New Seaham Academy Science scheme of work

Class 2 :

	Content	Objectives	Skills
Autumn 1	Plants 1 Pupils should use the local environment throughout the year to explore and answer questions about plants growing in their habitat. Where possible, they should observe the growth of flowers and vegetables that they have planted. They should become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (trees: trunk, roots, branches, leaves, flowers (blossom), fruit; garden and wild plants: flower, petals, stem, leaves, roots, fruit, bulb and seed).	Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. ▪ Where do the most plants grow in the school grounds? ▪ Do all plants have roots, stem/trunk, leaves and flowers. ▪ What type of plants/trees are there in the school/park? ▪ What grows first the root or the stem? Outdoors: look at plants in their natural habitats. *To count concrete objects up to 10 to secure 1 to 1 correspondence.* To compare and describe lengths using long/short, longer/shorter. To measure lengths using standard units (ruler, cm).	• Ask simple questions when working scientifically • Observe closely, using simple equipment • Perform simple tests with a guided structure • Identify and classify.

Autumn 2	Seasonal Changes: Year Long Unit 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? ***This unit should be revisited and repeated across the year to observe the seasonal changes.***	Pupils should be taught to: • observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies. • How does the temperature change during a week, month, term? Outdoors: take seasonal observations outside. *To recognise and use language related to dates, including days of the week, weeks, months and years* *To compare time using quicker/slower, earlier/later.*	• Ask simple questions when working scientifically • Observe closely, using simple equipment • Perform simple tests with a guided structure • Identify and classify
Spring 1	Living Things and Habitats Pupils might work Scientifically by observing and counting living things in a habitat and then creating simple charts/tables to identify and classify.	Explore and compare the differences between things that are living, dead, and things that have never been alive. Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. I can identify and name a variety of common animals that are carnivores, herbivores and	• Ask simple questions when working scientifically • Observe closely, using simple equipment • Perform simple tests with a guided structure • Identify and classify

		omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) *To count concrete objects up to 20 to secure 1 to 1 correspondence.* Outdoors: find animals living in the habitats around our school.	
Spring 2	Materials Pupils should explore, name, discuss and raise and answer questions about everyday materials so that they become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent. Pupils should explore and experiment with a wide variety of materials, not only those listed in the programme of study, but including for example: brick, paper, fabrics, elastic, foil. ▪ Which bag is most waterproof (how much water passes through) or strongest?	Distinguish between an object and the material from which it is made Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses Compare and group together a variety of everyday materials on the basis of their simple physical properties Outdoors: investigate natural materials we can find outside and how they might be used.	• Ask simple questions when working scientifically • Observe closely, using simple equipment • Perform simple tests with a guided structure • Identify and classify

	▪ What material is the most hard/soft; stretchy/stiff; shiny/dull; rough/smooth or bendy? Pupils might work scientifically by: performing simple tests to explore questions such as: 'What is the best material for an umbrella? ... for lining a dog basket? ... for curtains? ... for a bookshelf? ... for a gymnast's leotard?'	*Compare capacity (Link to waterproof investigation).*	
Summer 1	Plants 2 Pupils should use the local environment throughout the year to explore and answer questions about plants growing in their habitat. Where possible, they should observe the growth of flowers and vegetables that they have planted. They should become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (trees: trunk, roots, branches, leaves, flowers (blossom), fruit; garden and wild plants: flower, petals, stem, leaves, roots, fruit, bulb and seed).	Observe and describe the basic structure of a plant. Pupils might work scientifically by: observing closely, perhaps using magnifying glasses, and comparing and contrasting familiar plants; describing how they were able to identify and group them, and drawing diagrams showing the parts of different plants and trees. Pupils might keep records of how plants have changed over time, for example the leaves falling off trees and buds opening; and compare and contrast how different plants change over time. Outdoors: compare plants they can see outside now to the ones they found in	• Ask simple questions when working scientifically • Observe closely, using simple equipment • Perform simple tests with a guided structure • Identify and classify

		Autumn 1. Or look at the same plants and how they have changed over time, *To compare and describe lengths using long/short, longer/shorter.* *To measure lengths using standard units (ruler, cm).*	
Summer 2	Animals, including humans Pupils should use the local environment throughout the year to explore and answer questions about animals in their habitat. They should understand how to take care of animals taken from their local environment and the need to return them safely after study. Pupils should become familiar with the common names of birds, fish, amphibians, reptiles, mammals and invertebrates, including pets. Pupils should have plenty of opportunities to learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.	Describe the importance for humans of exercise, eating the right amounts of different types of food. Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. What differences are there between the skeletons of different animals? Can we taste when we can't smell? Pupils might work scientifically by: using their observations to compare and contrast animals at first hand or through videos and photographs, describing how they identify and group them; grouping animals according to what they eat; and using their senses to compare different	• Ask simple questions when working scientifically • Observe closely, using simple equipment • Perform simple tests with a guided structure • Identify and classify

		textures, sounds and smells. Outdoors: go outside to explore the use of the senses.	

