

Term and unit name	Learning Question	Corresponding Success Criteria.
Term 1 Energy: Light and shadows (A) Year 3	Lesson 1: Sources of Light Knowledge Can I explain the role of light sources? Working scientifically Can I plan and draw a results table?	Knowledge 1) I can recall examples of light sources and those that do not give out light. 2) I can describe ways to protect my eyes from harm. 3) I can recall that darkness is the absence of light. Working scientifically 1) I can recall what information needs recording to decide the number of columns. 2) I can suggest suitable headings for the results table. 3) I can record information in the correct columns.
	Lesson 2: What is Reflection? Knowledge Can I compare light reflecting on different surfaces?	Knowledge 1) I can describe what happens when light reflects. 2) I can give examples of reflective surfaces or materials. 3) I can describe factors that may affect the quality of a reflected image.
	Lesson 3: Where do Shadows come from? Knowledge Can I recognise which materials cast a shadow? Working scientifically Can I ask testable questions and plan how to answer them?	Knowledge 1) I can describe how shadows form. 2) I can identify patterns between groups of materials and the shadows produced. 3) I can recall factors that affect the way a shadow appears. Working scientifically 1) I can identify if a question is testable. 2) I can explain whether a question is testable or not. 3) I can plan ways to answer a testable question.
	Lesson 4: Shadows throughout the day. Knowledge	Knowledge 1) I can recall what causes shadows to change throughout the day. 2) I can describe the pattern of changing shadows throughout the day.

	Can I summarise how shadows change throughout the day? Working scientifically Can I evaluate a method?	Working scientifically 1) I can identify something as an advantage or disadvantage of a method. 2) I can explain why something is an advantage or disadvantage of a method. 3) I can suggest an improvement to the experiment.
	Lesson 5: Investigating Shadows Knowledge Can I investigate how the distance of the light source affects the size of its shadow? Working scientifically Can I find patterns in data and form conclusions?	Knowledge 1) I can name factors that change the size of a shadow. 2) I can describe how the light source's distance affects the shadow's size. Working scientifically 1) I can describe patterns in data. 2) I can quote values as evidence of patterns in data. 3) I can identify odd results that do not fit the pattern. 4) I can use patterns to make predictions for missing data.
	Lesson 6: Using light and shadows Knowledge Can I tell a story using shadow puppets? Science in action Can I recall how different people work with light and shadows?	Knowledge 1) I can explain why a particular material is appropriate to make a shadow puppet. 2) I can use my knowledge of shadows to animate a shadow puppet. Science in action 1) I can name different examples of people who work with light and shadows. 2) I can describe how different people work with light and shadows.

Term and unit name	Learning Question	Corresponding Success Criteria.
Term 2 Animals, including humans: Movement and nutrition (A) Year 3	Lesson 1: Skeletons Knowledge Can I explain the role of a skeleton? Working scientifically Can I group animals based on their physical properties?	Knowledge 1) I can name the three key functions of the skeleton. 2) I can recall key features of a vertebrate, invertebrate, endoskeleton and exoskeleton. 3) I can describe the role of joints in the skeleton. Working scientifically 1) I can group animals based on their skeletons.
	Lesson 2: The bones in our body. Knowledge Can I recognise the main bones in the body? Working scientifically Can I measure and sort data?	Knowledge 1) I can name key bones in the human skeleton. 2) I can identify the location of key bones in the human skeleton. Working scientifically 1) I can measure the length of different bones. 2) I can sort the data into size order.
	Lesson 3: Muscles and movement. Knowledge Can I explain how muscles are used for movement? Science in action Can I explore scientific advances?	Knowledge 1) I can recall that there are different muscles in the body. 2) I can describe how a muscle causes movement. Science in action 1) I can explain how scientific research has helped with prosthetics.
	Lesson 4: Eating Survival Knowledge	Knowledge 1) I can recall that animals, including humans, need to eat food to survive.

