New Seaham Academy Science scheme of work

Class 3:

Year-long Unit:

To be revisited once a term…	Seasonal Changes: Pupils might work scientifically by: making tables and charts about the weather; and making displays of what happens in the world around them, including day length, as the seasons change. • How does the temperature change during a week, month, term? • observe and describe weather associated with the seasons and how day length varies. ***This unit should be revisited and repeated across the year (Once a Term) to observe the seasonal changes.*** ***ONE table/chart across the year to track weather/temperature/day length etc.***	Pupils should be taught to: • To observe changes across the four seasons **(observe and record).** **(Perform simple tests).** **(Gather data and record in a given way).** Outdoors: take seasonal observations outside.	**Vocabulary:** Spring Summer Autumn Winter Temperature

	Content	Objectives	Vocabulary
Autumn 1	Everyday Materials Children to name a range of everyday materials. Discuss which objects are made from these materials. Begin thinking about why. Present in different ways. Practical resources.	To accurately know the difference between objects and the materials they are made from. **(Ask simple questions).**	Rough/Smooth Bendy, Waterproof, Absorbent, Squashing, Bending, Twisting, Stretching.
	Use of concept cartoons etc. Identify which material would be best for a wall/window? Generate own questions.Compare how other materials would be better/worse using Scientific vocabulary. Identify how some materials can be used for more than one thing.	To identify and compare the suitability of a range of everyday materials for different uses. (**Ask simple questions and recognise that they can be answered in different ways).**	
	Children to explore range of solid objects. Explore if they can be bent, squashed, squeezed, twisted, stretched etc. Record in tables/charts.	To find out how the shapes of solid objects made from some materials can be changed. **(Perform simple tests).** Pupils could explore materials outdoors.	
	Guide children into a key question. What is the best material for a gymnast's leotard? Must be stretchy. Which material can be stretched the furthest? Children to investigate in groups. Less scaffold than previous session. Could be x 2 sessions here to deepen understanding.	To perform a simple test independently to investigate the properties of materials. **(Perform simple tests independently).**	
	From previous investigation, children to record their data. Use charts/tables etc. for how stretchy materials were. Choose which material was best based on this. Could also use pictogram.	To gather and record data from my investigation. **(Gather data and record in a given way).**	

	Ice melting from balloons or chocolate melting etc. Children to observe and record using simple drawings, diagrams or sentences.	To further observe how everyday materials change when heated or cooled **(Observe closely using a range of simple equipment)**.	
Autumn 2	Materials/Light: Gather list of questions about sources of light for children to explore and answer to name different sources of light. Recap on last lesson. Discuss different light sources. Sort into different categories e.g natural/man made light sources. Use torches, shapes, shadow puppets etc. to begin exploring shadows. Pupils DO NOT need the vocabulary of transparent, translucent or opaque at this point. Children on yard/in classroom identifying different light sources and different shadows. Could draw round	To ask and answer questions about sources of light. **(Ask simple questions and recognise that they can be answered in different ways).** To identify and classify a range of light sources **(Identify and classify).** To understand that shadows are formed when something blocks light. **(Observe closely, using simple equipment).**	**Vocabulary:** Light, Shadows, Dark, Fire, Torch, Sun, Electric Lights, (***Transparent, Translucent, Opaque).***

	shadows outside/compare shadows outside and inside. What is similar to places shadows were found? (Shadow hunt). What is the best material for a pair of curtains? Children given range of equipment to begin devising their own test. Use torches etc. X2 one to investigate and one to present data. (Gather and record data in a given way). Possible extension to ask more questions when working Scientifically to plan another investigation. Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.	To observe different shadows in the school environment **(Perform simple tests with a guided structure).** Outdoors: observe shadows made by the sun. To perform a simple test using my understanding of light and shadows **(Perform simple tests independently). X 2 lessons.**	
Spring 1	Animals, including humans What do we need to survive? Simple terms - air, water, shelter and food. Discuss ways we have this to keep us alive. Ask questions to answer in groups about what animals need to survive. Do some animals need less water than others? Etc. Identify and classify by matching given animal pictures to the offspring. Could use 'Monkey Puzzle' book by Julia Donaldson. Then, produce simple life cycles showing stages of growth. The following examples might be used: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Growing into adults can include reference to baby, toddler, child, teenager, adult. Make sure they know plants and animals reproduce/make more of them. No detail required.	To ask and answer simple questions to understand the basic needs of animals for survival. **(Ask and answer simple questions when working Scientifically).** To understand that animals, including humans, have offspring which grow into adults **(identify and classify using simple Scientific knowledge).**	**Vocabulary:** Survival, Water, Air, Food, Adult, Baby, Offspring, Exercise, Hygiene.

	Children to create simple list of healthy and unhealthy food. They should then discuss why we need a lot of some types of food and a little of others. Discuss how exercise can keep us healthy and talk about the benefits (physically) of exercise on the body. ***Also, discuss the importance of good hygiene as a way for us to stay healthy.***	To describe the importance for humans of exercise and eating the right amounts of different types of food. **(Ask simple questions and recognise that they can be answered in different ways).**	
	Use knowledge from last lesson to recap effects of exercise on the body. Children to then perform different exercises and monitor the effect on their body. How heavy were they breathing/10 or how fast was their heart beat/10? Place results in a table.	To perform a simple test independently, using knowledge of exercise and the human body **(Perform simple tests independently).** Outdoors: investigate the effects of exercise on the human body	
	Children to put their data into pictograms to show which exercise had the greatest effect on the human body. Then, discuss what they found out. Did everyone find the same exercise made their heart beat fastest? Write a simple sentence for findings.	To gather and record data in a given way from my investigation. (**Gather and record data in a given way).**	
	Children to come up with, led by the teacher, different questions that they could answer to find out more after their investigation. Can they find out the answer to any of these questions through further research or through another investigation? X 2 sessions – one to generate questions and one to research/investigate.	To ask further questions from an investigation and recognise that they can be answered in different ways **(Ask simple questions and recognise they can be answered in different ways).**	

Spring 2	Living Things and Habitats Pupils should be introduced to the idea that all living things have certain characteristics that are essential for keeping them alive and healthy. They should become familiar with the life processes that are common to all living. Use pictures/videos or real-life objects etc. to sort into things that are alive, dead and have never been alive. This could be recorded in a table, labelled pictures or sorting hoops. Children to write a simple explanation of their choices e.g. I know this is alive because it moves by itself… Pupils should be introduced to the terms: 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro- habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter). Match animals to a habitat and explain why certain animals are suited to specific habitats. Children to explore woodland/wetlands. Focus on a microhabitat or the pond (for example). Are there more woodlice in the grass or under a rock? Do insects prefer dark or light spaces? Are there more animals in the pond or under a rock? Use range of equipment safely. ***This would also meet the perform simple tests independently objective.*** Put results into pictogram in this lesson also.	To use Scientific knowledge to understand the differences between things that are living, dead, and things that have never been alive **(Identify and classify using simple Scientific knowledge).** To identify and classify animals based on which habitat they are suited to. **(Identify and classify using simple Scientific knowledge).** To observe closely, using a range of simple equipment when investigating habitats. **(Observe closely using simple equipment).** Outdoors: explore animal habitats in our school grounds **Gather and record data in a given way).**	Dead, not alive, food chain, habitat, eat, breathe, respire (sleep), microhabitat, shelter, source.