New Seaham Academy Science scheme of work

Class 3:

	Content	Objectives	Skills
Autumn 1	Everyday Materials Pupils should identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass). They should think about the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials. Pupils might find out about people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam • Which sponge is the best for mopping up spills? • When squashed, which materials return to their original shape? • What happens to materials when they are heated or cooled? • Which surface does a car roll down quickest? Pupils might work scientifically by: comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); observing closely, identifying and classifying the uses of different materials, and recording their observations.	Pupils should be taught to: • identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. **BV:To be conversant with examples of British creativity and/or culture.** Outdoors: explore natural materials found outside and how they can be used. *Compare capacity (Link to waterproof investigation).* *Compare and measure capacity.* *Construct simple charts and tables.*	• Ask simple questions when working scientifically • Observe closely, using simple equipment • Perform simple tests with a guided structure • Identify and classify • Ask simple questions and recognise that they can be answered in different ways • Observe closely, using a range of simple equipment • Perform simple tests independently • Identify and classify using simple scientific knowledge • Gather data and record in a given way

Autumn 2	Light and Sound: Year Long Unit Pupils should explore materials to raise questions that will help them to understand the differences between materials that are transparent, translucent and opaque (though these words do not need to be used at this stage). They should observe shadows being formed in everyday contexts, such as when they play outside or shine torches indoors. Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses. ▪ Which is the most reflective material? ▪ Which materials let light through? ▪ Which torch is the brightest? ▪ How can we make our shadows bigger? ▪ Which is the brightest light source in the class/school? Pupils might work scientifically by exploring shiny things and grouping them according to whether they shine in the dark or not. They can go on a shadow hunt and think about what is similar about the places where shadows are found (that is, that there is a light source and something is blocking it).	Pupils should be taught to: • observe and name a variety of sources of light, including electric lights, flames and the Sun • associate shadows with a light source being blocked by something. Outdoors: observe shadows made by the sun. Are there any naturally reflective materials you can find outside? *To compare and describe lengths using long/short, longer/shorter.* *To measure lengths using standard units (ruler, cm) - (Comparing lengths of shadows).* *Construct simple charts and tables.*	• Ask simple questions when working scientifically • Observe closely, using simple equipment • Perform simple tests with a guided structure • Identify and classify • Ask simple questions and recognise that they can be answered in different ways • Observe closely, using a range of simple equipment • Perform simple tests independently • Identify and classify using simple scientific knowledge • Gather data and record in a given way
Spring 1	Animals, including humans Pupils should be introduced to the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans. They should also be introduced to the processes of reproduction and growth in animals. The focus at this stage should be on	Pupils should be taught to: • notice that animals, including humans, have offspring which grow into adults • find out about and describe the basic needs of animals, including humans, for survival (water, food and air) describe the importance for	• Ask simple questions when working scientifically • Observe closely, using simple equipment • Perform simple tests with a guided structure • Identify and classify

	questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs. 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.	humans of exercise, eating the right amounts of different types of food, and hygiene. Outdoors: investigate the effects of exercise on the human body *To compare and describe lengths using long/short, longer/shorter.* *Construct simple charts and tables.*	• Ask simple questions and recognise that they can be answered in different ways • Observe closely, using a range of simple equipment • Perform simple tests independently • Identify and classify using simple scientific knowledge • Gather data and record in a given way
Spring 2			
Summer 1	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 raise and answer questions that help them to become familiar with the life processes that are common to all living things. 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). They should raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example plants serving as a source of food and shelter for animals. Pupils should compare animals in familiar habitats with animals found in less familiar	Pupils should be taught to: • explore and compare the differences between things that are living, dead, and things that have never been alive • identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • identify and name a variety of plants and animals in their habitats, including micro-habitats • describe how animals obtain	• Ask simple questions when working scientifically • Observe closely, using simple equipment • Perform simple tests with a guided structure • Identify and classify • Ask simple questions and recognise that they can be answered in different ways • Observe closely, using a range of simple equipment • Perform simple tests independently • Identify and classify using simple scientific knowledge

	habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest.	their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. *To count concrete objects and pictures up to 20, securing one to one correspondence* *Construct simple charts and tables.* Outdoors: explore animal habitats in our school grounds	• Gather data and record in a given way
Summer 2			

New Seaham Academy Science scheme of work

Class 4:

	Content	Objectives	Skills
Autumn 1	Animals, including humans Pupils should be introduced to the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans. They should also be introduced to the processes of reproduction and growth in animals. The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs. 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.	Pupils should be taught to: Notice that animals, including humans, have offspring which grow into adults. Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). 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. *Construct simple charts and tables.* Outdoors: investigate different types of exercise and if there is a difference between exercising indoors and outdoors in terms of the effect it has on the human body.	• Ask simple questions and recognise that they can be answered in different ways • Observe closely, using a range of simple equipment • Perform simple tests independently • Identify and classify using simple scientific knowledge • Gather data and record in a given way • Use observations to suggest answer to questions through simple conclusions • Make simple predictions from basic scientific knowledge
Autumn 2	Sound • What size/shape makes the best ears? • What makes the best string telephones? • Which ear protector is best? Which sounds can be heard furthest away?	Pupils should be taught to: • observe and name a variety of sources of sound, noticing that we hear with our ears • recognise that sounds get fainter as the distance from the sound source increases.	• Ask simple questions and recognise that they can be answered in different ways • Observe closely, using a range of simple equipment • Perform simple tests independently

