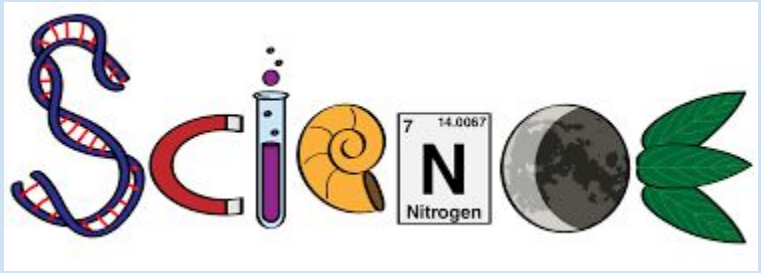

Year 5

Year 5 • Animals Including Humans

Unit overview

KEY KNOWLEDGE

Order and compare the stages in the human life cycle.
Understand and describe the changes as humans develop to old age.
Describe the changes experienced in puberty.
Understand why puberty happens.
Compare gestation time in animals.

KEY VOCABULARY

Offspring, baby, toddler, child, adolescent, adult, geriatric, growth, puberty, fertilisation, gestation, birth, egg, sperm, gamete, embryo, foetus, periods, pubic hair, testicle, penis, vagina, uterus, womb, ovary, breasts, erection, intercourse, ejaculation, metamorphosis, table of results, cause, effect, repeats, bar chart, coordinate, graph, data point, scale, plot, mean, trend line.

PRIOR LEARNING

Describes processes of life – reproduction, growth (Living Yr2) Knows plant life cycle. Sexual reproduction (Plants Yr2/3) Knows human life cycle. Growth creates change (Animals Yr2) Know mammals give birth to live young (Living Things Yr4) Knows life cycles in other animals/mammals (Living Things Yr5) Describes metamorphosis / internal reproduction (Living Yr5) Sexual / asexual reproduction in animals & plants (Living Yr5)

DISCIPLINARY KNOWLEDGE & SKILLS

Order the human life cycle from offspring to old age and describe how growth changes the body. • Use observations and data to describe patterns of growth and change across the human life cycle. • Describe the physical and emotional changes experienced during puberty. • Explain that puberty brings reproductive maturity and prepares the body for reproduction. • Describe fertilisation, gestation and birth using appropriate scientific vocabulary. • Compare gestation periods and identify patterns between different animals.

ENQUIRY TYPES

Researching

CAREERS LINK

Paediatrician • Midwife • GP • Health researcher
Gatsby: BM4 — connect human development to healthcare careers; BM5 — encounter an appropriate health professional; BM6 — explore healthcare careers through virtual/workplace resources.

SCIENTISTS / STEM LINKS

Granville Stanley Hall (1844-1924) American who pioneered ideas on human development. He used scientific method to 'discover' adolescence in 1904. He held openly eugenic and antisemitic views. David Sinclair (1969-) World's leading scientist on human aging. Discovered the role of our DNA's body clock in causing aging and ways to slow aging down in mice through gene therapy. Franz Naegele (1778-1851) German doctor who first proposed that the gestation period in humans is 40 weeks. He developed Naegele's Rule that works out the expected delivery date that is still used today.

WHY THIS? WHY NOW?

Builds on KS1 life cycles and Year 2 growth. Pupils now describe human development from birth to old age, including puberty and changes over time. This supports personal development and prepares for Year 6 body systems and healthy lifestyle choices.

