Year 5 Autumn 1: Separating Mixtures (Chemistry)

Year 5: Autumn 1

Chemistry: Separating Mixtures

	Required prior knowledge	Knowledge to be explicitly taught	How knowledge will be built upon
Substantive	• Magnets attract magnetic objects (Y3 Sum). • Some metals are magnetic but not all are. Plastics, wood, fabric, glass are all non-magnetic materials (Y3 Sum). • Matter exists in three states: solids, liquids and gases. Materials are different states at room temperature (Y2 Sum). • When matter changes states, the melt, freeze (Y2 Sum) and condense and evaporate (Y4 Spr). • Particle arrangement of solids, liquids and gases (Y4 Spr). • Physical properties include electrical conductivity; melting and boiling points; thermal conductivity; being malleable; windproof; hard/soft; and magnetic (Y4 Sum).	• A **pure substance** is one that contains only one type of particle. • A **mixture** is two or more different substances, e.g. air, steel. • **Mixtures** can be made of two gases (e.g. air), two solids (e.g. steel), two liquids (e.g. squash and water), or a liquid and a solid (e.g. salt water). • A **solution** is made when one substance **dissolves** in another substance called a solvent. A solution is a mixture; it is made of more than one type of particle. • The substance that dissolves is called the **solute**. The substance that it dissolves in is called the **solvent**. • A substance that will dissolve in a solvent is **soluble** in that solvent. If it does not dissolve, it is **insoluble** in that substance. • When no more solute can dissolve in the solvent, the solution is **saturated.** • The higher the temperature of the solvent, the greater the mass of solute that can be dissolved. • Two solids can be separated by using **magnets** or **filters** (e.g. sieve). • A solid and a liquid can be separated by using **filtration** (if the solid is insoluble) or **evaporation** (if the solid is soluble). • A **reversible** change is a change that can be undone, where the original substances can be recovered. • An **irreversible** change is a change that cannot be undone, where the original substances cannot be recovered.	• Physical and chemical changes (Y6 Sum) • Simple techniques for separating mixtures: distillation and chromatography (Y6 Sum) • The concept of a pure substance (KS3) • Diffusion in terms of the particle model (KS3) • The identification of pure substances (KS3)
Disciplinary	• Write an appropriate method (Y2 Aut) • Identify dependent, independent and control variables (Y3 Aut2) and set a hypothesis (Y4 Spr1) • Data is repeatable if the same person repeats the investigation and the results are the same; data is reproducible if the investigation is repeated by a different person and the results are the same (Y3 Sum1) • **Mathematics**: Measure temperature in °C using a thermometer (Y2)	***Investigate the effect of temperature on the mass of the solute that can be dissolved.*** ***Separate a mixture including coarse sand, water, salt and lumps of a magnetic material.***	
VCs	• 1: If a material could be divided into smaller and smaller pieces, it would be found to be made of particles, which smaller than can be seen even with a microscope. These particles are not in a material; they are the material (Y4). • 5B: The air is all around us on Earth (Y2). Air has oxygen (Y2) and carbon dioxide (Y3) in it.	• 1: A pure substance is one that contains only one type of particle. A mixture is created when two or more substances are mixed. The two types of particle are mixed together, but the particles themselves stay the same. • 5B: Air is a mixture of lots of different gases, including oxygen and carbon dioxide.	• 1: A chemical change is where a new substance – that is made of a different type of particle – is formed (Y6). • 5B: There is less and less air further away from the Earth's surface; space is a vacuum (Y5).

Year 5: Autumn 2 - Energy (Physics)

