior, between the outer crust and the core.
Metamorphic rock	Naturally occurring rock that has been transformed by heat and pressure in the Earth's crust.
Metamorphism	The transformation of rocks beneath the Earth's surface through heat and pressure, and the presence of dissolved minerals in hot groundwater.
Oceanic crust	The uppermost solid layer of the Earth beneath the oceans.

P-wave	A fast-moving seismic wave produced by an earthquake.
Pangaea	The supercontinent that included all of Earth's land surface about 200-300 million years ago.
Plate boundary	Boundaries where the Earth's tectonic plates meet, where crust can be made, destroyed, and deformed as adjacent plates move.
Pyroclastic flows	Fast-moving ground-level flows of hot gases and rock fragments, dust and ash from a volcanic eruption.
S-wave	One of two types of seismic wave produced in an earthquake.
Seafloor spreading	The spreading of the seafloor around mid-ocean ridges as new rock is formed in between two tectonic plates.
Sediment	Naturally occurring debris, often the product of weathering of rocks, carried by wind or water and deposited in a new location.
Sedimentary rock	Rock formed by the build up of layers of sediment over time.
Subduction	The process that takes place when two tectonic plates collide together, and one is pushed under another.
Topsoil	The uppermost 5 to 20cm of soil, with a high concentration of organic matter and microorganisms, where almost all of the biological activity in soil takes place.
Trench	An oceanic trench is a deep, narrow depression in the ocean floor along a subduction boundary where one tectonic plate is pushed under the other.
Water table	The level below which the ground is completely saturated with water.
Weathering	The breakdown of rock into smaller pieces by physical and chemical processes at the Earth's surface.



Changing Atmosphere

The Ozone Layer	What caused the hole in the ozone layer, and how have we successfully reduced it?
The Greenhouse Effect	Is the greenhouse effect now threatening our planet's future?
Global Warming	What is global warming and how can we stop it?
Natural Climate Change	What do ice-cores tell us about the Earth's climate history?
Ocean Conveyer	Discover how a super-current controls global climate.
Beetles	Discover how beetles have revealed climate change throughout history.
Climate Cycles	What can glacial ice cores tell us about global climate cycles?
State of the Greenland Ice Sheet	Is the Greenland Ice Sheet growing or shrinking?
The Big Chill	Why is the most important oceanic current in the world under threat?
Climate Models	Can we predict the future of Earth's climate?
The Great Global Warming Debate: Part 1	Is the world getting warmer?
The Great Global Warming Debate: Part 2	Is global warming unprecedented or could it be a natural phenomenon?
Global Dimming	Discover the climate change paradox – why less sunlight is reaching Earth's surface.
Inventions to Save the Planet	The futuristic technology that could manipulate Earth's climate.
Clathrate Gun Hypothesis	Discover the greenhouse gas which could cause climate catastrophe.

Humans and the Carbon Cycle

The Carbon Family	Get a domestic perspective on pollution. How big is the average family's carbon footprint?
Carbon Capture: Phytoplankton	Discover how mysterious micro-organisms in the oceans could save our planet.
Carbon Trading	Will government caps help industrial polluters to reduce their carbon footprint?
Carbon Capture: Artificial Trees	Investigate the artificial trees of the future.
The Future Carbon Family	How the average family can help save our planet – a domestic perspective on 'greenliving'.

Pollution	
Pollution: Water	Explore the causes and effects of water pollution.
Pollution: Land	Explore the causes and effects of land pollution.
Pollution: Air	Explore the causes and effects of air pollution.

Oil Spills	What is an oil spill and how can it be dealt with?
The Oilmen and the Animals	Does nature have to suffer in our search for resources?
Deforestation	Find out why destroying the rainforest could endanger the future of our planet.
Ecosystem Management: Deserts	Explore the different uses desert ecosystems are put to in MEDCs and LEDCs.
Ecosystem Management: Tropical Rainforests	Find out why the most important ecosystem on our planet needs our help.
Ecosystem Management: Deciduous Forests	Find out how conservation helps to keep these important ancient ecosystems thriving.

Acid rain	Rain that is unusually acidic, with a pH less than 5.
Aerosol	A suspension of very fine liquid or solid particles in a gas.
Biodegradable	Easily broken down by biological activity, especially bacteria in the soil.
Chlorofluorocarbons	A class of compounds based on simple hydrocarbons like ethane, methane and propane, in which hydrogen atoms are replaced by chlorine and fluorine.
Greenhouse effect	The effect caused by some atmospheric gases trapping heat close to a planet's surface.
Greenhouse gas	Any gas in the atmosphere that absorbs and re-emits radiation in the infra-red range, so warming the atmosphere and planet's surface.
Smog	From 'smoky fog', smog is a form of pollution often associated with cities.

