Science – Year 5 – Medium Term Plan
Autumn 1: Mixtures and separation

Lesson	Learning Objective	Success Criteria	National Curriculum Links	Vocabulary	Resources
One: Mixtures	• To describe mixtures. • Working scientifically: To research using a range of secondary resources.	- I can define the term 'mixture'. - I can name some common examples of mixtures. - Working scientifically: I can research a mixture to find out what substances it is made from. -	• Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills: • Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	**mixture** **particle**	- Materials for science practical (see Teacher guidance): o plastic cups (five between two); o plastic spoons (one between two); o salt; o sugar; o pepper; o sand; o flour; o metal paper clips; o water. - Device for internet research
Two: Sieving	• To explain the process of sieving. • Working scientifically: To draw and annotate a diagram to explain a concept.	- I can define the term 'sieving'. - I can describe how sieving separates mixtures. - I can determine when it is more effective to use sieving or magnetism to separate a mixture. - Working scientifically: I can draw and annotate a diagram to explain how sieving separates a solid-solid mixture. -	- Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills: - Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	- **sieve** - **sieving**	- Materials for teacher demonstration (see Attention grabber): o plastic gold nuggets or alternative (one tub); o extra chunky gold glitter (one tub); o large mixing bowl of soil. - Two tea towels (teacher demonstration s. see Attention grabber and Main event). - Colander (one between two). - Sieve (one between two). - Paper plates (one between two). - Materials for iron filings teacher demonstration (see Main event):

					○ mixture of sand and iron filings in a sealed container; ○ a magnet; ○ a plastic cup
Three: Filtering	• To explain the process of filtering. • Working scientifically: To identify testable questions and how to answer them.	- I can define the term 'filtering'. - I can describe how filtering separates mixtures. - I can identify when filtering should be used. - Working scientifically: I can identify and justify which type of enquiry to use to answer my testable question. -	- Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills: - Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.	**filtering**	• A two-litre bottle of muddy water. • Materials for making a water filter (see Teacher guidance): ○ plastic cups (one between two); ○ small plastic bottles (one between two); ○ elastic bands (one between two); ○ squares of gauze bandage (one between two); ○ materials to act as filters (class set); ○ paper plates (one per filter material); ○ sticky notes (one per filter material); ○ plastic spoons. • Hoops (ten s. see Wrapping up). • Tea bags (five s. see Adaptive teaching). • Link: Building block sieves on Videolink.x • Link: NASA water filter
Four: Solutions	• To describe solutions and how they can be identified. • Working scientifically: To make observations about solutions.	• I can define the terms 'solution' and 'dissolve'. • I can name some common examples of solutions. • Working scientifically: I can identify solutions by observing and describing their appearance.	• Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills: • Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.	**dissolve** **insoluble** **soluble** **solution**	- Materials for dissolving salt (teacher demonstration s. see Attention grabber): ○ salt (one cup); ○ plastic cup half-filled with water; ○ spoon; - Materials for making solutions (see Main event): ○ plastic cups (five between two); ○ access to water; ○ sugar (one cup);

					○ sand (one cup); ○ teabags (one between two); ○ flour (one cup); ○ food colouring (one bottle). -
Five: Dissolving	• To identify which factors affect the time taken to dissolve. • Working scientifically: To plan a fair test with consideration of variables and measurements.	- I can recall some factors that affect the time taken to dissolve. - I can describe the effect of temperature on the time taken to dissolve. - Working scientifically: I can suggest which variables to change, measure and control. - Working scientifically: I can decide which measurements to take and how long to take them for. -	Pupils should be taught to: • Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills: • Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.	**control** **variable** **variable** -	- Materials for soluble dyes teacher demonstration (see Recap and recall): ○ Skittlesk or chocolate mini eggs; ○ jug of warm water; ○ paper plate. - Materials for dissolving sugar investigation (see Main event): ○ sugar cubes (three between three); ○ plastic cups (three between three); ○ spoons (three between three); ○ permanent marker (one between three); ○ stopwatch (one between three). ○ jug of cold water; ○ jug of warm water; ○ jug of hot water. - Tea towel. - Thermometer (optional s see Adaptive teaching).
Six: Evaporating	To describe the process of evaporation.	- I can define the term 'evaporation'. - I can describe how evaporation separates solutions. - I can identify when evaporation should be used. -	Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.	**crystallising** **evaporation** **evaporation method**	• Materials for salt dissolving teacher demonstration (see Attention grabber): ○ salt (one cup); ○ one long spoon; ○ a jug of warm water. • Materials for salt flat investigation (see Main event): ○ large plastic tray; ○ recycled lids; ○ a device to take photographs. • Highlighters

Assessment: Assess topic using end of unit quiz and assessment sheet.

