Science Curriculum

Non - Negotiables

Pupils must complete *all* of the learning challenges.
Evidence of *all* learning challenges in books.
One piece of extended writing per term.
Evidence of the application of mathematics.
Evidence of Speaking and Listening

Year 1					
Big Question			**Who am I?**	**Where do Polar Bears Live?**	**How Would We Survive on a Desert Island?**
WOW			**Senses Game**	**Visit from animal man. (Jay's encounters)**	**Visit from pirate. Trip to Hartlepool Historic Quay.**
Science			**Plants**	**Animals including humans. Everyday Materials**	**Seasonal Changes**
Working Scientifically					
Working Scientifically					
English Link					
Maths Link					
Famous Scientist					
P4C					

Caedmon Primary School Science Planning
Topic: Who Am I and Celebrations **Year:** 1 **Term:** Autumn 1/2
Big Question
Who Am I?
Overview:
- Identify the five senses and match to the body. - Investigate the five senses. - Investigate sources of light. - Find out and discuss celebrations of light. - Label a plant or flower.
Wow:
Match the five senses to the five parts of the body.
Challenge 1 – What is sight?
- Can they describe sight? - How is sight used? What happens if sight is lost? - Which part of the body is used to see? **Suggested Activities** - Investigate sight- looking games and activities.
Challenge 2– What is smell?
- Can they describe smell? - How is smell used? What happens if smell is lost? - Which part of the body is used to smell? **Suggested Activities** - Investigate smell- smelly pot testing.
Challenge 3 – What is hearing?
- Can they describe hearing? - How is hearing used? What happens if hearing is lost? - Which part of the body is used to hear? **Suggested Activities** - Investigate hearing- listening activity.
- Challenge 4- What is touch?
- Can they describe touch? - How is touch used? What happens if touch is lost? - Which part of the body is used to touch?

Suggested Activities - Investigate touch- blindfold test activity.
• **Challenge 5- What is taste?**
- Can they describe taste? - How is taste used? What happens if taste is lost? - Which part of the body is used to taste? **Suggested Activities** - Investigate taste- taste testing activity.
- **Challenge 6- What is a source of light?**
- **Maths link** - Can they describe natural and man-made sources of light? - What are the differences between natural and man-made sources of light? - Can they sort sources of light into the two categories? **Suggested Activities**
Challenge 7 – Candles burning –
- **Extended writing** - Can they predict what will happen to a burning candle? - What factors could change the time that the candle takes to burn or how the candle burns? - Can they observe and record the changes to the burning candle at the beginning, middle and end of the investigation? - Can they evaluate the investigation? **Suggested Activities**
Challenge 8- Can you make a shadow?
- Can they talk about how shadows are made? - Can they make shadows using a torch? - Can they make shadows outside? - Can they describe the factors needed to create a shadow? **Suggested Activities**
Challenge 9- What is a plant?
- Can they label and name the parts of a plant and/or flower? - Can they describe the specific role/job of each part of the plant or flower? - Can they sort plants and flowers by categorising their features? - Can they identify and name a variety of common wild garden plants, including deciduous and evergreen trees. **Suggested Activities**

Caedmon Primary School Science Planning
Topic: Polar Adventurers and Animal Safari **Year:** 1 **Term:** Spring 1/2
Big Question
Where do polar bears live?
Overview:
- Classifying and Grouping materials. - Properties of materials. - Features of day and night including temperature - How animals are suited to their environment.
Wow:
- Dress up for a polar expedition - Animal Encounters visit (7th Jan) - Challenge 1- Ice Exploration Investigation (Properties of ice, how ice melts, how ice is made).
Challenge 2 – What would I wear for a polar adventure?
- Can they describe materials using their senses? - Can they describe materials using their senses, using specific scientific words? - Can they explain what material objects are made from? - Can they explain why a material might be useful for a specific job? - Can they compare and group together a variety of everyday materials on the basis of their simple physical properties? - **Suggested activities** - Label a polar outfit (Rising Stars p32-39)
Challenge 3– What would I see on a polar adventure?
- Can they classify common animals? (birds, fish, amphibians, reptiles, mammals, invertebrates) - Can they describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets? - Can they classify animals by what they eat? (carnivore, herbivore, omnivore) - Can they talk about and identify habitats of animals? - Can they discuss the lifecycle of a penguin? - **Suggested activities** - Create a lifecycle of a penguin (Rising Stars p32-39)
Challenge 4 – What do animals eat?

- Can they discuss how animals hunt and catch their prey? - Can they sort the animals into three categories- herbivores, carnivores and omnivores? - Can they identify what each group of animals would eat? - **Suggested activities** - Sort animals
- **Challenge 5**- Predators and Prey
- Can the children identify and sort predators and prey? - Can they create simple food chains using predator, arrow and prey in the correct order? - Can they use their knowledge of herbivores, carnivores and omnivores to help them? - **Suggested activities** - Create a food chain
• **Challenge 6- Habitats.**
- Can they describe how an animal is suited to its environment? - Can they match animals to their habitats, discussing the reasons for their choices? - **Suggested activities** - Match animals to habitats
- Challenge 7- Materials and their properties..
- Can they describe materials and textures? - Can they sort the materials by their properties eg. Waterproof, warm, cool etc.? - **Suggested activities** - Sort materials
Challenge 8 – Testing Materials – extended writing
- Can they test materials to see are waterproof and record these findings? - **Suggested activities** - Test materials
Challenge 9- Can you make a shelter that would keep you dry?
- Can they use their knowledge of materials and their properties to create a waterproof shelter? - Plan, create and evaluate. - **Suggested activities** - Build a shelter

Caedmon Primary School Science Planning
Topic: Treasure Island and Holidays **Year:** 1 **Term:** Summer 1 and 2.
Big Question
How would we survive on a desert island?
Overview:
- To identify and name a variety of animals including fish, amphibians, reptiles, birds and mammals. - To describe the structure of a fish. **Scientific Skills** - To identify and classify. - To ask simple questions and recognise that they can be answered in different ways. - To observe closely and perform simple tests. - To gather and record data. - To describe the simple physical properties of a variety of everyday objects.
Wow:
- Wider Curriculum visit to Hartlepool Historic Quay (27.5.16)
Challenge 1 –Help, we are stuck on a desert island. Get us out of here!
- Message in a bottle stimulus (Rising Stars, resource book p.26). - Can they answer questions about the message in a bottle? - Where has the message come from? What is a desert island? Who sent the message? Why is it in a bottle? How would they survive on a desert island? - Can they organise the choice cards in order of importance? What job would you need to do first and why?
Challenge 2 – What would we eat?
- Can they discuss what food you might find on a desert island? What food could they grow? What food could they catch? - Can they taste different fruit and vegetables that they might find? Can they sort them into fruits and vegetables and discuss and record their taste, texture and smell? (Rising Stars p.47, List of fruits and vegetables)
Challenge 3 – What could we hunt or catch?
- Can they handle and talk about the properties of a real fish?

- Can the children label a picture of the real fish using correct language eg. backbone, scales, fins, gills? - Can they talk about how fish are different to the human body? - (Rising Stars p. 48)
Challenge 4 – What other animals would we find on the seashore?
- Can they identify and sort a variety of seashore animals? - Can they organise the animals into groups depending on where on the seashore they will live. eg. cliff, rock pool, beach, sea? (Rising Stars p. 68 and Rising Stars Resource p. 45/46)
Challenge 5-Are rock pools dangerous? (2 lessons)
- Can they explore the rock pool materials- sand, water, shells, small world animals, seaweed, rocks using their hands and magnifying glasses? - Can they talk about what they can see? Can they describe the objects using language and vocabulary for the materials found? - Can they us the IPads, books and information to find information out about the animals? - Can they make an information booklet about 1 animal? (Rising Stars p.69)
Challenge 5 - How could we escape? (2 lessons)
- Can they decide how we could escape from the desert island? - Can they choose materials to make a raft/boat to help them escape from the island? Can they describe the properties of the materials and discuss why they have chosen them? - Can they draw a plan to make a raft/boat in small groups? - Can they make their raft/boat using the materials provided together in a small group? (Rising Stars, p.46)
Challenge 6 – Lets test our boats! Can we use our boats and rafts to escape? Who will manage to escape?
- Can they test their rafts and boats in water? Can the children decide if their boat would be seaworthy? - Can they load their raft or boat using "cargo"? Whose rafts or boats can carry the largest load? - Can the children collect the numerical data and record it in a simple table? (Rising Stars, p.46)
Challenge 7- A pirate ship ambush! How far can the pirates shoot their water cannons? - investigation
- Can they challenge each other to a pirate water cannon "squirt off"? - Can the children choose a water bottle/washing up liquid bottle/sports bottle to use in the "squirt off?" - Can the children make an informed decision as to which materials to use, explaining their reasons why? How will we make the experiment fair for everyone? - Can they measure each "squirt" of the water cannon and decide whose cannon can fire the furthest? - Can the children create a chart to show whose water cannon squirted the furthest in the experiment? (Rising Stars, Seasonal Change p. 80)

Challenge 8- Can you make pirate "tack biscuits"? – extended writing
- Can 1 group of children write the recipe to make "hard tack biscuits"? - Can 1 group of children measure and mix the ingredients to make the biscuits? - Can 1 group of children write the ingredients for homemade shortbread biscuits? - Can 1 group of children measure and mix the ingredients to make the biscuits? - Can the children answer questions about the materials, the mixture, the changes to the ingredients and predict the differences between the two sets of biscuits. (Rising Stars p. 47)
Challenge 9- How do pirates protect themselves from the sun?
- Can the children decide what "slip, slop, slap" means? - Can the children think about what else pirates might need on a sunny day? - Can the children discuss how sunglasses keep us safe? - Can the children use appropriate materials to make sunglasses? - Which materials are best? Fit for purpose? - Could these fit here? Can they observe changes across the 4 seasons? - Can they observe and describe weather associated with the seasons and how day length varies? (Rising Stars p.67)
Challenge 10- How can we keep sea turtles safe?
- Can the children identify hazards and dangers to sea turtles? - Can they talk about why plastic bags are dangerous to sea creatures especially the sea turtle? - Can the children create a poster to warn people about the dangers of plastic bags? - Could the children think of alternatives to plastic bags? - Can they talk about pollution and how they can help? (Rising Stars p. 79, Rising Stars Resources p. 44)
Challenge 11- What should people do with their rubbish?
-Can the children talk about pollution? Can they identify human litter? -Can they discuss why this litter is dangerous and has an impact on the environment? -Can they sort the litter into bins labelled plastic, wood, glass, metal and cloth? (Rising Stars p.70)

