St Mary Cray Primary Academy – Knowledge Organiser

Science Focus	Earth and Space	Year 5	Autumn 1

What? (Key Knowledge)

The Earth and the Sun

WARNING
It is not safe to look directly at the Sun, even when wearing sunglasses.

What is the Sun?	• The Sun is the star at the centre of our solar system
What is the solar system?	• The solar system as 8 planters: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.
How is the Earth related to the Sun?	• The Earth obits (goes around) the Sun. • The Earth takes one year to orbit the Sun. • The Earth is held in its orbit by the Sun's gravitational pull.

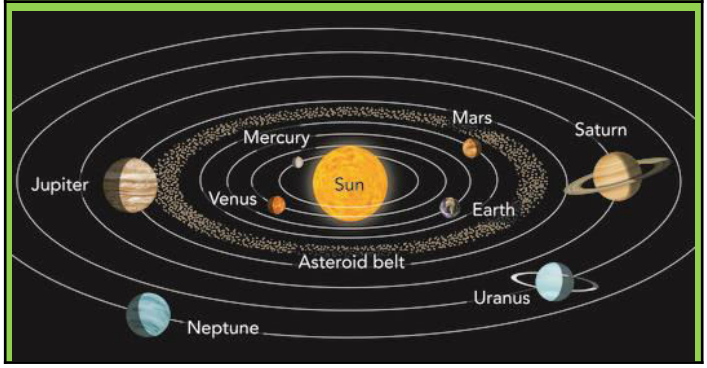
The Moon and the Earth

What is a moon?	• A moon is a celestial body that orbits a planet • The Earth has one moon; Jupiter hs 4 large moons and numerous small ones
How is the Moon related to the Earth?	• The Moon orbits the Earth. • It takes about 298 days for the Moon to orbit the Earth. • The Moon is held in its orbit round the Earth by Earth's gravitational pull.
Why does the Moon change shape?	• IT DOESN'T, it just appears to change shape. • The half of the **Moon** that points toward the Sun **looks** bright because it is lit by sunlight. The **Moon appears to change shape** because we see different amounts of the lit part as the **Moon** orbits Earth. ... As it moves around Earth, more and more of the lit side comes into view.

The rotation of the Earth

How else does the Earth move?	• The Earth spins on it's own axis • The Earth takes 24 hours (1 day) to completely rotate on its axis
What causes day and night?	• The Earth spins once a day • The side of the Earth facing the Sun is in daytime • The side of the Earth facing away from the Sun is in night time.
What causes sunrise and sunset?	• The Sun doesn't move – it's us that moves • Because the Earth is rotating, the Sun appears to move across the sky as the day goes on.

Pictures and Diagrams



What? (Key vocab)

Spelling	Definition
Solar	Relating to the Sun
Orbit	The curved path of an object around a star or planet
Axis	An imaginary line around which something moves
Rotating	Moving in a circle around an axis
Gravitational	Moving towards the centre of gravity

Possible experiences

- Use the internet (pen pals) to establish that the time of day is different in different places in the world.
- Create a working model of the solar system
- Make shadow clocks or sundials

St Mary Cray Primary Academy – Knowledge Organiser

Science Focus	Forces	Year 5	Autumn 1

What? (Key Knowledge)

Forces	
What is gravity?	• Gravity holds things to the Earth's surface and forbids things from floating up and into the atmosphere around and above us. When a person jumps, the energy they create will lift them off the ground, however, gravity is what pulls them back down again. Gravity is an invisible force.
What are the effects of air resistance, water resistance and friction, that act between moving surfaces?	• Air resistance is a type of friction between air and another material. • If you go swimming, there is friction between your skin and the water particles. This is known as water resistance. • Friction occurs when objects move through water or air.
How do some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect?	• Levers. These use a long pole and a pivot point to increase a force. • Pulleys. These use a rope running over a pulley wheel to increase a force. • Gears. These use cogs with teeth in to increase the force and also transit it from one part of a machine to another.

Statuary requirements

- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.
- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

What? (Key vocab)

Spelling	Definition
Air resistance	A force that is caused by air with the force acting in the opposite direction to an object moving through the air
Force	A push or pull upon an object resulting from its interaction with another object
Friction	The resistance that one surface or object encounters when moving over another
Gears	A toothed wheel that works with others to alter the relation between the speed of a driving mechanism (e.g. engine) and the speed of the driven parts (e.g. the wheels)
Gravity	The force that attracts a body towards the centre of the earth
Levers	A rigid bar resting on a pivot that is used to move a heavy or firmly fixed load
Mass	Mass is how much matter (or 'stuff') is inside an object. It is measured in kilograms (kg).
Weight	Weight is how strongly gravity is pulling an object down. It is measured in Newtons (N).
Pull force	To draw or haul towards oneself or itself, in a particular direction
Push force	To move something in a specific way by exerting force

Possible experiences

- Measure
  Newtons of different objects around the school using a force meter.
- Design different sized parachutes to see which catches the most air resistance.
- Investigate streamlining, Plan a fair test to investigate how fast different shapes of plasticine fall through water.
- Make your own Rube Goldberg machine.

