Year 5 Progression & Coverage Science

Working Scientifically in KS2 - Years 3 - 6

Welton Primary School

	What pupils should know and be able to do Lower KS2	Key vocabulary Lower KS2	What pupils should know and be able to do Upper KS2	Key vocabulary Upper KS2
	Identifying means to recognise something. Pupils learn that living and non-living things can be sorted according to their differences (classifying) They can then group things according to similarities and differences. These are called criteria. Pupils record classifications using Venn and Caroll diagrams and tables.	differences, similarities, classify, diagram, chart, key, Carroll Diagram, Venn Diagram, behaviour, properties, criteria,	Identifying means to recognise something. Pupils learn that living and non-living things can be sorted according to their differences (classifying) They can then group things according to similarities and differences. These are called criteria. Pupils record classifications using Venn and Caroll diagrams and tables. Pupils use classification keys to group according to criteria.	differences, similarities, classify, diagram, chart, key, Carroll Diagram, Venn Diagram, behaviour, properties, criteria, classification key
	A systematic observation is a way scientists observe repeatedly with a clear purpose. Pupils need to know that they can use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements, using a range of equipment, including thermometers and data loggers. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings)	systematic, notice, patterns, observations, careful, accurate, evidence, increase, decrease, predict, conclude, relationships, appearance, unit measurements	Pupils must know how to select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale. During an enquiry, they make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value)	systematic, notice, patterns, observations, careful, accurate, evidence, increase, decrease, predict, conclude, relationships, appearance, unit measurements (force, mm, cm, mins, seconds)
	In a scientific test, scientists make predictions and hypotheses. A prediction is what they think the outcomes might be, and a hypothesis is an explanation of phenomena. In simple comparative tests children compare one event with another and identify different outcomes. A variable is something that can change. In order to demonstrate a causal relationship between two variables children carry out a fair test. For a fair test, they identify a variable that can be changed and measured while keeping the other variables the same. In investigations, **conclusions** summarize how your results support or contradict your original prediction and help to form a hypothesis. Pupils learn to recognise when a simple fair test is necessary and help to decide how to set it up. They	cause, effect, enquiry, fair test, comparative test, variable factor, record, measure, prediction, conclusion, evidence, hypothesis, phenomena.	The children show they know how to select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale. During an enquiry, they assimilate other scientific processes into their learning. They make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value). They evaluate their findings, suggest improvements to their methods and form hypotheses.	Control, relationships, reliability, accuracy, interpret, justify, prove, Question/Enquiry , Method , Variables , Prediction , Results , Conclusion , Evaluation

	learn to think of more than one variable factor. They recognise when a simple comparative test is necessary and help to decide how to set it up.			
	Children begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. With help, children can look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. Children can say what they found out, linking cause and effect.	patterns, relationships, cause, effect, data, changes, similarities, differences, predict, question, observations, conclude,	Pupils learn how to identify causal relationships and patterns in the natural world from their evidence; make simple conclusions, make predictions for new values, suggest improvements and raise further questions. They draw conclusions based on their evidence and current subject knowledge. They identify results that do not fit the overall pattern; and explain their findings using their subject knowledge (anomalies)	causal, interpret, data, graphs and charts, anomaly, atypical, typical, impact
	Begin to recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations	secondary source, reliability, fact, interpretation	Begin to recognise when and how secondary sources might help to answer questions that cannot be answered through practical investigations	secondary source, reliability, fact, interpretation