Year 5 • Animals Including Humans

Learning sequence • knowledge, disciplinary skills and enquiry

Learning objectives / key knowledge	Disciplinary knowledge / skills	Enquiry opportunities	Enquiry type
How do we change over time?	Order the human life cycle from offspring to old age and describe how growth changes the body.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	Researching
What happens as we get older?	Use observations and data to describe patterns of growth and change across the human life cycle.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
What happens during puberty?	Describe the physical and emotional changes experienced during puberty.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
Why does puberty happen?	Explain that puberty brings reproductive maturity and prepares the body for reproduction.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
What happens during fertilisation?	Describe fertilisation, gestation and birth using appropriate scientific vocabulary.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
How does gestation vary between animals?	Compare gestation periods and identify patterns between different animals.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	

Year 5 • Forces

Unit overview

KEY KNOWLEDGE

Opposing forces can be in balance or unbalanced. Unsupported objects fall towards earth because of gravity force acting between earth and the falling object. Air resistance force (gas) water resistance force (liquid) and friction force (solid) act between moving surfaces.Ideas about weight and acceleration due to gravity force could be described but should be left to KS3). Levers, pulleys and gears allow a smaller force to have a greater effect (force multipliers).

KEY VOCABULARY

Force, force arrow, contact force, non-contact force, push force, pull force, twist force, friction force, upthrust force, reaction force, gravity force, air resistance force, water resistance force, particle, solid, liquid, gas, balanced, unbalanced, resultant force,force meter, Newton (N), mass, weight, machine, lever (type 1,2 & 3), pivot, fulcrum, effort, load, pulley, mechanical advantage, force multiplier, gear, cog, turning force, speed, acceleration, table of results, cause, effect, repeats, bar chart, bar, coordinate, graph, data point,

PRIOR LEARNING

Some forces need contact (contact forces) between two objects and some forces act at a distance (non-contact forces). Recognise & name contact (push, pull & friction) / non-contact (gravity & magnetic) forces (Forces Yr1/3) Forces changes the direction & speed of a moving object. More force more change. Use Force Arrow Model (Forces Yr1/3) Particle Model to describe solids, liquids & gases (States Yr4)

DISCIPLINARY KNOWLEDGE & SKILLS

Use the Force Arrow Model to show the size and direction of forces and explain their effects. • Identify opposing forces and explain the effects of balanced and unbalanced forces. • Explain friction as a contact force that resists movement between surfaces. • Investigate air resistance and explain how it affects falling objects. • Investigate water resistance and relate it to movement through liquids. • Explain how levers, pulleys and gears allow a smaller force to have a greater effect.

ENQUIRY TYPES

Researching; Classification

SCIENTISTS / STEM LINKS

Isaac Newton (1643-1727) English scientist who develop the Laws of Motion and discovered gravity force (watched an apple falling from a tree). He also discovered that force causes a planet to orbit. Leonardo Da Vinci (1452-1519) Italian artist and scientist. He was always inventing machines and experimented with friction force. He increased & reduced it and predicted its effect. Galileo Galilei (1564-1664) Italian scientist who suggested that the speed of a falling object is independent of its mass – due to gravity force. This was famously proved right by astronauts on the moon.

WHY THIS? WHY NOW?

Builds directly on Year 3 contact/non-contact forces, friction and magnets. Pupils now investigate gravity, air resistance, water resistance and mechanisms, using more precise measurement and explanation. This prepares for KS3 forces and engineering applications.

CAREERS LINK

Mechanical engineer • Aerospace engineer • Marine engineer • Product engineer
Gatsby: BM4 — connect force investigations to engineering; BM5 — encounter an engineer; BM6 — explore transport, marine or manufacturing workplaces.

Year 5 • Forces

Learning sequence • knowledge, disciplinary skills and enquiry

Learning objectives / key knowledge	Disciplinary knowledge / skills	Enquiry opportunities	Enquiry type
Can you describe forces correctly?	Use the Force Arrow Model to show the size and direction of forces and explain their effects.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	Researching; Classification
What happens if forces are unbalanced?	Identify opposing forces and explain the effects of balanced and unbalanced forces.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
What makes an object slow down?	Explain friction as a contact force that resists movement between surfaces.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
How can we slow down falling objects?	Investigate air resistance and explain how it affects falling objects.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
How does water resistance affect movement?	Investigate water resistance and relate it to movement through liquids.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
How do simple machines help us?	Explain how levers, pulleys and gears allow a smaller force to have a greater effect.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	