"The best thing is that there are no old professors talking for 5 minutes!"

- Pupil

Water	
Types of Weather: Rain	How do water molecules form rain?
The Water Cycle	Discover the cycle that began billions of years ago through which all Earth's water travels.
Cloud Seeding	How are scientists around the world making rain?
What is a Rainbow?	Investigate the light-splitting process that forms a natural wonder.
Avalanches	What causes these giant snow slides?
Galtür: The Perfect Storm	What caused the devastating avalanche that hit the village of Galtür in Austria?
How the Oceans Formed	Where did Earth's water come from?
Deserts	Why are deserts so dry?
Thunder and Lightning	What happens inside storm clouds to create thunder and lightning?
The Lost City of Peru	Could the weather have destroyed a great civilisation?
FactPack: Weird Weather	Find out about some weird and wonderful weather phenomena.

Weather Systems	
Weather Systems	What causes weather and how can we predict it?
Types of Weather: Introduction	Learn how the movement of air is at the heart of all weather.
Coriolis Effect	How does Earth's rotation influence our weather systems?
Climate Zones	Why does Earth's climate vary across the globe?
High and Medium-Level Clouds	Can you tell the difference between the different types of cloud?
Monsoon Zone	Discover where changes in wind direction produce the biggest rain storms on the planet.
Killer Heat Wave	The story of five days of unusually hot weather which brought disaster to the city of Chicago.
Low-Level Clouds	How do different cloud types affect our weather?
Climate Influences	What causes the world's varied climate zones?
El Niño	Discover the natural phenomenon that produces some of the world's most chaotic weather.
FactPack: Superstorms	How many times a day does lightning strike the Earth?

Wind	
Types of Weather: Wind	What is the wind and where does it come from?
Hurricanes	Hurricanes are destructive and powerful, but where do they come from?
Storm Surges	Discover why, during a hurricane, the ocean can be the biggest threat.
What is a Tornado?	What do scientists know about these mysterious storms?
Hurricane Katrina: Part 1	Flood defences were designed to protect the city – so why was New Orleans devastated by Hurricane Katrina?
Hurricane Katrina: Part 2	Discover what caused the devastating floods in New Orleans.
FactPack: Beaufort Scale	How powerful is the wind?

Anticyclone	A high-pressure weather system with winds spiralling outwards from the centre.
Atmosphere	A layer of gas surrounding a planet or star, held in place by gravity.
Climate	The long-term average weather conditions in a region, typically over a period of thirty years or more.
Climatology	The study of climate, long-term weather patterns and behaviour, rather than its short-term fluctuations.
Depression	An area of low pressure, formed between polar and tropical latitudes when warm and cool air meet and begin to swirl around each other.
Lightning	A high-current electrical discharge in the atmosphere that may occur during thunderstorms, or sometimes dust storms or volcanic eruptions.
Mesosphere	The layer of the atmosphere above the stratosphere but below the thermosphere, from 50 to 85km altitude.
Millibar (mb)	A unit of pressure widely used for expressing atmospheric pressure.
Ozone layer	A layer in the Earth's atmosphere at 13 to 20km altitude with an unusually high concentration of ozone gas.
Sampling	The method of using a small part of something to represent the whole.
Stratosphere	The second layer of the Earth's atmosphere, above the troposphere and below the mesosphere.
Temperate zones	The regions of the Earth in between the Tropic of Cancer and arctic circle in the northern hemisphere, and the Tropic of Capricorn and Antarctica in the south, that have less extreme temperatures than the poles and equatorial regions.
Troposphere	The lower and most dense part of the atmosphere, extending to an altitude of about 20km at the equator and 11km at the poles.
Weather	The state of the atmosphere at a specific time and place, including factors such as temperature and pressure, wind speed, and precipitation.

Additional Science Terms

Accuracy	An accurate measurement is one that is close to the true value, though it may show a spread of values around the correct value when the measurement is repeated.
Billion	One thousand million, or ten to the power of nine in scientific notation.
Control	A vital reference in a scientific experiment, to which the system under test can be compared.
Correlation	How closely the changes in one set of data follow the changes in another.
Data	A collection of pieces of information, organised and categorised for some purpose.
Hypothesis	An idea or suggestion that is put forward to be tested.
Mean	The average value of a set of data, calculated by adding all the values and dividing by the number of values.
Median	The middle value of a list of data arranged in incremental order.
Observer	In physics, an observer is a person or system that records some observable property of a system, such as the velocity of an object.
Peer review	The practice of independent experts reviewing an academic paper or research, to scrutinise the quality and importance of the work and check for errors.
Precision	How repeatable a measurement is.
SI	SI is the International System of Units.
Theory	An explanation or model that is logical, testable, and predictive.
Variable	A factor, condition or parameter that can be observed and measured in the course of scientific research.