	Can I explain how food is an essential energy source for animals? Working scientifically Can I gather and compare data to answer questions?	2) I can describe ways the body uses energy. 3) I can identify how energy needs are different between people. Working scientifically 1) I can compare the nutritional information on food packaging.
	Lesson 5: Nutrient Groups Knowledge Can I identify the main nutrient groups and their simple functions? Working scientifically Can I record information using secondary sources?	Knowledge 1) I can recall some of the seven nutrient groups. 2) I can give examples of food that contain a particular nutrient group. 3) I can explain why a particular nutrient group is essential for the body. Working scientifically 1) I can summarise key information using secondary sources.
	Lesson 6: Balanced diets Knowledge Can I explain what makes a balanced diet? Science in action Can I explore how knowledge has progressed over time and how different jobs use this information?	Knowledge 1) I can give examples of foods that make up a balanced diet. 2) I can compare different meals, explaining which is more balanced. Science in action 1) I can describe some changes to scientific knowledge about nutrition. 2) I can identify some jobs that require knowledge of nutrition.

Term and unit name	Learning Question	Corresponding Success Criteria.
Term 3 Materials: Rocks and Soils (A) Year 3	Lesson 1: Rocks appearance. Knowledge Can I group rocks using their appearance? Working scientifically Can I observe the appearance of rocks closely, using a magnifying glass?	Knowledge 1) I can define the term rock . 2) I can describe the appearance of different rocks. 3) I can identify crystals and grains. Working scientifically 1) I can use a magnifying glass correctly. 2) I can observe the appearance of a rock in detail.
	Lesson 2: Rocks: Physical properties. Knowledge Can I group rocks using their physical properties? Working scientifically Can I make predictions, suggest improvements and explain observations over time?	Knowledge 1) I can group rocks by their absorbency. 2) I can group rocks by their reaction to acid rain (vinegar). 3) I can group rocks by their hardness. Working scientifically 1) I can use my results to choose the appropriate rock type for a specific use. 2) I can use my results to suggest a better choice of rock for a specific use. 3) I can use my results to predict how a rock will be affected by the weather.
	Lesson 3: Fossil Formation Knowledge Can I describe the process of fossil formation? Working scientifically Can I present research on fossil formation?	Knowledge 1) I can list the different factors that break down rocks. 2) I can use a model to demonstrate fossil formation. 3) I can use a short film to sequence the steps of fossil formation. Working scientifically 1) I can research fossil formation using a single source. 2) I can present research in short film form.
	Lesson 4: Fossils and Palaeontology	Knowledge 1) I can identify fossils in rocks.

	Knowledge Can I identify fossils and group rocks accordingly? Working scientifically Can I use the fossil record to answer questions about the past?	2) I can group rocks that contain fossils. 3) Science in action: I can describe the work of a palaeontologist. Working scientifically 1) I can use a model to determine the relative age of a fossil. 2) I can use the fossil record to suggest how a living thing has changed over time. 3) I can use the fossil record to suggest what living things were around in a certain era.
	Lesson 5: Soil Formation. Knowledge Can I compare soils and how they were formed? Working scientifically Can I record the drainage rate for different soils in a bar chart?	Knowledge 1) I can name some different types of soil. 2) I can describe some different types of soil. 3) I can compare and group soils according to their appearance. Working scientifically 1) I can draw the bars on a bar chart. 2) I can label the bars on a bar chart.
	Lesson 6: Soil layers and earthworms. Knowledge Can I describe a soil sample using sedimentation? Working scientifically Can I draw and label a diagram?	Knowledge 1) I can list some of the benefits of earthworms to the soil. 2) I can identify the layers in a sedimentation jar. 3) I can describe the size of the particles in a sedimentation jar. Working scientifically 1) I can accurately draw the layers of sediment in a sedimentation jar. 2) I can accurately label the layers of sediment in a sedimentation jar.

Term and unit name	Learning Question	Corresponding Success Criteria.
Term 4 Plants: Plant reproduction (B) Year 3	Lesson 1: Plant growth Knowledge Can I identify the growth and survival needs of plants? Working scientifically Can I pose relevant questions?	Knowledge 1) I can identify that plants need air, water, light, nutrients and space to grow. 2) I can describe how these needs vary in some plants. Working scientifically 1) I can identify reasons a question may not be testable in the classroom. 2) I can describe how to gather evidence to answer a testable question. 3) I can pose a testable question.
	Lesson 2: Structure and Function Knowledge Can I describe the relationship between structure and function in plants? Working scientifically Can I design simple results tables?	Knowledge 1) I can identify parts of flowering plants. 2) I can describe the function of each part. Working scientifically 1) I can describe the purpose of a table. 2) I can give a table a heading. 3) I can design a table to gather results.
	Lesson 3: Transporting Water Knowledge Can I investigate how water is transported in plants? Working scientifically Can I plan a simple enquiry?	Knowledge 1) I can label parts of the plant involved in water transport. 2) I can identify the functions of the stem. 3) I can describe how water travels through a plant. Working scientifically 1) To suggest what observations to make and how long to make them for. 2) To decide on equipment that might be useful.
	Lesson 4: Flowers Knowledge	Knowledge 1) I can describe the plant life cycle. 2) I can identify the features of flowers.

