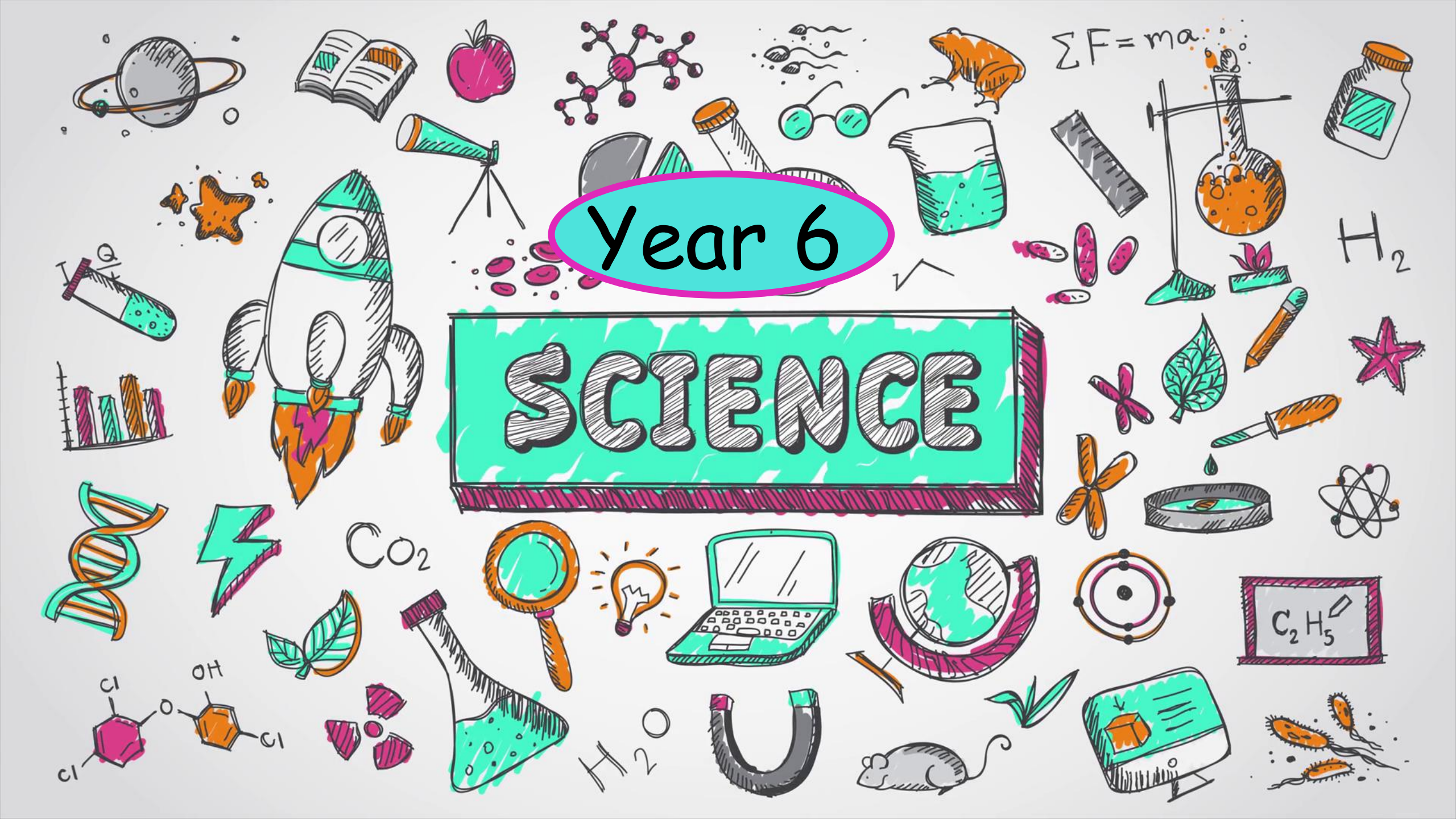

Year 6
SCIENCE

- Opportunities for Maths

- Recording measurements from observations.
- Creating graphs that show the data they have collected from investigations, enquiries or observations.
- Within each topic there is a short explanation about how you can use Maths in your lessons.