Orientation and Settlements

Human Geography

A Changing World

Changing Lives

Overpopulation	How many people are too many? Discover the population capacity of our planet.
Could Climate Change Your Life?	What effects could climate change have on populations around the world?
Feeding the Planet	How will we cope with a global food shortage?
Brazil: Life in a Favela	What is life like in one of Brazil's biggest slums?
India: Curbing Population Growth	Discover the voluntary and compulsory measures used to tackle India's growing population.
Japan: Encouraging Population Growth	What are the problems of an aging population? And what can be done to tackle it?
Manila: Megacity	What is life like in one of the most densely populated cities in the world?

Globalisation

What is Globalisation?	How has technology changed the world we live in, and the rate of development?
A Global Village	Explore the impact of improving communications networks on towns and cities around the world.
Transport Networks	Why are transport networks so vital in global trade?
Brazil: Life on a Plantation	What is life like on a sugar cane plantation, and how is increased mechanisation affecting Brazil's sugar cane cutters?
Traffic Congestion	Discover the causes and impacts of traffic congestion.
Brazil: Agricultural Revolution	Find out about the new agricultural methods being pioneered in Brazil to produce more, using less.

Humans and the Carbon Cycle

The Carbon Family	Get a domestic perspective on pollution. How big is the average family's carbon footprint?
Carbon Capture: Phytoplankton	Discover how mysterious micro-organisms in the oceans could save our planet.
Carbon Trading	Will government caps help industrial polluters to reduce their carbon footprint?
Carbon Capture: Artificial Trees	Investigate the artificial trees of the future.
The Future Carbon Family	How the average family can help save our planet – a domestic perspective on 'greenliving'.

Unequal World	
Global Inequalities	Discover why where you live can affect every aspect of your life.
LEDCs	What determines whether a country is Less Economically Developed?
MEDCs	What are the defining characteristics of a More Economically Developed Country?
LEDCs: Barriers to Development	What are the factors preventing countries from becoming more economically developed?
International Trade: An Unequal Relationship?	Discover the balance of power between countries when they trade.
Demographic Transition Model	How do population dynamics change as countries become more developed?
Brazil:The Wealth Divide	Discover the different lives of the rich and poor in Brazil.
Fair Trade	How does Fair Trade improve the lives of farmers around the world?
Sapphires: A Fair Trade?	Discover the dangers of Madagascan sapphire mines, and who stands to profit.
Different Types of Aid	Aid is an important factor in helping countries recover from disasters. But what is aid?
The Issues With Aid	Aid comes in many different forms. What are the advantages and disadvantages of each type?

"Twig makes it easy to understand relatively complex ideas"

- Pupil

Mapping Earth

Ways of Looking at the World	Discover the many different ways we can survey our planet.
Ordnance Survey Maps	Learn how modern technology has transformed the way these world-famous maps are created.
The Longitude Problem	Discover how one man revolutionised maritime navigation with a watch.
Time Zones	What time is it? Well, that depends where on Earth you are!
Mapping the Sea	How do we map the sea? And why is it so important that we know what lies beneath the ocean's surface?