	Can I explore the role of flowers in the life cycle of a plant? Working scientifically Can I complete, read and interpret data in a bar chart?	3) I can describe the role of flowers in pollination and fertilisation. Working scientifically 1) I can identify the value of a bar in a bar chart. 2) I can complete a bar chart.
	Lesson 5: Evaluating and Enquiry Knowledge Can I apply knowledge of plant life and growth? Working scientifically Can I identify and suggest changes to an enquiry?	Knowledge • I can identify the effects of different variables on plant growth. • I can apply my knowledge of plant growth to draw a conclusion. Working scientifically • I can say whether a step in a method was good practice. • I can identify steps that were difficult to control. • I can comment on the quality of the results.
	Lesson 6: Seed dispersal Knowledge Can I explore seed dispersal methods? Working scientifically Can I use results to draw conclusions?	Knowledge 1) I can identify the effects of different variables on plant growth. 2) I can apply my knowledge of plant growth to draw a conclusion. Working scientifically 1) I can say whether a step in a method was good practice. 2) I can identify steps that were difficult to control. 3) I can comment on the quality of the results.

Term and unit name	Learning Question	Corresponding Success Criteria.
Term 5 Forces and space: Forces and magnets (B) Year 3	Lesson 1: pushes, pulls and twists. Knowledge Can I describe the effects of contact forces? Working scientifically Can I label a diagram using arrows and scientific vocabulary?	Knowledge 1) I can define the terms force and contact force . 2) I can classify a force as a push, pull or a twist. Working scientifically 1) I can use arrows and scientific vocabulary to show the direction of a contact force.
	Lesson 2: Friction Knowledge Can I recognise the effects and uses of forces? Working scientifically Can I write a scientific conclusion identifying cause and effect?	Knowledge 1) I can list the effects of forces. 2) I can define the term friction. 3) I can list some uses of friction. 4) I can describe how surface roughness affects friction. Working scientifically 1) I can use evidence to support my conclusion.
	Lesson 3: Investigating Friction. Knowledge Can I interpret how and why things move differently on different surfaces? Working scientifically Can I plan an investigation using variables?	Knowledge 1) I can describe and compare how things move on rough and smooth surfaces. 2) I can explain why things move differently on rough and smooth surfaces. Working scientifically 1) I can identify the variables to change, measure and control.
	Lesson 4: Magnets	Knowledge

	Knowledge Can I describe the effects of magnets? Working scientifically Can I write a method?	1) I can define the terms magnetism, magnetic material and non-magnetic material. 2) I can describe the poles of a magnet and how they attract and repel. 3) I can name some magnetic metals. Working scientifically 1) I can write a method to explain how to use a magnet to classify materials as magnetic or non-magnetic.
	Lesson 5: Investigating Magnet Strength Knowledge Can I compare the properties of different types of magnets? Working scientifically Can I display data using a bar chart?	Knowledge 1) I can predict whether two magnets will attract or repel. 2) I can name some examples of magnets. 3) I can compare the strength of different magnets. Working scientifically 1) I can label the axes of a bar chart. 2) I can draw the bars accurately.
	Lesson 6: use of magnets Knowledge Can I explain the uses of magnets? Working scientifically Can I research the uses of magnets?	Knowledge 1) I can list some of the uses of magnets. 2) I can describe some of the uses of magnets. Working scientifically 1) I can identify key information from a source. 2) I can use more than one source to research.

