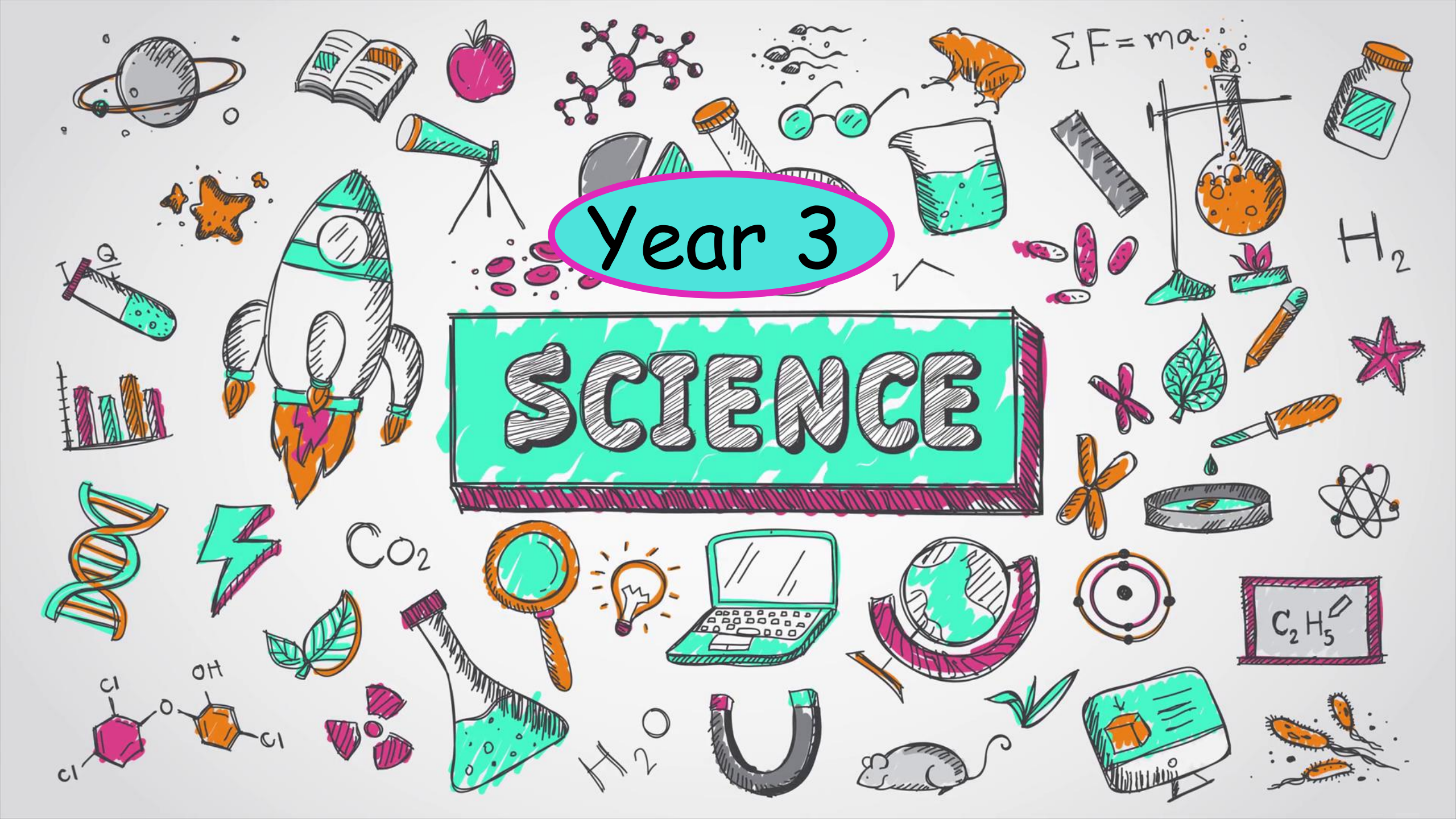

Year 3
SCIENCE

- 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.