Lesson	Learning Objective	Success Criteria	National Curriculum Links	Vocabulary	Resources
One: Hardness	• To determine the hardness of materials and link this to their uses. • Working scientifically: To evaluate the hardness test to determine the degree of trust in the results.	- I can define the term 'hardness'. - I can test, compare and group hard and soft materials. - I can select materials for a specific purpose based on their hardness. - Working scientifically: I can identify difficult variables to control. - Working scientifically: I can judge how variables affect the degree of trust in results.	- 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. - Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. - WS: Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	- hard - hardness - property - soft - trustworthy	- equipment for science practical (per group of three): - 5 objects to test and sort according to hardness (each object made from a different material – see Teacher knowledge for a list of suggested materials); - 5 sticky notes; - a device to take photographs; - a nail; - a magnifying glass.
Two: Transparency	• To determine the transparency of different materials and link this to their uses. • Working scientifically: To plan and draw a table of results.	- I can define the term 'transparency'. - I can test, compare and group transparent, translucent and opaque materials. - I can select materials for a purpose based on their transparency. - Working scientifically: I can identify which information should be recorded. - Working scientifically: I can draw the correct layout for the information I want to record.	- 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. - Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. - WS: Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	- light intensity - light meter - lux - opaque - translucent - transparency - transparent	- 10 sticky notes - Equipment for transparency investigation (per group of three): - a tablet with a light meter app downloaded (or data logger or light meter – see Lesson organisation in Teacher knowledge); - materials to test (see Lesson organisation in Teacher knowledge); - a torch. - Rulers (one each).
Three: Conductivity	• To determine the conductivity of different materials and link this to their uses. • Working scientifically: To write a detailed, organised method	- I can define the terms 'thermal conductivity' and 'electrical conductivity'. - I can test and compare the conductivity of different materials. - I can choose an appropriate material for a specific purpose.	- Demonstrate that dissolving, mixing and changes of state are reversible changes. - WS:Recording data and results of increasing complexity using tables. - WS:Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.	- conductor - electrical conductivity - insulator - thermal conductivity	- Equipment for tealight conductivity demonstration - a bucket of water; - metal spoon; - 5 paper clips; - petroleum jelly; - heat mat or foil tray of sand; - tealight;

	which is easy to follow.	- Working scientifically: I can write a method in a logical sequence that others can follow. - Working scientifically: I can include necessary detail in my method including variables, measurements, equipment and safety.			- a candle lighter or long matches. - Whiteboard and pen (one each). - 4 plastic cups of hot water; - a permanent marker; - 3 different materials to wrap around the cups - a thermometer; - a timer; - sticky tape.
Four: Reversible changes	• To demonstrate reversible changes. • Working scientifically: To write a prediction using prior knowledge of the states of matter.	- can define the term 'reversible change'. - I can describe how to reverse mixing and dissolving using separation techniques. - I can describe how to reverse changes of state by heating and cooling. - Working scientifically: I can use previous scientific knowledge and evidence to inform predictions.	- 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. - Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. - WS: Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. - WS: Using test results to make predictions to set up further comparative and fair tests. - Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations. - WS: Identifying scientific evidence that has been used to support or refute ideas or arguments.	- change of state - condensing - dissolve - evaporating - freezing - melting - mixture - reversible change - states of matter	- Sticky notes (five between three – see Recap and recall). - A candle lighter (for use by supervising adults only). - A bucket of water. - Equipment for heating investigation (per group of three – see Main event): - 1 heat mat (or foil tray of sand); - 1 tealight (or hot water bottle – see Lesson organisation); - 3 foil cupcake cases; - 1 set of tongs; - 3 safety goggles; - 3 different materials to test (see Lesson organisation in Teacher knowledge). - Materials for rusting demonstration (see Wrapping up): - steel wool scouring pad; - a jar of water (with lid).