Term and unit name	Learning Question	Corresponding Success Criteria.
Term 6 Making connections: How does food affect muscle fatigue? (Year 3/4 A)	Lesson 1: Investigating muscle fatigue – Planning Knowledge - To revise the units <i>Movement and nutrition</i>, <i>Digestion and food</i> and <i>Rocks and soil</i>. Working scientifically - To plan a comparative test.	Knowledge - I can name different forms of energy. - I can assign different examples to their energy form. Working scientifically - I can form a prediction. - I can identify variables. - I can design a results table.
	Lesson 2: Investigating muscle fatigue – Gathering data Knowledge - To revise the units <i>Movement and nutrition</i> and <i>Digestion and food</i>. Working scientifically - To gather and record data.	Knowledge - I can describe the change of chemical energy into movement energy. - I can list the reasons for muscle fatigue. Working scientifically - I can gather data. - I can record data. - I can measure accurately in minutes and seconds.
	Lesson 3: Investigating muscle fatigue – Analysing, concluding and evaluating Knowledge - To revise the units <i>Movement and nutrition</i> and <i>Digestion and food</i>. Working scientifically - To conclude and evaluate the investigation.	Knowledge - I can describe the role of the digestive system. - I can explain how muscles get the energy they need to work. Working scientifically - I can draw a bar chart. - I can write a conclusion. - I can evaluate the trustworthiness of the method.
	Lesson 4: Investigating muscle fatigue – Extending Knowledge To revise the unit <i>Electricity and circuits</i>.	Knowledge - I can make a simple circuit. - I can describe the change of energy in a circuit. Working scientifically - I can pose new questions.

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	Working scientifically To pose and investigate new questions.	
	Last lesson: Lesson 5: Investigating muscle fatigue – Presenting Knowledge - To revise the unit <i>Light and shadows</i> and <i>Movement and nutrition</i>. Working scientifically - To report on my findings using a shadow puppet display.	Knowledge - I can describe how shadows are formed. - I can describe the role of joints in the skeleton. Working scientifically - I can summarise my findings. - I can use the results as evidence of my conclusions. - I can refer to the trustworthiness of my results.
	None	

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Lower KS2 Scientific knowledge and understanding requirements Year 3 as per Kapow

Year 3

Knowledge

- To know that animals can be grouped based on the presence of a skeleton.
 - To know that the skeleton in humans and some animals is used for movement, protection and support.
 - To know that the muscular system in humans and some animals works with the skeleton for movement.
 - To know the main bones in the body.
 - To know that animals, including humans, need the right types and amount of nutrition.
 - To understand that humans cannot make their own food and therefore eat to get the nutrition needed.
 - To know the main food groups (carbohydrates, protein, fats, fibre, vitamins, minerals and water) and their simple functions.
 - To know that a balanced diet should include all food groups.
 - To describe the diets of different animals.
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- To know some examples of contact and non-contact forces.
 - To know that some forces are a result of contact between two surfaces, but some forces can act at a distance (e.g. magnetism).
 - To know the North and South poles of a magnet.
 - To know some examples of magnetic materials, including iron and nickel, and how they react to a magnet and each other.
 - To know some different examples of magnets, including bar, horseshoe, button and ring.
 - To know some uses of magnets.
 - To know that friction is a contact force that acts between two surfaces to slow an object down.
 - To know that magnetism is a non-contact force that affects objects containing magnetic metal.
 - To understand that the opposite poles of a magnet attract one another and like poles repel one another.
 - To know that rougher surfaces have more friction between them than smoother surfaces.
 - To understand that the strength of different magnets may vary.
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- To know that rocks can be grouped based on their appearance or properties, (e.g. colour, texture, hardness, permeability.)
 - To know that rocks may contain grains, crystals or fossils.
 - To know that grains and crystals appear differently and can be used to classify rocks.
 - To know that soils are made from rocks and dead matter.
 - To understand the relationship between the properties of rocks and their uses.