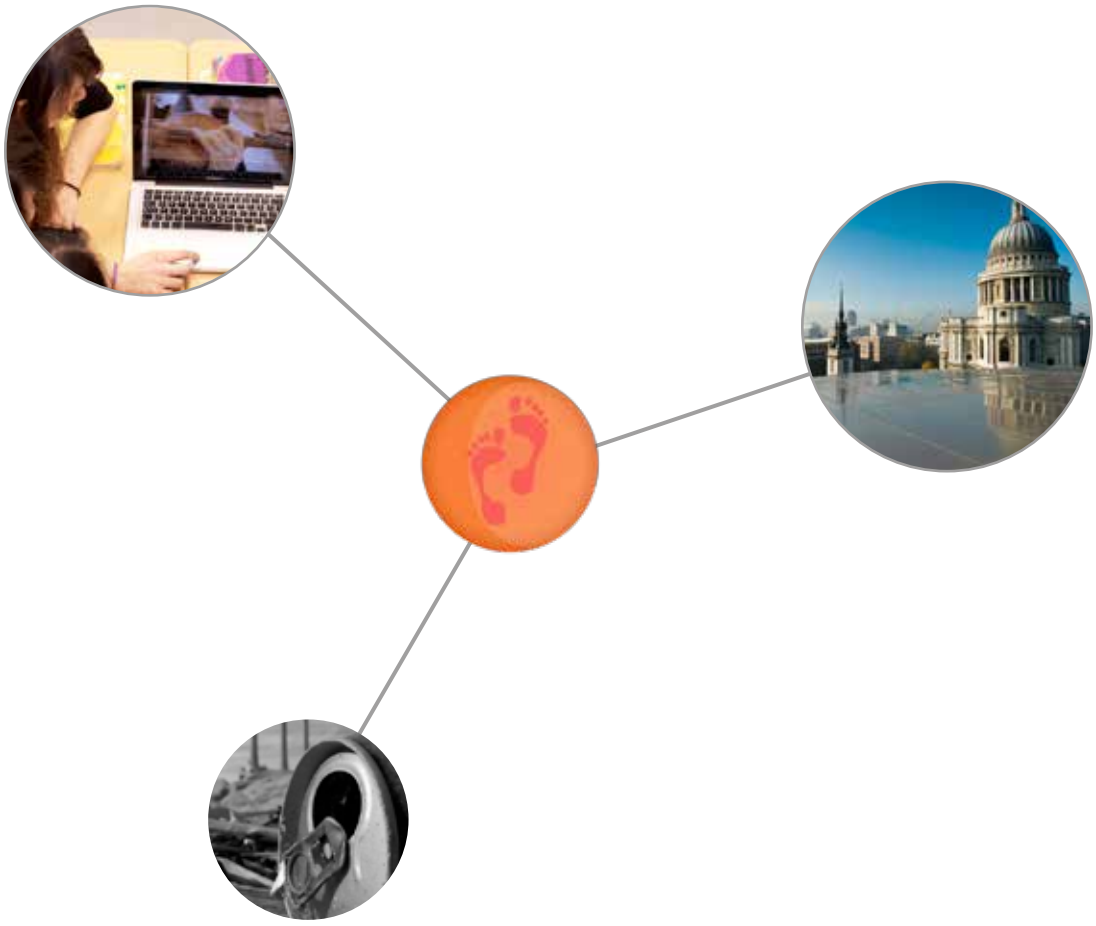
Town vs Country

Settlement Resources	Which infrastructures are vital to creating sustainable settlements?
Urban Land Use Models	Learn about models which explain the layout of urban settlements.
Rural Settlements	Discover how rural settlements are changing in the face of Urbanisation.
Rural-Urban Fringe	Where the city meets the country is called the Rural-urban fringe. What are the distinctive characteristics of this area?
Rural Deprivation	Why are many rural areas around the world in decline?
Protecting St Paul's	Discover the urban planning laws that maintain London's historic skyline whilst allowing modern developments.
Brownfield Sites	What are Brownfield sites, and do they provide an answer to housing shortages?

Travel and Migration

Census: Counting People	Why do we need to know how many people live in a country?
Butler's Tourism Model	The life of a tourist resort passes through six distinct stages which are shown in Butler's Tourism Model.
China's Mass Migration	Find out why rural farmers in China are heading for the bright lights of Shanghai.
Illegal Immigration: Crossing the Sahara	The dangers faced by illegal immigrants seeking a way into Europe.
Hawaii: Impacts of Tourism	The positive and negative impacts of global tourism on the people of Hawaii.
Namibia: Ecotourism	Can global tourism and local interests coexist successfully?
Mass Tourism: Case Study	Can the beautiful environment of Thailand withstand the pressure of mass tourism?

Where We Live	
Population: Physical Factors	How does the physical environment determine where settlements are built?
Populating the World: Migration	Learn about the human factors which determine migration patterns.
Urban Settlements	What are the common characteristics of urban settlements across the world?
Brazil: Ethnic Diversity	How has Brazll become one of the most racially diverse countries in the world?
Extreme Living: The Frozen North	How do people survive in extremely cold environments?
Extreme Living: The Sahara	Find out how NASA technology revealed a life-changing secret beneath the Sahara's sand dunes.
Extreme Living: Nomads	Discover what life is like for one of the few remaining nomadic tribes on the planet.
Settlements and Apartheid	Discover how racial segregation policies changed the face of Johannesburg.
Tuvalu: The Threat of Rising Seas	Discover why the tiny island nation of Tuvalu might soon disappear forever.