Five: Irreversible changes: Burning and rusting	• To demonstrate irreversible changes. • Working scientifically: To analyse observations about rusting and use them to support a conclusion.	- I can define the term 'irreversible change'. - I can identify and describe burning and rusting as irreversible changes. - Working scientifically: I can use observations to determine the necessary conditions for rusting.	- 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. - WS: Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. - WS: Recording data and results of increasing complexity using tables. - WS: Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.	- burning - irreversible change - rust - rusting	- Jar containing water and iron wool scouring pad from Lesson 4: Reversible changes. - A candle lighter (for use by supervising adults only). - A bucket of water. - Equipment for burning investigation (per group of five – see Main event): - 1 heat mat (or foil tray of sand); - 1 tealight; - 1 set of tongs; - 5 safety goggles; - small 1.5 cm by 1.5 cm samples of materials to burn (see Teacher knowledge). - Stopwatches (optional – see Adaptive teaching).
Six: Irreversible changes: Mixing	• To demonstrate irreversible changes. • Working scientifically: To measure the circumference of a balloon accurately.	- To demonstrate irreversible changes. - Working scientifically: To measure the circumference of a balloon accurately.	- Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.	- Circumference	- Equipment for the experiment (see Lesson organisation in Teacher knowledge): - 10 plastic bottles containing varying amounts of vinegar; - 10 balloons containing bicarbonate of soda; - 5 plastic trays; - 1 permanent marker. - Equipment for measuring activity (one between three): - a whiteboard and pen; - a ball of string; - scissors; - ruler. - Sticky notes (11 between three).

Assessment: Assess topic using end of unit quiz and assessment sheet.	

Lesson	Learning Objective	Success Criteria	National Curriculum Links	Vocabulary	Resources
One: Models of our Solar System	• To compare the contributions of Ptolemy, Alhazen and Copernicus to models of the Solar system. **Working scientifically** • To pose testable questions about the solar system.	• I can describe the geocentric model. • I can describe the heliocentric model. • I can describe the shape of celestial bodies. **Working scientifically** • I can pose questions about the movement of the celestial bodies in our Solar System. • I can identify testable questions and which enquiry type is best used to answer them. • I can ask further questions about the Solar System.	- Describe the movement of the Earth, and other planets, relative to the Sun in the solar system. - Describe the Sun, Earth and Moon as approximately spherical bodies. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills: - Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.	- **celestial bodies** - **Earth** - **moon** - **planet** - **orbit** - **our Solar System** - **solar system** - **space** - **spherical** - **star** - **the Sun** - **the Moon**	- Whiteboard and pen (one each). - Link: Stellarium webx - Link: Google Earth
Two: Our Solar System	• To describe the movement and shapes of the celestial bodies in our Solar System. **Working scientifically** • To develop a model to represent the Solar System.	• I can name the celestial bodies in the solar system. • I can name the force that keeps planets in their orbits. • I can describe the orbits of celestial bodies in the Solar System. **Working scientifically** • I can use a model to represent the Solar System. • I can identify the problems with the model. • I can make improvements to the model. -	Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.	• **elliptical** • **force** • **gravity** • **Jupiter** • **Mars** • **Mercury** • **Neptune** • **Pluto** • **Saturn** • **Uranus** • **Venus**	- Whiteboards and pens (one between three). - Tablets or devices for internet research (one each). - A large area, such as a hall or playground (see Attention grabber and Main event); - To demonstrate the size of the celestial bodies in our Solar System (see Teacher knowledge): o 1 peppercorn to represent Mercury; o 2 cherry tomatoes to represent Venus and Earth; o 1 blueberry to represent Mars; o 1 watermelon to represent Jupiter; o 1 large grapefruit to represent Saturn;

					○ 1 apple to represent Uranus; ○ 1 orange to represent Neptune; ○ 1 grain of sugar or salt to represent Pluto; ○ 1 yoga ball to represent the Sun. - Modelling the Solar System activity (per group of nine or ten ≤ see Main event): ○ 5 balloons (see Teacher knowledge); ○ clay or modelling dough (see Teacher knowledge); ○ a 15 m tape measure. - Link: Natural History Museum.≪ - Link: NASA spaceplace.≪ - Link: National Geographic kids - Passport to space -
Three: The Moon	• To describe the movement of the Moon relative to the Earth. **Working scientifically** • To design and draw a table.	• I can define the term 'moon'. • I can name some of the phases of the Moon. • I can describe the orbit of the Moon around the Earth. **Working scientifically** • I can design and draw a table to record data on moons. • I can choose appropriate headings for a table.	-Describe the movement of the Moon relative to the Earth. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills: -Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	**first quarter moon** **full moon** **last quarter moon** **moon** **new moon** **phase** **reflect** **shadow** **table**	• Whiteboard and pen (one between two). • Tablets or devices for internet research (one each). • Ball and torch (optional ≤ see Adaptive teaching). • Link: NASA Planetary moons
Four: Day and night	• To explain the causes of day and night and the seasons. **Working scientifically** • To draw a diagram to explain day and night.	• I can describe how the Earth rotates on its axis. • I can describe the tilt of the Earth. • I can describe the orbit of the Earth around the Sun. **Working scientifically**	- Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills:	**axis** **day** **daytime (daylight)** **night (nighttime)** **rotate**	- Whiteboard and pen (one between two). - Equipment for the day and night and seasons activity (one between two and one for the teacher ≤ see Main event):