- Opportunities for English

- What I know, what to know and know now grids.
- Writing hypothesis and predictions.
- Oral/ written evaluations of experiments.

Recording information in books

There are KS2 example sheets to use when conducting an observation they will print in an A3 size so you can create a class version before the children write on their own sheet. This will be useful the first few times the children see these sheets.

Our aim is to hopefully get the children to know the process of these sheets well enough for them to create their own graphs, tables, plans and predictions etc.

Including cross-curricular links is essential in Science and it is important that any investigations/observations are recorded in the children's books. After an 'activity lesson' we should be asking the children a question about what they have learnt so they can make predictions using the knowledge they have gained from that lesson.

When children are recording their findings they should be doing so using their mathematical knowledge to record and present their data in tables, graphs and charts.

Marking should be light touch with Reasoning questions after 'activity lessons', these can be printed for ease.

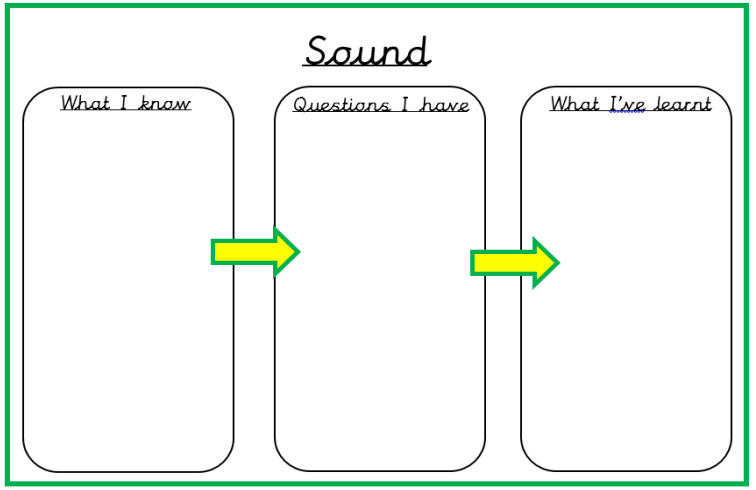
How we assess.

Assessing Knowledge of a subject.

The easiest part of our summative assessment would be the “What I know, questions I have and what I’ve learnt” grid. Children will fill in the things they have learnt at the end of a half-term. However, this isn’t going to be enough information to build a picture of a whole unit of work’s progression. Which is why we use the deeper learning questions after an ‘active lesson’ to ask questions that make the children explain their thinking and their knowledge.

Teachers should use a broad range of assessment approaches, for example:

effective questioning;
KWL grids
teacher observation;
peer and self-assessment;
Deeper learning questions.