	Children to draw their own simple food chains or look at simple diagrams of food chains and answer simple questions. What is the prey? What is the producer? What is the source of food?	To use simple Scientific knowledge to describe how animals obtain their food from plants and other animals. **(Ask simple questions and recognise that they can be answered in different ways).**	
Summer 1	Plants Observe plants, naming them and explaining how they know if it is a flower or a tree etc. Ensure they recognise fruits and vegetables as plants. Use magnifying glasses etc. Look at features and put real plants on big sheets of sugar paper to observe the structure. They should become familiar with common names of flowers and plant structures (trees: trunk, roots, branches, leaves, flowers (blossom), fruit; garden and wild plants: flower, petals, stem, leaves, roots, fruit, bulb and seed). Create tables and charts to sort images of trees into whether they are deciduous or evergreen. How many of each can they find in the yard? Deciduous trees lose leaves and evergreen trees do not. Use images of trees to sort and explain in simple vocabulary. What type of plants/trees are there in the school/park? Are there more deciduous or evergreen trees in the school grounds? Pick a question/generate a question and come up with a simple enquiry to investigate. Woodland walk, recording different plants. Record data in a tally, chart, table etc. Children to discuss their	To identify and name a variety of common wild and garden plants **(Identify and classify).** To observe closely using simple equipment when exploring the structure of plants **(Observe closely).** To be able to classify trees based on whether they are deciduous or evergreen **(Identify and classify).** To ask simple questions to plan an investigation about plants. (**Asking simple questions).** Outdoors: look at plants in their	**Vocabulary:** Growth flowers vegetables deciduous evergreen trees Flower Petal Bulb Roots Stem

	findings/write simple sentence to explain. Children to develop their last investigation by answering another one of the questions they generated through enquiry. Where do the most plants grow in the school grounds? Do all plants have roots, stem/trunk, leaves and flowers. See example questions above.	natural habitats. To observe closely when investigating plants in our local area **(Observing closely). (Perform simple test with guided structure).**	
Summer 2 **Time to cover missed content/objectives.**			

New Seaham Academy Science scheme of work

Class 4:

	Content	Objectives	Vocabulary
Autumn 1	Living things and habitats Use the idea of life cycles. Children to match animals to offspring, even where the animal and offspring do not look alike. Use life cycles to explore the idea of growth in animals NOT how the process of reproduction occurs. Discuss what all living things (including humans) need to survive. Pupils should also learn about herbivores, omnivores and carnivores and what they eat. Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. Investigation on the effects of exercise on the body. Make simple predictions for which exercise will have biggest impact on the body. Complete the investigation using different exercises and how they felt afterwards. Which one made them breathe heaviest etc. Record data and keep simple when making a basic conclusion.	To use my own observations to notice that animals and humans have offspring which grow into adults. **(Use observations to make simple conclusions).** To ask and answer questions to understand the requirements for animals and humans to survive. (water, food and air). **(Ask simple questions and recognise that they can be answered in different ways)** To make a simple prediction about the effects of exercise on the body. **(Make simple predictions from basic scientific knowledge)** To investigate the effects of exercise on the body. **(Perform simple tests independently)**	**Vocabulary:** Egg, chick, chicken; egg etc. Baby, toddler, child, teenager, adult Habitat Micro-habitat (water, food and air).

	Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. Pupils should be introduced to the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat), Pupils should compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest.	**(Record data and write simple conclusions)** To identify food sources within habitats using simple food chains. **(Identify and classify using simple Scientific knowledge).** To identify and classify plants and animals in habitats, including micro-habitats. **(Identify and classify using simple scientific knowledge)** **Separate lesson to gather and record data (Gather and Record Data).** Outdoors: Pupils could investigate plants on our local habitat and use a key/table/pictogram to identify them	
Autumn 2 **Vocabulary:** Hear, ear, sound waves, vibrations, loud, quiet.	Sound Children will explore a range of sound sources and learn in a basic sense how sound energy travels through vibrations and is picked up by the ear. Sound hunt. String telephone or coat hanger and strings activity to reinforce sound energy travels through vibrations and that sound can travel through the air and objects.	To ask and answer simple questions about how we hear and what sound sources are. **(Ask simple questions and recognise that they can be answered in different ways).** Outdoors: Pupils could investigate naturally occurring sounds in our school environment. To use simple equipment to observe how sound travels **(Observe closely, using a range of simple equipment).**	**Vocabulary:** Hear, ear, sound waves, vibrations, loud, quiet.

	Children to have a sound source e.g. dog barking sound clip or cockerel crowing. Children to predict what will happen as they move further from the sound. Play same sound repetitively and have children listen and record a loudness score from different cones at different distances from the sound source. Children to ask and answer question to draw a simple conclusion. Children to plan an investigation for which ear defender is best/best material for an ear muff. Discuss which might be best using simple scientific concept cartoons or videos e.g a video of a man putting a pillow over his ears to stop the noise of music playing. Use a pictogram e.g. pictures of ears on an axis to record how loud each sound was when using the ear defenders. Pupils then to write a simple conclusion for which ear defender was best. Which one blocked the most sound?	To make a simple prediction about what happens to sound when you move further away from the source. **(Make simple predictions from basic scientific knowledge).** To perform a simple test independently when investigating how sound travels. **(Perform simple tests independently).** **(Simple conclusions).** To ask Scientific questions to plan my own investigation about sound. **(Ask simple questions and recognise that they can be answered in different ways).** To gather data and record it to answer my Scientific questions on sound. **(Gather and Record Data/Simple conclusions).**	
Spring 1 **Vocabulary:** Solids, liquids, gases, melt, harden,	Solids, Liquids, Gases Which objects are solid? Which objects can bend? Which objects can be squashed? Use this type of question to describe the properties of everyday materials.	To ask and answer questions to describe the physical properties of a variety of everyday materials (**Ask simple questions and understand they can be answered in different ways).**	**Vocabulary:** Solids, liquids, gases, melt, harden, freeze, squash, squeeze, bend.

freeze, squash, squeeze, bend.	Give children a range of different objects/materials. Ensure they can identify the difference between object and material. Independently have them generate criteria to group and have them sort materials to understand their physical properties. Can they record most bendy material etc. and explain why? Basic understanding of particles in solids, liquids and gases required – how are they arranged? Use diagrams and role play to convey this. Breathe on mirror to create water vapour/show condensation, have ice cubes for children to observe/draw and write about to understand how water changes state. How long does it take for chocolate/ice lolly/butter to melt? Which do you think will melt the fastest? Which do you think will melt the slowest? Children to Pupils might work scientifically by: comparing how long it takes different solids to melt. Chocolate, ice-cream, ice etc. Agree time intervals to observe and add to a table, then pictogram or simple bar chart. Children to answer the questions they set within the prediction, observing and	To perform simple tests independently when comparing and grouping together a variety of everyday materials based on their physical properties **(Perform simple tests independently).** To observe and record carefully to gain a basic understanding of solids, liquids and gases **(Observe closely, using a range of simple equipment).** To make simple predictions from basic scientific knowledge of changes of state **(Make simple predictions from basic scientific knowledge).** To observe closely when investigating changes of state and gather and record data. **(Observe closely, using a range of simple equipment) (Gather and record data in a given way). X 2 lessons.**	

	recording and gathering data lessons. Explain how they knew in simple terms. Can they generate any further questions from what they discovered? Were their predictions correct?	To suggest answers to my questions and write a simple conclusion to my investigation. **(Suggest answer to questions through simple conclusions).**	
Spring 2	Plants Build on prior learning from previous classes. Identify a range of types of plants, referring to their basic structure and the function of each parts. Explain using their knowledge. I know this is a fruit because…for example. Ask a range of questions, which grows first? Roots or shoots? Why do plants have a stem? How to plants make more plants? Children to answer questions. Could be an opportunity for a simple non-chron. With these as subheadings. Include diagram for stages of life of a plant. What do plants need to survive? Children to discover what they need to stay healthy – water, nutrients, sunlight and space. Note: Seeds and bulbs need water to grow but do not need light; seeds and bulbs have a store of food inside them. Describe how plants need water, light and a suitable temperature to grow and stay healthy.	To identify and classify a range of plants using simple scientific knowledge **(Identify and classify using simple scientific knowledge).** To ask and answer Scientific questions to understand the processes of growth and reproduction in plants. **(Ask simple questions and recognise that they can be answered in different ways).** To understand the requirements of plants for growth and survival **(Use observations to suggest answer to questions).**	**Vocabulary:** Seeds, bulbs, fruit and vegetables, deciduous and evergreen bushes and trees. Water, light, nutrients.