	• How can you make the sounds louder/softer? • How many ways can you play these instruments? • How far do you need to walk before you stop hearing eg. a clock tick? Pupils might work scientifically by: comparing different sound sources and looking for patterns; carrying out tests to find the best places to locate fire bells in school.	Outdoors: investigate naturally occurring sounds in our school environment. *Construct simple charts and tables.*	• Identify and classify using simple scientific knowledge • Gather data and record in a given way • Use observations to suggest answer to questions through simple conclusions • Make simple predictions from basic scientific knowledge
Spring 1	Solids, Liquids, Gases • What are solids, liquids and gases? • How long does it take for chocolate/ice lolly/butter to melt? Pupils might work scientifically by: comparing how long it takes different liquids to freeze and melt. They might observe and record water changing state. Pupils might observe and record to investigate liquids evaporating and carry out simple tests to understand changes of state.	Pupils should be taught to: Describe the simple physical properties of a variety of everyday materials Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. Compare and group together a variety of everyday materials on the basis of their simple physical properties. Outdoors: can you find an example of each state of matter outside? *To compare time using quicker/slower, earlier/later.* *Construct simple charts and tables.*	• Ask simple questions and recognise that they can be answered in different ways • Observe closely, using a range of simple equipment • Perform simple tests independently • Identify and classify using simple scientific knowledge • Gather data and record in a given way • Use observations to suggest answer to questions through simple conclusions • Make simple predictions from basic scientific knowledge

Spring 2	Everyday Materials • Which sponge is the best for mopping up spills? • When squashed, which materials return to their original shape? • What happens to materials when they are heated or cooled? • Which surface does a car roll down quickest? Pupils might work scientifically by: comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); observing closely, identifying and classifying the uses of different materials, and recording their observations.	Pupils should be taught to: • identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses • find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. Outdoors: investigate natural materials in the local environment. *Construct simple charts and tables.*	• Ask simple questions and recognise that they can be answered in different ways • Observe closely, using a range of simple equipment • Perform simple tests independently • Identify and classify using simple scientific knowledge • Gather data and record in a given way • Use observations to suggest answer to questions through simple conclusions • Make simple predictions from basic scientific knowledge
Summer 1	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 raise and answer questions that help them to become familiar with the life processes that are common to all living things. 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	Pupils should be taught to: • Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • Identify and name a variety of lesser known plants and animals in their habitats, including micro-habitats • Describe how animals obtain their food from plants and other animals, using the idea of a	• Ask simple questions and recognise that they can be answered in different ways • Observe closely, using a range of simple equipment • Perform simple tests independently • Identify and classify using simple scientific knowledge • Gather data and record in a given way • Use observations to suggest answer to questions through simple conclusions

	or leaf litter). They should raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example plants serving as a source of food and shelter for animals. 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.	simple food chain, and identify and name different sources of food. *Construct simple charts and tables.* Interpret tally charts, tables and pictograms. Outdoors: investigate plants on our local habitat and use a key to identify them	• Make simple predictions from basic scientific knowledge
Summer 2	Plants Pupils should use the local environment throughout the year to observe how plants grow (including seeds, bulbs, fruit and vegetables, deciduous and evergreen bushes and trees). Pupils should be introduced to the requirements of plants for growth and survival, as well as the process of reproduction and growth in plants. Note: Seeds and bulbs need water to grow but do not need light; seeds and bulbs have a store of food inside them. **Note:** Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.	Pupils should be taught to: • observe and describe how seeds and bulbs grow into mature plants • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. *Measure accurately in cm/m* Outdoors: grow some plants or vegetables in our garden area and observe them as they grow.	• Ask simple questions and recognise that they can be answered in different ways • Observe closely, using a range of simple equipment • Perform simple tests independently • Identify and classify using simple scientific knowledge • Gather data and record in a given way • Use observations to suggest answer to questions through simple conclusions • Make simple predictions from basic scientific knowledge

New Seaham Academy Science scheme of work

Class 5:

	Content	Objectives	Skills
Autumn 1			
Autumn 2	Light and Sound 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. They should think about why it is important to protect their eyes from bright lights. They should look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change. • How does distance of a shadow causing object from a screen affect the size of the shadow? • How does distance from the light source affect the size of the shadow? • How does the colour of a filter affect the colour of white/blue/red/green/yellow light? • How do overlapping shadows affect the darkness of the shadow? Pupils might work scientifically by: looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.	Pupils should be taught to: 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 a solid object Find patterns in the way that the size of shadows change. *Measure accurately in cm/m and compare lengths – longer/shorter/longest/shortest.* *Construct charts and tables.* Outdoors: investigate their shadows and how they change as the day goes on. Make a working sundial using light and shadows to help you.	• Ask relevant questions and use different types of scientific enquiries to answer them. • Set up simple practical enquiries with direct instructions. • Make careful observations by taking measurements with different equipment. • Gather, record, classify and present data using direct instruction. • Use simple scientific language, drawings, diagrams and basic charts and graphs to record findings • Identify differences and similarities to simple scientific ideas.
Spring 1	Materials and Rocks • How does the size of particles affect the flow rate of water through a funnel?	Pupils should be taught to: • compare and group together different kinds of rocks on the basis	• Ask relevant questions and use different types of scientific enquiries to answer them.