Year 2				
Big Question	What is our school made of?	Why would a Dinosaur not make a good Pet?	How can you grow your own salad?	How can I keep Healthy?
WOW	Feed the materials monster (RS pg 20)	Jay's encounters Visit.	Make a Scarecrow and explain its job.	Fitness Challenge!
Science	Use of everyday materials	Living things and their habitats	Plants	Animals including humans.
Working Scientifically	Performing simple tests Identifying and classifying Observing and answering questions			
English Link	Report	Report	Instructions	Explanation Text
Maths Link	Venn Diagrams	Tally charts	Bar chart	Sequencing, sorting, draw a graph
Famous Scientist			Charles Darwin	
P4C				

Topic: Materials Year: 2 Term: Autumn	
Big Question	
What is our school made of?	
Overview:	
- Use of different everyday materials - Classifying and grouping Changing materials by bending, etc.	
WOW:	
Feed the materials monster (Rising Stars pg20)	
Challenge 1- What is our homes made from?	Suggested Activities
Can they identify where different materials are used in their homes? Can they identify and name a range of everyday materials? (wood, plastic, metal, water, rock)	Ask children to share some objects and the materials, which they are made from, from their homes. Discuss how we can tell what material things are made from (Look, feel, sound, texture). Look at the different rooms in the home. E.g.: bathroom. Share what materials they can see have been used and what they have been used for. Children to complete a table and record objects that are made from wood, plastic, paper, rock, metal, ceramics and fabric.
Challenge 2 - How could you sort these materials?	
Can they distinguish between an object and the material from which it is made? Can they describe the simple physical properties of a variety of everyday materials? Can they compare and classify a variety of materials based on their simple physical properties? Can they say which materials are natural and which are manmade? Speaking and Listening	Look at a group of objects. How could we sort them? Take ideas and organise them into hula hoops. Discuss why they have been organised like this. How do they feel, look etc Introduce terms 'Man-made ' and 'Natural'. LA: Sort objects into natural and manmade. (Take a Photo) HA- LA: Sort objects into natural and manmade and label properties in a table.
Challenge 3 - Which material is best?	

Can they classify objects based on the materials that they can be made from? Can they recognise that some objects can be made from more than one material? Maths link – Venn Diagrams	Explain that objects can be made from more than one material eg: window can be glass or plastic. Can children think of anymore objects that can be made from more than one material? Give children a Venn diagram with headings Plastic and Wood. Can they classify the pictures (window frames, toys, chairs, balls, cups, bottles, matches, sheds, fences, and radiators). Higher - can they add some of their own? Discuss why plastic might be inappropriate for some of the wooden objects.
Challenge 4 -Can you change the shape?	
Can they explore how the shapes of solid objects can be changed? (squashing, bending, twisting, stretching) Can they compare and classify a variety of materials based on their simple physical properties? English link- definition work	Explain that scientists test the properties of a material or an object to make sure it is suitable for that object. Watch http://www.bbc.co.uk/education/clips/zy6w2hv Explain that the children are going to be testing the properties of different items. Ask children to think about and explain how some of the properties of the objects make them suitable for their purpose. E.g. Elastic band is stretchy so you can wrap it around things of different sizes. Discuss how objects that are made of the same of the same material can still have different properties e.g.: paper clip and coin are metal, but one is flexible. http://www.bbc.co.uk/bitesize/ks1/science/changing_materials/play/
Challenge 5 – How can we keep our elf dry?	
Can they carry out a simple fair test? Can they explain why it might not be fair to compare two things? Can they say whether things happened as they expected? Can they suggest how to find things out? Can they use prompts to find things out? English link- Report	Complete investigation planner

Topic: Mini Worlds **Year:** 2 **Term:** Spring 1	
Big Question	
Why would a dinosaur not make a good pet?	
Overview:	
Habitats Early Food Chains	
WOW:	
Jay's Encounters	
Challenge 1- Dead or Alive?	Suggested Activities
Can they explore and compare the differences between things that are living, dead, and things that have never been alive? (Maths Links) (Speaking and Listening)	Carry out a treasure hunt. Children to explore whether something is living or has never been alive and find out about the characteristics of living things.t can be played in the school grounds or adapted to an indoor location if needed. Giving children a container such as a bag and a list of objects makes the activity more like a treasure hunt. Once the 'treasures' have been collected children can sort them into two groups giving reasons for why they have done this. (Venn Diagram). Children to recognise that living things move, feed, grow, reproduce and use their senses. They may be find it difficult to understand that plants are living just as much as animals, only they carry out the processes in different ways. (Differentiated worksheet?)
Challenge 2 – Where do animals live?	
Can they 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? (ICT LINK)	Living things live in habitats to which they are suited and provide their basic needs. This interactive activity asks children to identify which animals are suited to a particular habitat and choose the reasons from different options. It could be used as a whole class session in an ICT suite or for pairs of children working on a class computer. The following habitats are considered: • Antarctic • Desert • Savannah grassland • Temperate farmland • Temperate forest • Temperate pond • Sea • Tropical rainforest https://368.stem.org.uk/Human%20and%20Animal%20Habitats/page/modules/habitats1.html

Challenge 3 – Am I alive?	
Can they identify and name a variety of plants and animals in their habitats, including microhabitats?	A presentation on penguin diversity and adaptation containing high quality photographs of different penguin species. This resource shows how penguins are adapted to survive in a particular habitat. Children then make masks of the different species showing their variation. There is also a quiz to consolidate learning. This links to learning about variation at Key Stage One. h ttps://www.stem.org.uk/elibrary/resource/28680 This puzzle asks children to guide a squirrel and a snake to the centre of an oak tree. It looks at the oak tree and how it provides a habitat for many living things. Use it as a starting point to discuss the basic needs of different kinds of animals and plants, and how they depend on each other. For example: What would happen to the bird if the insects were removed? What would happen to the tree if there were too many squirrels? Children could investigate other habitats within the school grounds or on a day trip, and draw the creatures they find within the habitats.
Challenge 4 – Where do worms live? Investigation	
Can they identify and name a variety of plants and animals in their -habitats, including microhabitats? Can they observe closely, using equipment? Can they identify and classify? Can they use their observations to suggest answers to questions? (English Link)	This activity helps children carry out close observation in order to identify adult and immature worms and sort them into two groups. Carrying out this simple survey is a great way of letting children work in a scientific way, whilst also investigating habitats. Try looking for worms in any other microhabitats nearby. Worms like dark, damp places so they may be under rotting wood, beneath stones and in piles of decaying leaves. Did you find more immature worms than adults? Was there more than one species of worm? Did you find different species in different habitats?
Challenge 5 – Who eats who?	
Can they 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?	This starter clip is a fun way of introducing simple food chains. Watch in class then ask children to draw some simple food chains found in different habitats. Habitats could include: a meadow, a pond, a wood, the seashore. Children

	could name the food sources for each part of the food chain remembering that the Sun is the ultimate source of energy.https://www.stem.org.uk/elibrary/resource/32076 OR Rabbits and Foxes is a fun game which will help to show your class the relationships within a food chain, as well giving them some exercise! It works best in a large area, such as a hall or a playground. Children could draw pictures to show simple food chains, remembering that the sun is the ultimate source of energy and the start of all food chains. https://www.stem.org.uk/elibrary/resource/34119

Topic: Young Gardeners (plants) **Year:** 2 **Term:** Spring 2	
Big Question	
How can we grow our own salad?	
Overview	
Living and non living things What plants need to grow Growing from seeds and bulb	
WOW	
Make a scarecrow/bring in a scarecrow to explain about his job and to talk about pests.	
Challenge 1 – What can we remember about plants?	**Suggested Activities**
Can they label the parts of a plant?	The Sunflower jigsaw could be used as an independent activity as a way of refreshing knowledge about parts of a plant. https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/6955-activity3.pdf
Challenge 2 – What do we need to remember if our plants are to grow?	
Can they describe how seeds and bulbs grow into mature plants? Can they describe how plants need water, light and a suitable temperature to grow and stay healthy? Can they name a variety of plants? (speaking and listening) English link	Look at seeds/bulbs and sort them. The children could look through a magnifying glass or microscope. What do they need to grow? • http://www.bbc.co.uk/schools/scienceclips/ages/5_6/growing_plants.shtml Can children sort/write instructions of how to grow a plant? Could children go on a plant hunt around school and take photos of plants around the school. Can we find the name of the plants? **Or** could the children look at some photos of different plants and discuss what they are as part of the plenary? Look at similarities and differences and where they grow?
Investigation – Can you grow your own salad? Can you grow a beanstalk as tall as Jack?	
Can they suggest what they will grow and how they will grow it? Can they observe and describe how seeds and bulbs grow into mature plants? Can they explain that plants grow and reproduce?	Film cook asking the children to grow some salad for the school's salad bar. OR Send the children a letter from Jack and ask them to help him grow a beanstalk. Complete the investigation planner. Draw a table and a whole class graph to show whose beanstalk grew the tallest

Can they find out and describe how plants need water, light and a suitable temperature to grow and stay healthy? Can they compare how plants grow in different conditions by making measurements? Can they record their findings? Maths link- graph	
Challenge 3 – Can you draw and label your plant?	**Aim to make a sandwich filled with the salad they have grown.**
Can they name the parts and functions of a plant?	Take a photograph of the child's plant. Can they label the parts of the plant and explain its function. Job of the leaves, stem, roots etc Can the children make a sandwich with the salad they've grown? Photo.