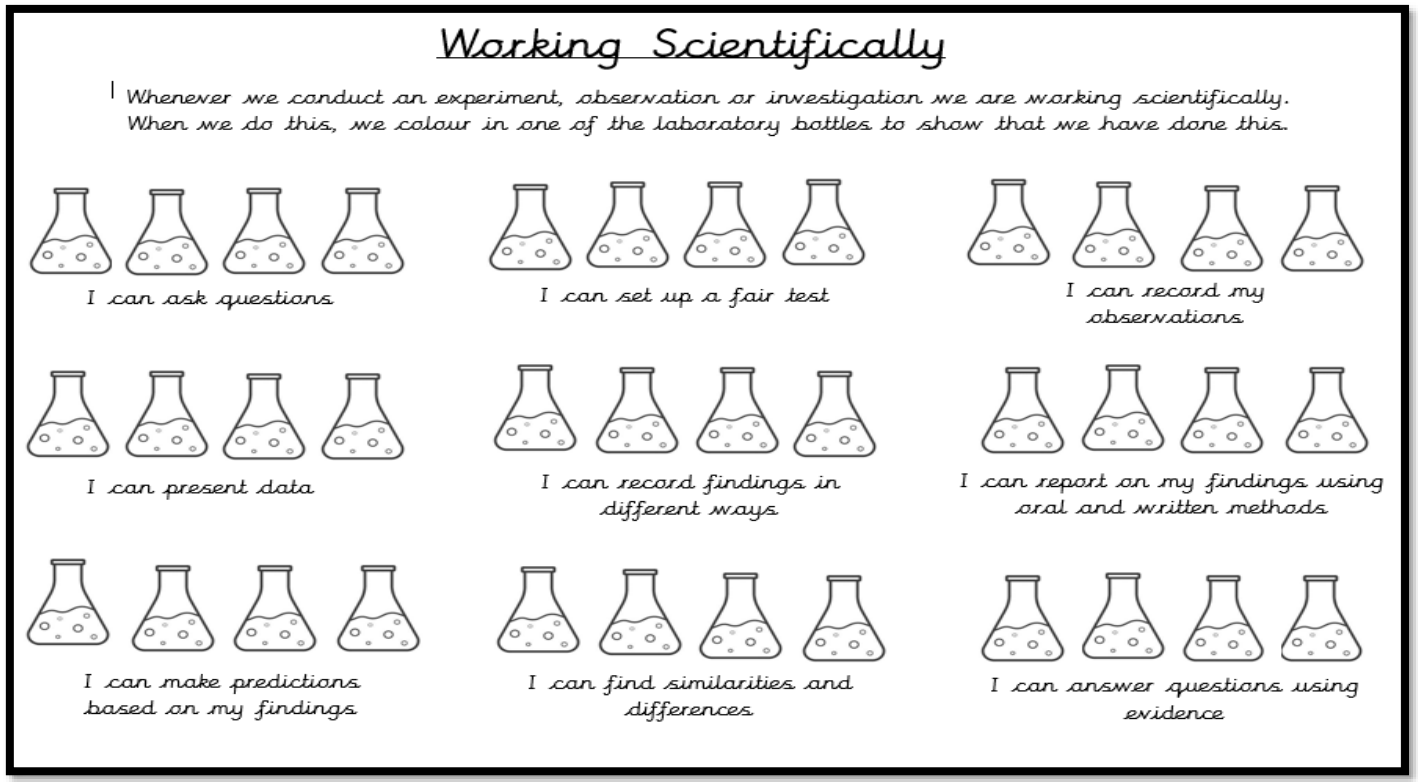
KWL grid used at the start of each topic in Science across the school.

At the end of the year teachers will moderate 2 HA, 2 MA and 2 LA children’s books to check their assessment of the children is similar.

Assessing Working Scientifically.

With the new scheme all children will be taking part in different experiments, investigations and observations. These are designed to meet the Working Scientifically objectives throughout the year, as well as providing the children with a range of experiences in the science curriculum.

Within each lesson there is a lesson objective as well as at least one objective in Working Scientifically. The children will have a sheet at the back of their science books that they can record how often they fulfil a WS objective. At the end of the year teachers can easily identify how well the children have met the WS objectives.



For children in KS2

The children will be directed to colour in a lab bottle each time they have worked scientifically in a lesson.

Working Scientifically

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments.

Living things and their Habitats

- 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
- give reasons for classifying plants and animals based on specific characteristics.

Equipment needed
Bags
Cameras
Magnifying glasses
World map
Internet access

Useful websites
https://ed.ted.com/on/90vRVJZ6
http://www.bbc.co.uk/bitesize/ks2/science/living_things/variation/play/popup.shtml
http://listverse.com/2016/02/12/10-recently-discovered-animals-with-amazing-features/
https://www.zooniverse.org/projects/zooniverse/snapshot-serengeti