Year 5 • Living Things and their Habitats

Unit overview

KEY KNOWLEDGE

Describe the similarity and differences in the life cycles of mammals, amphibians, birds and insects. Compare & contrast. Research life cycles of plants, invertebrates & vertebrates within local habitats. Be able identify & describe changes over time. Describe the life process of reproduction in plants & animals.

o Sexual – fertilisation leading to variation
o Asexual – vegetative growth leading to clones

KEY VOCABULARY

Sexual, asexual, growth, metamorphosis, puberty, reproduction, fertilisation (internal / external), gamete, egg, sperm, embryo, foetus, larva, pupa (chrysalis), testes, uterus, gestation, birth, petals, sepals, carpel, stigma, ovary, anther, stamen, pollen, pollination, dispersal, vegetative, bulb, runner, tuber, rhizome, corm, stem, root, variation, clone, independent variable, dependent variable, controlled variable, data range, data interval, repetition, reliability, risk, relationship prediction, hypothesis, method, scale.

PRIOR LEARNING

Animal (human) & plant life cycles (PlantsYr2/3, AnimalsYr2/5) Sexual reproduction (pollination) in plants (Plants Yr3) Classification as vertebrate & invertebrates (Living Things Yr4) Sampling & species identification (Plants Yr1, Living Yr2/4) Puberty as in humans (other animals) as a change to reproductive maturity. Eggs & sperm (Animals Yr5) Internal fertilisation. Gestation in mammals (Animals Yr5)

DISCIPLINARY KNOWLEDGE & SKILLS

Compare life cycles of mammals, birds and amphibians, identifying similarities and differences. • Describe insect and other invertebrate life cycles, including metamorphosis. • Research and identify local vertebrates and invertebrates and investigate their behaviour. • Describe sexual reproduction in flowering plants, including pollination, fertilisation and dispersal. • Describe asexual reproduction in plants through vegetative growth and explain that it produces clones. • Compare and contrast sexual and asexual reproduction and life cycles across plants and animals.

ENQUIRY TYPES

Researching; Classification

SCIENTISTS / STEM LINKS

Jam Swammerdam (1637-1680) Dutch scientist that revolutionised the study of insects. He proved that the egg, pupa and adult were the same animal that was not known at the time. Maria Sybilla Merian (1647-1717) German scientist who was the first to observe, record and name to process of insect metamorphosis in silk worms. She built on Swammerdam's research. Karl von Frisch (1886-1982) Austrian scientist who studied bee behaviour and communication. He was the first to describe the 'waggle-dance' a bee uses to describe the location of nectar to others.

WHY THIS? WHY NOW?

Builds on Year 4 classification, habitats and environmental change. Pupils now compare life cycles and reproduction in plants and animals, developing understanding of continuity and variation. This prepares for Year 6 evolution and inheritance.

CAREERS LINK

Ecologist • Zoologist • Botanist • Reproductive biologist
Gatsby: BM4 — connect life cycles to biological careers; BM5 — encounter a field/lab scientist; BM6 — explore conservation, botanical or animal-care workplaces.

Year 5 • Living Things and their Habitats

Learning sequence • knowledge, disciplinary skills and enquiry

Learning objectives / key knowledge	Disciplinary knowledge / skills	Enquiry opportunities	Enquiry type
How do other vertebrates develop?	Compare life cycles of mammals, birds and amphibians, identifying similarities and differences.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	Researching; Classification
How do invertebrates develop?	Describe insect and other invertebrate life cycles, including metamorphosis.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
What lives in our local habitats?	Research and identify local vertebrates and invertebrates and investigate their behaviour.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
How do plants develop and reproduce?	Describe sexual reproduction in flowering plants, including pollination, fertilisation and dispersal.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
Can plants reproduce asexually?	Describe asexual reproduction in plants through vegetative growth and explain that it produces clones.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
How do life cycles compare?	Compare and contrast sexual and asexual reproduction and life cycles across plants and animals.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	

Year 5 • Properties and Changes of Materials

Unit overview

KEY KNOWLEDGE

Compare and Group materials based on their properties. Give reasons (from evidence) for uses of these materials. A mixture is made up of 2 or more substances (particles mix). A solute (solid) dissolves in a solvent (liquid) to form a solution. A solution and other mixtures can be separated through evaporating, filtering, sieving and chromatography. Dissolving, mixing and changes in state are reversible changes
Some changes form new materials (compounds) through chemical reactions. These are irreversible reactions.