Topic: Healthy Me **Year:** 2 **Term:** Summer 1	
Big Question	
What do rocks tell us about the way the Earth was formed?	
Overview	
Rocks, soil and fossils.	
WOW	
Fitness challenge! Children to complete a number of physical activities, talk about how they feel before and after and say why these activities are important	
Challenge 1 – What can we do now that we couldn't do as a baby?	**Suggested Activities**
Can they explain the different things they will learn to do as they grow?	This short clip shows humans and animals at different stages in their lifecycles. It could be used as a way into a discussion about the different things we learn to do as we grow older. These include talking, walking, swimming and making important choices in our life as we become more independent. Try compiling a class list of things humans can do at different stages in life with a picture to show each stage. http://www.bbc.co.uk/education/clips/z4tmhyc Can they cut and stick a basic life cycle?
Challenge 2 :What do we need to stay alive?	
Can they understand the basic needs of animals, including humans, for survival ?	Ask children to think, pair, share what people need in order to live. Watch the video on animals, their basic needs and some adaptations that animals have at http://www.youtube.com/watch?v=9juC9JQ7Vxs and http://www.youtube.com/watch?v=X_DvvEfuCvU Explain that all animals need oxygen, water and food Ask children to describe the difference between something that we *need* and something that we *want* Explain that if we *need* something, without it we would die; if we only *want* something, then we can survive without it Explain independent work – Can children sort list of items into a table of wants or needs?
Challenge 3 – Can we always eat what we want?	
Can they describe the importance for humans of eating the right amounts of different types of food?	Ask children to explain why we need to eat different types of food Ask them which foods we should not eat too much of and why.

	Watch the video http://www.bbc.co.uk/learningzone/clips/a-healthy-diet-for-the-human-body/2271.html Watch video at http://www.bbc.co.uk/learningzone/clips/the-long-term-effects-of-unhealthy-food-choices/4090.html Highlight how the children in the school know about healthy eating, but still don't always make the right choices Also focus on the part where the children are 'aged' and explain the health problems that they are suffering from due too much salt, sugar or fat.
Challenge 4 – How do germs spread? Investigation	
Can they describe the importance for humans of hygiene? Can they begin to understand some of the methods of being hygienic?	Ask children if they have heard of the word 'hygiene' before, and if so, what they think it means Explain that hygiene is about how we stop ourselves getting ill Ask children to think, pair, share ways that we clean ourselves and the products that we use to do this Explain how we pick up germs when we touch things, particularly when we go to the toilet, play in places where animals go to the toilet, when we cough or sneeze and when we are around people who are ill . Carry out an investigation to see how far germs spread when we sneeze- use squirt bottles with water. How far does the sneeze spread? Can children suggest how to prevent ways to stop germs spreading?
Challenge 4 –Why is exercise important? ?	
Can they describe the importance for humans of exercise?	Ask children to think, pair, share some different ways that we can exercise. Can they suggest why we exercise? Watch the video on exercise at http://www.bbc.co.uk/learningzone/clips/the-physical-effects-and-demands-of-sport/13784.html Ask children to think about how their bodies change when they do exercise e.g. increased heart-rate, breathing more often and sweating Carry out some exercise- take photos. Ask them to think about how they feel after doing exercise.

Year 3					
Big Question	What do Rocks Tell us about the way the Earth was Formed?	How Far can you throw your Shadow?	How did that Blossom become an Apple?	Are you attractive enough?	How Can Usain Bolt move so quickly?
WOW	Bring in a collection of rocks and let the children touch and talk about them.	Use torches to create shadow shapes and photograph them.	Look at picture/videos of unusual plants and flowers like the Venus Fly Trap.	Explore with magnets. Find out which side attracts and which side repels.	Check how far each child can run in 9.68 secs. Compare with Bolt.
Science	Rocks	Light	Plants	Forces and Magnets	Animals including humans.
Working Scientifically					
English Link			Report	Report	
Maths Link	Measures	Measuring length.	Measures-length and volume	Bar Chart/tables	Draw Bar Chart/tables.
Famous Scientist					

Topic: Rocks Year: 3 **Term:** Autumn 1	
Big Question	
What do rocks tell us about the way the Earth was formed?	
Overview	
Rocks, soil and fossils.	
WOW	
Bring in a collection of rocks and let the children touch and talk about them. https://www.stem.org.uk/elibrary/resource/32188	
Challenge 1 – What are fossils and why are they so fascinating?	Suggested Activities
Do they understand that there are different types of rock? Do they know that different rocks have different uses?	Ask children to think, pair, share the names of rocks that they know and any words they know to describe them. Take ideas as a class Explain independent work Split children up into teams Sheet with two columns – one has the names and images of rocks and key vocabulary associated with rocks. The other column has definitions. The two columns do not match up. The children need to cut them up in their teams and rearrange them so that they match. Give children the actual rocks as well if have them. Discuss how some rocks are natural e.g. pumice, sandstone etc and some rocks are man-made e.g. concrete and bricks.
Challenge 2 –	
Do they understand that there are different types of rock? Do they know that different rocks have different uses?	Think. pair, share the names of as many types of rocks as possible Children need to complete activity from the BBC website at http://www.bbc.co.uk/schools/scienceclips/ages/7_8/rocks_soils.shtml to complete a table on the properties of some different rocks, and to find out what those rocks are used for and why they are suitable for the different purposes. Children share their findings with the people on their table and discuss any differences.
Challenge 3 – How are fossils formed?	
Can they describe in simple terms how fossils are formed when things that have lived are trapped within rock?	Look at how fossils are formed. Can children complete and label a diagram of the different layers? HA – can they complete and label a diagram of the different layers and add a description.

Challenge 4 – Which is the hardest rock?	
Can they investigate the hardness of different rocks? (Moh's test)	Experiment: Children will be given various types of rocks and some sugar / sand paper. Children rub each rock against the paper to see how much of the rock comes off on to the paper Revise different types of rock and how they are formed. Think, pair, share what might affect the hardness of the rocks? (how they were formed e.g. sedimentary rock will be the softest) **Complete Investigation planner**
Challenge 5 – Why is soil so important?	
Can they explain how soil is formed from rocks?	Revise what we did last lesson – rocks can be eroded (worn away) Ask children to think, pair, share how they think soil is formed Explain that soil is formed by rocks being broken into smaller pieces and by erosion of rocks. Watch video of 'Rock meets lichen' on YouTube at: http://www.youtube.com/watch?v=zv2JNaqnYxU&feature=related Explain that the sun, wind and river / the sea also erode and break rocks.

Topic: Light **Year:** 3 **Term:** Spring 2	
Big Question	
How far can you throw your shadow?	
Overview	
• Sources, including the Sun and electricity • Shadows • Reflection • Vocab- translucent.	
WOW	
Use torches to create different shadow shapes and attempt to photograph them.	
Challenge 1- Do we need light?	Suggested Activities
Can they recognise that they need light in order to see things and that dark is the absence of light? Speaking and listening link	Children to experience a lesson in the dark. What could we do to help us with our lesson? What could we not do without light? What can we do with light? Why is light important?
Challenge 2 –What are the most common sources of light?	
Can they notice that light is reflected from surfaces? Can they describe the reflections when light is reflected from surfaces? Can they name sources of light and sort materials into those which are good reflectors of light? - Maths link- Venn Diagram	Can children list as many sources of light as they can? Explain what a reflector of light is. What materials are used? Can children sort materials into good/bad reflectors of light? Use torches to support decision making. (Rising Stars p38-41)
Challenge 3 – How can you show that your shadow changes according to the position of the Sun?	
Can they recognise that light from the sun can be dangerous and that there are ways to protect their eyes? Can they recognise that shadows are formed when the light from a light source is blocked by a solid object? Can they describe how shadows are formed ? Can they sort materials into those that are opaque, translucent and transparent?	Discuss that the sun is a source of light. Discuss the dangers of the sun and why children should not look at it. Go out onto the playground and look for shadows? Discus how a shadow is formed? Take photos of children with their shadow. Go back outside at different times during the day and see how the shadow has moved. Explain why the shadow is moving. Make shadow puppets and collect photos- discuss how the shadow is formed by light source being blocked by solid image. (Rising Stars- p41-44) Explain the meaning of opaque, translucent and transparent.

	Children have a walk around school what can they see that's opaque, translucent and transparent. Children sort a bag of materials into opaque, translucent and transparent. Record in a table.
Investigation- How can Miss Smith make a gigantic shadow for the Iron Man?	
Can they find patterns in the way that the size of shadows change? Can they explain why their shadow changes when the light source is moved closer or further from the object? Can they make and record a prediction before testing? Can they record their observations in different ways? (Labelled diagrams, charts etc.) Can they describe what they have found using scientific words? Maths link-measures	Complete the investigation planner.
Challenge 4 – How do shiny things respond in the dark?	
Can children explain the difference between a shadow and a reflection? Can they describe what a reflection in a mirror looks like?	Children to look in mirror and describe what reflection looks like. Turn the lights off and explore what shiny things look like in the dark. Can they make a mirror? Can they name 10 uses for a mirror? (Rising stars – p46 -49)

Topic: How does your garden grow? **Year:** 3 **Term:** Spring	
Big Question	
How did that blossom become an apple?	
Overview	
- Function of different parts of plants - What different plants need to flourish - Journey of the food in a plant Life cycle of a plant	
WOW	
Look at videos and pictures of unusual plants such as Venus Flytrap http://webecoist.momtastic.com/2011/01/20/6-unusual-plants-and-monstrous-blooms/ https://www.youtube.com/watch?v=Aqj_Wrw2gJg	
Challenge 1 – What does each part of the plant do?	Suggested Activities
Can they identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers? Speaking and Listening	Give the children many different flowering plants. Can they name any of them? Can they name the parts of the plants and explain their functions. Demonstrate with celery and food colouring how water travels up the stem. Photo evidence(Rising Stars p52-54)
Challenge 2 – How can I classify a plant?	
Can they 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.	ICT- complete the simulation of plant growing on BBC website. Deliberately give the plant the wrong amount of heat, water and sunlight. Explain virtually all plants need these three things to survive. Discuss there are thousands of species of plants and their needs vary- rainforests. Watch bbc clip –plant adaptations. Give children a picture of a plant. Can they suggest where the plant might be found and why...?
Investigation – Does a plant drink?	
Can they describe the ways in which nutrients, water and oxygen are transported within plants? Can they investigate the way in which water is transported within plants? Can they make and record a prediction before testing?	Complete investigation planner Can children complete a table to record how much water is given? If the plant is given fertiliser does it grow more? (Rising Stars p55 – 57)