Year 5: Autumn 2

Physics: Energy

	Required prior knowledge	Knowledge to be explicitly taught	How knowledge will be built upon
Substantive	**Biology**: • In a food chain, the arrows show where the energy is being transferred from and to (Y2 Spr). • Leaves use sunlight, carbon dioxide from the air, and water to make their own food (Y3 Spr). They are called producers (Y2 Spr). • A food web shows the transfer of energy between different organisms (Y4 Aut). • Animals and plants need to digest food to transfer energy from it (Y4 Aut). **Physics**: • A complete circuit must have a power source (cell/batteries) and have all the components connected in a loop. If it is missing any of these things it is an incomplete circuit (Y4 Sum). • Appliances use electricity to serve a purpose (e.g. toaster, kettle etc.) (Y4 Sum). • Sounds are made when objects vibrate. These vibrations cause the air particles surrounding them to vibrate and collide, causing the vibrations to pass between particles (Y4 Spr). **Geography:** • Fossil fuels are materials made from fossils over millions of years, like coal and oil. Humans use these to run cars and electrical items (Y5 Aut).	• **Energy** is needed by both living and nonliving things. • Energy can be **transferred** from one **store** to another store. • When energy is removed from one store and is transferred to another store, the amount of energy in the first store goes down and the amount of energy in the second store goes up. • Energy is not used up; it is just moved around from store to store. • **Energy stores** are needed for something to happen. • **Energy resources** such as oil, gas, coal, food and other fuels can be depleted. • Fossil fuels and batteries are examples of **chemical energy stores**. • Energy can be stored **thermally** in the surroundings. • Different foods (fuels) store more chemical energy per unit mass than others. • The **Sun** is an example of a chemical energy store. • In a **food chain,** an amount of energy from the Sun (a **chemical store**) is transferred to the plant by light. The energy is then transferred along the food chain as the different organisms are eaten. • Not all the chemical energy stored in an organism is passed to the next organism in a food chain because a) not all of the organism is eaten and b) some energy is transferred from the organism to the thermal store of the surroundings. • In a circuit that has a cell/battery, the cell/battery is the chemical store of energy. • In a circuit, energy is transferred electrically to the device in the circuit, but the device does not store the energy; the device changes the way the energy is **transferred**.	• Coal, oil and gas are all used to generate electricity. The store of chemical energy in the fuel is transferred electrically to the appliances that we use in the home (Y6 Aut). • A battery is a store of chemical energy (KS3). • Energy can be transferred electrically using an electric current (KS3). • Energy can be transferred electrically from the battery using an electric current to a device like a lamp or a buzzer (KS3). • Devices such as bulbs do not store the energy. During this process the energy is transferred to a different store (KS3). • Appliances are items that transfer electrical energy to a different store, e.g. light to the surroundings (KS3).
D	• A&E: Scientists use models to help explain their ideas (Y4 Spr).		
VCs	• 4: All living things need food to give them energy. The arrows in a food web show where energy is being transferred from and to (Y4). • 8: Plants make their own food using sunlight, carbon dioxide and water (Y3).	• 4: Many processes and phenomena are explained in terms of energy exchanges. Energy cannot be created or destroyed. When energy is transferred from one object to others, the total amount of energy in the universe remains the same; the amount that one object loses is the same as the other objects gain. Two examples of energy stores are thermal stores and chemical stores of energy. • 8: Energy is transferred to the Earth by light. When making their own food, plants transfer some of this energy to their chemical store. As other organisms eat these producers, some energy in this chemical energy store is transferred.	• 4: Objects have energy because of their chemical composition, their movement, their temperature, their position in a gravitational or other field, or because of compression or distortion of an elastic material (KS3).

Year 5 : Spring 1 - Life Cycles (Biology)

Year 5: Spring 1

Biology: Life Cycles

	Required prior knowledge	Knowledge to be explicitly taught	How knowledge will be built upon