Working Scientifically objective	How we can work scientifically
• Record data and results of increasing complexity using classification keys. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Identify scientific evidence that has been used to support or refute ideas or arguments.	Identify similarities and differences between living things in order to determine their classification. Use classification keys to sort living things according to observable characteristics. Children will then go out into the EYFS woods and collect, record, classify and name some of the leaves they find. They will then Sketch a tree and its corresponding leaf in the style of a botanical illustration.
• Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Identify scientific evidence that has been used to support or refute ideas or arguments.	Write scientific descriptions of unusual living things from around the world. Classify unusual living things using their descriptions and online research.
• Record data and results of increasing complexity using scientific diagrams and labels, and classification keys. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Identify scientific evidence that has been used to support or refute ideas or arguments.	Design, describe and name a new creature that characteristically sits within the Animalia classification. Sort ‘new’ creatures within the Animalia taxonomy. Sketch a detailed creature based on known characteristics and imagination.

Animals including humans

- identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- describe the ways in which nutrients and water are transported within animals, including humans.

Equipment needed
Clay and sculpting tools
Stopwatches
Jars or glasses
Elastic bands
Food colouring
Paper towels

Useful websites
https://www.bbc.com/bitesize/articles/zqv4cwx
https://www.bbc.com/teach/class-clips-video/art-and-design-ks1-ks2-using-different-painting-techniques-for-effect/z7h76v4
https://kitchenpantryscientist.com/diffusion-and-osmosis-experiments/
http://www.bbc.co.uk/programmes/articles/1yV5MBkc2Y6pQSWyMgR21y2/what-should-i-be-eating-drinking
https://www.youtube.com/watch?v=dyvfSmB0YOQ

• Working Scientifically objective	How we can work scientifically
• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of results. • Identify scientific evidence that has been used to support or refute ideas or arguments.	Explore the structure and function of the human heart. Create anatomically correct sculptures of a heart. Investigate and recreate heartrates for varying levels of exertion, giving explanations for observations and recording the heartbeats.
• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Identify scientific evidence that has been used to support or refute ideas or arguments.	Know that nutrients and water are transported around the body in the blood. Know that diffusion and *osmosis* are processes that move nutrient and water in the body. Complete the experiment with a jar with water and secure a paper towel in the jar's mouth (with a rubber band) so that it hangs down into the water, making a water-filled chamber that you can add food colouring to. Put a few drops of food colouring into the chamber and see what happens

Evolution and inheritance

- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Equipment needed
Jelly – order through the office Tesco order
glasses
Small objects
Mr men and little miss lesson (on server)

Useful websites
https://www.pbslearningmedia.org/resource/tdc02.sci.life.evo.dar/evolving-ideas-who-was-charles-darwin/
http://www.sciencemadesimple.co.uk/curriculum-blogs/biology-blogs/animal-adaptations
https://www.bbc.com/bitesize/topics/zvhhvcw
http://www.planet-science.com/categories/under-11s/games/2010/09/mission-adaptation.aspx

Working Scientifically objective	How we can work scientifically
• Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. • Identify scientific evidence that has been used to support or refute ideas or arguments.	Introduce Isaac Newton – Explain his ideas on Evolution. Investigate variation across specific animals and plants. Identify subtle adaptations to environments in the animal and plant world looking at the images of foxes from around the world. Identify advantages and disadvantages of certain characteristics – e.g a polar bear having thick fur and living in the artic. Give the children different pictures of foxes and get them to explain where they think the fox is from and why.
• reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments.	Introduce a trilobite. Explain that it lived 250 Million years ago. How do we know what it looked like? How do we know how old it is? Tell the children they are going to explore those two questions. Prepare a jelly mixture and pour into a large, clear container to make the first layer. Place small items in the jelly. Once the first layer has set, pour in a different colour jelly into the same container. This acts as the next rock layer and is younger than the previous layer and will have younger things in it. Repeat the process until you have several different colours of layers and 'fossils' within! Then get the children, to be palaeontologists and search for the fossils in the jelly and place them in order from oldest to newest. Talk to them about Mary Anning and palaeontology. Deeper learning Questions could be - How are fossils useful? How can you tell how old the fossil is?
• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	Using Mr Men and Little Miss to combine them and see what their children would look like – sticking them in their books and explaining why they have common traits. Sheet and PowerPoint in resources folder.
• reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations • identifying scientific evidence that has been used to support or refute ideas or arguments.	Mission planet game on the laptops – A game where children take 'photos' of animals in the wild and document their adaptation. (link is on previous page.)