Maths

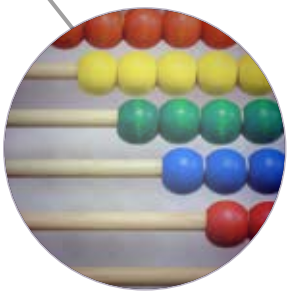
History of Maths

Accuracy and Proof

Statistics and Probability

Shape

Space



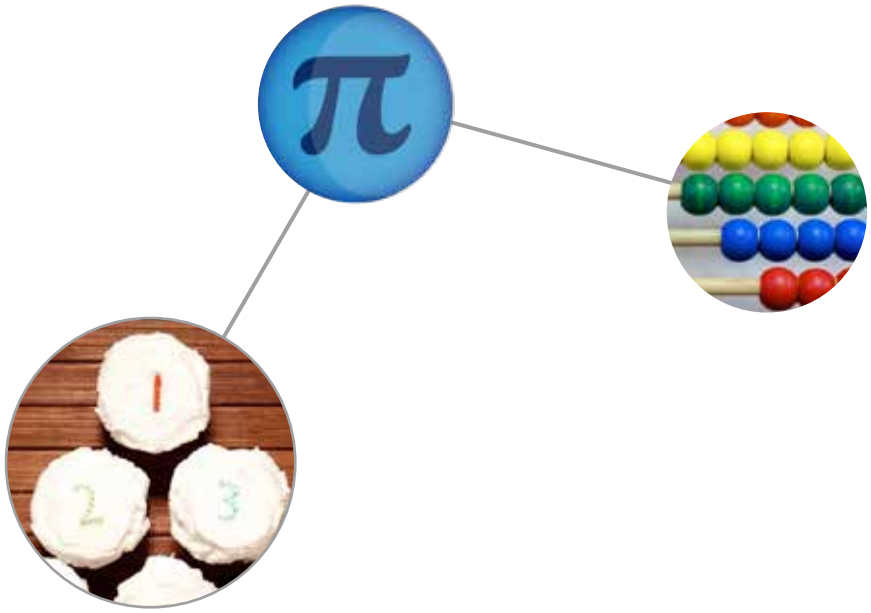
Measurement

Number

Algebra

Accuracy and Estimation	
Jai Singh	Why did the Maharaja build the biggest observatories in the world?
Rounding: Snails vs Rockets	Discover why rounding numbers is both useful and necessary, by looking at two extreme cases.
Counting Crowds	1.8 million people watched Obama's inauguration speech – but who counted them?
Volume: Counting Stars	Revealing how astronomers count the number of stars in the sky.
Speed of the Earth	Calculate how fast Earth is speeding through space.
How Long is a Metre?	Who decided how long a metre is, and how did it become the standard metric measure?

Proof	
The Greeks and Proof	Witness how the Ancient Greeks managed to prove mathematical reasoning beyond doubt.
Proofs: Million-Dollar Maths	Learn how proving a famous hypothesis could net you $1,000,000.
How Origami Changed the World	Discover the surprising applications of the paper-folding art of Origami.



Algebraic Modelling	
How Algorithms Change the World	Find out how mathematical functions influence human behaviour.
Variables: Dating By Numbers	Could an algebraic formula get you a date?
Tank Wars	The amazing prediction made using algebra that helped to win World War II.
Algorithms: Turing	Learn how Alan Turing developed the simple mathematical foundation of computing science.
The Birthday Paradox	Explore the likelihood of you sharing your birthday with someone in the same room.

Coordinates	
Coordinate Geometry: Descartes	Discover how Descartes developed the (x,y) coordinates so familiar today.
Vectors: Air Traffic Control	What are vectors and how do they make air travel safe?
Cartesian Coordinates	Learn how coordinates describe a point in space in one, two, three, or even four dimensions!

Equations	
The Heartbeat Formula	Discover the formula that can predict how long a wild mammal will live.
Heptathlon	A demonstration of the complex scoring system used to place heptathletes.
The Chase	Can you calculate how long the zebra has to escape the pursuing lion?
The Arabic Science of Balancing	Discover the fundamental principle of algebra.
European Mathematical Symbols	Find out when and why mathematical symbols were invented.
Diophantine Equations: Fermat	Find out why a mathematician's scribbles became one of the world's most difficult maths problems.

Sets	
Set Theory: Cantor	Find out how Cantor's work on set theory shaped his life.
Venn Diagrams: Global Habitats	Learn how to compare the relationships between rainforest and desert environments.
Sets: Infinity	Discover why there are two different types of infinity.

Great Mathematicians 1	
Jai Singh	Why did the Maharaja built the biggest observatories in the world?
Irrational Numbers: Pythagoras	Find out why the discovery of irrational numbers is said to have led to murder.
Calculating Pi: Archimedes	How was Pi first accurately calculated?
Geometry: Euclid	What were the simple rules Euclid set out that form the basis of Geometry?