Substantive	• Parents and their young animals look similar and different (N3-4 Spr2).
	• Germination is the development of a plant from a seed. During germination roots and shoots emerge and grow (Y2 Aut).
	• Some plants grow from bulbs (Y2 Aut).
	• A seed is the embryonic stage of the plant life cycle (Y2 Aut).
	• Animals, including humans, reproduce. This means they have offspring that grow into adults (Y2 Aut).
	• As animals grow they get bigger, some animals change during their life cycle as the mature (e.g. tadpole to frog) (Y2 Aut).
	• The four main stages of the plant's life cycle include germination, pollination, fertilisation and seed dispersal (Y3 Spr).
	• Pollination and fertilisation usually takes place in flowers. Dispersal is important to make sure there is enough space for seeds to germinate and plants to grow (Y3 Spr).
	• A species is a group of one type of organism, individuals in this group can breed with each other to produce offspring that can go on to breed (Y4 Aut).
	• Fish, amphibians, reptiles, birds and mammals are all vertebrates (Y4 Aut).
	• Invertebrates can be grouped based on their characteristics as snails and slugs; worms; spiders and insects (Y4 Aut).
		• A cell is the smallest building block of living things. All organisms are made of cells.
		• There are lots of different types of cell, which each have different purposes.
		• Plants and animals look similar to their parents in many features because information is passed from one **generation** to the next. This information comes from the parents' **genome**.
		• **Sexual reproduction** involves two parents - usually male and female - creating a new **organism** by mixing their **genomes.**
		• Sexual reproduction begins with **fertilisation** of an egg, which mixes the genes from two parents. Fertilisation can be internal or external.
		• After an egg is fertilised, an embryo will develop. Embryos develop inside the body in the **gestation** period for **viviparous** animals. Embryos develop outside the body in eggs for **oviparous** animals.
		• Viviparous animals are **born**, oviparous animals **hatch** from eggs, plant seeds **germinate.**
		• Almost all mammals are viviparous; all birds and most amphibians are oviparous.
		• Amphibians and most insects undergo **metamorphosis.**
		• Life cycle of:
		  • hedgehog: internal fertilisation, gestation, hoglet, adult.
		  • peregrine falcon: internal fertilisation, incubation in eggs, hatchling, fledgling, adult.
		  • frog: external fertilisation, frogspawn, tadpole, adult frog (metamorphosis).
		  • ladybird: internal fertilisation, eggs hatch, larva, pupa, adult.
		• Most plants have both male and female parts.
		• The male part of the plant is called the **stamen**, made up of the **anther** and **filament**, and the anther produces **pollen grains**.
		• The female parts of the plant are the **ovary** (which produces the female sex cells which are contained in the **ovule**) and the **stigma** which collects pollen.
		• **Asexual reproduction** does not involve sex cells or fertilisation. Only one parent is needed and offspring are (**genetically**) identical to the parent and each other.
		• Potatoes develop **tubers** and daffodils have **bulbs**, which will grow to be identical copies of the plant.
			• The human life cycle goes through the same stages as those for other animals: fertilisation, gestation, growth (Y5 Spr).
			• Humans are viviparous and a foetus develops inside the mother (or surrogate mother). A human embryo is considered a foetus at the end of the 8th week of pregnancy (Y5 Spr)
			• The gestation period for humans is 40 weeks
			• The bigger the animal, the longer the gestation period (Y5 Spr2).
			• A foetus is considered a baby when it is born (Y5 Spr).
			• Fertilisation in most humans is internal, but it can happen externally (in vitro fertilisation - IVF - which means 'in glass' fertilisation) (Y5 Spr).

Disciplinary	• A&P: Scientists conduct secondary research to learn from what other scientists have already learned (Y1 Spr). • A&P: Science is studied as three disciplines: biology (study of organisms), chemistry (study of properties of matter and how it interacts with energy) and physics (study of energy) (Y5). • M&O: Gather information from text/books/images (Y1 Aut) and the internet (Y3).	***Using images, text and the internet to research internal and external fertilisation, and viviparous and oviparous organisms***	
VCs	• 7: Humans are organised with organs like hearts and lungs, which do particular jobs. The skeleton and muscles allow the body to move (Y3).	• 7: A cell is the smallest building block of living things. All organisms are made of cells. There are lots of different types of cell (e.g. sex cells), which each have different purposes. • 9: An organism's genome is the information that controls how that individual organism will develop. In sexual reproduction, two parents contribute to the formation of offspring. They each pass down half their genome through specialised cells called sex cells. The two halves are combined during fertilisation. While it inherits genetic information from both parents, the offspring's genome is distinct, which means the offspring is not identical to a parent. Asexual reproduction involves only one parent. In this process, the offspring's genome is an exact copy of the parent's genome. The offspring is identical to the parent.	• 7: All organisms are made of one or more cells. All the basic functions of life – growth, reproduction, extracting energy from food – are the results of what happens inside cells. Cells are often aggregated into tissues, tissues into organs, and organs into organ systems (KS3). • 9: In a human body, most cells contain 23 pairs of chromosomes. These provide information that is needed to make more cells in growth and reproduction (KS3).