Can they explain what they have found out and use their measurements to say whether it helps to answer their question? **English link- report** **Maths link- Measures**	
Challenge 4 Will plants be around forever? Extended writing	
Can they explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	Watch clip http://www.bbc.co.uk/education/clips/znvfb9q The pollination game is an excellent way for children to understand how pollination occurs and the structure and function of the parts of a flower. Have fun role-playing insects and giant flowers. Bees visit the flower and take a sip of the lovely sugary drink (nectar) held inside it. This helps children see that it is the nectar that bees go to a flower for and not the pollen. Pollen attaches to them, which they then leave on another flower when they go to have another drink of nectar https://www.stem.org.uk/system/files/elibrary-resources/legacy_files_migrated/6949-introduction.pdf

<table>
<tr><td colspan="2">Topic: Forces and magnets Year: 3 Term: Summer</td></tr>
<tr><td colspan="2">Big Question</td></tr>
<tr><td colspan="2">Are you attractive enough?</td></tr>
<tr><td colspan="2">Overview</td></tr>
<tr><td colspan="2">• How magnets attract some materials
Floating and sinking</td></tr>
<tr><td colspan="2">WOW</td></tr>
<tr><td colspan="2">Explore with a number of magnets and work out which side attracts and which side repels</td></tr>
<tr><td>Challenge 1 – What is a magnet and what is its relationship to the North Pole?</td><td>Suggested Activities</td></tr>
<tr><td>Can they notice that some forces need contact between two objects, but magnetic forces can act at a distance?
Can they describe magnets as having two poles?
Can they predict whether two magnets will attract or repel each other, depending on which poles are facing?
(Rising Stars p69- 73)</td><td>Explain how like poles repel and unlike poles attract, emphasising the vocabulary. Allow children to play with magnets.
Explain the relationship to the North Pole.
Complete worksheet: Label direction of force on the four possible combinations of magnets i.e. North – North, North – South, South – South and South – North. Complete a sentence under each combination of magnets to say whether the magnets will attract or repel.
Draw a diagram of a spring in a normal state, stretched state and compressed state and label the pushes and pulls.</td></tr>
<tr><td>Challenge 2 – Which materials are magnetic?</td><td></td></tr>
<tr><td>Can they observe how magnets attract or repel each other and attract some materials and not others?
Can 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?
(Rising Stars- p74-81)</td><td>Model how to use the real magnets and the BBC activity
Children complete table with:
<table><tr><td>Object</td><td>Material</td><td>Prediction</td><td>Result</td><td>Right/Wrong</td></tr></table>1/2 class: Test materials with a real magnet to see if they are magnetic or not and classify them under headings ‘magnetic’ or ‘non-magnetic’
1/2 class: Test materials through BBC activity at http://www.bbc.co.uk/schools/scienceclips/ages/7_8/magnets_springs.shtml
Groups swap over
Discuss what we found out and how not all metals are magnetic: only iron, steel, nickel and cobalt are magnetic.
Explain the difference between a magnet and a magnetic material</td></tr>
<tr><td>Investigation- How many paperclips can a magnet attract? Extended writing</td><td></td></tr>
<tr><td>Can they observe how magnets attract objects and why some magnets pick up more than others?</td><td>Experiment: Children will be given different magnets and paper clips. They see how many paper clips each magnet can hold as a chain. The one that</td></tr>
</table>

Can they observe why some magnets pick up objects through a surface? Can they make a prediction based on their knowledge and size of magnets?	can hold the most is the strongest magnet. Complete Investigation planner.
Challenge 4 – How can we use magnets to make an exciting game?	
Can children create a game using magnets? Can they compare how they move on different surfaces?	In pairs how many paperclips can they move in a minute? Each player place the magnets under the desk then move as many magnets across to themselves as they can. Who rounded the most paperclips/sheep? (Herd the sheep) Change the surface. Can they still move as many? Why? Photo.

Topic: Animals Including Humans **Year:** 3 **Term:** Summer	
Big Question	
How can Usain Bolt move so quickly?	
Overview	
• Nutrition, linked to what we eat Skeletons and muscles	
WOW	
Check to see how far each child can run in the 9.68 secs which is the world record for 100m. Compare with Usain Bolt.	
Challenge 1 – What is a balanced diet and why is it important?	Suggested Activities:
Can they understand 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?	Discussion around what children like to eat. Have they ever heard anyone say that's not healthy or that's not a balanced diet? Discuss what this means. Share the different food groups and sort foods into the right headings. Use the link below to help Alisha sort a balanced meal for a day. http://www.foodafactoflife.org.uk/Activity.aspx?siteId=15&sectionId=64&contentId=58 Children create their own balanced plates for a days meal.
Challenge 2 – How does the food move around our body?	
Can they explain how the nutrients needed to stay alive are transported around the body?	Explain to the children that now we have found out about the different foods that we need to eat for a balanced diet, but we now need to think about how the nutrients, water & oxygen are transported within animals (including humans). What do chn think? Our blood (circulatory system) transports nutrients, water & oxygen around our bodies! Drama showing how nutrients are transported. Photo
Challenge 3 – Whose skeleton is it?	
Can they use evidence to suggest who the skeleton belonged to and how and when it may have died? Maths link- measures	Present children with a mystery to be solved when a skeleton is discovered. Children will need to collect data and make comparisons between the skeleton and people of various ages in their school. Ask children to decide what data to collect, and then measure accurately, present data and to look for patterns. Children may believe that bones are dead material, as they are often associated with dead animals. It is important to point out that bones in living animals are composed of living cells. One way of helping them understand this is to talk about when a person breaks a bone it will mend itself in time. All children should know someone who has broken a

	bone at some point
Challenge 3 – What role does the skeleton have in keeping us alive?	
Can they identify that humans and some other animals have skeletons and muscles for support, protection and movement?	Explain that we all have skeletons inside our bodies. The function of which is to protect organs like the heart, lungs and brain and to provide support, so we stand up instead of wobbling like jelly. Because our muscles connect to our bones, our skeletons also help us to walk, run, lift and play sport. Find out where children think bones are by asking them to draw bones inside an outline of the body before looking at a model skeleton and identifying the main bones. Differentiated worksheet placing named bones on to skeleton. Play Bone Bingo.
Challenge 4 – Whose Skeleton is it?	
Can they identify that humans and some other animals have skeletons and muscles for support, protection and movement?	Remind children of the functions of the human skeleton – *protection, support, movement* and revise the scientific names learnt in the previous session. Tell the children that humans share many common characteristics with other animals including skeletons. Explain that not all animals have their skeletons inside their bodies (internal or endoskeletons) – *vertebrates, e.g. armadillo & tortoises have an endoskeleton & exoskeleton & invertebrates, e.g. insects, crabs, have exoskeletons.* See http://www.bbc.co.uk/learningzone/clips/invertebrate-skeletons/2304.html. What functions do these external skeletons have? – *Protect the softer insides, give structural support to the organs & muscles & facilitate movement of limbs* (same as endoskeletons!). ICT – games http://pearl.tvb.com/lifeofmammals/challenges/flash/maker.swf - http://www.bbc.co.uk/sn/prehistoric_life/games/skeleton_jigsaw/ http://www.rigb.org/contentControl?action=displayContent&id=00000001873

Year 4					
Big Question	What happens to the food we eat?	How would we cope without electricity for one day?	How would we survive without water?	Why is the sound that One Direction make enjoyed by so many?	Which Wild Plants and Animals Thrive in your locality?
WOW	Dentist speak to children	Children to work without electricity.	Create different shapes within clay or plastercine and put water into the mould and freeze it	Listen to a range of different music: rock; classical and opera and discuss likes and dislikes.	Visit a gradin centre. Watch video clips of unusual animals,.
Science	Animals including humans.	Electricity	States of Matter	Sound	All living things
Working Scientifically					
English Link					
Maths Link					
Famous Scientist					
P4C					

Topic: Animals including humans. Year: 4 Term: Autumn 1	
Big Question	
What happens to the food we eat?**?**	
Overview	
• 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.	
WOW	
Ask a dentist to visit the school to talk to the children about caring for teeth.	
Challenge 1 – What happens to a piece of chocolate once you swallow it?	Suggested Activities
Can the children identify and name the basic parts of the human digestive system? Can they make observations about the digestive system and record findings using scientific language?	Introductory activity. Can children label the digestive system? Do they know what happens to the food they eat? Taste some chocolate then watch video of journey through digestive system. Do they want to move any of the labels they placed on the body earlier? Label differentiated diagram for books. (Rising Stars p.56).
Challenge 2- Why is the digestive system so important?	
Can children describe the functions of the organs in the digestive system? (Build on understanding from Challenge 1) Are they able to use scientific language and diagrams to explain how the digestive system works?	Show the video of the journey through the digestive system again. Discuss the different organs and their functions. Children to complete differentiated sheets on the digestive system and the function of various organs. (Rising Stars- p.56-59)
Challenge 3- Why is it important to brush our teeth each day?	
Extended writing Can children identify the simple function of different types of human teeth? Are they able to explain how the foods we eat impact on the health of our teeth? (Recognise how and why we must care for our teeth)	Show the children a photograph of a child with rotten teeth and teeth missing. Discuss with the children what the problem might be. Talk about how many sets of teeth we have in a life time and how we can look after them. Give each child a diagram of the mouth. Can they work with a partner and colour in any fillings they have or teeth that are missing. Explain the different types of teeth we have and label them on their diagram. Molar, incisor, canine. Watch dental adverts. Literacy Link- Write an advert for a new dental health product.