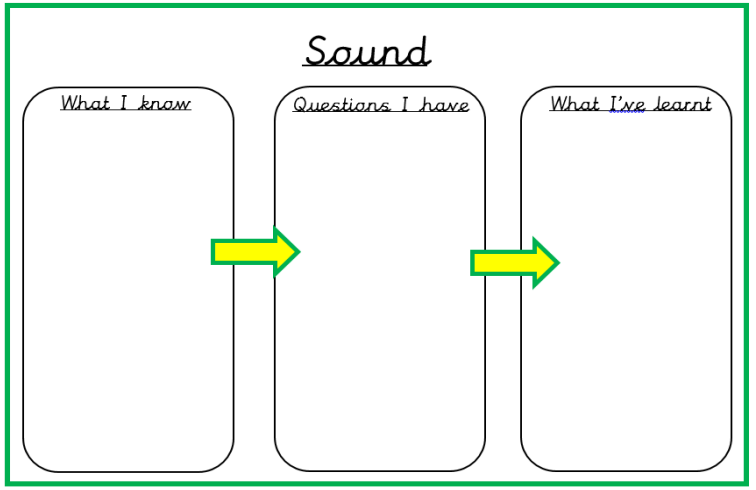
How we assess.

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.



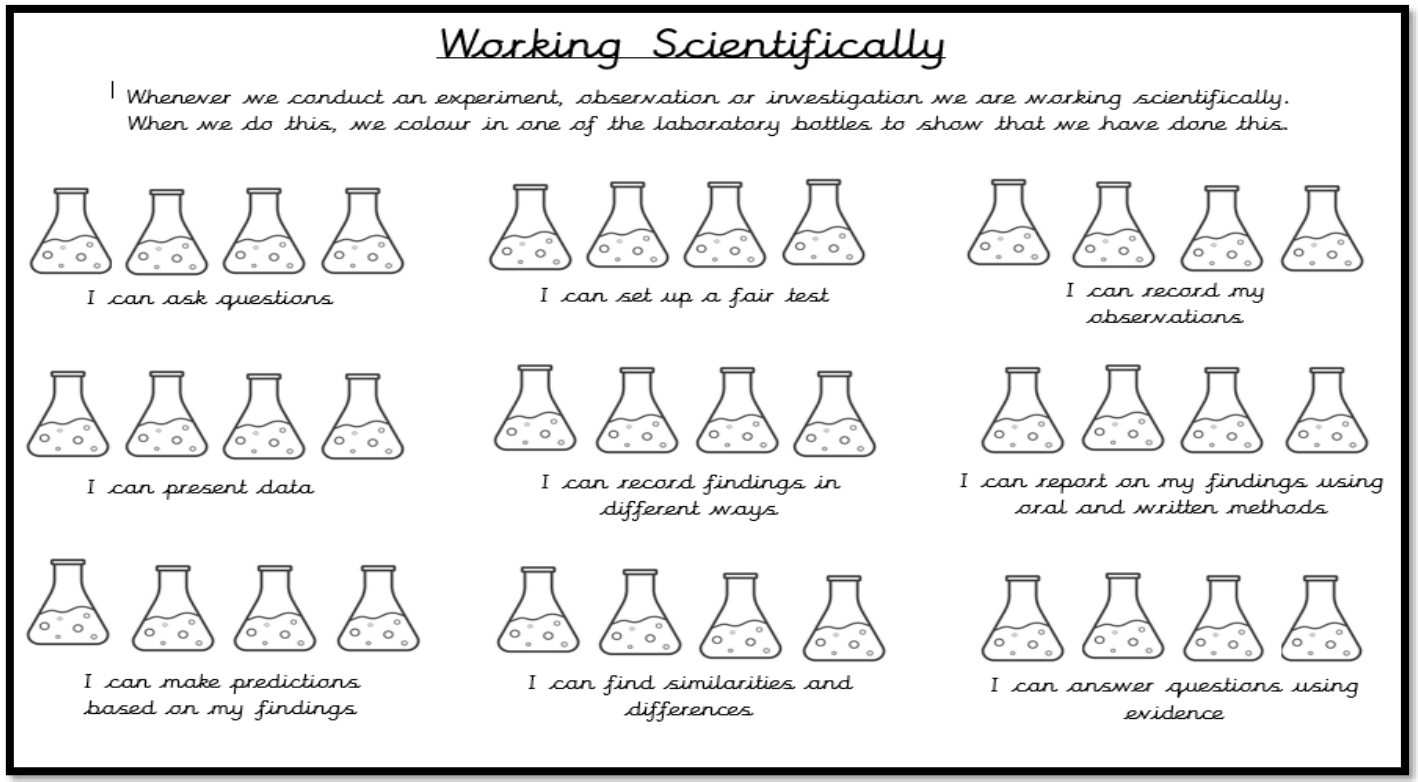
KWL grid used at the start of each topic in Science across the school.