Great Mathematicians 2	
Coordinate Geometry: Descartes	Discover how Descartes developed the (x,y) coordinates so familiar today.
Calculus: Newton	Discover how Newton's study of movement led to a revolutionary new branch of mathematics.
Set Theory: Cantor	Find out how Cantor's work on set theory shaped his life.
Algorithms: Turing	Discover how Alan Turing developed the simple mathematical foundation of computing science.
Diophantine Equations: Fermat	Find out why mathematician's scribbles became one of the world's most difficult maths problems.
Number Theory: Gauss	The patterns that allowed a seven-year-old mathematician to perform amazing calculations.
Degrees of Separation: Erdös	What's your Erdös number?

Maths in Modern History	
Tank Wars	The amazing prediction made using algebra that helped to win World War II.
Beating the U-Boats	Find out why Churchill's Navy relied on geometry to protect supplies during World War II.
Enigma: Cracking the Code	Find out why the Nazi's message encoding mechanism proved so difficult to crack.
Numbers: Life Without Numbers	Meet the Aboriginal tribe who manage with only numbers 1, 2 and 3.
How Long is a Metre?	Who decided how long a metre is, and how did it become the standard metric measure?
Decimals: Decimal Day	Discover what happened when the United Kingdom changed to a decimal currency.
How Origami Changed the World	Discover the surprising applications of the paper-folding art of Origami.
The Prime Number Code	Discover why prime numbers hold the key to encryption.

Maths Through the Ages 1	
The Babylonians and Plimpton 322	See the surprisingly familiar numbers that appear on this ancient tablet.
The Egyptians and Unit Fractions	The legend that led the Egyptians to use a complex system of fractions.
The Egyptians and Multiplication	Find out how the Egyptians tackled multiplication, using powers of two.
Building the Pyramids	See how Egyptian builders used triangles to create perfectly symmetrical pyramids.
The Greeks and Proof	Witness how the Ancient Greeks managed to prove mathematical reasoning beyond doubt.
The Romans and Numerals	Discover why the Romans were such terrible mathematicians!

Maths Through the Ages 2	
India and Negative Numbers	Find out why one of the most positive contributions of Indian mathematicians was, in fact, negative!
The Arabic Science of Balancing	Discover the fundamental principle of algebra.
European Mathematical Symbols	Find out when and why mathematical symbols were invented.
Numbers: The Discovery of Zero	The number zero has not always existed – why was it 'invented'?
Chinese Development of Maths	A summary of the independent development of Chinese mathematics.

Accuracy and Estimation	
How Long is a Metre?	Who decided how long a metre is, and how did it become the standard metric measure?
Jai Singh	Why did the Maharaja build the biggest observatories in the world?
Volume: Counting Stars	Revealing how astronomers count the number of stars in the sky.
Speed of the Earth	Calculate how fast Earth is speeding through space.
Rounding: Snails vs Rockets	Discover why rounding numbers is both useful and necessary, by looking at two extreme cases.
Counting Crowds	1.8 million people watched Obama's inauguration speech – but who counted them?

Proof	
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The Greeks and Proof	Witness how the Ancient Greeks managed to prove mathematical reasoning beyond doubt.
Proofs: Million-Dollar Maths	Learn how proving a famous hypothesis could net you $1,000,000.

Ratio and Proportion	
The History of the Golden Ratio	Introducing the beginnings of the Golden Ratio, and how it has endured throughout time.
Maths and the Mona Lisa	Discover how Da Vinci used this ancient ratio to enhance his famous portrait.
The Beauty Formula	Can mathematics explain what we find beautiful?
Proportion: The Vitruvian Man	Learn how Da Vinci used geometry to create the 'perfect' human.
Ratios: The Maths of Baking	Learn how to bake a cake as big as you like!
Ratios: Currency Exchange	Learn how to convert currencies – and make a profit!
Aiming for the Outer Planets	Discover the maths that helped send a spacecraft deeper into space than ever before.

Scale and Perspective	
Queen Hatshepsut's Ship	Can a team of archaeologists use scale to recreate this ancient ship?
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Perspective: Parallax	Find out why closing each eye seems to cause an object to move – and how this can help measure extreme distances.
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Binary	
Binary: What is Binary?	The number system that lets you to count to over a thousand using just ten fingers.
Binary: The Computer Language	Why is binary the computer-programmer's code of choice?
Binary: The Alien Language	Discover why Scientists use binary code to try to communicate with extra-terrestrial life.

