**THE BIG IDEAS OF SCIENCE**

Physics

P1: The universe follows unbreakable rules that are all about forces, matter and energy.

P2: Forces are different kinds of pushes and pulls that act on all the matter that is in the universe. Matter is all the stuff, or mass, in the universe.

P3: Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it.

Chemistry

C1: All matter (stuff) in the universe is made up of tiny building blocks.

C2: The arrangement, movement and type of the building blocks of matter and the forces that hold them together or push them apart explain all the properties of matter (e.g. hot/cold, soft/hard, light/heavy, etc).

C3: Matter can change if the arrangement of these building blocks changes.

Biology

B1: Living things are special collections of matter that make copies of themselves, use energy and grow.

B2: Living things on Earth come in a huge variety of different forms that are all related because they all came from the same starting point 4.5 billion years ago.

B3: The different kinds of life, animals, plants and microorganisms, have evolved over millions of generations into different forms in order to survive in the environments in which they live.

Earth science

E1: The Earth is one of eight planets that orbit the sun.

E2: The Earth is tilted and spins on its axis leading to day and night, the seasons and the climate.

E3: The Earth is made up of several layers, including a relatively thin rocky surface which is divided into tectonic plates, and the movement of these plates leads to many geologic events (such as earthquakes and volcanoes) and geographical features (such as mountains.)



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| **Year 5 – Ongoing throughout the year – Working scientifically****NC Objectives:*** Sc5/1.1 planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
* Sc5/1.2 taking measurements, using a range of scientific equipment, with increasing accuracy and precision
* Sc5/1.3 recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs
* Sc5/1.4 using test results to make predictions to set up further comparative and fair tests
* Sc5/1.5 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as

 displays and other presentations* Sc5/1.6 identifying scientific evidence that has been used to support or refute ideas or arguments

**Revision from LKS2****Vocabulary:** prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis**Knowledge:** * Know that we can ask questions and answer them by setting up scientific enquiries.
* Know how to make relevant predictions that will be tested in a scientific enquiry.
* Know that in a fair test one thing is altered (independent variable) and one thing that may change as a result is measured (dependent variable) while all other conditions are kept the same.
* Know how to use a range of equipment to measure accurately, including thermometers, data loggers, rulers and stopwatches.
* Know how to draw bar charts; how to label a diagram using lines to connect information to the diagram; how to use a coloured key how to draw a neat table; how to draw a classification key; how to show the relationship between an independent variable in a two-way table; and how to label specific results in a two-way table.
* Know – with structured guidance - how to write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion.
* Know how to precis a scientific enquiry write-up into a brief oral discussion of what was found in a scientific enquiry.
* Know that scientific enquiries can suggest relationships, but that they do not prove whether a prediction is true.
* Know that scientific enquiries are limited by the accuracy of the measurements (and measuring equipment) and by the extent to which conditions can vary even, and that repeating enquiries, measurements and taking measures to keep conditions as consistent as possible can improve an enquiry.
* Know that the conclusions of scientific enquiries can lead to further questions, where results can be clarified or extended to different contexts (e.g. effect of changing sunlight on a plant – does this work with other plants / different types of light / etc.).
* Know that they can draw conclusions from the findings of other scientists.
* Know that a theory is an explanation of observations that has been tested to some extent and that a hypothesis is an explanation that has not yet been tested, but that can be tested through a scientific enquiry.

**New Vocabulary and Knowledge** **Vocabulary:** line graph, relationship, outlier **Knowledge:** * Know how to choose appropriate variables to test a hypothesis (e.g. plant height as a dependent variable when measuring effect of light on plant growth)
* Know how to identify conditions that were imperfectly controlled and can explain how these might affect results
* Know how to accurately use further measuring devices, including digital and analogue scales, measuring cylinders and beakers, recognizing the relative accuracy of each device
* Know how and when to repeat measurements, how to find an average of a set of measurements and how to recognize and remove outliers from a set of data, justifying the removal as a potential mis-measurement
* Know how to independently write a simple scientific enquiry write-up including an introduction, a list of equipment, a numbered method, a detailing of results and a conclusion
* Know how to present brief oral findings from an enquiry, speaking clearly and with confidence and using notes where necessary
* Know examples of instances where scientific evidence has been used to support or refute ideas or arguments (e.g. fossil records as evidence of natural selection)
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| **Year 5 – Autumn – Has our planet finished evolving?** **Aut 1:****Big idea(s): C2, C3****Properties and changes of materials*** group materials based on their properties
* investigate how some materials dissolve in water to form a solution
* explore how mixtures might be separated
* demonstrate that dissolving, mixing and changes of state are reversible
* explore and explain that some changes result in the formation of new materials
* investigate how lava and molten rock are part of the process of creating new rocks