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

- Asking relevant questions and using different types of scientific enquiries to answer them
- Setting up simple practical enquiries, comparative and fair tests
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identifying differences, similarities or changes related to simple scientific ideas and processes
- Using straightforward scientific evidence to answer questions or to support their findings.

Plants

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- investigate the way in which water is transported within plants
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Equipment needed
A few trays of seedlings
Green photocopy paper & different shades of green tissue paper
A calendar & sticky labels
Compost & 18 medium flowerpots
Observation sheet (from server in general sheets)
celery
Food colouring
Plastic cups

Useful websites
A short compilation clip of plants growing from www.bbc.co.uk
Zinnia's first message from www.YouTube.com
Color changing flowers and celery experiment Grace's Science Place from www.youtube.com

Working Scientifically objective	How we can work scientifically
• Ask relevant questions and using different types of scientific enquiries to answer them. • Set up simple practical enquiries and comparative and fair tests. • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	Begin the topic saying that an alien Zinnia want you to provide her with the best information to help them grow plants. Make a list of what we know and what we want to find out. Plant some beans in transparent jars and place them in different conditions to begin some observations. Use data loggers and other equipment to record light levels, water etc. Begin to take measurements of height and make notes on observations. From this - discuss and decide all the requirements we think plants need to grow strong and healthy. Set up a plant growth investigation to test our theories. Continually check on all the seedlings including the ones that are growing without something – light, air, water, soil, warmth and space and begin to think about the differences they are showing and why. set up data loggers to record temperature and light over a 24 hour period. Children should create a report on these findings towards the end of the term.
• Make systematic and careful observations and, where appropriate, take accurate measurements using standard units. • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.	It's time to check up on your investigation and see which seedlings are growing strong and healthy and which are not. Further broaden your plant knowledge by observing whole plants closely and making detailed, labelled drawings of real life plants they can dissect and label together. There is also a game they can play to support knowledge of the plants.

Working Scientifically objective	How we can work scientifically
• Make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • Identify differences, similarities or changes related to simple scientific ideas and processes.	Investigate how water is transported in plants using celery and food colouring. Get each group to choose their colour for the water. Put the celery into the water and the following few hours they should notice the water being transported through the bottom of the plant through to the top. Get the children to take pictures of this. Stick them into their books and get the children to make accurate guesses as to why the plant was changing colour from the bottom to the top.
• Set up simple practical enquiries and comparative and fair tests • Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	Begin to understand why fruits are so varied – to help with the dispersal of their seeds. Make your own paper seed and investigate wind dispersal by testing different versions to find the best flier. Find the sheets on the server for the paper copters and the investigation sheets.

Animals including humans

- identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat
- identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Equipment needed
A full water bottle for every child (their usual class drinking bottle will be fine)
Skeleton to cut
Marker pens
A flip chart marked with 2 axes
Pens, pencils and rulers
A drum

Useful websites
A brief BBC film clip introducing some of the 5 different food groups from www.bbc.co.uk
Film on human skeleton with other animals from www.bbc.co.uk
Film clip on invertebrate with exoskeletons from www.bbc.co.uk
Film clip showing how muscles work in pairs from www.bbc.co.uk

Working Scientifically objective	How we can work scientifically
Gather, record, classify and present data in a variety of ways to help in answering questions. Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	Use knowledge of food groups and a balanced diet to design healthy meals by creating lifelike models of food on paper plates.
• Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions	Look at skeletons- compare vertebrates and invertebrates use a classification grid- discuss why we as humans need a skeleton to move. Create their own skeleton and get them to think about joints.
Gather, record, classify and present data in a variety of ways to help in answering questions. Use straightforward scientific evidence to answer questions or to support findings - pattern seeking enquiry.	Learn how muscles work in pairs and investigate the question 'Do people have stronger muscles because they use them more?' Make predictions, gather data, discuss, display and interpret findings. Investigate how muscles work in pairs (biceps and triceps) using a bottle of water as a weight. Investigate the question –*Do some people have stronger muscles because they use them more?* With guidance, decide what data to collect, how to tabulate it and how to share out the work in the group. With guidance display data as a scatter gram and use it to look for a pattern in the data.

Rocks

- compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- describe in simple terms how fossils are formed when things that have lived are trapped within rock
- recognise that soils are made from rocks and organic matter.