	Children to predict whether there will be more daffodils as seed heads, flowers, or dead flowers at the end of life cycle. Write a simple prediction using their knowledge of stages of a plant's life cycle. Children to go into field/woodlands and tally how many daffodils there are at each stage of their life cycle. Refer to pictures/diagrams given to the children so they can find them with independence. Agree on a set time to search for to ensure everyone completes a fair test. Use results from tally table to write which there were more of. Were the children's predictions correct? Did they notice anything strange? What did their results show and why? Use knowledge of life cycles of plants in conclusion. Are there any further questions they could raise?	To make simple predictions based on my knowledge of plants **(Make simple predictions from basic scientific knowledge).** (Kept as two separate lessons due to timetabling change). To perform a simple test about plants independently **(Perform simple tests independently).** Outdoors: investigate plants in the woodland area. To use my knowledge of plants to write a simple conclusion **(Use observations to suggest answer to questions through simple conclusions).**	
Summer 1/Summer 2	Everyday Materials Note: Build on learning from states of matter where children needed to briefly recap on types of material. Use images of houses etc. why are the windows made from glass? Why	To compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses **(Identify and classify using simple scientific knowledge).**	**Vocabulary:** squash, squeeze, bend, twist, stretch.

	are the walls made from brick? Children to annotate and explain.		
	Which sponge is the best for mopping up spills? Children to make predictions based on their knowledge of materials. Is it the thickest sponge? Will it be the sponge that can be squashed the most? Make a simple Scientific prediction.	To make a simple prediction based on Scientific knowledge. **(Make simple predictions from basic scientific knowledge).** .	
	Children to see which type of sponge is the best for mopping up a spill. To make fair test, ensure same amount of water spilled. To see how effective sponge was, wring out into jug to measure how much was soaked up.	To observe closely using equipment when investigating with everyday materials **(Observe closely, using a range of simple equipment).**	
	Present data from investigation in a simple bar chart or pictogram. Children to vote to decide which they think will be best way to show results. Simple sentence to show most absorbent/least absorbent.	To present data from my investigation into everyday materials in an appropriate way. **(Gather data and record in a given way).**	
	Were the children's predictions correct? Did they notice anything strange? What did their results show and why? Use knowledge of everyday materials in conclusion. Are there any further questions they could raise?	To use my knowledge of materials to write an effective conclusion **(Use observations to suggest answer to questions through simple conclusions).**	
	Children to perform a simple test, not necessarily a fair test, to see how they can plan and set up their own simple investigation. Which surface can a car roll down fastest? This would be a good suggested investigation.	To perform a test independently using my knowledge of everyday materials **(Perform simple tests independently).**	

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Class 5:

	Content	Objectives	Vocabulary
Autumn 1	Light Use videos, practical demonstrations etc. to model how we see objects and that we need light to see them. Reinforce darkness as the absence of light. Pupils should explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves. **Make predictions before investigating.** They should think about why it is important to protect their eyes from bright lights (especially the sun). Use different light sources, shadow puppets, hands, silhouettes etc, to explore the concept of shadows practically. Children to understand the terms transparent, translucent and opaque by exploring different objects with light sources. They should look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change. **Make predictions before investigating.** 1. How does distance of a shadow causing object from a screen affect the size of the shadow? 2. How does distance from the light source affect the size of the shadow?	To use simple Scientific language and diagrams to understand how we need light to see. **(Use simple scientific language, drawings, diagrams).** To set up practical enquiries to explore how light is reflected from surfaces. **(Set up simple practical enquiries with direct instructions).** To use Scientific language to recognise and explain how shadows are formed. **(Identify differences and similarities to simple scientific ideas).** To ask relevant questions and use enquiries to find patterns in the way that the size of shadows change. **(Ask relevant questions and use different types of scientific enquiries to answer them).**	**Vocabulary:** light light source dark reflection/reflect/ reflective ray shadow opaque translucent transparent

	Measure shadows with torch in different positions. Use rulers/meter stick to ensure careful measurements. Use one of the questions from previous lesson to take measurements. Put results from previous investigation into a bar chart. Children to then write a simple conclusion using the results from their data.	To make careful observations of shadows by taking measurements with different equipment. (**Making careful observations and taking measurements).** X 2 lessons. To gather and present data from my investigation into the size of shadows. **(Use charts and graphs to record findings).** Outdoors: Pupils could investigate their shadows and how they change as the day goes on.	
Autumn 2	Rocks Children to sort different ricks using images and practical samples from Science cupboard. Ask them what they notice to group the different rocks in sorting hoops and record in tables etc. Identify and label different types of fossil at different stages to understand how they are formed. Collect samples of soil and explore how it is made up by sieving, filtering etc. Can they find chalk, sand, rocks and clay etc. Gather list of questions about rocks/soil in groups then narrow down into most relevant questions that could be answered using an enquiry e.g. How does the size of	To identify and classify rocks based on their appearance and properties. **(Gather, record, classify).** To use Scientific language to describe in simple terms how fossils are formed. (**Use simple scientific language to record findings).** To make careful observations to recognise that soils are made from rocks and organic matter. **(Make careful observations with different equipment).** To ask Scientific questions about rocks and soil and set up simple enquiries to answer them. (**Ask relevant questions and use**	**Vocabulary:** rock pebble grain crystals layers absorb fossil sandy/chalk/clay soil

	particles affect the flow rate of water through a funnel? Which is the hardest rock? Is the soil in the woods different to the soil in the Quiet Area? **Make predictions before investigating.** Complete a Scientific enquiry to answer one of the above questions. Record data in an appropriate way e.g. diagrams, charts, tables or graphs. X 2 lessons, one to complete the enquiry and one to present the data and draw a simple conclusion.	**different types of scientific enquiries to answer them).** Outdoors: Pupils could investigate the different types of soil we have in our outdoor areas. Is the soil in the woods different to the soil in the Quiet Area? To set up and conduct a practical enquiry using my knowledge of rocks and soil. **(Set up practical enquiries with direct instructions).** To gather and present data from my practical enquiry on rocks and soil. **(Use simple scientific language, drawings, diagrams and basic charts and graphs to record findings).**	
Spring 1	Animals, including humans Pupils could compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. They should also research different food groups and how they keep us healthy and design meals based on what they find out. Label human and animal skeletons. Record similarities and differences. Recognise what we need muscles for. Identify the largest muscles and bones in our body. How does this differ from other animals? What about invertebrates? How do they protect their organs? What would happen if we didn't have skeletons?	To use Scientific language when understanding that animals, including humans, need the right types and amount of nutrition and get nutrition from what they eat **(Use simple scientific language to record findings).** To use Scientific diagrams to identify that humans and some animals have skeletons and muscles for support, protection and movement **(Use simple scientific diagrams to record findings).**	**Vocabulary:** Movement Muscles Nutrition Skeletons Exoskeleton Vertebrate

	Do people with longer arms throw farther? Do people with large hands have big large feet? Do taller people have the largest feet? Choose one of these to investigate. Use knowledge from previous lesson linking to longest bones/largest muscles etc. Investigate to answer questions. Model using meter rulers/tape measures to carefully find height and length of feet/hands etc. Model careful measurements and how to keep a basic fair test. Create a bar chart, under instruction from the teacher to plot both axes. Shortest on left, tallest on right for example, to show if the bars get taller as the feet get bigger. Discuss what the data shows. Use Scientific vocabulary and knowledge to write a conclusion. Children should discuss similarities and differences between Scientific ideas. What did they find out? Were their predictions correct?	To make predictions using my knowledge of animals and humans **(Make effective predictions using Scientific knowledge).** To make careful observations by taking measurements with different equipment when investigating **(Make careful observations by taking measurements with different equipment). Possibly x 2 lessons.** To choose an effective way to gather data from my Scientific investigation **(Gather, record, classify and present data using direct instruction).** To use my knowledge of humans and Scientific ideas to write an effective conclusion. **(Identify differences and similarities to simple scientific ideas).**	Invertebrate Food groups
Spring 2/ Summer 1	Forces and Magnets Draw magnet with N and S pole. Use Iron filings/videos of magnetic fields to draw	To use Scientific diagrams and language when describing the poles of a magnet **(Use simple scientific language, drawings, diagrams and**	**Vocabulary:** Magnetic Force Contact Attract Repel Friction Poles Push/Pull

	and label so that children understand how magnets work (basic understanding). Show that N and S etc. attract and same poles rep	**basic charts and graphs to record findings).**	
	Predict whether magnets will attract and repel each other (using knowledge from last lesson). Children to investigate with bar magnets in next session.	To predict whether two magnets will attract or repel each other, depending on which poles are facing **(To use Scientific language to make an effective prediction)**.	
	Children to investigate with bar magnets. Record how they move when poles are facing. Reinforce the concept that magnetic force can act at a distance. Give a tick or cross to check their predictions from previous lesson.	To make careful observations, using different equipment, to notice how magnetic force acts **(Make careful observations by taking measurements with different equipment).**	
	Which magnet is strongest? Are bigger magnets stronger? Investigate either of these questions to identify whether there are similarities or differences between Scientific ideas. Did we all think the biggest magnet would be the strongest? Is a magnet's strength determined by its size? Could judge strength by seeing what is the longest string of paper clips it can pick up or distance it can attract a piece of metal from etc.	To identify similarities and differences between Scientific ideas when investigating the strength of magnets **(Identify differences and similarities to simple scientific ideas).**	
	Carry out tests to find out how far things move on different surfaces and gather and record		

	data in a table. Use a ramp/same toy car and keep the ramp at same angle. Set this up so children are aware of how to keep a fair test. Ensure children make a prediction at the start of this lesson. Agree on best method for presenting the data. Put data in a bar chart – give children the scale of the bars. Children should also write a simple conclusion to describe what their results showed.	To set up an enquiry about forces under instruction **(Set up simple practical enquiries with direct instructions).** To present my data from a forces investigation in an effective way. **(To gather, record, classify and present data using direct instruction).**	
Summer 2 Time to cover missed content/objectives.			