		• I can accurately shade day and night on the Earth. • I can label the day and night and seasons diagrams.	- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	**tilt** **season** **summer** **winter** **year**	○ a permanent marker; ○ polystyrene ball; ○ a cocktail stick; ○ a torch; ○ a handful of modelling dough (optional s. see Teacher knowledge). - Ruler (one each). - Tablet or device for internet research (one each). - Link: 24 Time zones
Five: Time	• To devise a sundial to tell the time. **Working scientifically** • To calibrate and use a sundial to measure time.	• I can name the parts of a sundial. • I can explain how a sundial works. **Working scientifically** • I can calibrate a sundial using a compass and torch. • I can use a sundial to measure time.	- Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills: - Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.	**calibrate** **face** **gnomon** **horizon** **midday** **sundial** **sunrise** **sunset** -	- Equipment for labelling the classroom (per group of three s. see Attention grabber): ○1 compass; ○4 sticky notes. - Equipment for making a sundial (per pair s. see Teacher knowledge): ○1 sundial face (e.g. paper plate, whiteboard, plastic tray containing sand or PE hoop); ○a choice of gnomons (e.g. straw, modelling dough, pen, stick or twig); ○sticky tape or glue; ○equipment to create the numbers (e.g. chalk, pens, sticky notes, string, pebbles or shells); ○an outside sunlit space, such as a playground (optional).
Six: Satellites and space junk	• To describe some uses of satellites and the problems posed by space junk. **Working scientifically**	• I can list some of the uses of satellites. • I can explain why space junk poses a problem to satellites. **Working scientifically**	- Describe the movement of the Moon relative to the Earth. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills:	• **artificial satellite** • **climate change** • **data**	• Equipment for the telling the time activity (one per pair s. see Recap and recall): ○1 sundial (made in Lesson 5: Time); ○1 compass (one each);

	• To use temperature data to make predictions about climate change.	• I can analyse patterns in temperature data for the Earth. • I can predict temperature values for the Earth in the future. -	- Using test results to make predictions to set up further comparative and fair tests.	• **natural satellite** • **space junk**	○1 torch (optional, depending on weather). • Whiteboards and pens (one each). • Online timer (one for the teacher s. see Main event). • Tablet (optional s. see Adaptive teaching). • Link: *Assessment s. Science Y5: Earth and space.* • Link: Kiddle
Assessment: Assess topic using end of unit quiz and assessment sheet.					

Science– Year 5 – Medium Term Plan
Spring 2: Living things and their habitats: Life cycles and reproduction
Exploring the life cycles of plants and animals and the life process of reproduction

Lesson	Learning Objective	Success Criteria	National Curriculum Links	Vocabulary	Resources