	(Rising Stars- p. 52-55)
Challenge 4- What happens if we don't care for our teeth? - Investigation	
Can the children make predictions and support them using appropriate scientific language? Are they able to apply their knowledge about teeth? Maths link - graph	Put chicken bones or real teeth in cola, vinegar and water, leaving for one week. Return after a week to investigate the effects. Complete investigation planner (Rising stars – p.54)
Challenge 5- Why are shark's teeth different to our teeth?	
Can the children compare the teeth of herbivores and carnivores? Do they have awareness that the teeth animals have impacts the food they eat? Can they name the teeth of various herbivores and carnivores using scientific language?	Compare and contrast shark and human teeth. Discuss why animals may have different teeth. Herbivore, carnivore, omnivore. Become detectives and sort the animal jaws- which jaw belongs to which animal. Why? (Rising Stars- p.54)
Challenge 6- How do animals survive?	
Can the children explain that living things depend on one another to survive? Can they explain what a simple food chain shows and use scientific language to do so? (E.g. Producer, predator and prey) Can they apply this knowledge to construct a simple food chain?	Show a clip of a predator hunting its prey. Discuss. Construct differentiated food chains from animals given. All must start with a producer (plant). Can the HA put themselves into a food chain? (Rising Stars- p.60-61)

Topic: Living with Electricity **Year:** 4 **Term:** Spring	
Big Question	
How could we cope without electricity for one day?	
Overview	
Identify uses of electricity Importance of safety when constructing simple circuits. Understand how to change a circuit by changing components.	
WOW	
Children to work without electricity.	
Challenge 1 – Why have we become so dependent on electricity?	**Suggested Activities**
- Can they identify common appliances that run on electricity? - Can they classify and record appliances that run as mains or battery operated? - Do they understand that electricity can be dangerous? Speaking and listening Maths link	https://www.stem.org.uk/elibrary/resource/30647 Watch clip. List appliances that require electricity. Can they add any extras? Venn diagram- sort objects into those that require electricity and those that are battery operated. (Rising Stars p66-69) Plenary – Discuss the dangers if electricity- show video clip.
Challenge 2 – How can you create an electrical circuit that has a switch?	
Can they construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzer? - Can they recognise what is needed in order to make a bulb light in a circuit? -can they 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? Can they recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit? (Rising Stars- p70-73)	Show the children a simple circuit. Can the children make their own? Can they become the apprentice electrician? Set challenges for children to explore. Who can make the bulb the brightest? How? Who can add a switch to the circuit so the bulb only lights when it is needed? Plenary Show a couple of circuits. Will the bulb light? Yes or no? Why? Explain what is a complete circuit.
Challenge 3 – How can you create an electrical circuit that has a buzzer?	
Can they construct a simple series electrical circuit, identifying and	Show the children a simple circuit. Can the children make their own?

naming its basic parts, including cells, wires, bulbs, switches and buzzer? - Can they recognise what is needed in order to make a buzzer sound in a circuit? -can they identify whether or not a buzzer will sound in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery? (Rising Stars- p70-73)	Set challenges for children to explore. Who can make the buzzer sound? How? Who can add a switch to the circuit so the buzzer works like an alarm? Only lights when it is needed. Show a couple of circuits. Will they work?. Extension- solve the problem with the circuits which are not working.
Challenge 4- What is a conductor? Investigation	
Can they recognise some common conductors and insulators, and associate metals with being good conductors? Can they create a circuit to create a device? Can they plan and carry out an investigation by controlling variables fairly and accurately? Can they make predictions? English link	Discuss what a conductor is and what an insulator is? Look at examples. https://www.sigmascience.co.uk/resources/y4-conductor-or-insulator Children to test metals to see if they are conductors. Complete Investigation Planner. Mr Burnett has run out of wire. He has been asked by Mr Mclean to put up an outdoor light outside the y4 classrooms. He has been looking around for other things to use instead. Using the everyday materials on your desk can you find which will conduct electricity and which will resist?

Topic: States of Matter **Year:** 4 **Term:** Spring 2	
Big Question	
How would we survive without water?	
Overview	
• Solids, Liquids and Gases • Heating and cooling (no baking, etc.) Evaporation and condensation	
WOW	
Create different shapes within clay or plastercine and put water into the mould and freeze it.	
Challenge 1 – How can you classify solids, liquids and gases?	Suggested Activities
Can they compare and group materials together, according to whether they are solids, liquids or gases?	How can water be a solid, liquid and gas? Can they compare materials? Have three identical balloons filled with ice, water and air to observe water as a solid, liquid and gas. This would lead into to a discussion about the properties of each state. When grouping materials into solids, liquids and gases it is a good idea to have items which are more difficult to place- e.g. toothpaste, jelly and foam. These items will promote discussion and really get children thinking about the properties of materials. When comparing and grouping materials include some materials such as a sand, flour, sugar which will provoke discussion. They may be harder to place as they behave like a liquid but are in fact very small pieces of a solid. Try including a sponge and see were children place it. It is a solid with air trapped inside its many holes Differentiated sheet. Can they group them into solids, liquids and gases? (Rising Stars p38-41)
Challenge 2 – Which other materials change when they are heated or cooled?	
Can they observe that some materials change state when they are heated or cooled, and measure or research the temperature at which	Can they make careful observations about how matter changes from solid to liquid to gas? **Snowman – Raymond Briggs**

this happens in degrees Celsius? (°C)? Can they understand and begin to explain reversible and irreversible changes? Speaking and listening	**Children to make the snowman - Can children describe the life cycle of the snowman?** Can they observe the change in state when a material is heated and cooled? Can they recognise these processes called, freezing, boiling and melting take place? Can they measure temperature (Celsius) and how does temperature vary during the day and across the world? (Rising Stars- p42-45).Reversible and irreversible (make chocolate covered rice crispy cakes) HTTPS://WWW.STEM.ORG.UK/ELIBRARY/RESOURCE/34080 This short clip helps children see that chocolate changes from a solid to a liquid when heated and back to a solid when cooled. Children will love seeing how chocolates are made and how the science of changing state has applications in the real world. Making crispy cakes or even chocolates if you are more adventurous is a great activity, which children will enjoy whilst helping them learn more about changing state.
Investigation- How can Mr McLean clear the ice from the playground quickly?	
Can they observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius? (°C) Can they set up a simple fair test to make comparisons? Can they use their findings to draw a simple conclusion? Can they make predictions? Maths link English link	Complete Investigation Planner How could Mr Mclean clear the ice from the playground quickly? Children to plan predict and carry out experiment to see what will melt the ice. Can they explain why the coffee granules didn't melt the ice as fast as the salt? (Rising Stars- p74-77)
Challenge 3- Where do puddles on the playground disappear to? Why do windows sometimes steam up?	
Can they identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature?	Evaporation and condensation are difficult concepts for children. Many will think that water in puddles disappears rather than that the water has evaporated to form a vapour. Heat vinegar . Children will be able to smell the vinegar and lemon juice as the liquid evaporates and the vapour travels around the room. Though invisible it can be

Maths link	smelt and therefore will help children to understand that evaporation has taken place. Can they recognise when evaporation and condensation take place? Can they explore what happens to a material that is evaporating or condensing? Can they identify the part played by evaporation and condensation in the water cycle? Report/Diagram of water cycle. Photo of class investigations of the changes of state.

Topic: Sound **Year:** 4 **Term:** Summer 1	
Big Question	
Why is the sound that 'One Direction' makes is enjoyed by so many?	
Overview	
Sources Vibration Loud and faint Pitch Volume	
WOW	
Listen to a range of different music: rock; classical and opera and discuss likes and dislikes.	
Challenge 1 – What caused that 'racket'?	Suggested Activities
Can they observe and name a variety of sources of sound and suggest how the sound is made? (Rising Stars p 6-9)	Find out what children already know about sound. Listen carefully to sounds in the environment. Go on a sound meander around school. Children try a circus of activities to describe sounds, suggest how musical instruments make sounds, Why do animals prick up their ears and why some have very large ears? Photo
Challenge 2 – How do your ears work? Extended writing	
Can they notice that we hear with our ears? Can they begin to recognise how sounds are made? (Vibrations Do they begin to recognise that vibrations from sounds travel through a medium to the ear?	Briefly examine the structure of the ear & how vibrations are heard as sounds. Discuss echoes & how bats or dolphins use echolocation. Talk about deafness & introduce children to British Sign Language. Explain that all sounds are made by objects vibrating and that sound can travel through gases, liquids and solids. Activities? Carry out some short investigations about vibrations (rice on a drum) and make a string telephone with a partner. Label a diagram of the ear and explain how we hear.
Challenge 3- What do we mean by volume of sound?	
Can they find patterns between the volume of sound and the strength of the vibrations that produced it? Can they identify the similarities and differences between sounds	Children have a play with the different musical instruments. Can they play a soft sound and a loud sound? How did they increase the volume? Discuss how the volume is increased. Look again at the rice

made in different ways?	on the drum. Can they explain what happens when the drum is played quietly and then loudly? Photo with sentence to explain findings.
Investigation- Does **sound have the same intensity the further away you go from the source?**	
Do they recognise that sounds get fainter as the distance from the sound source increases?	Complete Investigation planner. Children to work in groups, Mr McLean would like to play music at the next school sports day. He wants to know how far away music, from an I pad, can be heard? Will he need a microphone to speak to the children? How far can a voice be heard?
Challenge 4- What **do we mean by the pitch and volume of the sound?**	
Can they find patterns between the pitch of a sound and features of the object that produced it	Can they explore different ways of making sounds with different pitches? Can they find patterns between the pitch of a sound and the features of the object that produced it? (Length of string etc). Can they make their own junk band and do their instruments play at different pitches. (fill more water in some glass bottles, use different size tubs as drums,, use different materials) Can they use instruments designed in class to play a recognisable tune? (Could you be the next x factor star?)