St Mary Cray Primary Academy – Knowledge Organiser

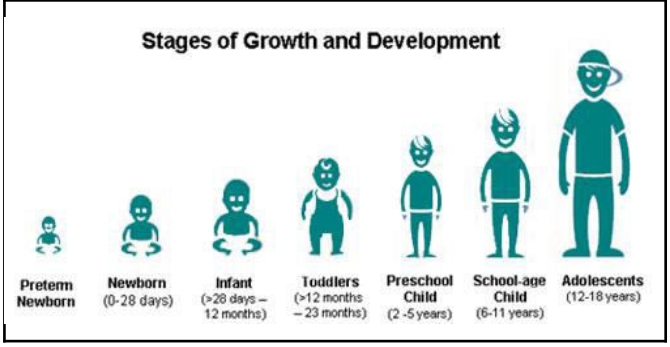
Science Focus	Animals, including humans	Year 5	Spring 1

What? (Key Knowledge)

The human reproductive system

What is fertilisation?	The male and female sex cells fuse together.
What is puberty?	Usually, puberty starts between ages 8 and 13 in girls and ages 9 and 15 in boys. At that stage, their pituitary gland (a pea-shaped gland located at the bottom of your brain) releases special hormones that change and mature the body ready for reproduction.
Becoming old	As you get older, your skin wrinkles because it becomes thinner and less elastic. It gets drier too as it makes less oil and sweat. Your bones become more visible as you store less fat beneath your skin. Inside the body your bones and muscle become weaker. Your memory gets worse, and your immune system cannot fight disease as easily.

Pictures and Diagrams



Possible experiences

- Invite guests in to share their experiences e.g. parent with a newborn child, an elderly person.
- Measure children from different year groups in the school – from Nursery to Year 6. What can they do? What milestones have they passed.
- For homework, talk to your parent and make a list of your personal milestones – when did you say your first words, when did you walk?

Statutory requirements

Describe the changes as humans develop from birth to old age.

What? (Key vocab)

Spelling	Definition
Gestation	The process or time when prenatal development takes place before birth.
Fertilisation	The process of the male and female sex cells fusing together.
Reproduce	To produce young.
Prenatal	The cells develop and grow into a foetus inside the mother's uterus. After around 9 months, the baby is born.
Newborn	A human infant that is less than 28 days old.
Infant	Child under 1 year of age.
Toddler	Child aged 12-36 months.
Child	Human aged 3-11 years.
Adolescent	Human aged 12-18 years old.
Elderly person	The final stage of life – often defined as over 60/65 years.
Hormones	Hormones are your body's chemical messengers.
Puberty	The period during which adolescents reach sexual maturity and become capable of reproduction.

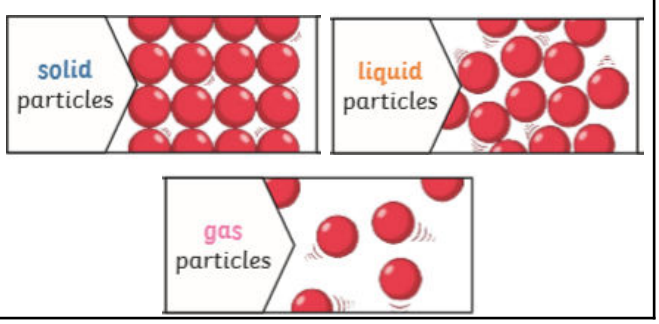
St Mary Cray Primary Academy – Knowledge Organiser

Science Focus	Properties and changes to materials	Year 5	Spring 1

What? (Key Knowledge)

Materials are chosen for a purpose by their properties; electrical conductivity, flexibility, hardness, insulators, magnetism, solubility, thermal conductivity, transparency.	Glass is used for windows as it is hard and transparent. Oven gloves are made from a thermal insulator, to keep the heat from burning your hands.
Particles – including states of matter	That all materials are made of particles and in each they are arranged differently. See the diagram below. Solid, liquid and gas are know as states of matter.
Changes of state	The state of matter can change. For example, a liquid can be frozen and then it becomes a solid. When water is boiled, it turns into water vapour, which is a gas
The state of some matter can be reversed.	Sieving – separates particles by size, smaller pieces will move through the sieve. Filtering – solid particles get caught in the filter paper whilst the liquid can go through. Evaporating – the liquid changes into a gas leaving the solid particles behind.
The state of some matter is irreversible.	Irreversible changes often result in a new product being made from old materials. For example, burning wood produces ash, mixing milk and vinegar produces casein plastic.