Year 5: Spring 2 - Human Development (Biology)

Year 5: Spring 2

Biology: Human Development

	Required prior knowledge	Knowledge to be explicitly taught	How knowledge will be built upon
Substantive	• Talk about how they have changed from being a baby (N3-4 Aut1). • Humans are made of many different body parts including head, neck, back, ears, eyes, nose, mouth, arms, shoulders, elbows, hands, fingers, legs, knees, feet, toes, ears, eyes, nose, mouth, arms, legs, hands, feet, toes (Y1 Sum). • Plants and animals look similar to their parents in many features because information is passed from one generation to the next. This information comes from the parents genome (Y5 Spr). • Sexual reproduction is two parents - usually male and female - create a new organism by mixing their genomes (Y5 Spr). • Sexual reproduction begins with fertilisation of an egg, which mixes the genomes from two parents (Y5 Spr). • Fertilisation can be internal or external (Y5 Spr). • After an egg is fertilised, an embryo will develop (Y5 Spr) . • Almost all mammals are viviparous (Y5 Spr). • Embryos develop inside the body in the gestation period for viviparous animals. (Y5 Spr). • Viviparous animals are born, oviparous animals hatch from eggs, plant seeds germinate (Y5 Spr).	• The human life cycle goes through the same stages as those for other animals: **fertilisation**, **gestation**, **growth.** • Fertilisation in most humans is internal, but it can happen externally (**in vitro fertilisation** - IVF - which means 'in glass' fertilisation). • The human life cycle: **embryo**, **foetus**, **infant**, **child**, **adolescent**, **adult**, **senior.** • Human are **viviparous** and a **foetus** develops inside the mother (or **surrogate** mother). • A human embryo is considered a foetus at the end of the 8th week of pregnancy. • The **gestation** period for humans is 40 weeks. • The bigger the animal, the longer the gestation period. • A foetus is considered a baby when it is born. • **Cognitive**, **physical** and **social** and **emotional** development takes place at the greatest rate during infancy. • During **puberty**, adolescents' bodies change, e.g. pubic hair, voice deepen, hips widen. • **Primary aging** of adults occurs naturally as our bodies get older (e.g. slower reaction time, reduced hearing). • **Secondary ageing** relates to environmental factors, like poor diet, not enough exercise, smoking etc. • There are ages where humans at their peak for different things (e.g. reproduction, running etc.). • Different cultures around the world have different perceptions around the life cycle and ageing.	• The structure and function of the male and female reproductive systems (KS3). • The female menstrual cycle (KS3). • The male and female gametes, as specialised cells (KS3). • Fertilisation, gestation and birth (KS3). • The effect of maternal lifestyle on the foetus (through the placenta) (KS3).
Disciplinary	• **Mathematics**: Use coordinates in the first quadrant (Y4); Interpret and construct line graphs (Y4). • A&P: Scientists look for patterns in the world around them (Y1 Aut). • A&P: Set a hypothesis to test (Y4 Spr). • A&E: Draw conclusions (e.g. 'the greater the..., the greater the...') (Y4 Spr). • **Geography**: Recognise that people have differing opinions about environmental issues (Y4 Spr).	***Draw a scatter graph to suggest whether there is a relationship between animal size and length of gestation period*** • A&P: Scientists look for patterns in data to try to identify correlations. • R&P: Scatter graphs can help you decide if there is a relationship between two variables. ***Discuss one aspect of IVF that is appropriate to your class (e.g. who in the world has access; post code lottery within the UK)*** • A&E: Some people may agree or disagree with the use of some scientific discoveries.	• Debates around more divisive ethical issues and questions (KS3).
VCs	• 11: Humans need to exercise, practise good hygiene and eat a healthy and balanced diet to stay healthy. Their diet should be high in fruits and vegetables and low in fats, sugar and salt (Y2).	• 11: Healthy development includes cognitive, physical, social and emotional development. Most of this happens during infancy and childhood. Ageing happens naturally, and can be sped up by environmental factors like smoking. Some adults are unable to become pregnant. IVF and other treatments can be used.	• 11: The biological causes and effects of diseases (e.g. coeliac disease and emphysema), exercise, lifestyles (e.g. vaping) and deficiencies on the body (KS3).