Scientific Knowledge Year 5

Topic Title (Concept) **NC Reference**	**Forces (Movement, Forces and Magnets)** 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.	**Earth and Space (Earth in Space)** Describe the movement of the Earth, and other planets, relative to the Sun in the solar system Describe the movement of the Moon relative to the Earth Describe the Sun, Earth and Moon as approximately spherical bodies Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	**Properties & Changes of Materials (Substances and properties)** Compare and group together everyday materials on the basis of their properties, know 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 Demonstrate that dissolving, mixing and changes of state are reversible changes	**Living Things & Their Habitats (Living Things & Their Habitats)** 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.	**Animals inc Humans (Animals & Humans)** Describe the changes as humans develop to old age.
Prior learning	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. (Y3 - Forces and magnets)	Observe changes across the four seasons. (Y1 - Seasonal changes) • Observe and describe weather associated with the seasons and how day length varies. (Y1 - Seasonal changes)	Compare and group materials together, according to whether they are solids, liquids or gases. (Y4 - States of matter) • 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). (Y4 - States of matter) • Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (Y4 - States of matter)	Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans) • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)	Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans)
Sticky Knowledge	A **force** causes an object to start moving, stop moving, speed up, slow down or change direction. **Gravity** is a force that acts at a distance. Everything is pulled to the Earth by gravity. **Air resistance, water resistance and friction** are contact forces that act between moving surfaces. A **mechanism** is a device that allows a small force to be increased to a larger force. The payback is that it requires a greater movement. The small force moves a long distance and the resulting large	The Sun is a star. It is at the centre of our **solar system**. There are 8 planets (can choose to name them, but not essential). These travel around the Sun in fixed orbits. Earth takes 365¼ days to complete its **orbit** around the Sun. The Earth **rotates** (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). As the Earth rotates,	Substances have different uses depending on their **properties** and **state** (liquid, solid, gas). Properties include **hardness, transparency, electrical and thermal conductivity** and attraction to magnets. Some substances will **dissolve** in a liquid and form a **solution** while others are **insoluble** and form **sediment. Mixtures** can be separated by **filtering, sieving and evaporation.** Some changes to materials such as dissolving, **mixing** and **changes of state** are **reversible**, but some changes such as burning wood, rusting and mixing vinegar with	Most animals **reproduce** sexually. This involves two parents where the sperm from the male fertilises the female egg. Animals, including humans, have **offspring** which grow into adults. In humans and some animals, these offspring will be born alive and then grow into adults. In other animals, such as chickens or snakes, there may be **eggs** laid that **hatch** to young which then grow to adults. Some young undergo a further change before becoming adults e.g.	When **babies** are young, they grow rapidly. They are very dependent on their parents. As they develop, they learn many skills. A**t puberty,** a child's body changes and develops **primary and secondary sexual characteristics**. This enables the adult to **reproduce.** This needs to be taught alongside PSHE.

	force moves a small distance, e.g. a crowbar or bottle top remover. **Pulleys, levers and gears** are all mechanisms, also known as simple **machines**.	the Sun appears to move across the sky. The Moon **orbits** the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately **spherical.**	bicarbonate of soda result in the formation of new substances and these are **not reversible.**	caterpillars to butterflies. This is called a **metamorphosis**. Plants reproduce both **sexually and asexually**. Bulbs, tubers, runners and plantlets are examples of **asexual plant reproduction** which involves only one parent. **Sexual reproduction** occurs through **pollination**, usually involving wind or insects.	
Working Scientifically (These are suggested WS areas that complement unit - also refer to and highlight WS milestones as cover and ensure all covered over year/phase)	**Identify, classify and group** Identify and classify gears, levers and pulleys **Comparative and fair testing** Investigate the effects of friction, air and water resistance on objects and speed	**Pattern Seeking** Investigate how the planet's temperatures change according to their distance from the sun Explain evidence gathered about the position of shadows in term of the movement of the Earth and show this using a model **Secondary Sources** Research each planet and find out how far away from the sun. Present in scaled way	**Identify, classify and group** Classify materials according to their properties Classify ways of separating materials Classify which solids dissolve in water Classify reversible and non- reversible changes **Pattern Seeking** Observe and describe reversible and non-reversible changes **Comparative and fair testing** Investigate variables which affect how fast sugar dissolves.	**Identify, classify and group** Classify vertebrates and identify their life cycles Classify flowers according to male and female parts Identify the ways plants reproduce and the reproductive parts of flowers which differ from plant to plant. **Pattern Seeking** Compare the gestation times for mammals and look for patterns e.g. in relation to size of animal or length of dependency after birth. Look for patterns between the size of an animal and its expected life span.	Taught through direct instruction and in conjunction with PHSE according to RSE policy. **Pattern Seeking** Look for patterns in the main changes occurring from birth to old age
End of unit task	**Understand movement, forces and magnets** How does the height and surface of a ramp affect how the car travels along it?	**Describe movement of the Earth in relation to the sun** Explain and demonstrate how a sundial, used to tell the time, works.	**Understand how mixtures can be separated** Investigate how to extract pure salt from rock salt. Explain findings	**Describe life process of reproduction in plants and animals** Explain the similarities and differences between the process of reproduction in plants and animals, including amphibians, insects and birds as well as mammals.	**Investigate living things** Graph changes in average heights of males and females at different ages. Summarise findings.