Diagrams and Symbols



Possible experiences

- Baking – making bread, pizza etc.
- Melting chocolate and reforming into another shape.
- Freezing liquids and watching it melt.
- Making jelly.
- Melting wax and watching it reform.
- Cornflour – link back to forces. How the matter changes when a force is applied to it.

Statutory Requirements

- Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- Understand that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- Demonstrate that dissolving, mixing and changes of state are reversible changes
- Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

What? (Key vocab)

Spelling	Definition
Material	The substance that something is made out of e.g. wood, plastic, metal.
Solids	One of the three states of matter. Solid particles are very close together meaning that solids, such as wood and glass hold their shape.
Liquids	This state of matter can flow and take the shape of the container because the particles are more loosely packed than solids and can move around each other. Examples of liquids include water and milk.
Gases	One of the three states of matter. Gas particles are further apart than solid and liquid particles and are free to move around. Examples of gases are oxygen and helium.
Melting	The process of heating a solid until it changes to a liquid.
Freezing	When a liquid cools and turns into a solid.
Evaporating	When a liquid turns into a gas or vapour.
Condensing	When a gas such as water vapour cools and becomes a liquid.
Conductor	A conductor is a material that heat or electricity can easily travel through. Most metals are both thermal conductors (heat) and electrical conductors.
Insulator	An insulator is a material that does not allow heat or electricity to travel through it. Wood and plastic are both thermal insulators.
Transparency	A transparent object lets light through so that the object can be looked through, for example some glass and plastics.

St Mary Cray Primary Academy – Knowledge Organiser

Science Focus	Living things and their habitat	Year 5	Summer 1

What? (Key Knowledge)

Life cycle of animals	Most animals including fish, mammals, reptiles and birds have very simple life cycles: These animals have three stages -- before birth, young and adult. The young are typically similar to the parent, just smaller. The young slowly "grow" to become adults.
Amphibians	E.g. frogs and newts, have a slightly more complicated life cycle. They undergo a metamorphosis: they are born (either alive from their mother or hatched from eggs), they spend their childhood under water, breathing with gills, they grow into adults and move to the land, breathing with lungs
Metamorphosis	Some insects undergo a complete metamorphosis with four stages in their life cycle: egg: unborn stage, larva: young stage -- this is when most of the feeding is done; pupa: inactive (no feeding) stage between larva and adult stages; adult: final, breeding stage (they usually grow wings). About 10% of insects go through an incomplete metamorphosis. They do not have a pupal form -- these include dragonflies, grasshoppers and cockroaches.
Plant reproduction Structure of the flower	Sepals – (if present) help to protect the flower in bud Petals – attract insects with colour, scent and nectar Stamens – make pollen and hold it in position Stigma – receives pollen during pollination Ovary – contains undeveloped seeds (ovules) which, if fertilised following pollination, develop into seeds Fruit – holds the seeds

Who? (Key Knowledge)

1799-1847	Aristotle – Philosopher and scientist
1707-1778	Carolus Linnaeus – Father of Classification

Possible experiences

- Watch clips from David Attenborough documentaries.
- Make life cycle wheels to show the life cycles of different animals.

Statutory requirements

- Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- Describe the life process of reproduction in some plants and animals.

What? (Key vocab)

Spelling	Definition
Vertebrate	An animal with a backbone.
Invertebrate	An animal without a backbone.
Amphibian	A cold-blooded vertebrate.
Annelid	A segmented worm.
Arachnid	An animal that has 8 legs and a body formed of 2 parts.
Crustaceans	Hard shell, segmented body, mostly live underwater.
Habitat	The natural home or environment for an animal, plant or other organism.
Insect	A small animal that has 6 legs and generally 1 or 2 sets of wings.
Mammal	A warm blooded vertebrate animal, distinguishable by possession of hair or fur. Mothers secret milk for young and generally give birth to live young.
Micro-organism	A microscopic organism, especially a bacteria, fungus or virus.
Reptile	Dry scaly skinned vertebrate, typically lays soft-shelled eggs on land.

Diagrams