KEY VOCABULARY

Material, particle, substance, mixture, compound, state, solid, liquid, gas, melting, boiling, evaporation, condensation, freezing, energy, attraction, dissolve (dissolving), solute, solvent, soluble (solubility), insoluble, opaque, translucent, transparent (transparency), conductive (conductivity), insulating(insulation), heat, temperature, thermal, flexible (flexibility), rigid (rigidity), elastic (elasticity), absorbent (absorbency), magnetic, filtration, sieving, permeable (permeability), chromatography, chemical, physical, reaction, bond (bonded), combined, reversible, irreversible, variable, cause, effect, independent variable, dependent variable, controlled variable, data range, data interval, repetition, reliability, risk, relationship

PRIOR LEARNING

Properties (light Yr3; Forces Yr3/5; Electricity Yr4; Sound Yr4) Particles move (vibrate; collisions) with energy (Sound Yr4) Particles move faster with more energy (Sound Yr4) Know properties of solid, liquid & gas (MaterialYr2; StatesYr4) Can use Particle Model to describe reversible changes in states of matter. Know associated complex terminology (States Yr4) Heat increases the rate of evaporation (States Yr4)

DISCIPLINARY KNOWLEDGE & SKILLS

Compare and group materials using evidence from properties such as hardness, conductivity, transparency and flexibility. • Give evidence-based reasons for selecting materials for particular uses. • Use the Particle Model to distinguish mixtures, solutes, solvents and solutions. • Select and explain separation methods including filtering, sieving, evaporation and chromatography. • Explain that dissolving, mixing and changes of state are reversible changes. • Identify chemical reactions that form new materials and explain why these changes are irreversible.

ENQUIRY TYPES

Researching; Classification

SCIENTISTS / STEM LINKS

Virginia Holsinger (1937-2009) American scientist that developed milk substitutes for those with lactose intolerance. She used an enzyme from fungi to break down lactose so it was more easily digested. Spencer Silver (1941-1921) American scientist that developed the low- tack glue that Arthur Fry later used to create his Post-It Notes in 1974. Silvers glue allowed stick-re-stick without leaving a residue. Ruth Benerito (1916-2013) American scientist who worked for the textile industry and developed wash-and-wear (wrinkle free) cotton and flame-resistant fabrics in the 1950s. She saved the cotton industry.

WHY THIS? WHY NOW?

Builds on KS1 material properties and Year 4 states of matter. Pupils now investigate dissolving, solutions, separation and reversible/irreversible changes, selecting methods from evidence. This prepares for KS3 chemistry and more formal particle explanations.

CAREERS LINK

Chemist • Chemical engineer • Materials scientist • Laboratory technician
Gatsby: BM4 — connect material testing to chemistry careers; BM5 — encounter a scientist/technician; BM6 — explore a laboratory or manufacturing workplace.

Year 5 • Properties and Changes of Materials

Learning sequence • knowledge, disciplinary skills and enquiry

Learning objectives / key knowledge	Disciplinary knowledge / skills	Enquiry opportunities	Enquiry type
What are the main properties of materials?	Compare and group materials using evidence from properties such as hardness, conductivity, transparency and flexibility.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	Researching; Classification
How do properties affect material use?	Give evidence-based reasons for selecting materials for particular uses.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
What is a mixture? Is it different to a solution?	Use the Particle Model to distinguish mixtures, solutes, solvents and solutions.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
How can mixtures be separated?	Select and explain separation methods including filtering, sieving, evaporation and chromatography.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
Which changes are reversible?	Explain that dissolving, mixing and changes of state are reversible changes.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
Which changes are irreversible?	Identify chemical reactions that form new materials and explain why these changes are irreversible.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	

Year 5 • Earth and Space

Unit overview

KEY KNOWLEDGE

The sun, planets and moon(s) are spherical bodies.
Can describe the development of a heliocentric model of the solar system. The Earth & other planets orbit the sun in the Solar System.
Know the order of planets in our solar system. Can describe how planets rotate (day/night) and orbit the sun (seasons). Big Picture.
Day and night are caused by the Earth's rotation (sun appears to move across the sky).
The moon orbits the Earth. Know the phases of the moon.