New Seaham Academy Science scheme of work

Class 6:

	Content	Objectives	Vocabulary
Autumn 1 **Vocabulary:** Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators.	Electricity In simple terms, explain how electricity is generated. Children to sort appliances that run on electricity. Deepen by sorting into mains/battery power etc. MUST include how to safely work with electricity. Construct simple circuits. Pupils should draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6. Use circuit pictures/diagrams to have children predict whether a lamp will light; not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6. Children to build circuits from previous lesson and record whether the lamp lit. Explain why using knowledge of whether it is a closed circuit. Discuss whether predictions were correct.	To identify and classify common appliances that run on electricity **(Gather, record, classify)**. To construct a simple series circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. **(Set up simple practical enquiries with direct instructions).** To predict whether or not a lamp will light in a simple series circuit. **(Draw simple predictions).** To use a practical enquiry to find out whether or not a lamp will light in a simple series circuit. **(Use simple scientific language, drawings, diagrams and basic charts and graphs to record findings). X 2 lessons.**	**Vocabulary:** Cells, Wires, Bulbs, Switches, Buzzers, Battery, Circuit, Series, Conductors, Insulators.

	Children to deepen their understanding of series circuits by building circuits that sue a switch. Use different types of switch. Draw diagrams and label to explain the function of a switch. Introduce the idea of electrical conductors and insulators. Model how to leave a gap in a circuit and investigate whether the material will let current flow through. Associate metals with being conductor, but NOT all metals.	To make careful observations, when using a range of equipment. To understand the function of a switch in a simple series circuit. To set up a comparative, fair test to investigate electrical insulators and conductors. **(Set up practical enquiries, comparative tests and fair tests).** **(Use results to draw simple predictions and conclusions). (Suggest improvements and raise further questions).**	
Autumn 2	Plants Pupils should be introduced to the relationship between structure and function: the idea that every part has a job to do. They should explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction. Pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens. How does the amount of water/light/soil affect the height/number of leaves of a plant? Pupils to make a prediction and then set up a fair test to compare. Which plant grew tallest/had the most leaves? Model how	To identify and describe the functions of different parts of flowering plants: roots, stem, leaves and flowers. **(Ask and answer relevant Scientific questions).** To use Scientific language/diagrams to explain 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. **(Using Scientific language/diagrams).** To complete a fair test to identify the impact of different factors on the growth of a plant. **(Making predictions).** **(Set up a fair test).**	**Vocabulary:** Air, Light, Water, Nutrients, Soil, Reproduction, Transportation, Dispersal, Pollination, Flower.

	to keep everything else the same and change one thing to make it a fair test. Continue to observe and record to measure the height of the plants that have been growing. Model how to take measurements carefully. Present data from previous investigation in a bar chart. Discuss findings and write a conclusion using knowledge of plants. Suggest how the enquiry could be improved if conducted again. XC Writing – Non-chronological report with subheadings to present this information using subheadings etc. to answer Scientific questions.	To make careful observations when working Scientifically by taking measurements with different equipment. **(Make careful observations by taking measurements with different equipment).** To report on findings from my enquiry and use my results to draw a conclusion. **(Use simple scientific evidence explain some findings to enquiries). (Suggest improvements and raise further questions).** To explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. **(To Gather, record, classify and present data in a variety of different ways when answering scientific questions).**	
Spring 1 **Vocabulary:** Solid, Liquid, Gas, Evaporation, Condensation, Particles,	Solids, Liquids and Gases Children to practically move, and then use diagrams, to understand the particle layout in solids, liquids and gases. Address misconception that particles in a solid don't move. They do, they vibrate on	To use Scientific language and diagrams to compare and group materials together, according to whether they are solids,	**Vocabulary:** Solid, Liquid, Gas, Evaporation, Condensation, Particles, Temperature, Freezing, Heating.

Temperature, Freezing, Heating.	the spot. Group a range of everyday materials in tables, venn etc. Children to set up the practical enquiry under instruction. Explore the effect of temperature on substances such as chocolate, water, ice etc. Children to observe, time using a stopwatch to understand the temperatures at which different materials change state. They should identify evaporation and condensation and how rate of evaporation links to temperature. Children to generate Scientific questions and narrow down questions to inform a future enquiry. Guide them into water temperature/dissolving investigation. Answer some of the questions through research and select which they would need an enquiry to answer. Use prior learning from last lesson – hot water has more energy in particles etc. Children to make prediction and then investigate. Measure, using stopwatch/ipad how long it takes for sugar or salt to dissolve. Decide on how hot water in each beaker should be (50 degrees is MAX temp. children should work with).	liquids or gases **(Use simple scientific language, drawings, diagrams).** To observe that some materials change state when they are heated or cooled, and measure the temperature at which this happens in degrees Celsius (°C) **(Make careful observations by taking measurements with different equipment).** To ask questions based on basic scientific knowledge of solids, liquids and gases and plan an enquiry to answer them. **(Ask questions based on basic scientific knowledge and use a range of scientific enquires to answer them).** To make effective predictions when investigating how the temperature of water affects the time for salt/sugar to dissolve **(Use results to draw simple predictions and conclusions).** To gather, record and present data when investigating how the temperature of water	

	While children are working, promote controlling an investigation to ensure it is a fair test e.g same amount of water in each beaker/same type of thermometer used to get more accurate results. Record data in table then bar chart. Discuss results. Children to write a conclusion e.g. my results showed that the hotter the water, the less time it took for sugar/salt to dissolve. As with last conclusion, suggest improvements and raise further questions using their Scientific knowledge.	affects the time for salt/sugar to dissolve **(Gather, record and present data in a range of ways). X 2 lessons.** To use my results to write an effective conclusion when investigating how the temperature of water affects the time for salt/sugar to dissolve **(Use simple scientific evidence explain some findings to enquiries).**	
Spring 2/Summer 1 .	Forces and Magnets Draw magnet with N and S pole. Use Iron filings to find the magnetic field and draw/explain or photograph and then label the photograph. Do this with bar magnets and horseshoe magnets to see if the magnetic field and magnetic poles are the same. Show children a range of diagrams including magnets. Bar magnets and different types of magnet should be explored. Using knowledge of poles, predict what will happen. Test whether they will attract or repel and record	To use Scientific diagrams and language when describing the poles of a magnet **(Use simple scientific language, drawings, diagrams and basic charts and graphs to record findings)**. . To predict whether two magnets will attract or repel each other in a range of different positions **(To use results to draw effective predictions)**.	**Vocabulary:** Magnetic, Force, Contact, Attract, Repel, Friction, Poles, Push, Pull

	results in a table etc. Discuss whether their predictions were correct.		
	Use force diagrams to show children what forces are. Push and pull are examples of forces. Show arrows – bigger arrow in one direction will show direction of movement. Reinforce the idea of gravity and its discovery by Sir Isaac Newton. Children to ask questions to guide an enquiry and plan what they want to do. E.g. What happens to a rubber band as there is more mass? Do we need more or less force when pulling an object up a steeper incline?	To ask relevant questions about forces and plan enquiries to answer them **(Ask questions based on basic scientific knowledge and use a range of scientific enquires to answer them).**	
	Set up an enquiry pulling a shoe up an incline. **Make simple prediction before investigating.** Use Newtonmeters to measure how much force it takes to pull a shoe. Take readings for how steep incline was vs how much force was needed. Model taking careful measurements and using the same shoe each time to make it a fair test.	To set up a practical fair test and take careful measurements to investigate forces **(Set up practical enquiries, comparative tests and fair tests) (Make systematic and careful observations and take accurate measurements).**	
	The results from last lesson should be put in a bar chart. Model choosing	To present data from my forces investigation in a bar chart. **(Report on findings from enquiries using scientific language, drawings, labelled diagrams, keys, bar charts and tables).**	

	correct scale for graph and labelling axis. Discuss what the data shows and children to write observations from the data in books. Children should also draw force diagrams (with accurate arrow sizes) to show their results. Children to discuss whether their predictions were correct/incorrect. Then, write results. What happened to the amount of force as the incline got steeper? Raise further questions and give basic ways they could've improved their investigation if they were to repeat it to get more accurate results.	To explain my findings from my forces investigation to write an effective conclusion **(Use simple scientific evidence explain some findings to enquiries) (Begin to raise further questions and suggest improvements)**.	
Summer 2 Time to cover missed content/objectives.			