Big Question	
Which wild animals and plants thrive in your locality?	
Overview	
• Identify and name a variety of living things (plants and animals) in the local and wider environment Recognise that environments can change and can pose dangers	
WOW	
Visit a garden centre.	
Challenge 1 – What makes a bird a bird?	**Suggested Activities**
Can they recognise that living things can be grouped in a variety of ways?	http://www.bbc.co.uk/education/clips/zvgygk7 A look at how different animals move - birds, mammals and insects. Some birds fly whereas others do not, so how do we know when a bird is a bird? This clip shows a lady who works at an ostrich farm. She shows us the features of the ostrich, explaining why it looks the way it does, and the purpose of each feature (eyes on the side of its head, large feathers, and bare patches of skin). It is explained why the ostrich is definitely a bird, despite the fact it cannot fly How could children in class be grouped? Worksheet?
Challenge 2- What mini beasts are in your locality?	
Can they explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment?	Begin by revising how living things can be grouped in a variety of ways. Give children a quick activity to group a number of picture cards. Ask them to explain why they chose to group them that way. Go on a mini beast hunt out in the playground/ eco garden. Collect insects and compare them against a classification key. Could any of them be in more than one group? Photo evidence- Resource pack
Challenge 3- What plants and flowers are in your locality?	
Can they explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment?	Begin by revising how living things can be grouped in a variety of ways. Give children a quick activity to group a number of plant/ picture cards. Ask them to explain why they chose to group them that way. Go on a plant/flower/tree hunt out in the playground/ eco garden. Take photos and try to classify them. http://www-saps.plantsci.cam.ac.uk/trees/index.htm

	Could any of them be in more than one group? Photo evidence- Resource pack Extension – Could they create their own classification key?
Challenge 4- What is a Dodo?	
Do they recognise that environments can change and that this can sometimes pose dangers to living things?	Discuss what the Dodo was? Why did it become extinct? Look at other endangered species such as the Dolphin, Gray Wolf, Jaguar, Polar Bear and Sea Otter. Children could further research the animals and look at threats to their habitats. Extension Children often think that there are no new species and that we know all the animals on Earth. Explain to them that new species are still being discovered and could lead on to researching other newly discovered species.
Challenge 5- *How do we know that woodlice prefer damp conditions or How can we find out what snails prefer to eat?*	
Can they pose questions about organisms and the habitat in which they live and make predictions? Can they decide what evidence to collect and to design a fair test? Can make reliable observations of organisms?	Complete the Investigation planner.

Year 5					
Big Question	Will we ever send another human to the moon?	Do all plants and animals start life as an egg?	Could you be the next CSI investigator?	How different will you be when you are as old as your grandparents?	Can you feel the Force?
WOW	Set up a telescope and allow children to explore.	Listen to talk from Jay's encounters or watch U tube clips of unusual animals and discuss.	Look at number of materials which have been burnt. Can they tell what they were?	Use Photographic app that shows what they will look like in 20 years time.	Run up and down a hill? Which is easier?
Science	Earth and space	Living things and their habitats.	Properties and changes of materials.	Animals including humans.	Forces
Working Scientifically					
English Link					
Maths Link					
Famous Scientist					
P4C					

Topic: Earth, Space and Magnetism **Year:** 5 **Term:** Autumn	
Big Question	
Will we ever send another human to the moon?	
Overview	
To describe the movement of the Earth, and other planets, relative to the Sun in the solar system To describe the movement of the Moon relative to the Earth To describe the Sun, Earth and Moon as approximately spherical bodies To use the idea of the Earth's rotation to explain day and night, and the apparent movement of the sun across the sky	
WOW	
Wow :Use a telescope - Explore famous astronauts- you tube (Tim Peake/ Neil Armstrong)	
Challenge 1 – What can we learn about the solar system and the other planets in it?	
Can they explain how planets in our solar system are organised? (Rising stars –p6-9)	Share with the children a couple of u tube clips. Explaining the solar system. Learn the song. I am the sun which gives the properties of each planet. Children create own pneumonic for the order of the planets.
Challenge 2 - How can we appreciate the distances between and the sizes of the Sun, Earth and Moon?	
Can they decide which round objects best represent the sun, moon and earth and say why? Can they position the objects away from each other to appreciate the distance between the sun, moon and earth? Can they begin to understand how we know this? Maths Link	Discuss the shape of the sun, moon and Earth. Discuss how they compare in size. Show the children a number of spherical objects and ask them which would best represent each of them. (pea, marble, beach ball, tennis ball etc) Go out onto the playground and distance the sun, moon and earth apart. Photo.
Challenge 3 – Can we explain the movement of the moon in relation to the earth?	
Can they describe the movement of the moon relative to the earth? Can they use simple models to explain scientific ideas? (Rising stars – 14-16)	BBC revise wise game. Use a torch and two round objects and allow the children to mimic the movement of the moon and earth. Ask them to use the correct scientific vocabulary and explain as they act out the movement (anti clockwise). Discuss how long it takes for one complete rotation. Photo.
Challenge 4 – Why do we have day and Night?	
Can they describe the movement of the Earth and Moon relative to	Look at a u tube clip explaining this. Ask children to use the globe and

the Sun in our Solar System? Can they identify scientific evidence that has been used to support a theory? Can they use the idea of the Earth's rotation to explain day and night? (Rising stars – pg56-59	torch and round objects to physically explain to one another why we have day and night. Use children to carry out a physical demonstration. Differentiated worksheet with photo.
Investigation- How can you get the old man safely back from the moon? (John Lewis Advert	
Can they plan a fair test? Can they extend investigation and test results? Can they make detailed observations? Can they make a sensible conclusion?	Show children the John Lewis Advert and Tim Peake's safe arrival back to earth. How can they get the old man back safely? They must design a capsule that will protect an eggnaut. Complete Investigation Planner

Topic: All living things **Year:** 5 **Term:** Spring	
Big Question	
Do all plants and animals start life as an egg?	
Overview	
Life cycles of plants and animals (explain the differences in the life cycles of a mammal, an amphibian, an insect and a bird) Birth, growth, development, and reproduction (describe the life process of reproduction in some plants and animals).	
WOW	
Video clips of predators hunting their prey. Discussion	
Challenge 1 – Do all animals start life as an egg?	
Do they understand what is involved in a life cycle and can they give examples? Can they explain the differences in the life cycles of a mammal, an amphibian, an insect and a bird?	http://www.bbc.co.uk/education/clips/zhx76sg A lifecycle is the different stages a plant or animal goes through during its life. This presentation is a great way of showing children the distinct stages of lifecycles with the summary table showing the similarities and differences between mammals, amphibians, reptiles and flowering plants. The table could even be extended to include insects and birds so they might also be compared. Playing the Turtle lifecycle game helps children see distinct stages of lifecycles and how they may be affected by environmental factors. (stem)
Investigation – How do plants live and grow?	
Can they make a prediction before testing? Can they take measurements and record? (Rising Stars p40-43 p52-53) Maths link English link	Letter from Peter Barratts asking for help. The pansies keep dying and employee who works there cannot figure out why? What factors might be causing the plant to die? Children to try removing all the leaves, not giving water, not giving sunlight etc. Record results on investigation planner.
Challenge 2- How do plants reproduce?	
Can they describe the life process of reproduction in some plants?	Dissecting a flower is a great way of finding out about sexual reproduction in plants and a practical activity children really enjoy.

	Lilies, tulips and daffodils make good flowers to dissect. Ask children to find the different parts, label them and find out about their role in reproduction. Take a look at pollination, fertilization and seed dispersal. Identify the difference between sexual and asexual reproduction in plants.
Challenge 3- How do humans reproduce?	
Can they explain changes as humans develop to old age? Speaking and listening	Use photo shop and age the children to 2050. What do they notice? What can they explain about the stages a human goes through? What do they know happens in each of the stages? https://www.stem.org.uk/elibrary/resource/36134 Nurse to cover reproduction also.

Topic: Properties and changes of materials **Year:** 5 **Term:** Spring 2	
Big Question	
Could you be the next CSI investigator?	
Overview	
Dissolving Evaporating Filtering Reversible and Irreversible changes	
WOW	
Look at a number of different materials, that have been burnt, and examine the remains and see whether the original item can be identified.	
Challenge 1 – Why that material?	
Can they compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets? Can they give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic? Maths link	Put several objects made of different materials on each table in a bag. Ask different children to try and identify what they are made of by feeling them. Get them to try and describe how they knew (the metal coin was cold and smooth, the sponge was soft and rough and I could squeeze it, etc.). Discuss why children think things were made with specific materials. What is there everyday use? Discuss with the children the term 'property'. Brainstorm the different properties of materials that could be used for grouping and classifying. Take children's ideas on flipchart. Introduce/reintroduce children to scientific concepts: permeability, absorbency, hardness, solubility, transparency, conductivity (electrical & thermal) and response to magnets. For each property ask children to identify a way of testing whether materials have the property or not. **Plenary** Children to share their findings. Which materials are similar? Which materials are very different?
Challenge 2- What is a solution?	
Do they know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution?	Revise the use of sieves to separate materials. Place a bowl of dried pasta shapes in front of the children, if rice was added how could they be separated? – *Sieve they will say!* What if sand was now added? – *Use a sieve with smaller holes they will say!* Ask a child to come to the

	front and demonstrate the use of two different sized sieves to separate the pasta, rice and sand. What if water was now added? Add water to the rice, pasta and sand mixture and then repeat the sieving process using different sieves to first remove the pasta then the rice. Now look at the sand and water mixture. What do the children notice? *When shaken the sand is carried by the water, when left to stand the sand starts to settle*. Tell the children that sand is insoluble which means that it doesn't dissolve when mixed with water. Tell them that if a material is soluble in liquid a solution will be created, the material and the liquid become one new material e.g. orange squash! If it is insoluble a mixture of the two materials is created. Have a go at BBC interactive experiment on solutions and mixtures http://www.bbc.co.uk/bitesize/ks2/science/materials/reversible_irreversible_changes/play/ Return to the sand and water jar; is it a mixture or a solution? How can we remove the sand? Tell the children that you need a sieve with very small holes to remove tiny grains of sand! Pass some filter papers amongst the children. What do they notice when they look at them closely using a magnifying glass? – *There are very small spaces between the fibres.* Model how to use a funnel and a carefully folded filter paper to separate the sand and water mixture. **Plenary** Ancient Egyptians used to collect water from the Nile in large jars. They were left to stand to allow mud, sand & silt to settle at the bottom. Tipping the jar carefully allowed the solid (silt) and water to be separated, so that the water could be used. Demonstrate this with a jar of muddy water which has been settling since the start of the session. This process is called decanting.
Challenge 3 – What does reversible mean?	
Can they demonstrate that dissolving, mixing and changes of state are reversible changes? Can they explain that some changes result in the formation of new	http://www.collaborativelearning.org/reversiblechange.pdf Show Reversible and Irreversible Changes smart notebook which has a