	• Which soil is best for seed germination? • Which is the hardest rock? Pupils might work scientifically by: observing rocks and exploring how and why they might have changed over time; using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. Pupils might research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. Pupils could explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together. They can raise and answer questions about the way soils are formed.	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. Outdoors: 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?	• Set up simple practical enquiries with direct instructions. • Make careful observations by taking measurements with different equipment. • Gather, record, classify and present data using direct instruction. • Use simple scientific language, drawings, diagrams and basic charts and graphs to record findings • Identify differences and similarities to simple scientific ideas.
Spring 2	Animals, including humans • Do people with longer legs jump further/higher? • Do people with longer arms throw farther? • Which has stronger bones: chicken or fish, lamb or cow? • How many bones are there in a human body? • How many muscles are there in a human body? • Which is the longest bone in the body • Do people with large hands have big large feet? Pupils might work scientifically by: identifying and grouping animals with and without skeletons and observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons. They might compare and contrast the diets of different	Pupils should be taught to: • 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 animals have skeletons and muscles for support, protection and movement. *Measure accurately in cm/m and compare lengths – longer/shorter/longest/shortest.* *Construct charts and tables.* Outdoors: investigate the different types of animals in our outdoor areas and make a key to classify them.	• Ask relevant questions and use different types of scientific enquiries to answer them. • Set up simple practical enquiries with direct instructions. • Make careful observations by taking measurements with different equipment. • Gather, record, classify and present data using direct instruction. • Use simple scientific language, drawings, diagrams and basic charts and graphs to record findings • Identify differences and similarities to simple scientific ideas.

	animals (including their pets) and decide ways of grouping them according to what they eat. They might research different food groups and how they keep us healthy and design meals based on what they find out.		
Summer 1	Forces and Magnets • How well does magnetism pass through or attract different materials? • Which magnet is strongest? • Are bigger magnets stronger? • Are all metal objects attracted to a magnet? Pupils might work scientifically by: comparing how different things move and grouping them; raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions; exploring the strengths of different magnets and finding a fair way to compare them; sorting materials into those that are magnetic and those that are not; looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.	Pupils should be taught to: • 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. *Construct charts and tables.* Outdoors: Use a compass outside and learn about how it works.	• Ask relevant questions and use different types of scientific enquiries to answer them. • Set up simple practical enquiries with direct instructions. • Make careful observations by taking measurements with different equipment. • Gather, record, classify and present data using direct instruction. • Use simple scientific language, drawings, diagrams and basic charts and graphs to record findings • Identify differences and similarities to simple scientific ideas.
Summer 2			

New Seaham Academy Science scheme of work

Class 6:

	Content	Objectives	Resources
Autumn 1	Electricity Pupils should construct simple series circuits, trying different components, such as bulbs, buzzers and motors, and including switches, and use their circuits to create simple devices. 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. • How is brightness of the bulb affect by number of batteries/length of wire/thickness of wire/type of wire? • Which materials conduct electricity the best? How can we stop Burglar Bill from coming into the classroom? Find the best conductors and insulators. How does the number of batteries affect the brightness of a bulb? • How does the number of bulbs affect the brightness of a bulb? Pupils might work scientifically by: observing patterns, for example that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect	Pupils should be taught to: • 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. Outdoors: identify items in the outdoors that run on electricity *Construct charts and tables.* *Present data in pictograms.*	• Ask relevant questions and use different types of scientific enquiries to answer them. • Set up simple practical enquiries with direct instructions. • Make careful observations by taking measurements with different equipment. • Gather, record, classify and present data using direct instruction. • Use simple scientific language, drawings, diagrams and basic charts and graphs to record findings • Identify differences and similarities to simple scientific ideas. • Use results to draw simple predictions and conclusions. • Use simple scientific evidence to answer questions and explain some findings to enquiries.

	across a gap in a circuit.		• Ask questions based on basic scientific knowledge and use a range of scientific enquires to answer them. • Set up practical enquiries, comparative tests and fair tests. • Make systematic and careful observations and take accurate measurements using a range of equipment. • Gather, record, classify and present data in a variety of different ways when answering scientific questions. • Report on findings from enquiries using scientific language, drawings, labelled diagrams, keys, bar charts and tables. • Use results to draw simple predictions and conclusions. • Identify differences and similarities to scientific ideas. • Use simple scientific evidence explain some findings to enquiries. • Suggest improvements and raise further questions.

Autumn 2	Plants 1 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? • How is seed germination affected by seed size / temperature / moisture / soil? • How does the amount of space for roots affect the size of a plant? • What affects the speed that water rises up a plant stem? Pupils might work scientifically by: comparing the effect of different factors on plant growth, for example the amount of light, the amount of fertiliser; discovering how seeds are formed by observing the different stages of plant life cycles over a period of time; looking for patterns in the structure of fruits that relate to how the seeds are dispersed. They might observe how water is transported in plants, for example by putting cut, white carnations into coloured water	Pupils should be taught to: • identify and describe the functions of different parts of flowering plants: roots, stem, 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. Outdoors: investigate how well different plants grow in your classes planting box – work out why some grow better than others.	• Ask relevant questions and use different types of scientific enquiries to answer them. • Set up simple practical enquiries with direct instructions. • Make careful observations by taking measurements with different equipment. • Gather, record, classify and present data using direct instruction. • Use simple scientific language, drawings, diagrams and basic charts and graphs to record findings • Identify differences and similarities to simple scientific ideas. • Use results to draw simple predictions and conclusions. • Use simple scientific evidence to answer questions and explain some findings to enquiries. • Ask questions based on basic scientific knowledge and use a range of scientific enquires to answer them. • Set up practical enquiries, comparative tests and fair tests.