**Key vocabulary:** hardness, solubility, transparency, conductivity, electrical, thermal, magnets, filtering, sieving, evaporating, saturation, reversible, irreversible, comparative, fair test**Aut 2:****Big idea(s): E1, E2, E3****Earth and Space** * describe the movement of the Earth and planets in relation to the Sun – link to DT
* explain how the rotation of the Earth on its axis causes day and night
* describe the movement of the Moon in relation to the Earth

**Key vocabulary:** solar system, planets, celestial body, orbit, rotate, axis, geocentric**Aut 2:****Big idea(s): P1, P2****Forces*** explain that unsupported objects fall toward the Earth because of gravity
* understand how gravity affects the direction that lava flows
* identify the effects of air resistance, water resistance and friction
* understand that mechanisms allow a smaller force to have a great effect

**Key vocabulary:** resistance, friction, levers, pulleys, gears, springs | **Previous Learning** **Revision from KS1 and LKS2****States of matter****Year 1 in Spring Term and Year 2 in Autumn Term*** describe the simple physical properties of a variety of everyday materials
* compare and group together a variety of everyday materials on the basis of their physical properties
* identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
* find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

**Year 3 in Autumn Term and Year 4 in Spring Term*** compare and group together different types of rocks on the basis of their appearance and simple physical properties
* describe in simple terms how fossils are formed when things that have lived are trapped within rock
* recognise that soils are made from rocks and organic matter
* compare and group materials together, according to whether they are solids, liquids or gases
* observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
* identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

**Earth and Space****Related learning in KS1 and LKS2*** weather changes throughout the year and is hotter in summer and colder in winter
* Earth orbits the Sun with one orbit constituting a year of 365/366 days
* light is a form of energy and darkness is the absence of light
* light travels in straight lines
* everything that we can see is either a light source or something that is reflecting light from a light source into our eyes
* the Sun is a light source, but that the Moon is not and is merely reflecting light from the Sun