One: Life cycles and reproduction in plants	• To describe the life cycle of a plant, including the reproductive stage. **Working scientifically:** • To observe and compare equivalent parts in different flowers.	• I can describe the plant life cycle. • I can describe sexual reproduction in plants. **Working scientifically:** • I can dissect a flower. • I can observe the parts of a flower in detail using a magnifying glass. • I can compare equivalent parts in different flowers.	• Describe the life process of reproduction in some plants and animals. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills: • Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.	**asexual reproduction** **cuttings** **fertilisation** **flowering stage** **germination stage** **leaf growing stage** **life cycle** **ovule** **pollen** **pollination** **reproduction** **seed dispersal** **seed stage** **seedling stage** **seed** **sexual reproduction**	An outside space (see Attention grabber). Equipment for creating a plant life cycle activity (per group of three s. see Attention grabber): ○ 1 piece of chalk; ○ 6 whiteboards and pens. Equipment for the flower dissection activity (per group of three s. see Main event): ○ 3 different flowers (see Teacher knowledge); ○ 3 pairs of scissors; ○ 1 magnifying glass (or microscope); ○ 3 pieces of plain, A4 paper. Equipment for the investigation into mint cuttings (per pair s. see Main event: ○ scissors; ○ 1 mint stem (cut from a mint plant); ○ 1 plastic water bottle; ○ a tablet (see Teacher knowledge); ○ access to water; ○ paper towel; ○ a sensitive scale (optional s. see Adaptive teaching). Link: Flower dissection
Two: Life cycle of a mammal	• To describe the life cycle of a mammal. **Working scientifically:** • To research the life cycles of different mammals.	• I can describe the life cycle of a mammal. • I can compare the life cycles of different mammals. • I can describe sexual reproduction in mammals.	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. **Working scientifically**	**adolescence** **adult** **birth** **characteristic** **gestation** **infancy**	- Equipment for the investigation into mint cuttings (per pair s. see Main event): ○ a 30 cm ruler (one between two); ○ a paper towel;

		Working scientifically: • I can research using a fact sheet. • I can identify relevant information. -	Pupils should be taught to use the following practical scientific methods, processes and skills: Identifying scientific evidence that has been used to support or refute ideas or arguments.	**juvenile** **mammal** **mating** **newborn** **offspring**	○ a tablet (the same one they used in Lesson 1: Life cycles and reproduction in plants); ○ the Activity: Stem cutting data table (from Lesson 1: Life cycles and reproduction in plants); ○ mint plant cutting (from Lesson 1: Life cycles and reproduction in plants). - Devices with internet access (one each). - Plain A4 paper
Three: Life cycle of a bird	• To describe the life cycle of a bird and compare it with that of a mammal. **Working scientifically:** • To pose questions to compare the life cycles of different birds.	• I can describe the life cycle of a bird. • I can compare the life cycles of different birds. • I can compare the life cycles of mammals and birds. **Working scientifically:** • I can pose relevant questions about the life cycle of a bird. • I can use technology to answer those questions. • I can assess the value of a question. -	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.	• **bird** • **egg** • **fledgling** • **hatch** • **hatchling** • **incubation** • **nest** • **nestling**	• Equipment for the investigation into mint cuttings (see Main event 5 between two): ○ a 30 cm ruler (one between two); ○ a paper towel; ○ a tablet (the same one they used in Lesson 1: Life cycles and reproduction in plants). ○ the Activity: Stem cutting data table (from Lesson 1: Life cycles and reproduction in plants); ○ mint plant cutting (from Lesson 1: Life cycles and reproduction in plants).

					• Equipment to represent nests, eggs and food (see Teacher knowledge). • Devices with internet access (one each). • Sticky notes (five each). • Online timer (one for the teacher). • A2 plain paper (one between two). • The *Resource: Mammal life cycle poster* (see *Lesson 2: Life cycles and reproduction*).
Four: Life cycle of an amphibian	• To describe the life cycle of an amphibian. **Working scientifically:** • To suggest how temperature may affect egg hatching.	• I can describe the life cycle of an amphibian. • I can compare the life cycles of different amphibians. **Working scientifically:** • I can analyse data. • I can use data to draw conclusions. • I can identify what further data is needed.	•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. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills: •Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	**amphibian** **carnivore** **four-legged** **tadpole** **frog** **froglet** **gills** **herbivore** **lungs** **metamorphosis** **species** **tadpole** **two-legged** **tadpole**	- Equipment for the investigation into mint cuttings (see Main event s between two): o a 30 cm ruler (one between two); o a paper towel; o a tablet (the same one they used in *Lesson 1: Life cycles and reproduction in plants*). o the *Activity: Stem cutting data table* (from *Lesson 1: Life cycles and reproduction in plants*); o mint plant cutting (from *Lesson 1: Life cycles and reproduction in plants*). - Whiteboards and pens (one each).