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?	list of possible reversible and irreversible changes. Children have to complete the Venn diagram on and place them into either reversible, irreversible, or 'not sure'. Use the starter to start a discussion of what are the differences between reversible and irreversible reactions. What makes some reactions irreversible and others reversible? You can ask them again if dissolving is reversible or irreversible. It is important to emphasise at the start the difference between reversible and irreversible change. In a reversible change you are always left with the same substances, they might just have been separated. In an irreversible change you will end up with new substances, you no longer have the original substances. No matter what you do you cannot get them back! Use the following experiments to demonstrate this and how to generally spot an irreversible change: **Self-inflating balloon**: Use an empty glass milk bottle and fill the bottom with vinegar. Put a few tea spoons of bicarbonate soda in to a balloon then stretch the balloon over the top of the bottle. Ask the children to predict what they think is going to happen. Lift the balloon up and let the bicarb fall in. Make the students aware of what is happening - gas is being produced (effervescing). This is a sign that an irreversible change has occurred. You cannot get back the vinegar or bicarbonate of soda. **Cooking an egg:** this should be done at the front using a Bunsen burner or Campingaz stove. Get the students to observe the changes. In general a colour change indicates an irreversible change. **Glowsticks!**: Glowsticks are another great irreversible change, you can normally find tubes of 20 at poundland. Give the students a chance to play with them, but get them to note that light is being produced, this is normally a good indicator that an irreversible change has occured. Ask children what are some good indicators of irreversible changes: gas, colour change, light – what would you feel if I burned wood? Heat. They need to be aware that these signs are not always true, just a

	general rule. To emphasise this pass around a reusable hand warmer. It gets hot on its own but it is reusable. In fact it is hard to tell if something is R/I without looking at its chemical structure and it is a big grey area at this stage of science. **Plenary** Recap on the 4 ways that you can typically identify an irreversible change. Can the children come up with anymore that have not been talked about? Maybe see if each student can come up with an individual change.
Challenge 4- Which materials dissolve and evaporate and why can this sometimes be an important quality in those materials?	
Can they use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating? Can they identify some factors that affect dissolving? Can they describe ways to separate mixtures? (Rising Stars p26-31)	
Investigation – What's wrong with my soap/bath bomb?	
Can they explain (in simple terms) a scientific idea and what evidence supports it? Can they record their findings? Maths link	Complete Investigation Planner Letter of complaint from a customer asking why each time she places her soap in the bath it disappears. Can they investigate what is happening? Why it is happening and how long it takes to disappear?

Topic: Animals Including Humans **Year:** 5 **Term:** Summer 1	
Big Question	
How different will you be when you are as old as your grandparents?	
Overview	
Changes as humans develop from birth to old age	
WOW	
Use the photographic app that shows what they will look like in 20 years time and talk about what their feelings are, etc.	
Challenges 1 – What can you now do that you couldn't do when you were a baby?	
Can they describe changes as humans develop from birth to old age?	Discuss what they can remember from learning about life cycles. What are the stages in the life cycle for human? http://www.bbc.co.uk/bitesize/ks2/science/living_things/human_life_cycles/read/1/ Discuss what happens at each stage. Create and label a timeline of the stages.
Challenge 2- What are the important things we should do to keep fit and healthy?	
Can they suggest what a healthy and balanced diet might look like and what regular exercise could be? **Extended writing**	In order for us to give ourselves the best chances of growing old, there are certain things we can do to help. Discuss with the children what these might be? What does it mean to be fit and healthy? How could we do this? Create a poster that could be displayed in the doctors advising patients what they should eat for a healthy balanced diet and what regular exercise might include.
Challenge 3 Do we all have the same X Factor?	
Can they begin to suggest why they are not identical to their siblings?	Ask children to bring in photos of their relatives. Start with a fun 'Who is who?' game. Give the children photos of celebrity families but mix them up. Can they sort them into the correct families? How did they do it? Are they all right? Why do some families look similar and why do others not? Discuss briefly our genetics. Photo
Challenge 4 - What do we understand by the term 'puberty'?	
Can they look at the changes that happen as we get older, including puberty/adolescence?	The school nurse may cover this lesson. A letter may need to be sent out to parents. Discuss what the term puberty means. What do the children think will happen at this

	stage in their lives, Discuss the changes they might see happen to them as they reach puberty. Label the body describing changes that will happen.
Challenge 4- Investigation- What is it like getting old?	
Can they investigate what happens to our mobility as we get older?	Complete Investigation planner. Children to predict what might happen to the way a person carries out a task the older they get? Eg, the number of steps they can walk in a minute. Carry out a fair test and conclude scientifically why the findings are as they are.

Topic: Forces **Year:** 5 **Term:** Summer 2	
Big Question	
Can you feel the force?	
Overview	
Gravity Air Resistance Water Resistance Friction Gears, Pulleys, Leavers and Springs	
WOW	
Find a hill to run up and down and consider the question, 'Why does it take longer to run up rather than down a hill?'	
Challenge 1 – What is gravity?	
Can they explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object?	Ask children to think about what a 'force' is and to try to describe a force. Ask them to think, pair, share as many words to do with forces as they can. Show children videos of: some astronauts in zero gravity conditions at http://www.bbc.co.uk/learningzone/clips/weightlessness-in-space/1600.html (if the link does not work, Google 'BBC class clips Weightlessness in space') a zero gravity flight at http://www.youtube.com/watch?v=PosRfeUoPHM (if link does not work, Google 'Brian Cox Experiences Zero Gravity video') – watch from 1 min 36 secs to 2 mins 6 secs (when zero gravity occurs on the flight) Ask the children why they think the people in the plane and the space shuttle were able to float in the air and why we cannot do this in our classroom and why if I drop a book, the book falls to the floor instead of floating around? Explain the following historical explanations that people had before Newton began to explain gravity correctly in 1666: Differentiated worksheet.
Investigation – ***Does the size of a parachute affect how effective it is?***	
Can they identify the effects of air resistance, water resistance and friction that act between moving surfaces? Can they decide how to test an idea, explaining how to make a	Complete investigation planner. Ask children why things fall back to Earth when we drop them or when they fall e.g. why does someone who jumps out of a plane fall back to

simple test fair? Can they identify patterns in results and use these to draw conclusions? Can they explain results in terms of their scientific knowledge?	Earth? Revise key points about gravity: gravity prevents us floating off into space and causes objects to return to Earth when they fall or are dropped larger objects have a greater gravitational force, and we only notice the effect of the gravitational force of stars, planets and moons gravity explains why the planets orbit the sun, why the moon orbits the Earth and why the seas and the oceans have tides how mass always stays the same and is a measure of the amount of matter an object contains, whereas weight is a measure of the pull of gravity on an object's mass Ask the children what people can do to slow down how quickly they fall to Earth when they jump out of a plane (wear a parachute) Ask them to try to explain why a parachute slows down the fall of a sky-diver Watch the video on air resistance and parachutes at http://www.bbc.co.uk/learningzone/clips/parachutes-and-air-resistance/2183.html (if link does not work, Google 'BBC class clips parachutes and air resistance')
Challenge 2- What is friction?	
Can they observe a variety of forces that slow things down? Can they set up, carry out and make sense of investigations?	What is friction? Ask children to look at the soles of their shoes. What do they notice? Why aren't the soles made of plastic? What other examples of friction can they think of? Is it useful? Allow children to investigate different ways they could slow down a toy car. Allow them to change the surface to see which material works best. Photo.
Challenge 3 –Will a car always move faster than a boat?	
Do they recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect?	Discuss how children can get their bike to go faster or slow down and stop. Look at a diagram of a bike. Discuss how the gears and brakes work. Can they explain how levers, pulleys, spring and gears transfer force and motion? Can they observe a variety of forces that slow things down? Allow children to investigate different ways they could speed up a toy car.