Decimals and Fractions	
Why Do We Count in Tens?	Number systems can be based on any number – why is ten so popular?
Decimals: Decimal Day	Discover what happened when the United Kingdom changed to a decimal currency.
Decimal Places: Photofinish	Why decimal places are needed for the world's fastest sprint.
Fractions: Slow Motion	How videos use fractions to slow or speed up moving images.
The Egyptians and Unit Fractions	The legend that led the Egyptians to use a complex system of fractions.
Fractions: Pythagorean Tuning	Discover how music is created using fractions.
Fractional Reserve Banking	Discover the banking system that means your bank can lend out the money you deposit.

Integers and Natural Numbers	
Numbers: The Discovery of Zero	The number zero has not always existed. Why was it 'invented'?
The Sardine Run	Watch as predators from positive and negative altitudes threaten a sardine shoal.
Numbers: Animal Maths	Can animals really count?
Numbers: Life Without Numbers	Meet the Aboriginal tribe who manage with only numbers 1, 2 and 3.
The Babylonians and Plimpton 322	See the surprisingly familiar numbers that appear on this ancient tablet.
The Egyptians and Multiplication	Find out how the Egyptians tackled multiplication, using powers of two.
The Romans and Numerals	Discover why the Romans were such terrible mathematicians!
India and Negative Numbers	Find out why one of the most positive contributions of Indian mathematicians was, in fact, negative!

Number Patterns	
The Most Populous Country	When will India's population exceed China's?
The Fibonnaci Sequence	Discover Fibonacci's sequence, which occurs throughout nature.
Enigma: Cracking the Code	Find out why the Nazi's message encoding mechanism proved so difficult to crack.
Chinese Development of Maths	A summary of the independent development of Chinese mathematics.
Number Theory: Gauss	The patterns that allowed a seven-year-old mathematician to perform amazing calculations.

Percentages	
Percentages: Feeding the Nutcracker	See how this tiny bird plays the percentage game to survive the winter.
Could You Owe More Than America?	Discover the staggering amount of money you could owe if you fail to pay off a high-interest loan.
Percentages: Tax Breaks	How progressive tax systems can help make tax payment fairer.
Hyperinflation: 1920s Germany	Find out what happens when interest rates spiral out of control.

Powers	
The Emperor's Chess Board	Re-telling the legend of a simple request for a few grains of rice that threatened to bankrupt an Emperor.
What Does the Internet Weigh?	How to calculate the weight of all the information contained on the world wide web.
The Richter Scale	Discover how to read the Richter Scale, which reveals the true magnitude of earthquakes.
The Biggest Number Ever	Meet the 'inventor' of the biggest number ever used.
The Incredible Strength of Ants	Discover the mathematical law that means ants are the strongest creatures in the world.

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Special Numbers	
Irrational Numbers: Pythagoras	Find out why the discovery of irrational numbers is said to have led to murder.
Primed for Survival	Witness the mating behaviour that suggests insects use prime numbers.
The Prime Number Code	Discover why prime numbers hold the key to encryption.
A Pattern in Primes	Are prime numbers random, or is there a hidden pattern?
Imaginary Numbers	What caused mathematicians to dream up imaginary numbers?
Sets: Infinity	Revealing two different types of infinity.

"I also like that there is a movie about almost everything"

- Pupil

3D Shapes	
Polyhedra: Platonic Solids	Discover the properties of the Platonic Solids, and why they are considered special.
Cylinders: Fuelling Saturn V	Revealing the size of the giant cylinders that fuelled the most powerful machine ever.
The Power of the Sun	How to calculate the power of the Sun, without leaving Earth.
The Pacific Flyer	How big did this hot-air balloon have to be to break the world record?
Why Are Eggs Egg-Shaped?	Discover why a fragile egg is the ideal shape to protect the life within.
Cubist Art	How artists used geometry to depict the world.

Circles	
Beating the U-Boats	Find out why Churchill's Navy relied on geometry to protect supplies during World War II.
Designing Chartres	Explore circle theorems through the geometric design of Chartres Cathedral.
Pi: Reciting Pi	How many digits of Pi can one man memorise?
Calculating Pi: Archimedes	How was Pi first accurately calculated?

Similarity and Transformations	
Transformations: Skateboarding	See how a skateboard transforms as a skater performs tricks.
The Mirror Lines of the Taj Mahal	Discover how the beauty of the Taj Mahal is created using reflection.
Tessellated Designs	The beautiful patterns that can be created using shapes which fit together exactly.
Bees and Their Hives	Why are beehives made up of hexagons?
Fractals: The Koch Snowflake	Discover the rules that create an infinitely reducing pattern.
Fractals: The Menger Sponge	Introducing the shape that gets bigger the more you take away.