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- To know that fossils can form from the remains of living things.
- To know that rocks can change over time (e.g. erosion, weathering).
- To know that light travels from a source (e.g. the Sun, light bulbs and torches).
- To know that light is needed to see things and that dark is the absence of light.
- To know that light from the Sun can be dangerous and how to protect their eyes.
- To know that materials reflect light.
- To know that shadows are formed when the light from a light source is blocked by an opaque object.
- To know that shadows change as a result of different factors: - Changing the position of the light source. - Changing the distances between the light source, object and surface.
- To know that shadows change position and length throughout the day as the Sun changes position in the sky.
- To understand the functions of the basic parts of a plant and the relationship between structure and function.
- To know that water is transported within a plant from the root, through the stem, to the leaves.
- To know that plants need water, light, air, nutrients/fertilizer and a suitable temperature for growth and health.
- To understand that the needs for growth and health vary from plant to plant.
- To know the life cycle of a plant from seed to mature plant.
- To know that flowers are the reproductive organ of a plant.
- To know that the process of pollination is the transfer of pollen to the female (part of the) flower.
- To know that the process of seed formation is the growth of a seed after pollination/fertilisation.
- To know some different methods of seed dispersal and the benefits of each.

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Lower KS2 Scientific knowledge and understanding requirements Year 4 as per Kapow

Knowledge

- To know the main organs of the human digestive system (mouth, teeth, tongue, oesophagus, stomach, small and large intestines) and describe their simple functions.
 - To know the different types of human teeth (incisor, canine, premolar and molar) and their simple functions.
 - To know that teeth can be damaged, including the effect of sugary and acidic food.
 - To know that it is important to brush teeth twice a day, make good food choices and visit the dentist regularly.
 - To describe the teeth of carnivores and herbivores, and understand why they are different.
 - To know that predators hunt for their food and prey are the animals being hunted.
 - To know that producers make their own food.
 - To know that food chains begin with a producer followed by consumers, and arrows to show the energy passed on.
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- To know that all electrical appliances need a power source, including batteries or mains electricity.
 - To know that an electrical circuit needs a complete path for the electric charge to flow through.
 - To know the main components in a simple series circuit.
 - To know the precautions for working safely with electricity.
 - To know that some materials allow electric charge to pass through them easily and these are known as electrical conductors (e.g. metals).
 - To know that some materials do not allow electric charge to pass through them and these are known as electrical insulators (e.g. wood and plastic).
 - To know that metals are used for cables and wires because they are good conductors of electricity.
 - To know that plastic is used to cover cables and wires because it is a good insulator.
 - To understand that an open switch breaks a series circuit so the components will be off.
 - To understand that a closed switch completes a series circuit so the components will be on.
 - To understand the relationship between bulb brightness and the number of cells in a circuit.
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- To know that all substances around us can exist as solids, liquids and gases
 - To know that a property of a solid is that it keeps its shape unless a force is applied to it.
 - To know that a property of a liquid can flow freely and take on the shape of a container.
 - To know that a property of a gas does not have a fixed shape and can escape from an unsealed container.
 - To know that heating causes solids to turn into liquids (melting) and liquids to turn into gases (evaporating).
 - To know that cooling causes gases to turn into liquids (condensing) and liquids to turn into solids (freezing).
 - To know that water can exist as a solid, a liquid or a gas.
 - To know that the melting point of water is zero degrees Celsius and the boiling point of water is 100 degrees Celsius.
 - To know that water flows around the world in a continuous process called the water cycle.
 - To know that in the water cycle, evaporation is when bodies of water are heated and turn into water vapour.
 - To know that in the water cycle, condensation is the process of water vapour cooling to form water droplets in clouds, which can result in precipitation.

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- To know that the rate of evaporation increases as temperature rises.
- To understand that sound is a result of vibrations.
- To know that vibrations from sounds travel through mediums to the ear.
- To know that an insulating material reduces the amount of vibrations that pass through it and this can be used to protect the ears from damaging sounds.
- To know that different materials provide different amounts of insulation against sound.
- To know a variety of ways to change the pitch or volume of a sound.
- To know that quicker vibrations cause higher-pitched sounds and slower vibrations cause lower-pitched sounds.
- To know that stronger vibrations cause louder sounds and weaker vibrations cause quieter sounds.
- To know that sounds get fainter as the distance from the sound source increases.
- To know that living things can be grouped in different ways.
- To know that a classification key can be used to group and identify plants and animals.
- To know that vertebrates are animals which have a backbone and invertebrates are animals which do not have a backbone.
- To know that plants can be grouped into flowering or non-flowering varieties.
- To know that flowering plants include grasses and non-flowering plants includes ferns and mosses.
- To know that there are five main vertebrate groups: birds, mammals, reptiles, amphibians and fish.
- To know that invertebrate groups include snails, slugs, worms, spiders and insects.
- To know that habitats can change throughout the year and this can be dangerous for living things.
- To know that humans can have both a positive and negative impact on the environment.