**Forces****Year 3 in Spring Term*** compare how things move on different surfaces
* notice that some forces need contact between two objects, but magnetic forces can act at a distance
* observe how magnets attract or repel each other and attract some materials and not others
* compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
* describe magnets as having two poles
* predict whether two magnets will attract or repel each other, depending on which poles are facing
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| **Objective and Success Criteria**  | **Coverage** | **Key Questions**  | **Children should know that** | **Resources** |
| Group materials based on their properties**C2**Skills:To take accurate measurements using a data logger and thermometerTo be able to report and present findings from enquiries, including conclusions | * Recap the properties of materials
* Using a range of materials conduct tests to group materials together based on the following properties:
	+ conductor of heat
	+ insulator of heat
	+ conductor of electricity
	+ insulator of electricity
* Children to record their findings
 | How can you test whether a material is a good conductor of heat?How can you test whether a material is a good insulator of electricity?Which material was the best conductor of electricity?Which material was the best insulator of heat? | Know that materials can be sorted in a variety to ways based on their properties. | * a range of everyday materials including wood, glass, metal, fabric, ceramic, plastic, leather, paper
* data logger
* thermometers
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| Investigate how some materials dissolve in water to form a solution**C3** | * Introduce the concept of dissolving and the vocabulary of soluble and insoluble
* Explain that if a material dissolves in a liquid then a solution is created and introduce the vocabulary solute and solvent
* Conduct a test to explore which materials are soluble/insoluble
* Pose the question of whether the temperature of the liquid (water) would affect the test in any way
* Investigate whether the temperature does affect the outcome of the test
* Explore what would happen if too much solute is added – the solvent will become saturated
 | What does soluble mean?What does insoluble mean?Which materials were soluble?Which two materials (solute and solvent) are in this solution?What does saturated mean? | Know that in some solid materials the bonds between particles break when surrounded by a liquid; this allows the liquid to absorb the solid; when this happens, the solid is called a solute, the liquid is called a solvent and the result is a solution; when a solid does dissolve in a liquid it is described as being soluble in that solvent (e.g. sugar in water); when it cannot it is insoluble (e.g. sand in water).Know that a given amount of solvent can only absorb a certain amount of solid before no more will dissolve; when this happens, the liquid is said to be saturated. | * sand, chalk, flour, rice, coffee granules, sugar, salt, gravy
* beakers with water
* flask or thermos with warm water
* Useful videos and resources are available on Espresso KS2- Science → Investigating Change → Experiments in the classroom **and** Virtual Lab
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| Explore how mixtures might be separated**C3**Skills:To be able to report and present findings from enquiries, including conclusions, causal relationships and explanations  | * Explain the different methods that can be used to separate mixtures:
	+ sieving
	+ filtering
	+ magnetic attraction
	+ evaporation
* Explore the best method to use to separate different mixtures by conducting tests
* Make conclusions based on the findings of the test
 | What are the four methods used to separate mixtures?Which method did you use to separate the sand and water? Why?Which method did you use to separate the rice and paperclips? Why?  | Know that there are different methods to separate mixtures and be able to explain the suitability of using a chosen method.  | * sieves
* funnels
* filter paper
* magnets
* tealights
* sand, raisins, flour, rice, metal paperclips, salt, water
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| Demonstrate that dissolving, mixing and changes of state are reversible**C3**Skills:To be able to report and present findings from enquiries, including conclusions, causal relationships and explanations  | * Recap how can we reverse the process of dissolving and mixing
* Explore whether all chemical changes are reversible – suggestions: water and plaster of Paris or vinegar and milk
* Explain that not all changes are reversible and we call them irreversible
* Explore what happens when or vinegar and bicarbonate of soda are mixed – what is the resultant material?
* Investigate what happens when materials are heated
* What new materials were formed?
 | What does reversible mean?What does irreversible mean?Which change was irreversible? Why? How did some materials change?What cause them to change?What new materials were formed? | Know that a reversible change is one that can be reversed and that examples of this are mixing, dissolving and changes of state where no chemical reaction takes place.Know that an irreversible change is one that cannot be reversed and that examples of this often involve a chemical change where a new material is made, often a gas. | * BBC Bitesize video: Changes in state of materials is a great introduction:

<https://www.bbc.co.uk/bitesize/clips/zrkc87h>* Useful videos and resources are available on Espresso KS2- Science → Investigating Change → Experiments in the classroom **and** Virtual Lab
* items to burn
* metal trays with sand
* wooden clothe pegs or corks with pins
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| Explore and explain that some changes result in the formation of new materials**C2, C3** |
| Investigate how lava and molten rock are part of the process of creating new rocks**C3** | * Recap what a rock is
* Explain that molten rock is rock that has been heated and melted to become liquid rock
* Hypothesise how the molten rock forms new rocks – what process needs to take place
 | What is molten rock?What happens when molten rock cools slowly underground?What happens when lava cools quickly above ground? | Know that molten rock is melted liquid rock which can be found underground (magma) and above ground (lava).Know that when molten rock cools slowly underground, it forms large grained rocks such as granite. Know that when lava cools quickly above ground, it forms small grained rocks such as basalt or obsidian. | * Useful video to consolidate learning:

<https://www.bbc.co.uk/bitesize/clips/zw4pvcw> |
| Describe the movement of the Earth and planets in relation to the Sun – link to DT**E1, E2** | * Explore what shape the Earth is - what evidence do we have
* Explain the history behind people once thinking that the Earth was flat and the geocentric model
* Discuss what a star is and that the Sun is our closest star (see video link)
* Explore the 8 planets in our solar system - discuss that Pluto was downgraded to a dwarf planet in 2006
* Explain what orbit means and that all the planets orbit the Sun
* Discuss the work of Nicolas Copernicus and his heliocentric theory (video link in resources column)
* Linked to DT task of creating an Earth CAM toy
 | How do we know that the Earth is spherical?What is a star?What was the geocentric model?Who came up with the heliocentric model?Can you name the eight planets in our solar system in order?What does orbit mean? | Know that a celestial body is a large object in the universe.Know that a star is an exceptionally hot ball of gas, originally made from hydrogen and helium.Know that the Sun is a star.Know that there are eight major planets in our solar system Know that there are eight major planets in our solar system.Know it was once thought that everything orbited the Earth, but that scientists like Copernicus and Galileo used telescopes and measurement to show that the Earth orbited the Sun. | **Useful videos:*** Earth, Moon and Stars: (great to use as an introduction)

<https://www.bbc.co.uk/bitesize/clips/zscb4wx>* How do we know the Earth is spherical?

<https://www.bbc.co.uk/bitesize/clips/zd3fb9q>* What does the Sun really look like?:

<https://www.bbc.co.uk/bitesize/clips/z7g3cdm>* Planet song:

<https://www.youtube.com/watch?v=ZHAqT4hXnMw>* The work of Nicolaus Copernicus

<https://www.bbc.co.uk/teach/class-clips-video/science-ks2-the-work-of-nicolaus-copernicus/z64skmn> * Earth, Sun and Moon orbits:

<https://www.bbc.co.uk/programmes/p00n6zhw>* Earth’s orbit of the Sun:

<https://www.bbc.co.uk/bitesize/clips/z6vfb9q> |
| Explain how the rotation of the Earth on its axis causes day and night**E2** | * Explore how the Earth rotates on it axis once every 24 hours
* Notice that the Earth is tilted on its axis
* Demonstrate how Earth spinning on it axis causing the parts facing away from the Sun to be in darkness, while the parts facing the Sun will experience day time.
* Explore how Earth’s axis being tilted and its orbit causes the seasons
* Explore how the Sun was used to tell the time - sundial
 | What is the difference between Earth’s orbit and its rotation?Why can’t it be day time everywhere on Earth at the same time?What is a sundial and gnomon? What were the limitations of a sundial? | Know that the Earth spins around an imaginary line through its centre called an axis and that this axis is tilted relative to the Earth’s orbit.Know that night and day are the result of the Earth rotating on its axis.Know that the tilt of the Earth towards and away from the Sun’s light as the Earth orbits the Sun leads to the seasons as during winter the light is spread over a wider area.Know that a sundial was used to tell the time based on the shadow cast by the gnomon. | * torches
* tennis balls
* Sundial and gnomon template:

<https://er.jsc.nasa.gov/seh/sundialn.pdf> |
| Describe the movement of the Moon in relation to the Earth**E1, E2** | * Take a closer look at the Moon (see video link and link to Nasa’s interactive website)
* Explore the Moon phases and how the position of the Moon in relation to the Sun and Earth creates these (see video link)
 | How long does it take the Moon to orbit the Earth?What causes the Moon to look different during a month?How many moon phases are there? | Know that the Moon orbits the Earth roughly every 28 days.Know that as the Moon orbits the Sun, different parts of it are lit up by the Sun, which is why we see a different shape lit up on the Moon as the lunar cycle progresses (the Moon phases). | * What does the Moon look like and why?

<https://www.bbc.co.uk/bitesize/clips/zj3ygk7>* Nasa - The Earth’s Moon:

<https://moon.nasa.gov/>* The Moon phases:

<https://www.bbc.co.uk/programmes/p00n6zhl>* Useful website for you to have a look at what the Moon looks like in the month of covering this topic:

<https://www.moonconnection.com/moon_phases_calendar.phtml>* Oreos and paper plates for lunar cycle representation
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| Explain that unsupported objects fall toward the Earth because of gravity**P1, P2**Skill: To be able to identify scientific evidence that has been used to support or refute ideas or arguments. | * Explore what gravity it, focusing on the work of Sir Isaac Newton (see video link) and how it pulls objects to the centre of the Earth
* Children to conduct an experiment that is a fair test and draw conclusions
 | What is gravity?What affects gravity?What would a world without gravity look like? | Know that a force is measured in a unit called Newtons, named after a British scientist called Sir Isaac Newton who discovered lots about gravity and how planets move.Know that gravity is a force that acts between all objects in the universe, but that it acts much more strongly between objects that have more mass and that are close together. | * Video: The work of Sir Isaac Newton