KEY VOCABULARY

Solar system, sun, star, planet, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, Asteroids, moon, orbit, ellipses, gravity force, temperature, solid, liquid, gas, axis, tilted axis, day, night, month, year, satellite, atmosphere, surface, new moon, full moon, quarter moon, waxing, waning, crescent, gibbous, energy, transfer, Universe, telescope, astronomy, heliocentric, pattern, data, primary data, secondary data, trend, relationship, conclusion, valid (validity).

PRIOR LEARNING

Describes path/transfer of light energy (Model) (Light Yr3) Reflected light energy (shiny/dull) path to eye (Light Yr3) Sun moves across the sky. Day-length (Seasons/Light Yr1/3) Non-contact (gravity & magnetic) forces (Forces Yr1/3/5) Forces changes the direction & speed of a moving object. Balanced/unbalanced. Use Force Arrow Model (Forces Yr1/3/5) Particle Model to describe states of matter (Materials Yr4/5)

DISCIPLINARY KNOWLEDGE & SKILLS

Describe the Sun as a star and planets as spherical bodies; explain safe observation of the Sun. • Use the heliocentric model and recall the order of the planets orbiting the Sun. • Explain day and night using Earth's rotation and the apparent movement of the Sun. • Explain seasons using Earth's orbit and tilted axis. • Explain that the Moon orbits Earth and identify the main phases of the Moon. • Extend understanding to space exploration, satellites, asteroids, galaxies and scientific debate.

ENQUIRY TYPES

Researching; Classification

CAREERS LINK

Astronomer • Astrophysicist • Satellite engineer • Space scientist
Gatsby: BM4 — link models and space science to STEM careers; BM5 — encounter a space/STEM professional; BM6 — observatory, planetarium or space-sector workplace experience.

SCIENTISTS / STEM LINKS

Caroline Herschel (1750-1848) German scientist who discovered many comets and star clusters with a simple telescope. She was the first woman to receive a salary as a scientist. Nicolaus Copernicus (1473-1543) Polish scientist that developed the heliocentric model that replaced the geocentric model of Ptolemy. He said the planets orbited the sun which was revolutionary in its day. Stephen Hawking (1942-2014) English scientist who suffered from motor neurone disease. He was one of our greatest scientists who studied black holes and popularised science through many books.

WHY THIS? WHY NOW?

Builds on seasonal change, light and pupils' developing use of scientific models. Pupils now explain the Solar System, Earth's rotation, day/night and the Moon's movement using models. This prepares for more abstract secondary physics and astronomy.

Year 5 • Earth and Space

Learning sequence • knowledge, disciplinary skills and enquiry

Learning objectives / key knowledge	Disciplinary knowledge / skills	Enquiry opportunities	Enquiry type
What is the Sun? What are planets?	Describe the Sun as a star and planets as spherical bodies; explain safe observation of the Sun.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	Researching; Classification
What is our Solar System like?	Use the heliocentric model and recall the order of the planets orbiting the Sun.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
Why do we have day and night?	Explain day and night using Earth's rotation and the apparent movement of the Sun.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
Why do we have seasons?	Explain seasons using Earth's orbit and tilted axis.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
What are the phases of the Moon?	Explain that the Moon orbits Earth and identify the main phases of the Moon.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	
Isn't space amazing?	Extend understanding to space exploration, satellites, asteroids, galaxies and scientific debate.	Use increasingly precise scientific vocabulary/models; plan, measure, record, analyse and explain using evidence as appropriate.	