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End of KS2 Working Scientifically Statements as per the National Curriculum:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.
- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- investigate the way in which water is transported within plants
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
- identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- describe in simple terms how fossils are formed when things that have lived are trapped within rock
- recognise that soils are made from rocks and organic matter.
- recognise that they need light in order to see things and that dark is the absence of light
- notice that light is reflected from surfaces
- recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- recognise that shadows are formed when the light from a light source is blocked by an opaque object
- find patterns in the way that the size of shadows change.
- compare how things move on different surfaces
- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing.
- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- recognise that environments can change and that this can sometimes pose dangers to living things.
- describe the simple functions of the basic parts of the digestive system in humans
- identify the different types of teeth in humans and their simple functions
- construct and interpret a variety of food chains, identifying producers, predators and prey

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- compare and group materials together, according to whether they are solids, liquids or gases
- observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
- identify how sounds are made, associating some of them with something vibrating
- recognise that vibrations from sounds travel through a medium to the ear
- find patterns between the pitch of a sound and features of the object that produced it
- find patterns between the volume of a sound and the strength of the vibrations that produced it
- recognise that sounds get fainter as the distance from the sound source increases.
- identify common appliances that run on electricity
- construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- recognise some common conductors and insulators, and associate metals with being good conductors.
- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- 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 degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments.
- 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.
- describe the changes as humans develop to old age.
- 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
- 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
- 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.
- 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.
- 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.
- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals

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- give reasons for classifying plants and animals based on specific characteristics.
- identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- describe the ways in which nutrients and water are transported within animals, including humans.
- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
- recognise that light appears to travel in straight lines
- use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
- associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
- use recognised symbols when representing a simple circuit in a diagram

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Year 3 Working Scientifically statements as per Kapow:

Skills

Posing questions

- Beginning to raise further questions during the enquiry process.
- Considering what makes a testable question.
- Beginning to recognise that there are different types of enquiry and that they are suitable for different questions.
- Beginning to make suggestions about how different questions could be answered

Planning

- Beginning to select from options which variables will be changed, measured and controlled.
- Beginning to suggest what observations to make and how long to make them for.
- Planning a simple method, verbally and in writing.
- Beginning to write a simple method in numbered steps.
- Selecting and beginning to decide what simple equipment might be used to aid observations and measurements.

Predicting

- Using scientific knowledge and/or personal experience to explain their prediction (because...)
- Beginning to consider cause and effect when making predictions, where appropriate.
- Predicting a trend by considering how the changing variable will affect the measured variable. (The smoother the surface, the longer the distance the car will travel)

Observing (qualitative data)

- Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.

Measuring (quantitative data)

- Using standard units to measure and compare.
- Using measuring equipment with increasing accuracy.
- Reading scales with unmarked intervals between numbers.

Researching

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- Gathering specific information from a variety of sources.

Recording (diagrams)

- Beginning to draw more scientific diagrams by: ● Using some standard symbols. ● Drawing in 2D to produce simple line diagrams. ● Labelling with more scientific vocabulary.

Recording (tables)

- Using a prepared table to record results including more detailed observations.
- Using tables with more than two columns.
- Identifying and adding headings to tables.
- Beginning to design simple results tables.

Grouping and classifying

- Grouping based on visible characteristics and measurable properties.

Graphing

- Representing data using bar charts.
- Drawing bars with greater accuracy.
- Reading the value of bars with greater accuracy.

Analysing and drawing conclusions.

- Writing a conclusion to summarise findings using simple scientific vocabulary.
- Beginning to suggest how one variable may have affected another.
- Beginning to quote results as evidence of relationships.
- Identifying data that does not fit a pattern (anomalous data).
- Recognising when results or observations do not match their predictions.
- Beginning to use identified patterns to predict new values or trends.

Evaluating

- Beginning to identify steps in the method that need changing and suggest improvements.
- Identifying which variables were difficult to control and suggesting how to better control them.
- Commenting on the degree of trust by reflecting on: ● Results that do not fit a pattern (anomalies). ● The quality of results (accurate measurements and maintaining control variables).

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- Beginning to identify new questions that would further the enquiry.