<https://www.bbc.co.uk/teach/class-clips-video/science-ks2-the-work-of-sir-isaac-newton/zkw3qp3>* Video: Gravity and its effects on a stunt artist

<https://www.bbc.co.uk/bitesize/clips/zvqd7ty>  |
| Identify the effects of air resistance, water resistance and friction**P1, P2**Skills: To be able to use test results to make predictions to set up further fair-tests To be able to plan a fair-test; identifying the control variables | * Explain what air resistance is and how it affects moving objects
* Look at the role that Galileo Galilei played in investigating the rate at which objects fall (see video link for a re-enactment of his experiment)
* Investigate the effects of air resistance by conducting an investigation (suggestion: parachutes)
* Discuss why it is difficult to walk through a swimming pool - what forces could be at play?
* Explore why fish and boats can travel through water with relative ease
* Discuss what role the shape of an object plays
* Draw a force diagram with arrows representing how the different force act on an object
* Explore friction and examples of it
* Discuss how this would affect moving objects
 | What did Galileo Galilei discover?What is air resistance?How is air resistance related to gravitational force?What is water resistance?How does the shape of an object affect the effect of water resistance?What is friction? | Know that air resistance is a force felt by an object as it moves through the air; it is caused by the object bumping into the gas particles that make up air; the quicker an object moves, the more gas particles it bumps into and the more air resistance it experiences.Know that water resistance is a force felt by an object as it moves through water; it is caused by the object bumping into the water particles.Know that the shape of an object determines how much air resistance or water resistance it experiences; shapes of object that experience little air resistance or water resistance are described as streamlined. | * Video on the work of Galileo Galilei:

<https://www.bbc.co.uk/teach/class-clips-video/science-ks2-the-work-of-galileo-galilei/zh69t39>* Also see the videos and resources on Espresso → KS2 →Science →Forces
* materials for making parachutes
* string
* objects for mass
* stopwatches
* Video on Friction:

<https://www.bbc.co.uk/bitesize/clips/zcx76sg> |
| Understand that mechanisms allow a smaller force to have a great effect**P2** | * Explain what a lever, pulley and gear are - show everyday examples of these and how they work
* Demonstrate how each works and how they are often used together to create a mechanism
* Explore how pulleys work as a crane by conducting an investigation - which force had greater effect?
 | What is a pulley?How do gears work?Can you give an example where a smaller force had a greater effect? | Know that a lever is a rigid length pivoting around a fulcrum.Know that a pulley is a wheel with a fulcrum that supports a moving cable or belt.Know that a gear is a rotating wheel with cut teeth that mesh with the teeth of another gear so that turning one gear turns an adjacent gear in the opposite direction.Know that gears, levers and pulleys are simple machines that used to allow a smaller force to have a greater effect; they do this by moving a smaller force over a longer distance at one end of the machine, which the machine turns into a larger forcer over a small distance at the other end. | * Espresso video on simple machine is a great introduction
* Website for showing examples of pulleys:

<http://www.mikids.com/SMachinesPulleys.htm>* pulleys
* wood to attach to the pulley
* string
* plastic cups
* masses
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| **Assessment Questions**Are all changes in states of matter reversible?How does Earth’s orbit around the Sun and rotation on its axis affect the conditions on Earth?How does gravity work?How do resistance and friction affect moving objects? |
| **Year 5 – Spring – Is invasion ever justified?****Big idea(s): B1, B2, B3****Animals, including humans*** describe the changes as humans develop to old age
* create a timeline to represent growth and development of humans
* describe the changes experienced during puberty
* explore how age expectancy has changed through time – link to History