Year 6					
Big Question	What would a journey through your body be like?	Have we always looked like this?	Could you be the next Nintendo apprentice?	How can you light up your life?	Could Spiderman really exist?
WOW	Children to dissect a heart?	Watch a clip of Planet of the Apes. How realistic could this be?	Play a range of board games that require batteries and evaluate them.	Spend a small period of time being blind folded and see how successful you are at doing everyday things you take for granted?	Watch a Spiderman clip. Consider the attributes that Spiderman has and give realistic thought to whether these could exist in any creature we know.
Science	Animals including humans.	Evolution	Electricity	Light	Living things and their habitats.
Working Scientifically					
English Link					
Maths Link					
P4C					
Famous Scientist	**Medical pioneers- Harvey and Galen**	Charles Darwin			Aristotle nature ladder

Topic: Staying Alive **Year:** 6 **Term:** Autumn 1	
Big Question	
What would a journey through your body be like?	
Overview	
• Circulatory system • Heart and blood vessels • Diet, exercise and drugs Transportation of nutrients	
WOW	
Children to dissect a heart.	
Challenge 1 – Can they identify and explain the functions of the organs in the circulatory system?	
Can they label the heart? Can they label the circulatory system?	Play the circulation game. A common misconception about circulation is that there is a 'single loop', with the arteries carrying blood from the heart to the body (where oxygen is deposited and waste collected) and the veins carry blood from the body to the heart (where it is cleaned and re-oxygenated). A great way of demonstrating circulation is to carry out a whole class simulation with children. Children represent red blood cells as they move around a classroom-sized simulation of the human body simulating the dual circulation of blood. They may give oxygen to the organs then go back to the right side of the heart and flow to the lungs to get more oxygen. Then they flow to the left side of the heart to be pumped around the body. https://35058.stem.org.uk/humanbody/index.html - simulation. Children to dissect a heart. £4 Bolam's butchers, Take photos and label the heart. -
Challenge 2: Can they identify and explain the functions of the organs in the gaseous exchange system?	
Label gaseous exchange system. (lungs)	Children to dissect lung. Take photo and label it. https://35058.stem.org.uk/humanbody/index.html - simulation

Challenge 3- Can they make a diagram of the human body?	
Can children explain how part of the body work and depend on each other? Can they describe the ways in which nutrients and water are transported within animals, including humans?	An interactive simulation, 'Inside the Human Body', explores each of the systems demonstrating their structure and function. The skeleton-muscular system: Through a series of activities children identify the key features of the skeleton and investigate the functions of the skeletal and the muscular system. The Digestive System: Children identify different parts of the digestive system and find out about the functions they perform in the process of digestion. https://35058.stem.org.uk/humanbody/index.html
Challenge 4- Do we need to look after our body?	
Can they recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function?	http://www.bbc.co.uk/education/clips/z26w2hv Watch the keeping healthy clip. What do the children already know about how to keep healthy? How can we look after our bodies (eating, exercising, don't drink or take drugs). Can the children create a poster warning others of the effects of drink and drugs? How do they affect the body? Discuss what a healthy lifestyle is and what that entails.
Challenge 5 – What happens to our heart rate after exercise?	
Can they explain why heart rate increases after exercise?	Complete Investigation planner

Topic: Evolution and Inheritance **Year:** 6 **Term:** Spring	
Big Question	
Have we always looked like this?	
Overview	
Fossils tell us about the past Off spring Darwin	
WOW	
Watch an extract of Planet of the Apes and consider how realistic it could be?	
Challenge 1 – Why do you not usually look exactly like your mum or dad?	
Can they recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents? Speaking and Listening	Can they observe differences in appearance? Show photos of celebrity families or particular families within school. How are the relatives similar- different? Can they explain why we look like our parents but are not identical? Discuss genetics.
Challenge 2: What do fossils tell us about 'how things have changed'?	
Can they recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago?	Research paleontologists such as Mary Anning.
Challenge 3- Who was Charles Darwin and what is evolution?	
Can they identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution?	Show an image of Charles Darwin- explain who he is. Explain his theory of evolution. Then show video clip. https://www.stem.org.uk/elibrary/collection/4220 Evolution video of horse and whale. Can they recognise that if living things don't adapt, change and evolve, they could die? Describe why offspring are similar but not identical Explain what the process of natural selection is. (Rising Stars- p39 - 43)

	Evidence of Evolution Picture Pack- this link provides images of how species have evolved. Can children begin to explain why they have evolved in this way?
Investigation- Adaptation _ Which beak is best?	
Can they identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution? Can they predict which beak is best suited to eating which food? Can they use test results to make predictions to set up further comparative and fair tests? Can they using simple models to describe scientific ideas? Can they report and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other? English link	Different kinds of birds eat different kinds of foods, because they are specialised. Their beaks have adapted to be the best shape for picking up the food they like best and is most available to them. Complete investigation planner .This experiment asks children to predict which 'beak' will be best for each 'food' type and test it simulating beak type with chopsticks, spoons, tweezers etc. This is a great way of showing children how beak shape is important for a species as if it had a beak which was incompatible with it's food source then it would eventually die out. It is important to point out that adaptation is a very gradual process which happens within a population rather than to an individual bird. https://www.stem.org.uk/elibrary/resource/33665 This further activity looks at the way in which variation in beak shape is related to the available food sources within an environment. Children simulate bird feeding by using a 'beak' to collect food and place it into a stomach. There are four different beak shapes and a range of different food types to choose from.
Challenge 4 How do animals survive in extreme conditions?	
Can they identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution**?** English link Speaking and listening	Adaptation. (Research project) .Can you find out how animals who: live in the cold; around the equator; under the ground: and, in trees: are specifically adapted to live and survive there? Or Children to look at a selection of plants (Cacti and small trees, succulents, triffids and alpines) Can they say which environment they belong to? Can they suggest how they may have adapted to their environments? Can be presented as report/powerpoint.

To Topic: Electricity **Year:** 6 **Term:** Spring 2	
Big Question	
• **Could you be the next Nintendo apprentice?**	
Overview	
Brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches Use recognised symbols when representing a simple circuit in a diagram	
WOW	
Look at a range of board games that require batteries and evaluate them.	
Challenge 1 – Can you create a circuit that has at least one of these features: switch; buzzer; motor?	
Can they compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches? Speaking and listening link	http://www.hyperstaffs.info/science/work/child/circuits.swf This interactive activity could be used by small groups or pairs of children as a different way of comparing how components function within circuits. The simulation looks at how changing the thickness of a wire affects the brightness of a bulb, how changing the number of batteries affects the sound of a buzzer and how changing the number of light bulbs affects their brightness. Children could try building the circuits from the simulation, observing the effects and giving reasons why.
Challenge 2: What do you understand about: cells and volts and how it impacts on how electrical products work?	
Can they associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit? Maths link	Can they sort a variety of electrical appliances/photos according to volts (venn diagram)? Explain what a volt is. Can they explain the effect of changing the voltage of a battery? Can they create a simple circuit to test this? Can they compare and give reasons for variation in how components function, including bulb

	brightness, buzzer volume and on/off position of switches? Can they explain the danger of short circuits? Can they explain what a fuse is? Can they suggest what might happen to everyday appliances if the voltage increased or decreased? Discuss items in news- Segway boards setting on fire etc
Challenge 3- Can you make a circuit using symbols?	
Can they use recognised symbols when representing a simple circuit in a diagram?	Introduce the children to a circuit diagram. Can they suggest what each symbol might represent? Can they make the circuit? Can they create their own circuit and draw it using the correct symbols? Ask your partner to use your drawing to make the circuit. Is it a compete circuit? What's wrong with my circuit diagram? Become an apprentice electrician and fix the circuit. https://www.stem.org.uk/elibrary/resource/26916
Investigation- Mr Mclean has hired you to make a new alarm for our school. It needs to sound when the door/window has been opened. It must be loud enough for people to hear.	
Can they associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit? Can they use recognised symbols when representing a simple circuit in a diagram? Can they plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary? English link	Use investigation template. How can we create an alarm that will sound loudly when the circuit is broken? Draw circuit created and conclude findings. Discuss- is there anything we would do differently next time?

Topic: Light **Year:** 6 **Term:** Summer 1	
Big Question	
How can you light up your life?	
Overview	
How light travels The eye Shadows	
WOW	
Spend time in a blacked out room and consider how the eyes adapt and why it is difficult to see anything. Spend a small period of time being blind folded and see how successful you are at doing everyday things you take for granted?	
Challenge 1 – How do your eyes work?	**Suggested Activities**
Can they label a diagram of the eye?	In pairs look in each other's eyes. Close eyes and open them – observe what happens to the iris. Talk about letting light in/cats eyes. Look at the tear duct, the cornea and the function of the eyelid, lashes and brow. Talk about the inner workings of the eyes. The children draw and label a diagram. Provide SEN children with key vocabulary.
Challenge 2: How do you see?	
Can they recognise that light appears in straight lines? Can they 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? Can they 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?	Identify and sort different sources of light. Can children remember which are reflectors? Write a definition together of what a source of light is. Discuss how light travels in straight lines – look at pictures of light coming from lampposts or car headlights or shafts of light breaking through clouds. Look at how we see objects because they give out or reflect light into the eye. Draw a diagram of the eye and explain how we see.
Challenge 3- Where's my shadow?	
Can they use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them?	Use children and objects as examples. Pupils predict where the shadow will be when I turn the torch on. What will the shadow look like? Why? Revise that shadows are formed when the source of light is blocked. Pupils complete worksheets putting in where they think the source of light would be, by observing where the shadow is. They experiment with moving objects nearer and further from the source of light. They come up with a statement (The nearer the object is to the

	source of light the bigger the shadow). They draw/take photos to demonstrate this (One with object close and one with it far away)
Investigation- How can you set up an experiment to show that light travels in straight lines?	
Can they prove that light appears in straight lines?	Complete investigation planner

Topic: All Living Things **Year:** 6 **Term:** Summer2	
Big Question	
Could Spiderman Really Exist?	
Overview	
• Classification of living things • Vertebrates and invertebrates Classifying reptiles, amphibians, mammals, insects, etc	
WOW	
Consider the attributes that Spiderman has and give realistic thought to whether these could exist in any creature we know.	
Challenge 1 – Which group do you belong to?	
Can they create your own classification system that will take account of all plants and animals within the school grounds? Can they give reasons for classifying plants and animals based on specific characteristics?	Group children in the class. Don't tell them why they are in those groups. Can they suggest why? Make the grouping more complex and create a shared key. Girl/Boy. Blonde hair/Brown hair. Explain that this is called classification and how most plants and animals can be grouped. Go on a meander around school. Take photos of plants and create their own classification system. Compare with real classification system.
Challenge 2- What bugs are living near you?	
Can they describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals?	Collect insects from out in the eco garden. Look at them closely using a microscope. Can the children use a classification key to name them? Photo
Challenge 3 – Why do some plants and animals survive and others die?	
Can you discover the special attributes that some animals and plants have to help them survive?	Link this to evolution. Look at how species have developed over time. How do polar bears survive in the cold? Camels in the heat etc
Research- Which species is endangered? Why?	
Can they explain why species become endangered?	What does extinct mean? Can they think of animals that are now extinct? Why did this happen? Which other plants or animals might be endangered? Focus on one and carry out further research. (polar bear)