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Year 4 Working Scientifically statements as per Kapow:

Skills

Posing questions

- Beginning to raise further questions during the enquiry process.
- Considering what makes a testable question.
- Beginning to recognise that there are different types of enquiry and that they are suitable for different questions.
- Beginning to make suggestions about how different questions could be answered

Planning

- Beginning to select from options which variables will be changed, measured and controlled.
- Planning a simple method, verbally and in writing.
- Beginning to write a simple method in numbered steps.
- Selecting and beginning to decide what simple equipment might be used to aid observations and measurements.

Predicting

- Making predictions about what they think will happen by: • Using scientific knowledge and/or personal experience to explain their prediction (because...) • Beginning to consider cause and effect when making predictions, where appropriate. • Predicting a trend by considering how the changing variable will affect the measured variable. (The smoother the surface, the longer the distance the car will travel)

Observing (qualitative data)

- Using their senses to describe, in more detail and with simple scientific vocabulary, what they notice or what has changed.

Measuring (quantitative data)

- Using standard units to measure and compare.
- Using measuring equipment with increasing accuracy.
- Reading scales with unmarked intervals between numbers.

Researching

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- Gathering specific information from a variety of sources.

Recording (diagrams)

- Beginning to draw more scientific diagrams by: ● Using some standard symbols. ● Drawing in 2D to produce simple line diagrams. ● Labelling with more scientific vocabulary.

Recording (tables)

- Using a prepared table to record results including more detailed observations.
- Using tables with more than two columns.
- Identifying and adding headings to tables.
- Beginning to design simple results tables.

Classification keys

- Grouping based on visible characteristics and measurable properties.
- Populating a pre-prepared branching and number key.
- Choosing appropriate questions for classification keys.

Graphing

- Representing data using bar charts.
- Drawing bars with greater accuracy.
- Reading the value of bars with greater accuracy.

Analysing and drawing conclusions.

- Writing a conclusion to summarise findings using simple scientific vocabulary.
- Beginning to suggest how one variable may have affected another.
- Beginning to quote results as evidence of relationships.
- Identifying data that does not fit a pattern (anomalous data).
- Recognising when results or observations do not match their predictions.
- Beginning to use identified patterns to predict new values or trends.

Evaluating

- Beginning to identify steps in the method that need changing and suggest improvements.

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- Beginning to identify which variables were difficult to control and suggesting how to better control them.
- Commenting on the degree of trust by reflecting on: • Results that do not fit a pattern (anomalies). • The quality of results (accurate measurements and maintaining control variables).
- Beginning to identify new questions that would further the enquiry.

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End of KS2 Working Scientifically Statements as per the National Curriculum:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.
- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- investigate the way in which water is transported within plants
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
- identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- describe in simple terms how fossils are formed when things that have lived are trapped within rock
- recognise that soils are made from rocks and organic matter.
- recognise that they need light in order to see things and that dark is the absence of light
- notice that light is reflected from surfaces
- recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- recognise that shadows are formed when the light from a light source is blocked by an opaque object
- find patterns in the way that the size of shadows change.
- compare how things move on different surfaces
- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing.
- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- recognise that environments can change and that this can sometimes pose dangers to living things.
- describe the simple functions of the basic parts of the digestive system in humans
- identify the different types of teeth in humans and their simple functions
- construct and interpret a variety of food chains, identifying producers, predators and prey

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- compare and group materials together, according to whether they are solids, liquids or gases
- observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
- identify how sounds are made, associating some of them with something vibrating
- recognise that vibrations from sounds travel through a medium to the ear
- find patterns between the pitch of a sound and features of the object that produced it
- find patterns between the volume of a sound and the strength of the vibrations that produced it
- recognise that sounds get fainter as the distance from the sound source increases.
- identify common appliances that run on electricity
- construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- recognise some common conductors and insulators, and associate metals with being good conductors.
- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- 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 degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments.
- 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.
- describe the changes as humans develop to old age.
- 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
- 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
- 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.
- 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.
- 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.
- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals

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- give reasons for classifying plants and animals based on specific characteristics.
- identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- describe the ways in which nutrients and water are transported within animals, including humans.
- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
- recognise that light appears to travel in straight lines
- use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
- associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
- use recognised symbols when representing a simple circuit in a diagram