Electricity

- associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
- use recognised symbols when representing a simple circuit in a diagram.

Equipment needed
Light bulbs
batteries
wires
Buzzers
Motors
switches

Useful websites

Working Scientifically objective	How we can work scientifically
• identifying scientific evidence that has been used to support or refute ideas or arguments. • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	Get the children to experiment with the electrical equipment and draw how they made their circuit work. Get them to explain why it worked when everything was linked together with wires, and why it didn't work when there was a break in the circuit.
• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations	Look at how to make a basic circuit. Is there a relation to the strength of a battery and the strength of a lightbulb? Get the children to design their own experiment to see if the stronger the voltage the brighter the light bulb. Get them to think about how they can record this and what variables they will use. Get the children to draw their experiment using the recognized symbols.
• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests • reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations	Get the children to conduct a similar experiment with buzzers. Ask them to make predictions based on the last experiment. Get the children to design their own experiment to see if the stronger the voltage the brighter the louder the noise. Get them to think about how they can record this and what variables they will use. Get the children to draw their experiment using the recognized symbols.

Light

- recognise that light appears to travel in straight lines
- use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Equipment needed
CCTV based diagram including measurements
maths needed to solve the problem
Shiny metal
Mirrors
Torches
Sticky-notes
Rulers
Light meter
Retro reflectors (all flat)
Shiny coloured Perspex

Useful websites
https://www.bbc.com/bitesize/clips/zyntsbk
https://www.bbc.com/bitesize/clips/zf9c87h
http://www.makingyourown.co.uk/make-your-own-periscope-kaleidoscope.html
https://www.bbc.com/bitesize/articles/zqdxb82
https://www.bbc.com/bitesize/clips/ztcg9j6

Working Scientifically objective	How we can work scientifically
• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	A thief was spotted on CCTV 'casing' the school, using a torch. Can you demonstrate that light travels in straight lines and calculate plausible heights of the suspect based on their torch beam? • Demonstrate that light travels in straight lines • Understand why a light source is needed to see • Suggest viable angles based on sight • Convert feet and inches to cm
• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Use test results to make predictions to set up further comparative and fair tests. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.	We know that the thief could see round corners, and likely used a periscope. All suspects have one, but are they using materials that reflect well enough to see? Can you investigate and eliminate another suspect? Children need to work in groups or partners to create the different periscopes using the different materials and see which one is the best – record this in their books using the graphs/tables.

Working Scientifically objective	How we can work scientifically
• taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	Children will need the sheet on the server to draw their findings. They will need a book, a piece of paper, a torch and a ruler. The will shine the torch on the book and cast a shadow on the piece of paper. Can they change the shape and size of the shadow? Then, they need to follow the steps on their sheet to create shadows based on a room design.
• planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • using test results to make predictions to set up further comparative and fair tests	Ask the children to think of situations / times when they cannot see anything (when it's dark and when we close our eyes) Ask the children why they think we cannot see in these situations i.e. what is missing? Whole class investigation – Explain how light is reflected into our eyes and that's how we see. Use a pictures of an eye around the classroom and turn the lights off. Get the children to take it in turns reflecting the light of a torch into the eye pictures. Children given the steps in the process of how we see things in a jumbled up order; they need to cut them out and stick them in the correct order
• taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs	Get the children to create their own shadow puppets. Look at the shadows that they can create with them. Talk about why shadows have the same shape as the object that creates them. Then, get the children to record and measure using a scatter graph to show a correlation to how much light is blocked by the puppet and the size of the shadow. Reasoning question to stick in books should be linked to this such as "Why was the shadow bigger when the object was closer to the light source?"