Year 5: Summer 1 - Forces (Physics)

Year 5: Summer 1

Physics: Forces

	Required prior knowledge	Knowledge to be explicitly taught	How knowledge will be built upon
Substantive	•Forces are pushes or pulls that act in particular directions. They can cause a change in speed, direction or shape of an object (Y3 Sum). •Forces that act in opposite directions are called opposing forces (Y3 Sum). •Forces that are equal and act in opposite directions are described as balanced forces. They 'cancel each other out' (Y3 Sum). •When forces are balanced, an object will move at a constant speed in the same direction. This includes being stationary (Y3 Sum). •Contact forces require contact between two objects (e.g. friction). Non-contact forces can affect an object at a distance (e.g. magnetism) (Y3 Sum). •Friction is a force between two surfaces that are sliding or trying to slide over each other (Y3 Sum). •Friction is a contact force because it requires the two objects to be touching (Y3 Sum). •The bumpier or rougher the surfaces, the more friction there will be (Y3 Sum).	• **Force** is measured in **newtons** (N). • **Gravity** is a **non-contact force** that pulls all objects towards each other. The greater the **mass** of the object, the greater the **gravitational pull** around it. Gravity is most commonly experienced as the pull of the Earth (and all objects on it) towards each other. • The Earth's **gravitational pull** is so large that all objects - regardless of how heavy they are - are pulled towards Earth at the same rate. • **Mass** is a measure of how much matter something is made from, which is measured in kg (or equivalent). The mass of an object is always the same. • **Weight** is a force, it is measured in newtons (N). • The weight of an object will differ depending on the force of gravity. • **Air resistance** is a **frictional force** that acts between air and a moving object to slow it down. • **Surface area** is the area that is facing the direction the object is travelling in. The larger the surface area of an object, the greater the air resistance. • **Water resistance** is a frictional force that acts between water and a moving object to slow it down. • **Levers**, **pulleys** and **gears** allow a smaller force to have a greater effect. Examples of levers, pulleys and gears include wheelbarrows, lifts, bicycle gears, in construction. • Levers consist of a **beam** and a **fulcrum** (**pivot**). **Effort** lifts a **load.** The greater the distance from the effort to the fulcrum, the less effort is required to move the load. • **Upthrust** is an upwards force that a liquid (and a gas) exerts on an object floating in it. • If **upthrust** is equal to the weight of an object it will float.	• The Earth's Moon is smaller than the Earth and has less mass, so its gravitational force is less (Y5 Sum). • Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces (KS3). • Moment as the turning effect of a force (KS3). • Forces associated with deforming object; stretching and squashing- springs (KS3). • Measurement of stretch or compression as force is changed (KS3). • Work done and energy changes in deformation (KS3). • Non-contact forces: gravity forces acting at a distance on earth and in space, forces between magnets and forces due to static electricity (KS3). • Opposing forces and equilibrium; weight held by stretched spring or supported on a compressed surface (KS3). • Forces being needed to cause objects to stop or start moving, or to change their speed or direction of motion (KS3). • Change depending on direction of force and its size (KS3).
Disciplinary	•Mathematics: Round numbers with 1 decimal place to the nearest whole number (Y4); Understand difference between discrete and continuous data (Y4); Interpret and construct bar and line graphs (Y4); Area is the space inside a shape and can be measured by counting squares (Y4). •A&P: Dependent, independent and control variables (Y3 Aut). •M&O: Taking multiple readings allows you to see if your data is repeatable, and helps identify outliers (Y3 Sum).	***Investigate how much force is required to pull objects over different surfaces*** • M&O: Measure force using a Newtonmeter. ***Investigate how surface area affects air resistance, and how shape affects water resistance*** • R&P: Line graphs can be used when data is continuous; bar charts can be used when data is discrete. • A&E: Make judgements on the accuracy of the data.	
VCs	•2: A non-contact force is one that can act at a distance (Y3). •3: Forces act in pairs. Forces acting against each other are opposing. If opposing forces equal, they are balanced, and the object's motion will stay the same; this includes staying stationary. If opposing forces are unequal, they are unbalanced will change an object's speed, direction or shape (Y3).	• 2: The non-contact force of gravity pulls objects towards the centre of the Earth. • 3: There is gravitational force between all objects, but it is only felt when one or more of the objects has a very large mass. The greater the mass, the greater the gravitational force. Objects on Earth are pulled to the centre of the Earth because the Earth's mass and therefore gravitational force is much larger than that of the objects.	• 3: The downward force of gravity on an object on the Moon is less than that on Earth because the Moon has less mass on Earth (Y5).