	and observing how water travels up the stem to the flowers.		• Make systematic and careful observations and take accurate measurements using a range of equipment. • Gather, record, classify and present data in a variety of different ways when answering scientific questions. • Report on findings from enquiries using scientific language, drawings, labelled diagrams, keys, bar charts and tables. • Use results to draw simple predictions and conclusions. • Identify differences and similarities to scientific ideas. • Use simple scientific evidence explain some findings to enquiries. • Suggest improvements and raise further questions.
Spring 1	Solids, Liquids and Gases • How does the temperature of water affect the time for salt/sugar to dissolve? • How does the amount of salt/sugar affect the time for water to evaporate? • How does the type of filtering agent	Pupils should be taught to: • 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	• Ask relevant questions and use different types of scientific enquiries to answer them. • Set up simple practical enquiries with direct instructions. • Make careful observations by taking

	alter the cleanliness of water? • What affects the time for sand particles to flow in an egg-timer? • What happens when water is added to sand, salt and sugar, instant coffee, flour, and milk powder, custard powder, corn flour and icing sugar, plaster of paris, powder paint and dye. • Does the temperature of the water affect how much solid will dissolve in it? Pupils might work scientifically by: grouping and classifying a variety of different materials; exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). They could research the temperature at which materials change state, such as when iron melts or when oxygen condenses, using and applying what they have learnt in mathematics. They might observe and record evaporation over a period of time, such as a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.	degrees Celsius (°C) • identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. Outdoors: how quickly does water evaporate outdoors compared to indoors? *Present data in charts and tables.* *Present data using bar charts.*	measurements with different equipment. • Gather, record, classify and present data using direct instruction. • Use simple scientific language, drawings, diagrams and basic charts and graphs to record findings • Identify differences and similarities to simple scientific ideas. • Use results to draw simple predictions and conclusions. • Use simple scientific evidence to answer questions and explain some findings to enquiries. • Ask questions based on basic scientific knowledge and use a range of scientific enquires to answer them. • Set up practical enquiries, comparative tests and fair tests. • Make systematic and careful observations and take accurate measurements using a range of equipment. • Gather, record, classify and present data in a variety of different ways when

			answering scientific questions. • Report on findings from enquiries using scientific language, drawings, labelled diagrams, keys, bar charts and tables. • Use results to draw simple predictions and conclusions. • Identify differences and similarities to scientific ideas. • Use simple scientific evidence explain some findings to enquiries. • Suggest improvements and raise further questions.
Spring 2			
Summer 1	Forces 1. Children have magnets and they search for magnetic materials 2. Discuss what magnetic materials do near magnets 3. Will magnets attract magnetic materials through paper, fabric etc? 4. Which part of a bar magnet attracts magnetic materials 5. Children have two bar magnets and explore how they interact 6. Discuss what bar magnets do near other bar magnets	Pupils should be taught to: • 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	• Ask relevant questions and use different types of scientific enquiries to answer them. • Set up simple practical enquiries with direct instructions. • Make careful observations by taking measurements with different equipment. • Gather, record, classify and present

	7. Make a fishing game with magnets • Make a maze game. The object has to follow the path/maze on a board with a magnet pulling the object from underneath Pushes and pulls are examples of forces. • Forces act in particular directions. • When a force is applied it will make an object start moving, stop moving, change shape or change direction. • The greater the force, the greater the movement or change in shape. • The greater the mass the bigger the push or pull needed to move it. • The greater the mass, the greater the force needed to pull the mass. The steeper the incline, the greater the force required to pull the object up the ramp The greater the mass/incline the more the elastic band will stretch. This can be measured with a ruler. • Forces are measured in newtons. • Describe how scientists like Isaac Newton developed the theory of gravity. • Magnets attract certain metals. Like ends of magnets repel each other. Unlike ends attract.	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. **BV:To be conversant with examples of British creativity and/or culture.** *Present data in charts and tables.* *Present data using bar charts bar charts.* Outdoors: investigate Isaac Newton's theory of gravity outdoors	data using direct instruction. • Use simple scientific language, drawings, diagrams and basic charts and graphs to record findings • Identify differences and similarities to simple scientific ideas. • Use results to draw simple predictions and conclusions. • Use simple scientific evidence to answer questions and explain some findings to enquiries. • Ask questions based on basic scientific knowledge and use a range of scientific enquires to answer them. • Set up practical enquiries, comparative tests and fair tests. • Make systematic and careful observations and take accurate measurements using a range of equipment. • Gather, record, classify and present data in a variety of different ways when answering scientific questions. • Report on findings from enquiries using scientific language, drawings, labelled

			diagrams, keys, bar charts and tables. • Use results to draw simple predictions and conclusions. • Identify differences and similarities to scientific ideas. • Use simple scientific evidence explain some findings to enquiries. • Suggest improvements and raise further questions.
Summer 2			

New Seaham Academy Science scheme of work

Class 7:

	Content	Objectives	Skills
Autumn 1	Animals 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. • Which is the best toothpaste to clean shoe polish from a tile? • How clean are our teeth at different times during the day (Use disclosing tablets) Pupils might work scientifically by: comparing the teeth of carnivores and herbivores, and suggesting reasons for differences; finding out what damages teeth and how to look after them. They might draw and *discuss* their ideas about the digestive system and compare them with models or images.	Pupils should be taught to: • 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. Outdoors: what is the best toothpaste to clean mud off a rock? *Present data in bar charts.*	• Suggest improvements and raise further questions from results of scientific investigation. • Use scientific evidence to answer questions and to support predictions and findings. • Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge. • Take scientific measurements independently using a range of scientific equipment. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Use scientific evidence to answer questions and to support predictions and findings. • Suggest improvements and raise further questions from results of scientific investigation. • Use test results to make predictions and set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations).