New Seaham Academy Science scheme of work

Class 7:

	Content	Objectives	Vocabulary:
Autumn 1 **Vocabulary:** Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Herbivore, Carnivore, Canine, Incisor, Molar.	Animals including Humans Pupils should be introduced to the main body parts associated with the digestive system, such as mouth, tongue, teeth, oesophagus, stomach and intestine and explore questions that help them to understand their special functions. Pupils might work scientifically by: comparing the teeth of carnivores and herbivores, and suggesting reasons for differences. Look at their own teeth and use Scientific models and diagrams. Could create their own models. Link to human teeth – what can damage our teeth? Which substance causes the most damage to our teeth? Generate questions and plan an enquiry. How could we use eggs? Decide which liquids to use and how long to leave the eggs submerged for. Remember to have a CONTROL EGG. Predict which they think will be most/least harmful. **(Use scientific evidence to answer questions and to support predictions).** Periodically check in on the eggs (once weekly etc.) and record how they are looking/how much they have been damaged by looking at how much of the shell has been worn away.	Pupils should be taught to: To identify and describe the simple functions of the basic parts of the digestive system in humans **(Use scientific evidence to answer questions).** To identify and classify the different types of teeth in humans and their simple functions. **(Record data and results using scientific diagrams and labels).** To plan a scientific enquiry using previous scientific knowledge about teeth in humans. **(Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge).** To observe closely and record data when working Scientifically. **(Record data and results using scientific diagrams and labels). X 2 lessons/multiple lessons.**	Mouth, Tongue, Teeth, Oesophagus, Stomach, Small Intestine, Large Intestine, Herbivore, Carnivore, Canine, Incisor, Molar.

	Write an effective conclusion, check whether predictions were correct and then suggest how this enquiry could be improved if it were to be repeated. How could we get more accurate results? **(Suggest improvements and raise further questions from results of scientific investigation).** Children to create their own food chains identifying producers, predators, prey etc. Use diagrams of a variety of food chains to assist. Look at direction of nutrients not what eats what.	To report my findings from my enquiry in an effective conclusion. **(Report and present findings from enquiries, including conclusions, in oral and written forms).** To construct and interpret a variety of food chains, identifying producers, predators and prey. **(Record using Scientific diagrams and labels).**	
Autumn 2 **Vocabulary:** Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats.	Living Things Include plants as well. **Note:** Plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses. How could plants be grouped differently? Pupils could begin to put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects. Use tables/venn to do so and begin to refine criteria for classifying. Follow classification keys to complete 'who am I?' activities etc. Children to use classification keys to match each animal to its criteria. Use pond life classification keys etc. for woodland/wetland habitat. Use them to group different types of animals using classification knowledge from previous session. Include plants AND animals.	To use Scientific questions to recognise that living things can be grouped in a variety of ways **(Use scientific evidence to answer questions).** To explore and use classification keys to help group, identify and name a variety of living things in the local and wider environment **(Record data and results using scientific diagrams and labels, classification keys).**	**Vocabulary:** Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms, Spiders, Insects, Environment, Habitats.

	Looking at the woodland and wetland habitat – Can they compare two habitats? Which has most trees/plants/minibeasts? In minibeasts which number of legs is most common? Generate question then make prediction supported by Scientific knowledge. **(Use scientific evidence to answer questions and to support predictions and findings).** Have a bar chart with one bar for wetlands and one for woodlands for a direct comparison side by side. Children to interpret data in written form. What do they notice? What trends can they spot. Report on their findings to reflect on their prediction. Discuss results and analyse data. Then, suggest improvements for the enquiry if it were to be repeated. Raise further Scientific questions that they could answer and record how they could answer them. Pupils should explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation. XC writing opportunity here – Non chron/leaflet/presentation etc.	To ask scientific questions to begin to plan a scientific enquiry using knowledge of living things. **(Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge).** To collect and record data in a complex bar chart for living things in a habitat. **(Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs).** To report on my findings to write an effective conclusion **(Suggest improvements and raise further questions from results of scientific investigation).** To use research to recognise that environments can change and that this can sometimes pose dangers to living things. **Present findings in oral and written forms (displays and other presentations).**	
Spring 1	Sound Pupils should explore and identify the way sound is made through vibration in a range of different ways. Practical demonstrations are effective here. Could put drums/rice on tables and children come up with questions to answer to understand sound. Reinforce sound is NOT vibrations, it is energy, but it travels through vibrations. Pupils	To use Scientific evidence to ask and answer questions about how sounds are made, associating some of them with something vibrating **(Use scientific evidence to answer questions and support findings).**	**Vocabulary:** Volume, Vibration, Wave, Pitch, Amplify, Conductor, Insulator. Tone, Speaker.

	should recognise that sound travels through mediums into the ear – coat hanger on a string or string telephone would show this. Hit drum harder/softer – it is louder because of stronger vibrations.		
	How is the volume of a bell affected by the surface it is on? Does the length of material affect the pitch eg straw, string, wooden ruler? What happens to the sound of a cow bell as we get further away? Children to choose questions and then narrow down into an enquiry. Plan an enquiry based around this question. Should help pupils find patterns between the pitch of a sound and features of the object that produced it and recognise that sounds get fainter as the distance from the sound source increases.	To use scientific questions to begin to plan a scientific enquiry about sound using previous scientific knowledge **(Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge).** .	
	Make a prediction based on knowledge of sound, strength of vibrations, how sound travels etc. based on learning from previous lessons. Also, discuss what the children will keep the same and what they will change. Begin to introduce the vocabulary of variables and making it a fair test.	To use Scientific evidence to support predictions when investigating sound (**Use scientific evidence to answer questions and to support predictions and findings).** .	
	Using a clicker wheel to measure equal distances for example if recording how sounds change the further we are from the sound source. Use decibel metre apps on ipads/smartwatches if available. Collect data accurately, while controlling simple variables.	To accurately take a range of measurements to gather data when working Scientifically to investigate sound. **(Take scientific measurements independently using a range of scientific equipment). X 2 lessons.**	
	Put data into a line graph. Pupils should then discuss what the data shows. What does this tell us about the volume of a sound the further from the sound source? Children to be helped to plot axis and decide scale for graph.	To accurately record my data from my sound investigation in a line graph and analyse the results **(Record data and results using scientific**	

	In their conclusion, pupils should discuss whether their prediction were correct. They should also use Scientific evidence to support their findings and write an effective conclusion. They should also suggest how their investigation could be improved if repeated by better controlling variables etc.	**diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs).** To use Scientific evidence to write an effective conclusion to my sound investigation. **(Suggest improvements and raise further questions from results of scientific investigation). (Use scientific evidence to answer questions and to support predictions and findings).**	
Spring 2/Summer 1	Materials They should compare and group together everyday materials based on evidence from comparative tests, including their hardness, transparency, conductivity (electrical and thermal), and response to magnets. Build on prior learning from other classes – carousel of activities for pupils to explore and understand properties of materials. Based on series of mini-enquires in carousel from last lesson, children need to understand that some materials will dissolve in liquid to form a solution. 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/cooking. Make a prediction about what will happen when different materials (soil, sand, mud, sugar and rice etc.) are	To use Scientific evidence to ask and answer questions to demonstrate a systematic understanding of everyday materials **(Use scientific evidence to answer questions and support findings).** To use test results to make an effective prediction about changes in everyday materials and set up a further practical enquiry **(Use test results to make predictions and set up further comparative and fair tests).**	**Vocabulary:** Hardness, Solubility, Transparency, Magnetic, Filter, Evaporation, Dissolving, Mixing

	added to water. Will it dissolve, colour the water etc. Test what happens to these substances as they are added to water. Stir them for agreed amount of time to ensure fair test. All groups must stir for same amount of time (promote controlling simple variables). Add to carroll diagram – dissolves, does not dissolve, changed colour of water, did not change colour of water. Children to discuss whether their predictions were correct. Then, present what their results showed – this could be in a display or oral presentation to the group. Raise further questions. Guide children into thinking about how we can recover a solution? How can we get sand back from water? Keep cups from this lesson to investigate. Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating to recover a solution. Take cups from previous investigation and separate in groups. Can they use evaporation to recover a solution? Can they sieve out rice and filter out sand?	. To conduct a comparative test about changes in materials and record data using Scientific diagrams **(Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs).** To use Scientific evidence to write a conclusion and then raise further questions from results of a scientific investigation (**Suggest improvements and raise further questions from results of scientific investigation).** To make systematic and careful observations when investigating reversible changes **(Use scientific evidence to answer questions and support findings).**	