					- A die (one for the teacher s see Wrapping up). - A large space (e.g. a playground, field or hall s see Wrapping up). - Link: The life cycle of a frog on VideoLink.x - Link: Investigating factors affecting the frog life cycle on VideoLink
Five: Life cycle of an insect	• To describe the life cycle of an insect and compare it with that of an amphibian. **Working scientifically:** • To use data to describe a relationship and make predictions.	• I can describe the three-stage life cycle of an insect. • I can describe the four-stage life cycle of an insect. • I can compare the life cycles of insects and amphibians. **Working scientifically:** • I can identify patterns in data. • I can use data to make predictions. -	- 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. **king scientifically** ils should be taught to use the following practical scientific methods, processes and skills: - Using test results to make predictions to set up further comparative and fair tests.	**chrysalis** **cocoon** **four-stage life cycle** **insect** **larva** **nymph** **pupa** **three-stage life cycle**	-Equipment for the investigation into mint cuttings (see Main event s between two): o a 30 cm ruler (one between two); o a paper towel; o a tablet (the same one they used in Lesson 1: Life cycles and reproduction in plants). o the *Activity: Stem cutting data table* (from Lesson 1: Life cycles and reproduction in plants); o mint plant cutting (from Lesson 1: Life cycles and reproduction in plants). -Sticky notes (one each). -Whiteboard and pen (one between two). -Devices with internet access (one between two). -Scissors (one each). -Calculator (-
Six:	• To describe asexual reproduction in plants.	•I can describe the changes to a cutting as it grows.	Describe the life process of reproduction in some plants and animals. **Working scientifically**	**asexual reproduction**	• An online timer (one for the teacher).

Asexual plant reproduction	**Working scientifically:** • To represent root growth over time on a line graph.	• I can explain the difference between a clone and other offspring. **Working scientifically:** • I can plot data accurately on a line graph. • I can estimate missing data from a line graph. • I can extrapolate a line graph. -	Pupils should be taught to use the following practical scientific methods, processes and skills: Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	**bulb** **cuttings** **estimating** **extrapolating** **line of best fit** **tuber**	• Equipment for the investigation into mint cuttings (see Main event s between two): o a 30 cm ruler (one between two); o a paper towel; o a tablet (the same one they used in Lesson 1: Life cycles and reproduction in plants). o the Activity: Stem cutting data table (from Lesson 1: Life cycles and reproduction in plants); o mint plant cutting (from Lesson 1: Life cycles and reproduction in plants). • 1 red pencil (or another bright colour s one each). • Whiteboards and pens
Assessment: Assess topic using end of unit quiz and assessment sheet.					

Science – Year 5 – Medium Term Plan
Summer 1, Forces and space: Unbalanced forces
Investigating gravity, friction, air and water resistance and their effects.

Lesson	Learning Objective	Success Criteria	National Curriculum Links	Vocabulary	Resources
One: Gravity	• To describe gravity and its effects. **Working scientifically** • To analyse data to write a conclusion.	• I can define the term gravity. • I can explain why unsupported objects fall towards the Earth. • I can describe the relationship between mass and gravity. **Working scientifically**	• Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. **Working scientifically**	- **distance** - **force** - **gravity** - **mass** - **matter** - **non-contact force**	- A large outside space (e.g. playground s see Main event). - Equipment for drawing and measuring the diameter of celestial bodies (see Main event):

		• I can analyse data and identify anomalies. • I can compare data to a prediction. • I can describe the relationship between two variables.	Pupils should be taught to use the following practical scientific methods, processes and skills: • Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	-	○ 10 tape measures (15 m); ○ 10 pieces of chalk; ○ 10 devices with internet access; ○ 10 green highlighters; ○ 10 red, orange or pink highlighters; ○ masking tape (optional ≤ see Teacher knowledge). - Link: NASA - Celestial body data table
Two: Air resistance	• To describe air resistance and its effects. **Working scientifically** • To plan a fair test to investigate air resistance.	• I can define the term air resistance. • I can describe the relationship between surface area and air resistance. **Working scientifically** • I can identify variables. • I can write a method. -	- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills: - Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.	**air resistance** **contact force** **surface area**	- Whiteboards and pens (one each). - Equipment for the hammer and feather demonstration (see Attention grabber): ○ 1 hammer; ○ 1 feather (it must float well). - 3 different-sized coffee filters (or circles of paper ≤ see Main event). - Equipment for the air resistance investigation (per group of three ≤ see Main event): ○ 3 balloons; ○ 3 paper parachuters (from the *Resource: Parachuter cutouts*); ○ 3 pairs of scissors; ○ masking tape; ○ 3 equal lengths of string (pre-cut); ○ 1 stopwatch; ○ 1 calculator; ○ modelling dough
Three: Water resistance	• To describe water resistance and its effects. **Working scientifically**	• I can define the term water resistance.	- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces. **Working scientifically**	**aerodynamics** **streamlining**	• Equipment for investigating water resistance (per group of three ≤ see Main event):