Autumn 2	All Living Things Pupils should use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat. They should identify how the habitat changes throughout the year. Pupils should explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants. 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. **Note:** Plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses. • 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. Are mini beasts affected by bright light? • Compare two habitats: Which has most trees/plants/minibeasts? • In minibeasts which number of legs is most common? • What affects the numbers of different plants in different parts of the school grounds ? • Which tree has most birds on it? Pupils might work scientifically by: exploring local small invertebrates and using guides or keys to	Pupils should be taught to: • 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. Outdoors: find as many different plants as you can in the outdoor areas and categorise them. *Present data in bar charts.*	• Suggest improvements and raise further questions from results of scientific investigation. • Use scientific evidence to answer questions and to support predictions and findings. • Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge. • Take scientific measurements independently using a range of scientific equipment. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Use scientific evidence to answer questions and to support predictions and findings. • Suggest improvements and raise further questions from results of scientific investigation. • Use test results to make predictions and set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations).

	identify them; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.		
Spring 1			
Spring 2	Sound Pupils should explore and identify the way sound is made through vibration in a range of different musical instruments from around the world; and find out how the pitch and volume of sounds can be changed in a variety of ways. • How is the volume of a bell affected by the surface it is on? • What material conducts sound the best? • What material is the most effective sound insulator? • How can you amplfy sound ie make an alarm clock sound loud, shout a message across the playground? • Make the best drum from a container. • Does the length of material affect the pitch eg straw, string, wooden and metal ruler? • How can you make the best string telephone? Pupils might work scientifically by: finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. They might make earmuffs from a variety of different materials to investigate which provides the best insulation against sound.	Pupils should be taught to: • 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. Outdoors: What natural materials or items make good instruments? *Present data in bar charts and line graphs.*	• Suggest improvements and raise further questions from results of scientific investigation. • Use scientific evidence to answer questions and to support predictions and findings. • Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge. • Take scientific measurements independently using a range of scientific equipment. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Use scientific evidence to answer questions and to support predictions and findings. • Suggest improvements and raise further questions from results of scientific investigation. • Use test results to make predictions and set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, in oral and written

	They could make and play their own instruments by using what they have found out about pitch and volume.		forms (displays and other presentations).
Summer 1	Materials Pupils should build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4. They should explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes. Pupils should explore changes that are difficult to reverse, such as burning, rusting and other reactions, for example vinegar with bicarbonate of soda. They 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. **Note:** Pupils are not required to make quantitative measurements about conductivity and insulation at this stage. It is sufficient for them to observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them. Safety guidelines should be followed when burning materials.	Pupils should be taught to: • compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • understand that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • demonstrate that dissolving, mixing and changes of state are reversible changes explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes	• Suggest improvements and raise further questions from results of scientific investigation. • Use scientific evidence to answer questions and to support predictions and findings. • Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge. • Take scientific measurements independently using a range of scientific equipment. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Use scientific evidence to answer questions and to support predictions and findings. • Suggest improvements and raise further questions from results of scientific investigation. • Use test results to make predictions and set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations).

		associated with burning and the action of acid on bicarbonate of soda. *Present data in bar charts and line graphs* Outdoors: investigate irreversible changes through fire lighting.	
Summer 2			

New Seaham Academy Science scheme of work

Class 8:

	Content	Objectives	Skills
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 changes experienced in puberty. • How does head to body ratio change as a human grows? Pupils could work scientifically by comparing data about the gestation periods of humans and other animals or by finding out and recording the length and mass of a baby as it grows. Link to puberty talks Draw humans at different stages with correct head to body ratios. Plot average height of males and females as they grow into a line graph. Compare differences and rate of growth at different stages.	Pupils should be taught to: • describe the changes as humans develop from birth to old age. Outdoors: go outdoors to measure the growth rate of different plants compared to humans. *Present data in charts and tables.* *Present data in line graphs*	• Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge. • Take scientific measurements independently using a range of scientific equipment. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Use scientific evidence to answer questions and to support predictions and findings. • Suggest improvements and raise further questions from results of scientific investigation. • Use test results to make predictions and set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, in

			oral and written forms (displays and other presentations). • recognise and control variables during scientific enquiries. • Recognise when to repeat readings when taking measurements in scientific enquiries. • Use test results to make predictions and set up further comparative and fair tests.
Autumn 2	Light Pupils should build on the work on light in year 3, exploring the way that light behaves, including light sources, reflection and shadows. They should talk about what happens and make predictions. • What happens to the size of a shadow when you move the object nearer the light? • How can we see round corners? – link to periscopes • Which materials are the best for reflecting light? • What colour of writing can be seen best in the dark? • How many reflections can you create	Pupils should be taught to: • 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.	• Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge. • Take scientific measurements independently using a range of scientific equipment. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Use scientific evidence to answer questions and to support predictions and findings. • Suggest improvements and raise further questions from results of

	using mirrors? • Which light makes the best shadows? Pupils might work scientifically by: deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur)	Outdoors: investigate the shadows cast by different light, including natural light outdoors. Make a periscope and use it in the outdoor environment. *Present data in charts and tables.* *Present data in line graphs/bar charts.*	scientific investigation. • Use test results to make predictions and set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations). • recognise and control variables during scientific enquiries. • Recognise when to repeat readings when taking measurements in scientific enquiries. • Use test results to make predictions and set up further comparative and fair tests.
Spring 1	Solids, Liquids and Gases • How is evaporation of a liquid affected by size of container/ viscosity/ moving air/ additives/ temperature? • How is boiling time of water affected by adding salt? • Which liquid dissolves antacid tablets quickest? • Do all liquids evaporate at the same rate? - salt water, vinegar, cooking oil, milk,	Pupils should be taught to: • compare and group together everyday materials based on evidence from comparative and fair tests, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • understand that some materials will dissolve in liquid to form a solution, and	• Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge. • Take scientific measurements independently using a range of scientific equipment. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter

	aftershave lotion • Do all frozen materials melt at the same temperature? Pupils might work scientifically by: carrying out tests to answer questions such as 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?' They might compare materials in order to make a switch in a circuit. They could observe and compare the changes that take place, for example when burning different materials or baking bread or cakes. They might research and discuss how chemical changes have an impact on our lives, for example cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials. 1. Discussing the difference between powders and liquids 2. Discussing, sorting and grouping familiar materials as solids or liquids 3. Making a poster or collage illustrating the properties of solids or liquids or gases 4. List all you eat in a day as solids, liquids or gases 5. Explain with a drawing how smells travel around buildings 6. Research gases and their uses 7. Matching words to definitions evaporating, condensing etc. 8. Explore ways to remove salt from water. 9. Group changes into reversible and irreversible reactions	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 Outdoors: what natural materials make a good roof for a shelter or good insulation? *Present data in bar charts and line* *graphs.*	graphs, bar and line graphs. • Use scientific evidence to answer questions and to support predictions and findings. • Suggest improvements and raise further questions from results of scientific investigation. • Use test results to make predictions and set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations). • recognise and control variables during scientific enquiries. • Recognise when to repeat readings when taking measurements in scientific enquiries. • Use test results to make predictions and set up further comparative and fair tests.

Spring 2	Forces Pupils should explore falling objects and raise questions about the effects of air resistance. They should experience forces that make things begin to move, get faster or slow down. Pupils should explore the effects of friction on movement and find out how it slows or stops moving objects, for example by observing the effects of a brake on a bicycle wheel. They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. Pupils should explore the effects of levers, pulleys and simple machines on movement. Pupils might find out how scientists such as Galileo Galilei and **Isaac Newton** helped to develop the theory of gravitation. • How does type of material/weight added/shape/ making holes affect the falling time of a parachute? • How does moving the fulcrum on a lever affect the force needed to move an object? • What factors affect the sag of a simple beam bridge? • What affects the time of the swing of a pendulum? • What affects the height bounced by a ball? • What affects the time for different Plasticine shapes to fall in water? • How does air resistance affect our ability	Pupils should be taught to: • 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 • understand that force and motion can be transferred through mechanical devices such as gears, pulleys, levers and springs. **BV:To be conversant with examples of British creativity and/or culture.** Outdoors: investigate the effects of air and water resistance in the outdoors. *Present data in bar charts and line graphs.*	• Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge. • Take scientific measurements independently using a range of scientific equipment. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Use scientific evidence to answer questions and to support predictions and findings. • Suggest improvements and raise further questions from results of scientific investigation. • Use test results to make predictions and set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations). • recognise and control variables during scientific enquiries. • Recognise when to repeat readings

	to run? Pupils might work scientifically by: exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. 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.		when taking measurements in scientific enquiries. • Use test results to make predictions and set up further comparative and fair tests.
Summer 1	Plants / Living Things Pupils should study and raise questions about their local environment throughout the year. 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. They should find out about the work of naturalists and animal behaviourists such as David Attenborough and Jane Goodall. Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals. • What do seeds require in order to germinate? • How does the ovary of a flower change as the flower wilts? • Which animals have the longest gestation period? Pupils might work scientifically by: observing and	Pupils should be taught to: • explain 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. Outdoors: make a David Attenborough style documentary about our woodland habitat.	• Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge. • Take scientific measurements independently using a range of scientific equipment. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Use scientific evidence to answer questions and to support predictions and findings. • Suggest improvements and raise further questions from results of scientific investigation. • Use test results to make predictions and set up further comparative and

	comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences. They might try to grow new plants from different parts of the parent plant, for example seeds, stem and root cuttings, tubers, bulbs. They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.		fair tests. • Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations). • recognise and control variables during scientific enquiries. • Recognise when to repeat readings when taking measurements in scientific enquiries. • Use test results to make predictions and set up further comparative and fair tests.
Summer 2	Earth and Space Pupils should be introduced to a model of the Sun and Earth that enables them to explain day and night. Pupils should learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). They should understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones). **Note:** Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses. Pupils should find out about the way that ideas	Pupils should be taught to: • 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. Outdoors: investigate the Sun's	• Ask scientific questions to begin to plan a scientific enquiry using previous scientific knowledge. • Take scientific measurements independently using a range of scientific equipment. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Use scientific evidence to answer questions and to support predictions

	about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus. • How is the size of shadow affected by the time of day/distance from light source/brightness of light source? • How does the position of the Sun change during the day? • How does the shape of the moon appear to change over a month? • How does day length change through a term/year? • How does air temperature change through a term/year? Pupils might work scientifically by: comparing the time of day at different places on the Earth through internet links and direct communication; creating simple models of the solar system; constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day; finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.	position throughout that day and the length of days over a half term. *Solve problems involving units of time* *Construct and read line graphs.*	and findings. • Suggest improvements and raise further questions from results of scientific investigation. • Use test results to make predictions and set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations). • recognise and control variables during scientific enquiries. • Recognise when to repeat readings when taking measurements in scientific enquiries. • Use test results to make predictions and set up further comparative and fair tests.