Topology

Topology	Can you make a different shape wihtout tearing, cutting or gluing?
The Seven Bridges of Konigsberg	Try this ancient puzzle that tested some of the brightest mathematical minds.
Networks: Labyrinths and Mazes	Learn how to create – and find your way out of – these ancient networks.
Degrees of Separation: Erdös	What's your Erdös number?

Triangles

Proving Pythagoras	What is Pythagoras's Theorem, how can it be proved, and why is it useful?
Building the Pyramids	Discover how Egyptian builders used triangles to create perfectly symmetrical pyramids.
Stengthening the Bank of China	Find out why the world's tallest building was constructed from triangles.
Where is the Centre of a Triangle?	Discover the many centres of a triangle.

Trigonometry

Distance to the Sun and Moon	Find out how astronomers calculated these distances using the sine function.
Measuring the Earth	Discover how maths enabled the first calculation of the Earth's circumference in Ancient times.
Hyperbolic Geometry	Explore how our understanding of the space we live in has advanced since Euclid's time.
What Do Sine Waves Sound Like?	Hear the sound created by sine wave equations, and how their variables affect this.
The Tunnel of Samos	Find out how the ancient Greeks ensured a tunnel's ends would meet inside a mountain.

Coordinates	
Cartesian Coordinates	Learn how coordinates describe a point in space in one, two, three, or even four dimensions!
Vectors: Air Traffic Control	What are vectors and how do they make air travel safe?
Coordinate Geometry: Descartes	Discover how Descartes developed the (x,y) coordinates so familiar today.

Lines and Curves	
Straight Lines: Bee Lines	Why do bees fly in straight lines?
Gradients: Fold Mountains	How small hills under the ocean 'grow' to become the highest peaks on Earth.
Spirals in Nature	What are the different types of spiral, and where are they found in nature?
Arches	Exploring the shape that gets stronger as more force is applied.
Geometry: Euclid	What were the simple rules Euclid set out that form the basis of Geometry?
Calculus: Newton	Discover how Newton's study of movement led to a revolutionary new branch of mathematics.

Scale and Perspective	
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Queen Hatshepsut's Ship	Can a team of archaeologists use scale to recreate this ancient ship?

Charts

Most Popular Pet	Are cats, dogs or fish the most popular pet? See how different types of graphs display the whole story.
Nightingale's Diagram	Explore how one nurse's visual representation of data saved thousands of lives.
Histograms: Snapshot	Explore how photographers use the unique properties of histograms to take the best photographs.
Distorted Graphs: Heat Wave	Discover how graphs containing limited information can be misleading.

Extreme Events

Probability: Irrational Fears	Discover why often the most common fears are the least rational.
Can Monkeys Write Shakespeare?	Discover why it is possible for monkeys to write Shakespeare – and how it can become a certainty.
Freak Waves	Why were sailors reporting giant freak waves, when statistical models showed them to be unlkely?
Chaos By Mistake	Discover why it is so difficult to predict the behaviour of complex systems, like the weather.
Insuring the Titanic	How did underwriters calculate insurance premiums for the Titanic and her cargo?

Probability Modelling

The Odds Are Against You	Find out the mathematical reason that gambling on horse racing is unlikely to pay off.
The Card Counter	Learn how one mathematician came up with a formula for winning at Blackjack.
The Monty Hall Problem	In this famous game-show, should the contestant choose to switch?
Logic: Bayesian Robots	Discover how robots use logic to learn.
Why Do Shares Change Price?	Discover the economic and social factors that determine share value.
Beating the Stock Market	The story of three mathematicians who tried to eliminate risk from stock market trading.
The Prisoner's Dilemma	Would you choose to inform on your partner in crime?
Benford's Very Strange Law	Introducing the surprising discovery of a pattern in data, across both the man-made and natural worlds.

Sampling	
Can You Trust Your IQ?	Is it possible to create an unbiased measure of intelligence?
The Wrong Guy Won	Discover how a magazine's 'random' phone poll led to one of the most surprising election results in history.
Can Fish Oil Make You Smarter?	Find out how simply undertaking a study can jeopardise trial results and how to guard against this.
Mind Control	In the largest trial of human mind control ever, does size equal significance?

Statistical Measures	
Average Joe	How is it possible for the average American to live with one and a half other people?
Cumulative Frequency: You're Fired?	Find out how Enron employees could see where they rated, and whether they would be fired, on a cumulative frequency graph.
Can Eating Fish Prevent Murder?	Discover the real story behind the study that found a correlation between eating seafood and committing murder.