**Key vocabulary:** gestation, puberty, growth, reproduction, foetus, fertilisation, baby/infant, toddler, child, teenager, adult, old age, childhood, adolescence, adulthood  | **Previous Learning** **Related Learning from KS1:****Animals, including humans*** identify, name draw and label the basic parts of the human body and say which parts of the body is associated with each sense
* notice that animals, including humans, have offspring which grow into adults
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| **Objective and Success Criteria**  | **Coverage** | **Key Questions**  | **Children should know that** | **Resources** |
| Describe the changes as humans develop to old age**B1, B2** | * Discuss the human life cycle (assess how much do the children already know)
* Introduce asexual and sexual reproduction
* Categorise examples into asexual and sexual
* Discuss the 6 stages of human development and the milestones associated with each
 | What does asexual reproduction mean?What are the six stages of human development?Which stage are you currently in? | Know how to name and order the stages of development.Explain the changes that occur during human development. |  |
| Create a timeline to represent growth and development of humans**B1, B2**Skill:To be able to communicate and represent data using graphsTo be able to present conclusions | * Explain what a foetus is
* Focus on foetal development and the gestation period of humans
* Research what changes take place in each month of the gestation period
* Discuss what a pregnant mother needs to do to ensure the health and safety of her foetus
* Look closely at changes of height and weight during the gestation period
* Compare the human gestation period to that of other mammals
* Compare the mass of the mammals to the length of the gestation period - establish whether there is a link and represent it using graphs
 | What is the gestation period of humans?What changes take place during the gestation period?How can mothers do to minimise the risks to their foetus?What is the link between the mass of the animal and its gestation period? | Know how to explain the stages of foetal development and represent the changes using statistics.Know that different animals have different gestation periods.  | * BBC Bitesize video: Human Reproduction

<https://www.bbc.co.uk/bitesize/clips/zpmqxnb> |
| Describe the changes experienced during puberty**B1, B2, B3** | * Recap the human life cycle
* Explain and discuss the physical changes that will take place in boys
* Explain and discuss the physical changes that will take place in girls
* Take time to discuss the emotional changes caused by hormones that accompany the physical changes
 | When does puberty normally occur?What physical changes take place in girls?What physical changes take place in boys?Why do humans need to experience puberty?What changes do both girls and boys experience?What emotional changes are associated with puberty? | Understand the key physical and emotional changes during puberty in both boys and girls.Know why these changes take place during puberty.Know the similarities and differences between the changes that occur in boys and girls | * NHS online information resource

<https://www.nhs.uk/live-well/sexual-health/stages-of-puberty-what-happens-to-boys-and-girls/>  |
| Explore how age expectancy has changed through time – link to History**B1, B2, B3** | * Discuss the changes that take place in old age
* Suggest what can be done to minimise the impact of the changes
* Discuss the meaning of life expectancy
* Research how life expectancy has changed over the years - noting that the rate differs from country to country
* Explore the reasons for this
* Discuss why life expectancy has increased through time (advancements in medical care, improvements in sanitation, housing, and education)
 | What does life expectancy mean?Why was life expectancy so low in the past?What has caused the life expectancy to increase? | Know that life expectancy differs from country to country.Know that life expectancy has increased due to advancement and improvements in medical care, sanitation, housing and education.  | * Laptops and iPads for research
* Useful website with world statistics

<https://www.worldometers.info/demographics/world-demographics/> |
| **Assessment Questions**What are the six stages of human development?How does a foetus develop?What are the main physical and emotional changes that take place during puberty? |

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| **Year 5 – Summer – How do you build an empire?** **Sum 1 & 2:** **Big idea(s): B1****Living things and their habitats*** describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
* explore life process of reproduction in some plants and animals

**Key vocabulary:** similarities, differences, reproduction, asexual, sexual, metamorphosis, chrysalis, pupa, hatchling, fledgling | **Previous Learning** **Revision from KS1 and Year LKS2:****Living things and their habitats****Year 1 in Autumn Term*** identify and name a variety of common animals that are birds, fish, amphibians, reptiles and mammals
* describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles and mammals, and including pets).