New Seaham Academy Science scheme of work

Class 9:

	Content	Objectives	Skills
Autumn 1	Light Pupils should build on the work on light in year 3, exploring the way that light behaves, including light sources, reflection and shadows. They should talk about what happens and make predictions. • What happens to the size of a shadow when you move the object nearer the light? • How can we see round corners? – link to periscopes • Which materials are the best for reflecting light? • What colour of writing can be seen best in the dark? • How many reflections can you create using mirrors? • Which light makes the best shadows? Pupils might work scientifically by: deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).	Pupils should be taught to: • 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. Outdoors: are there any naturally occurring transparent materials? What natural materials reflect light? *Present data in charts and tables.* *Present data in line graphs*	• Planning different types of scientific enquiries to answer questions, including recognising and controlling variables. • Identify scientific evidence to support findings, ideas and arguments. • Taking scientific measurements independently, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Record data and results by selecting the appropriate method for the data (scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs) • Use test results to make predictions and set up further comparative and fair tests.

			• Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations). • Use scientific evidence to support and refute findings, ideas and arguments. • Report findings, conclusions, relationships and explanations of scientific enquiries with a degree of trust in results.
Autumn 2	Animals, including humans Pupils should build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function. Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body. • How does your heart rate change for different activities? • How would different types of stomach juices affect break down of food? • Is lung capacity linked to height, age, fitness?	Pupils should be taught to: • identify and name the main parts of the human circulatory system, and explain 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. Outdoors: explore the circulatory system through a range of exercises and working out their effects on the heart. *Collect and present data in charts and tables.*	• Planning different types of scientific enquiries to answer questions, including recognising and controlling variables. • Identify scientific evidence to support findings, ideas and arguments. • Taking scientific measurements independently, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Record data and results by selecting the appropriate method for the data (scientific diagrams

	Pupils might work scientifically by: exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.	*Construct and read line graphs*	and labels, classification keys, tables, scatter graphs, bar and line graphs) • Use test results to make predictions and set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations). • Use scientific evidence to support and refute findings, ideas and arguments. • Report findings, conclusions, relationships and explanations of scientific enquiries with a degree of trust in results.
Spring 1			
Spring 2	Electricity Building on their work in year 4, pupils should construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols. **Note:** Pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught	Pupils should be taught to: • 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	• Planning different types of scientific enquiries to answer questions, including recognising and controlling variables. • Identify scientific evidence to support findings, ideas and arguments. • Taking scientific measurements independently, with increasing

	to take the necessary precautions for working safely with electricity. • 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? Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.	switches use recognised symbols when representing a simple circuit in a diagram. Outdoors: how can you make an electrical item safe to use outdoors, in every type of weather? *Collect and present data in charts and tables.*	accuracy and precision, taking repeat readings when appropriate. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Record data and results by selecting the appropriate method for the data (scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs) • Use test results to make predictions and set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations). • Use scientific evidence to support and refute findings, ideas and arguments. • Report findings, conclusions, relationships and explanations of scientific enquiries with a degree of trust in results.
Summer 1	Living Things Pupils should build on their learning about	Pupils should be taught to: • describe how living things are classified	• Planning different types of scientific enquiries to answer questions, including recognising and

	grouping living things in year 4 by looking at the classification system in more detail. They should be introduced to the idea of broad groupings and how these subdivide. Through direct observations where possible, 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. Pupils might find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification. • Which groups would you put organisms from the local environment? Pupils might work scientifically by: devising classification systems and keys to identify some animals and plants in the immediate environment. They could research animals and plants in other habitats and decide where they belong in the classification system.	into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals • give reasons for classifying plants and animals based on specific characteristics. Outdoors: group organisms from the local environment. *Collect and present data in charts and tables.*	controlling variables. • Identify scientific evidence to support findings, ideas and arguments. • Taking scientific measurements independently, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Record data and results by selecting the appropriate method for the data (scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs) • Use test results to make predictions and set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, in oral and written forms (displays and other presentations). • Use scientific evidence to support and refute findings, ideas and arguments. • Report findings, conclusions, relationships and explanations of

			scientific enquiries with a degree of trust in results.
Summer 2	Evolution and Inheritance Building on what they learned about fossils in the topic on rocks in year 3, pupils should find out more about how living things on earth have changed over time. They should be introduced to the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles. They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox. Pupils might find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution. Note: At this stage, pupils are not expected to understand how genes and chromosomes work. • How are local aniamls/insects different from those in other locations/countries • Explore advantages and disadvantages of adaptations e.g. long fur Pupils might work scientifically by: observing and raising questions about local animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example cactuses, penguins and	Pupils should be taught to: • 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. Outdoors: choose an animals from the different habitats around school and explain how it has been adapted for its locality.	• Planning different types of scientific enquiries to answer questions, including recognising and controlling variables. • Identify scientific evidence to support findings, ideas and arguments. • Taking scientific measurements independently, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Record data and results by selecting the appropriate method for the data (scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs) • Use test results to make predictions and set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, in oral and written forms (displays and

	camels. They might analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.		other presentations). • Use scientific evidence to support and refute findings, ideas and arguments. • Report findings, conclusions, relationships and explanations of scientific enquiries with a degree of trust in results.