	• To design a results table.	• I can describe the effects of water resistance. • I can describe the relationship between surface area and water resistance. **Working scientifically** • I can measure time accurately. • I can design a results table for repeat data. • I can calculate an average. -	Pupils should be taught to use the following practical scientific methods, processes and skills: - Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	**water resistance**	○ 2 litre plastic bottle with the top cut off (see Teacher knowledge); ○ 1 plastic tray; ○ 5 equal-weight balls of modelling dough (see Teacher knowledge); ○ 1 stopwatch; ○ 1 long spoon; ○ a device that takes photographs. • 2 pieces of A4 paper (between three). • Device with internet access (optional s. see Adaptive teaching). • The *Pupil video: Mean average song* from *Lesson 2: Air resistance* (optional s. see Adaptive teaching). • Link: FoldNFly - Paper aeroplane design
Four: Friction	• To describe friction and its effects. **Working scientifically** • To evaluate a method.	• I can define the term friction. • I can describe the effects of forces. • I can predict the outcomes of balanced and unbalanced forces. **Working scientifically** • I can evaluate the degree of trust. • I can identify steps that need improving. • I can suggest improvements. -	Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.	**balanced** **evaluate** **friction** **reliable** **trustworthy** **unbalanced**	- Equipment for the effects of forces demonstration (one between two s. see Attention grabber): ○ a small ball (e.g. tennis, polystyrene or modelling dough); ○ whiteboards and pens; ○ a plastic tray (optional). - Equipment for the friction investigation (per group of three s. see Main event): ○ a large, open space with a smooth floor, such as a sports hall; ○ 1 large elastic band or several smaller ones linked together; ○ chair; ○ 1 plastic container;

					○ 1 tape measure; ○ 10 items of various weights, such as those found in a pencil case or classroom. - Link: How brakes work on Videol
Five: Levers, pulleys and gears	• To describe the effects of levers, pulleys and simple machines on movement. **Working scientifically** • To draw and label a diagram.	• I can explain the purpose of levers and pulleys. • I can explain the purpose of gears. **Working scientifically** • I can draw a diagram of a wind-powered pulley. • I can label a diagram. -	• Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills: • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. See National curric	**amplify** **effort** **gear** **lever** **load** **machine** **pivot** **pulley**	Whiteboards and pens (one each). Devices with internet access (one between three). Equipment for making the wind-powered pulley (per group of three s see Main event): a large, sturdy paper cup; a smaller, light paper cup; string; A4 paper; 1 straw; 1 wooden skewer; a ball of modelling dough; 2 elastic bands; masking tape; scissors; 1 paper clip. 1 hot glue gun (for the teacher's use only s see Teacher knowledge). Rulers
Six: Levers. Pulleys and gears (Part 2)	• To describe the relationship between lever length and effort. **Working scientifically** • To draw an accurate line graph.	• I can name the three things needed for a lever. • I can list the uses of levers. • I can explain how changing the length of a lever will affect the effort needed to lift the load. **Working scientifically** • I can label the axes on a line graph.	Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. **Working scientifically** Pupils should be taught to use the following practical scientific methods, processes and skills: Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	**line graph** **line of best fit**	• Equipment for the catapult experiment (see Main event s between three): ○ 6 lolly sticks; ○ 4 elastic bands; ○ 1 ruler; ○ 1 metre ruler; ○ 1 marshmallow. • The Resource: Knowledge organiser:

		• I can plot data on a line graph. • I can draw a line of best fit. -			Science s Unbalanced forces from Lesson 1: Gravity (optional s see Adaptive teaching). • Link: Assessment s Science Y5: Unbalanced forces. • Link: BBC Teach - What are levers?
Assessment: Assess topic using end of unit quiz and assessment sheet.					

Science – Year 5 – Medium Term Plan
Summer 2: Human timeline (31st May 2024)

Lesson	Learning Objective	Success Criteria	National Curriculum Links	Vocabulary	Resources
One:		-		-	-
Two:		-		-	-
Three:		-			
Four:		-		-	-

Five:		-		-	-
Six:		-			
Assessment: Assess topic using end of unit quiz and assessment sheet.					