**Year 2 in Spring Term*** identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other

**Year 4 in Autumn Term*** recognise that living things can be grouped in a variety of ways
* explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
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| **Objective and Success Criteria**  | **Coverage** | **Key Questions**  | **Children should know that** | **Resources** |
| Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird**B1** | * Recap what a life cycle is (see video link for a clip compilation which can be used as an introduction)
* Explain the generally life cycles of a mammal, an amphibian, an insect and a bird (the Espresso videos are a great introduction for each)
* Choose an example of each to take an in depth look at (for example: a rabbit, a frog, a butterfly and a chicken/robin)

If possible have caterpillars, tadpoles and a chicken’s egg in class so that the children can witness part of the life cycles first hand* Record the changes that take place for each during their growth phase
* Compare and contrast the differences is the life cycles of a mammal, amphibian, insect and bird
 | What is a life cycle?What are the stages in a frog’s life cycle?What is a chrysalis?What do you call a baby bird that is ready to fly?How did you feel watching a chicken hatch? | Know that the life cycle of a living thing is a series of stages of development starting with a fertilized egg in animals or a seed in many plants.Know that in most mammals a fertilized egg develops in the womb into an embryo and is then born and fed on milk before it is weaned onto the food that is adapted to eat; it then develops to maturity in a period called adolescence after which it can reproduce and the cycle can begin again.Know that in many insects (e.g. butterflies) a fertilized egg develops into wingless feeding form called a larva (caterpillar); the larva feeds then later becomes a pupa (chrysalis) with a protective cocoon; inside this cocoon, the pupa metamorphoses into the adult butterfly after which it can reproduce and the cycle can begin again.Know that in birds a fertilized egg hatches in a nest (a hatchling) and is fed by its parents until it is ready to fly (i.e. becomes a fledgling); it then leaves the nest and grows into an adult after which it can reproduce and the cycle can begin again. | * BBC Bitesize video: life cycles compilation:

<https://www.bbc.co.uk/bitesize/clips/zp62tfr>* Espresso has great videos on the life cycles of mammals, amphibians, insects and birds
* Espresso activities and quizzes to consolidate learning
* **Other useful videos:**

The life cycle of an animal:<https://www.bbc.co.uk/bitesize/clips/zt96sg8>Mating rituals of grey squirrels<https://www.bbc.co.uk/programmes/p007g7yv>Do baby animals look like their parents?:<https://www.bbc.co.uk/bitesize/clips/zd62tfr>Horse giving birth:<https://www.bbc.co.uk/bitesize/clips/zdfpyrd>Butterfly metamorphosis:<https://www.bbc.co.uk/programmes/p00cnsls><https://www.bbc.co.uk/programmes/p003kmdp><https://www.bbc.co.uk/programmes/p00cqd8s>Contact for chicken eggs:<https://www.thehappychickcompany.co.uk/chick-hatching-at-schools/>* equipment for keeping tadpoles in the classroom
* equipment for keeping caterpillars in the classroom
 |
| Explore life process of reproduction in some plants and animals**B1** | * Explain asexual and sexual reproduction in plants
* Recap the different parts of the plant and their functions
* Focus on sexual reproduction and the gametes: male (pollen) and female (ovules) and how fertilisation occurs
* Investigate how different plants reproduce asexually - bulbs, tubers, runners, cuttings
 | How many parents does a plant need for sexual reproduction?Bulbs are an example of which type of plant reproduction?When an offspring is an exact copy \_\_\_\_\_\_\_\_\_\_\_ reproduction has taken place. | The function of a flower is reproduction, where flowers of the same kind exchange pollen – made by an anther – in a process called fertilisation, and a structure in the flower’s ovary called an ovule becomes a seed; the ovary then becomes a fruit which helps the seed leave the plant in a process called dispersal. | * **Useful videos:**

The life cycle of a plant:<https://www.bbc.co.uk/bitesize/clips/zc234j6>How do flowering plants reproduce?:<https://www.bbc.co.uk/bitesize/topics/zgssgk7/articles/zqbcxfr>How do plants spread their seeds?:<https://www.bbc.co.uk/bitesize/topics/zxfrwmn/articles/z28dpbk> |
| **Assessment Questions**How do the lifecycles of mammals, amphibians, insects and birds differ?How do plants reproduce asexually? |