	Pupils should find out about how chemists create new materials, for example Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton. Create a short biography/fact file on one of these important Scientists. Could also be a PowerPoint presentation or video documentary.	To present Scientific information in written or presentation forms when researching significant Scientists linked to everyday materials. **Present findings in oral and written forms (displays and other presentations).**	
Summer 2 Time to cover missed content/objectives.			

New Seaham Academy Science scheme of work

Class 8:

	Content	Objectives	Vocabulary
Autumn 1	Animals including Humans Pupils should draw a timeline to indicate stages in the growth and development of humans. They should learn about the basic physical changes experienced in puberty. How does head to body ratio change as a human grows? Use diagrams, graphs and pictures to explore. Can children predict beforehand by looking at pictures of babies/toddlers/adults etc.? Draw humans at different stages with correct head to body ratios. Children come into class and show children picture of embryos. What do we think these are? How long does it take to grow? What is the gestation period of a human? Children to be given information about the growth rate of humans in the womb. Children to create tables, diagrams and graphs to explain how babies grow in the womb. Pupils could work scientifically by comparing data about the gestation periods of humans and other animals. Is there a relationship between size of animal and gestation periods? Plot in line	To use Scientific diagrams, labels and tables to understand the changes as humans develop from birth to old age **(Record data and results using scientific diagrams and labels).** To use Scientific evidence to support findings when exploring the head to body ratio changes as humans grow. **(Use scientific evidence to answer questions).** To present data and results using scientific diagrams and labels to understand the growth of human embryos throughout the gestation period. **(Record data and results using scientific diagrams, graphs and labels).** To record and analyse data to compare the gestation periods of humans and other animals **(Report and present findings from enquiries, including conclusions, in oral and written forms).** To use test results to make predictions and set up further comparative and fair tests into the growth of humans. **(Use test results to make predictions**	**Vocabulary:** Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty.

	graphs/bar charts etc. and write an effective conclusion. Have children predict beforehand using Scientific knowledge. Plot average height of males and females as they grow into a line graph. Compare differences and rate of growth at different stages. Compare the heights of boys and girls in the class and see if this matches the trends of other data. Draw a conclusion. What do their results show? Then, based on the last investigation, can children suggest ways to improve it? E.g. taking more heights from across the school at different ages, using more data to get a better average…Raise further Scientific questions they would like to research to answer.	**and set up further comparative and fair tests). (Take scientific measurements independently using a range of scientific equipment).** *Children should also recognise how to control variables – know the independent variable, control variable and dependent variable.* Also, promote repeat readings etc. for accuracy. X 2 lessons when discussing variables etc. To suggest improvements and raise further questions from results of scientific investigation **(Suggest improvements and raise further questions from results of scientific investigation).**	
Autumn 2	Light Pupils should build on the work on light in year 3, exploring the way that light behaves. Set up a range of practical tasks to demonstrate 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. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	To use Scientific evidence to recognise that light appears to travel in straight lines. **(Use scientific evidence to answer questions and to support predictions and findings).** .	**Vocabulary:** Light, Shadows, Mirror, Reflective, Dark, Reflection, Colour, Eye, Light Source.

	Reinforce the idea that light from a light source reflects off an object and then into our eye to enable us to see things. Answer questions, use diagrams and practical demonstrations/models e.g. skipping rope/rule as a straight line to an object and then to the eye. Use mirrors to explore. Answer questions to record. Where is the best place to put rear view mirrors on cars? Children to devise how to test this and plan their own enquiry. Can they refine and improve the question? Conduct the enquiry using their own methods and control variables (same size/shape of mirror etc. Gather data using Scientific diagrams and written forms. Could give a score for how many objects they could see or how good visibility was and plot on graph. Present conclusion by demonstrating the best position for the mirrors. Write up using Scientific vocabulary. Suggest how they could improve the investigation…Did they effectively control variables? Etc. Combining the knowledge from previous sessions, get children to predict how we could see round a corner/which method would work. Create own periscope and test it out. In diagrams, written forms or presentations, explain how their periscopes worked.	To use Scientific evidence to answer Scientific questions and explain how we see things. **(Use scientific evidence to answer questions and to support predictions and findings).** To ask scientific questions to plan a scientific enquiry using previous knowledge of light. **(Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge).** To gather results and write an effective conclusion for my enquiry on light (reflection) and suggest improvements. **(Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations).** To use test results to make predictions and set up further tests related to light **(Use test results to make predictions and set up further comparative and fair tests).** To report and present on my findings in a range of ways to deepen my understanding of light. **(Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations).**	

	Pupils to extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles. Explore these phenomena in practical activities.		
Spring 1	Solids, Liquids and Gases They should compare and group together everyday materials based on evidence from comparative tests, including their hardness, transparency, conductivity (electrical and thermal), and response to magnets. Record in tables and diagrams. Children should also classify these materials into solids, liquids and gases and should identify how the particles behave in each. Ensure pupils have knowledge of reversible and non-reversible changes. How is evaporation of a liquid affected by size of container/ viscosity/ moving air/ additives/ temperature? Do all liquids evaporate at the same rate? - salt water, vinegar, cooking oil, milk, aftershave lotion. Children to ask questions, identify variables and then how to control them. Write up their method. Give children a table of the temperature water evaporates/rate of evaporation at different times. Use these results to make predictions about the evaporation rate of the other liquids - salt water, vinegar, cooking oil, milk, aftershave lotion.	To use Scientific evidence to ask and answer questions to demonstrate a systematic understanding of the physical properties of everyday materials **(Use scientific evidence to answer questions and support findings).** To ask effective Scientific questions to plan an enquiry about solids, liquids and gases **(Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge).** To use test results to make an effective prediction about solids, liquids and gases **(Use test results to make predictions and set up further comparative and fair tests).** .	**Vocabulary:** Solid, Liquid, Gas, Evaporation, Condensation, Particles, Temperature, Freezing, Heating, Solubility, Dissolving, Mixing, Reversible/Non-Reversible.

	Investigate evaporation rate of liquids - salt water, vinegar, cooking oil, milk, aftershave lotion. Record in a line graph. Discuss reversible and non-reversible changes. Draw a conclusion. What do their results show? Then, based on the last investigation, can children suggest ways to improve it? E.g. using more data to get an average…Raise further Scientific questions they would like to research to answer. Complete a short, practical enquiry from one of the questions the children raised in the previous session to further develop knowledge of solids, liquids and gases. Ensure control of variables.	To conduct a comparative test about solids, liquids and gases and record my results in an appropriate way. **(Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs)**. X 2 lessons To use Scientific evidence to write a conclusion and then raise further questions from results of a scientific investigation (**Suggest improvements and raise further questions from results of scientific investigation)**. To use results to set up a further practical test about solids, liquids and gases **(Use test results to make predictions and set up further comparative and fair tests)**.	
Spring 2	Earth and Space (x4 lessons). Discuss geocentric (Earth in the centre) and Heliocentric (Sun in the centre) and how people's understanding of the solar system has changed over time. Use balls of varying sizes etc. and have children practically demonstrate. Record in labelled diagrams and explain. Pupils should describe the Sun, Earth and Moon as approximately spherical bodies. Plot movement	To use Scientific diagrams to describe the movement of the Earth, and other planets, relative to the Sun in the solar system **(Record data and results using scientific diagrams and labels)**. To use Scientific evidence to describe the movement of the Moon relative to the Earth **(Use scientific evidence to answer questions and to support predictions and findings)**.	**Vocabulary:** Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation.