Year 5: Summer 2 - Earth & Space (Physics)

Year 5: Summer 2

Physics: Earth & Space

	Required prior knowledge	Knowledge to be explicitly taught	How knowledge will be built upon
Substantive	• Geography: We live on the Earth (Y1 Aut). • Daytime is when the Earth is facing the sun; nighttime is when the Earth is facing away from the sun (Y1 Aut). • The Moon is more visible at night (Y1 Aut). • Animals, including humans, need food, water, oxygen and the right temperature to survive (Y2 Aut). • Light travels in a straight line (Y3 Aut). • Sources of light emit their own light, and others reflect light. (Y3 Aut). • Shadows form behind an opaque object when light from a source is blocked (Y3 Aut). • Sound travels through a medium; it cannot travel in a vacuum (Y4 Spr). • Gravity is a non-contact force that pulls all objects towards each other. • The greater the mass of the object, the greater the gravitational pull around it (Y5 Sum). • Air resistance is a frictional force that acts between air and a moving object to slow it down (Y5 Sum). • **Mass** is a measure of how much matter something is made from, which is measured in kg (or equivalent). The mass of an object is always the same. **Weight** is a force, it is measured in newtons (N). The weight of an object will differ depending on the force of gravity (Y5 Sum).	• The **universe** is made up of many **galaxies**. Our galaxy is called the **Milky Way.** • The **Milky Way** is made up of lots of **solar systems.** • Our solar system consists of a **star** (**Sun**), **planets** (which **orbit** a star), **satellites** (which orbit **planets**), and other bodies including **asteroids**, **meteoroids**, **meteors** and **meteorites.** The Sun is at the centre of the solar system - the **heliocentric model.** • The sun, planets and **moons** are approximately **spherical** bodies. • Planets orbit the Sun in the same **plane**; moons orbit planets. They are held in their orbits by **gravity**. • The Earth takes 365.25 days to orbit the sun (one year). Every four years our Earth year is one day longer, this is called a **leap year**, this year accounts for the four 0.25 days. • There are eight planets (M, V, E, M, J, S, U and N). Each planet has different characteristics, e.g. temperature; time taken to orbit the sun; number of moons; size. • The Earth **rotates** on its **axis** once every 24 hours, so only half of the Earth is facing the Sun at any one time; this creates night and day. • The Earth's rotation means that the sun appears to 'rise' in the east and 'set' in the west. • The Moon orbits the Earth in 28 days and, during this time, the sun shines on different parts of it. This creates phases of the Moon, including **new moon**, **crescent**, **quarter moon**, **gibbous moon** and **full moon.** • Space is a **vacuum**, which means there are no particles. • The Earth's Moon has less **mass,** so its **gravitational** force is less. • Geography: Vertical lines called meridians split the Earth into 24 different time zones. • Geography: Each time zone is x hours ahead or behind London, at the Prime Meridian. • Geography: Some countries choose to operate in multiple time zones.	• The Earth's tilt creates seasons, and different day lengths at different times of the year (KS3). • Calculating gravity force on different planets and stars (KS3). • The light year as a unit of astronomical distance (KS3). • Movement of stars and constellations (KS3).
Disc.	• Mathematics: Number of minutes in an hour; hours in a day (Y3); Number of days in a month, year and leap year (Y3). • A&E: Identify scientific evidence that has been used to support or refute ideas (Y4 Aut).	***Look for patterns between a planet's distance from the Sun and its temperature and size.*** ***Consider how the number of planets that humans consider to be planets has changed over time.*** • A&E: Science is never 'complete' and scientists are always working to make models more accurate or to discover new explanations.	• Scientists seek to understand how accurate their results are, and how confident they can be in their findings (KS3).
VCs	• 3: There is gravitational force between all objects, but it is only felt when one or more of the objects has a very large mass. The greater the mass, the greater the gravitational force. Objects on Earth are pulled to the centre of the Earth because the Earth's mass and therefore gravitational force is much larger than that of the objects (Y5). • 5B: Air is a mixture of lots of different gases, including oxygen and carbon dioxide. • 6: The Sun emits light, some of which reaches Earth. The moon reflects light from the Sun (Y3).	• 3: The downward force of gravity on an object on the Moon is less than that on Earth because the Moon has less mass on Earth. • 5B: There is less and less air further away from the Earth's surface; space is a vacuum. • 6: Our Sun is one of many stars that make up the Universe. The distances between us and the bodies in solar system is huge, and even bigger in the Universe.	• 3: How quickly an object's motion is changed depends on the force acting and the object's mass. The greater the mass of the object, the longer it takes to speed it up or slow it down (inertia). (KS3) • 6: The movements of galaxies suggest that the Universe is expanding from a past state called the 'big bang'. (KS3)