	of the moon in relation to the Earth in range of ways. Could use as a cross curricular piece of writing or a presentation. Work Scientifically by answering the following questions through research. How does day length change through a term/year? How does air temperature change through a term/year?	To report findings in a range of ways when using the idea of the Earth's rotation to explain day and night **(Report and present findings from enquiries, including conclusions, in oral and written forms).** *Opportunities for practical lesson within this as extra lesson/part outside to discuss model of solar system.*	
Summer 1	Forces Use force arrow diagrams, videos, images and concept cartoons to discuss the force of gravity. Children to create their own labelled diagrams to explore how the force of gravity works and use Scientific vocabulary in investigations. Pupils should explore falling objects and raise questions about the effects of air resistance. How does type of material/weight added/shape/making holes affect the falling time of a parachute? Guide into this sort of question and then plan an enquiry – ensure controlling of variables. ***Make a prediction about their chosen question in this lesson as well.*** Use parachutes from mezzanine level to investigate the effects of the variable they are changing. Use stopwatches or ipads for video to get precise time in seconds. Promote taking repeat readings if not accurate or to remove human error.	To use Scientific vocabulary to explain that unsupported objects fall towards the Earth because of the force of gravity **(Use scientific evidence to answer questions).** To take precise measurements when working Scientifically to gather data for my investigation on forces **(Take precise readings and recognise when to repeat readings when taking measurements in scientific enquiries).** To choose a suitable method to record date from my forces investigation **(Record data and results using scientific diagrams and labels, classification**	**Vocabulary:** Air resistance, Water resistance, Friction, Gravity, Newton, Gears, Pulleys.

	Choose data presentation method. Line graphs are good way to present data related to time. Or, could use a complex bar chart, comparing to control parachute. Plot graph and then discuss what the results show. Discuss whether their predictions were correct. Then, explore what their results showed AND how they could have controlled variables better to get more accurate results. Use test results to make predictions and set up further comparative and fair tests – set up further investigation in next lesson. They might explore resistance in water by making and testing boats of different shapes. They might design and make artefacts that use simple levers, pulleys, gears and/or springs and explore their effects. Carousel of investigations and then explain their findings.	**keys, tables, scatter graphs, bar and line graphs).** To use Scientific evidence to write an effective conclusion to my forces investigation **(Use scientific evidence to answer questions and to support predictions and findings).** To complete practical enquiries to identify the effects water resistance and friction, that act between moving surfaces **(Use scientific evidence to answer questions and to support findings).** **BV:To be conversant with examples of British creativity and/or culture.**	
Summer 2	Plants / Living Things Explore different life cycles through research, use of ICT etc. Children to draw/label diagrams of the different life cycles and then explain the similarities and differences. Compare the life cycles of plants and animals in their local environment with other plants and animals around the world (in the	To use Scientific diagrams, labels and explain the differences in the life cycles of a mammal, an amphibian, an insect and a bird **(Use scientific evidence to answer questions and to support predictions and findings).**	. **Vocabulary:** Mammal, Reproduction, Insect, Amphibian, Bird, Offspring.

	rainforest, in the oceans, in desert areas and in prehistoric times), Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals (basic terms, needs male and female to reproduce). Could work Scientifically by answering the following questions. How does the ovary of a flower change as the flower wilts? How are reproduction in plants and animals different? Pupils should study and raise questions about their local environment. They should observe life-cycle changes in a variety of living things, for example plants in the vegetable garden or flower border, and animals in the local environment. Create a documentary in groups. They should find out about the work of naturalists and animal behaviourists such as David Attenborough and Jane Goodall. Create a biography for one of these significant Scientific figures.	To report and present findings in different ways to describe the life process of reproduction in some plants and animals **(Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations).** To ask and answer Scientific questions to understand life processes of living things in our local environment **(Ask scientific questions to begin to plan a scientific enquiry).** Outdoors: make a David Attenborough style documentary about our woodland habitat. To report my findings from independent research in written forms when completing a biography **(Report and present findings in oral and written forms)**. X 2 lessons.	

New Seaham Academy Science scheme of work

Class 9:

	Content	Objectives	Vocabulary
Autumn 1	Light Children to explore various light challenges e.g. shadow puppets, light in straight lines, reflection and refraction, coloured films etc. Children to plan their own, short enquiries based on these, setting questions and controlling variables/saying what they are going to measure. From previous session, children to present the findings of their group in a range of ways. Could use posters, presentations, written forms and diagrams etc. encourage independence. Reinforce the idea that light from a light source reflects off an object and then into our eye to enable us to see things. Answer questions, use diagrams and practical demonstrations/models e.g. skipping rope/rule as a straight line to an object and then to the eye. **Some of this same as Y5 to reinforce knowledge. Take further in this class by looking at reflection, refraction and lines of incidence etc.**	To plan practical enquires about 'light' by generating questions and understanding how to control variables. **(Planning different types of scientific enquiries to answer questions, including recognising and controlling variables).** To present findings about how light travels in an effective conclusion. **(Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations).** To use Scientific evidence to answer Scientific questions and explain how we see things. **(Use scientific evidence to answer questions and to support predictions and findings).** To use my knowledge of light and reflection to write an effective prediction. **(Use test results to make**	Refraction, Reflection, Light, Spectrum, Rainbow, Colour, Light Source, Shadows, Eye (pupil and retina).

	Chn to investigate how light travels and how it reflects into a mirror. Establish all objects reflect, but smooth and shiny reflect at the SAME ANGLE. Use this knowledge to predict what will happen when shining a torch on a mirror (incident ray, reflected ray). Test predictions and draw incident ray, reflected ray, mirror and normal line (at 90 degrees). Measure angle of incidence and reflection to test prediction. (Shadow puppets crime scene resource). Discuss the idea of a shadow being made. What happens to the light? What will alter the size of the shadow? Chn to design an experiment with the information given and then accurately record and present their findings – in a line graph. Analyse findings: what does this mean for the size of the shadow and who must it belong to? Children should also control variables effectively here. Explore objects looking bent in water, arrows reversing and coloured filters etc. (they do not need to explain why these phenomena occur). Pupils to investigate in a range of practical tasks.	**predictions and set up further comparative and fair tests).** To learn how to record and present data relating to light and shadows and analyse the findings. **(Record data and results by selecting the appropriate method for the data). (Use scientific evidence to support and refute findings, ideas and arguments). X 2 lessons** To use Scientific evidence to explore a range of occurrences to deepen my understanding of light. **(Identify scientific evidence to support findings, ideas and arguments).**	
Autumn 2	Animals Including Humans Children to reive their knowledge of the human body e.g. skeleton, muscles and organs. Can they recall the digestive system from previous classes? Children to label and identify the organs in the human	To identify and name the main parts of the human circulatory system **(Record using Scientific diagrams and labels).**	**Vocabulary:** Circulatory, Heart, Blood Vessels, Veins, Arteries, Oxygenated, Deoxygenated, Valve, Exercise, Respiration.

	circulatory system. Use practical models and diagrams to aid in this. Through research, diagrams, videos etc. children to explain the function of the organs in the circulatory system. Especially the heart, lungs, blood vessels etc. XC writing opportunity here.	To use Scientific evidence to accurately explain the function of organs in the human circulatory system. **(Identify scientific evidence to support findings, ideas and arguments).**	
	Recap what variables are…How do we control them? Recap independent, dependent and control. Children will use their knowledge of the circulatory system to predict what will happen as the intensity of exercise increases. Model how to take a pulse reading and get a resting heart rate in BPM (15 sec x 4) and children will take their heart rate when lying down, standing still, jogging, jumping, skipping and sprinting (children should choose their own exercises). Present data in a more complex line graph with their resting heart rate in BPM plotted. Children to then explain which exercise was most intense as it had the greatest effect on heart rate.	To control variables and take precise measurements when investigating the effects of exercise on the circulatory system. **(Taking scientific measurements independently, with increasing accuracy and precision, taking repeat readings when appropriate).** To effectively present data in graphs and analyse my results from a Scientific investigation. **(Record data and results by selecting the appropriate method for the data).**	
	Based on the last investigation, generate a new Scientific question to make a prediction, investigate and discuss e.g. how long does it take to return to resting heart rate after vigorous exercise? Not full-scale enquiry but children to plan smaller group investigations. Still focus on controlling variables etc. Promote independence here as is Y6. Play a true/false game for the effects of drugs and alcohol. Introduce types of drugs e.g. caffeine, illegal drugs, alcohol and tobacco. The children will	To set up further comparative tests using results from my own investigation. **(Use test results to make predictions and set up further comparative and fair tests).** To independently research the impact that drugs and alcohol can have on the human circulatory system. **(Identify scientific evidence to support findings, ideas and arguments).**	

	begin discussing how these affect the human circulatory system. Children will discuss the impact on the lungs, heart, blood pressure etc. and create a group presentation.		
Spring 1	Living Things Children to discuss ways they could classify. Build on prior learning from previous years e.g. vertebrate/invertebrate etc. Children to group from basic 'kingdoms' e.g. plant and animal and narrow down progressively; discussing which classification they thought was most effective and why. Introduce Linnaeus – a Swedish Biologist – and how he developed classes of animals to progress the classification of living things. https://www.bbc.co.uk/teach/class-clips-video/science-ks2-the-work-of-carl-linnaeus/zhnjf4j Videos etc. found at this link. Children to complete their own research to discuss his work and explain how it impacts our classification of animals today. Try to classify an animal using the Linnaean method. Quiz on types of variable to open the lesson. Children then to choose a question to answer e.g. What type of animal is the most common on the school woodland/wetland habitat? Identify the	To accurately classify animals, plants and micro-organisms based on a range of characteristics **(Record data and results using scientific diagrams and labels, classification keys).** To use Scientific evidence to discuss the work of Carl Linnaeus; a pioneer of classification **(Identify scientific evidence to support findings).** To devise my own practical enquiry to answer a Scientific question about living things, including	**Spring 1** **Vocabulary:** Classification, Vertebrates, Invertebrates, Micro-organisms, Amphibians, Reptiles, Mammals, Insects

	independent, dependent and control variable and plan an investigation for how to collect the data. Through direct observations, they should classify animals into vertebrates (reptiles, fish, amphibians, birds and mammals) and commonly found invertebrates (e.g. insects, spiders, snails, worms). They should discuss reasons why living things are placed in one group and not another. Put in a simple table to collect. How could we ensure most accurate counting possible? Choose most suitable method e.g. bar graph, bar line graph…Could even use pie chart if ICT available. Discuss what their results show. Again, go back to variables; did we control them enough to get trust in our results? What did the results from our data show about the types of living thing in our local area. What was the most/least common? How could we control our variables better next time to achieve a higher degree of trust in our results?	recognising and controlling variables **(Planning different types of scientific enquiries to answer questions, including recognising and controlling variables).** To observe closely, with accuracy and precision, when collecting data for living things in our local environment **(Taking scientific measurements independently, with increasing accuracy and precision, taking repeat readings when appropriate). X 2 lessons.** To select the most appropriate way to record data from a practical enquiry **(Record data and results by selecting the appropriate method for the data).** To write an effective conclusion to my enquiry into the types of living thing in our local environment **(Report findings, conclusions, relationships and explanations of scientific enquiries with a degree of trust in results).**	
Spring 2	Electricity To progress from learning in Year 4, pupils must use recognised symbols when representing a simple circuit in a diagram. Children to explore	To use the correct Scientific diagrams when representing the components in a series circuit	**Vocabulary:** Cells, Wires, Bulbs, Switches,

	circuit components/how a circuit works and then complete a simple series circuit with a bulb, buzzer, battery etc. then draw using correct circuit diagrams and explain how it works.	**(Record data and results using scientific diagrams and labels).**	Buzzers, Battery, Circuit, Series, Conductors, Insulators, Amps, Volts, Cell.
	Does adding another battery make any difference?		
	Does the thickness of the wire affect the brightness of the bulb? Does the length of wire affect the brightness of the bulb? Plan a carousel of investigations to explore. MUST plan by identifying/controlling the independent, dependent and control variables. Write up method/with independence, plan how they are going to investigate.	To plan a comparative, fair test, using knowledge of electricity, by identifying and controlling variables **(Planning different types of scientific enquiries to answer questions, including recognising and controlling variables).** .	
	Use knowledge of circuits to make predictions based on the three short enquiries that have been planned. Children will make predictions e.g. the longer the wire, the dimmer the bulb will be.	To use my knowledge of circuits to make an effective prediction (**Use results to make predictions).**	
	Carry out the investigations by controlling variables e.g. ONLY changing the wire, number of bulbs, length of wire and keeping everything else the same. Children should record their data in simple tables, giving a score for the brightness of the bulb.	To recognise and control variables when working Scientifically to test the effects of changing components in circuits **(recognising and controlling variables).**	
	Discuss their findings, conclusions, relationships and explanations of scientific enquiries with a degree of trust in results. How could they improve their results? Could they control their variables better? Are there any further questions they could raise from their investigations?	To use Scientific evidence to draw effective conclusions when investigating the effects of changing components in circuits **(Use scientific evidence to support and refute findings, ideas and arguments).**	

	Investigate with different types of switches – push button, toggle, slide switch etc. Children to create circuits using switches and present back to the group to describe their functions – could do as a video format, presentation or poster annotating pictures of their own circuits. **Note:** Pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the necessary precautions for working safely with electricity.	To discuss my findings when investigating the function of switches in series circuits **(Report and present findings from enquiries, including conclusions, in oral and written forms – displays and other presentations).** (Some of these objectives may go into Summer Term to help with coverage.	
Summer 1/Summer 2	Evolution and Inheritance Mr Men - They should be introduced to the idea that characteristics are passed from parents to their offspring. Match Mr Men children to their parents based on inherited traits. Children could then design their own offspring, using the inherited traits from the parents. Environment and Habitats: What is an environment? What is a habitat? What different types of habitats are there? Children discuss their understanding of environments and habitats before feeding back to the class. Show examples on the IWB. What Does Adapted Mean?: Children read and discuss meanings of adapted and decide which are correct or incorrect. Identify animals in their habitats and explain adaptive traits. Draw diagrams and label.	To use Scientific evidence to explain the concept of inheritance **(Identify scientific evidence to support findings, ideas and arguments).** To use Scientific diagrams and written explanations to understand adaptation **(Record data and results using scientific diagrams and labels, classification keys, tables).** Outdoors: choose an animal from the different habitats around school and explain how it has been adapted for its locality. I can identify how adaptation may lead to evolution by examining the theories of evolution	**Vocabulary:** Inheritance, Adaptation, Evolution, Characteristics, Reproduction, Genetics

	Watch video clips od the theories of Darwin and Wallace and begin to understand the theory of evolution. Use certain animals for examples e.g. beaks of finches. Children to sort animals/information into the following categories: Natural Selection, Adaptation and Evolution, Human Evolution, Single Origin of Life, Inherited Traits and Adaptive Traits.	constructed by Darwin and Wallace **(Identify scientific evidence to support findings, ideas and arguments).**	
	Children to explore fossil diagrams for how species have changed over time. Darwin and Fossils: Explain Darwin's views on the evidence fossil records could provide for the theory of evolution. Examining Fossil Evidence: State the advantages and disadvantages of observing fossil records. Children to write paragraphs/draw diagrams to find similarities and differences between fossil records and living relatives.	To identify evidence for evolution from fossil records **(Identify scientific evidence to support findings, ideas and arguments)**.	
	Controversy of Human Evolution: Explain why the idea of human evolution was a controversial idea and how it was received. Evidence for Human Evolution: Highlight the main sources of evidence that supports the idea of human evolution. Biological Taxonomy: Explain the classification categories. Children to select and compare modern humans with three different human ancestors of their choice – use skill diagrams etc.	To use the theory of evolution to understand how humans have evolved **(Use scientific evidence to support and refute findings, ideas and arguments)**.	
	Evolution and Human Intervention: Explain how humans have affected the evolutionary process through selective breeding of plants and animals. Selective Breeding: Explain the process of selective breeding. Cross Breeding: Explain the difference between cross and selective breeding. Children match the advantages and disadvantages of adaptive traits in living things. Extension: Children write down	To explain how human intervention affects evolution and identify advantages and disadvantages of adaptation **(Report findings, conclusions, relationships and explanations)**.	

	own examples of advantages and disadvantages of bipedalism.		