Equipment needed
A selection of seashells with distinctive shapes, e.g. cockles
Poster paint in shades of brown/ grey/ ochre
Plaster of Paris (or alternative)
Thick card & paper clips
Flat boards or trays
A quantity of Plasticine & small rolling pins
Soil samples – see Teacher's Notes
Lidded tubs to store soil for the Soil Detective activity (one per group)
3 finely calibrated measuring cylinders 3 plastic funnels & 3 plastic beakers 3 balls of cotton wool
One per child of: plastic spoon, sheet of A4 paper, plastic gloves & a magnifying lens

Useful websites
Child friendly summary of Mary's life from www.bbc.co.uk
Illustrated child friendly account of how fossils are made from www.oum.ox.ac.uk
Short animation explaining how fossils are formed from www.planet-science.com
A very short clip which shows different types of soil from www.bbc.co.uk

Working Scientifically objective	How we can work scientifically
• Set up simple practical enquiries and comparative and fair tests. • Make systematic and careful observations. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	Use the classification grid with the children to deduce which rocks are which based on their appearance and simple physical properties . Once the children have done that they will need to rank the different rocks based on their permeability. – The classification grid and rock hardiness sheet are on the server.
• Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.	Meet the great fossil hunter Mary Anning, ask questions and discover fascinating facts about her life and work. Learn how fossils are made and make your own one from plaster of Paris.
• Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment. • Gather, record, classify and present data in a variety of ways to help answer questions. • Identify differences, similarities or changes related to simple scientific ideas and processes. • Use straightforward scientific evidence to answer questions or to support findings.	Investigate different soils, asking questions and seeking answers through a variety of scientific enquiries (exploring/ classifying and identifying /fair testing**)**

Light

- recognise that they need light in order to see things and that dark is the absence of light
- notice that light is reflected from surfaces
- recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- recognise that shadows are formed when the light from a light source is blocked by an opaque object
- find patterns in the way that the size of shadows change.

Equipment needed
Strong cardboard boxes (1 between 3 pupils) prepared ahead (see Teachers' Notes)
Random objects from the classroom
torches
Some large blackout curtains/a quantity of blackout material
Strong duct tape and scissors
Small squares of card in different colours, plus black, white, fluorescent colours and mirror card and a large number of tiny (sample) squares Objects: a mirror, reflector, high visibility strip or item, black and white clothing

Useful websites
Clip on light sources and reflectors from www.bbc.co.uk
Clip on reflective gear for roads from www.bbc.co.uk

Working Scientifically objective	How we can work scientifically
• Ask relevant questions and use different types of scientific enquiries to answer them. • Make systematic and careful observations. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	Investigate what we need in order to see objects in a dark place and discover how light travels. Children will need a box, and will work in groups of 3 put holes in the box (one at a time) and try to notice how the light falls (In a straight line) once they have made a few small holes they can shine a light on one of the top holes while looking through the side of the box to notice that the holes are lighting the box in straight lines. Fill in their investigation sheets.
• Gather, record, classify and present data in a variety of ways to help answer questions. • Record findings using simple scientific language, drawings and labelled diagrams.	What's it like to see in a very dark place? Go into a dark "cave" and observe which colours show up best and which do not. Shine a torch to reveal reflectors and high visibility items and discover why they gleam! Predict and then investigate how well different colours and materials reflect light in a simulated dark cave. Use results to sort and classify the samples.
• Identify differences, similarities or changes related to simple scientific ideas and processes. • Use straightforward scientific evidence to answer questions or to support their findings.	Discover how shadows are made and investigate first hand how changing the orientation of an object or the material it is made from can affect the nature and shape of the shadow. Record which type of object makes the darkest shadow. Record the different sizes of the shadows and how they made them longer or shorter (e.g by standing closer/further away to the object of light)

Working Scientifically objective	How we can work scientifically
• Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • • Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions	As a whole class sit in a circle and start with a torch. Get different children to hold mirrors and try to aim the torch at a mirror. The child with the mirror needs to make the light hit the target sheet. Chn to create a write up about how this worked and they need to understand that light reflects off objects.

Forces and magnets

- compare how things move on different surfaces
- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing.

Equipment needed
Different types of magnets
Different surfaces – carpet, gravel, concrete, laminate, wood
Toy cars
rulers
Balloons barely blown up

Useful websites
https://www.bbc.com/bitesize/clips/zk9rkqt
https://www.hamilton-trust.org.uk/science/year-3-science/forces-and-magnets-amazing-magnets/

Working Scientifically objective	How we can work scientifically
• Set up simple practical enquiries and comparative and fair tests. • Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment.	Introduce the idea of measuring force. Use a balloon and a ruler to push the toy car across different surfaces. Talk about using the same amount of force each time to make it a fair test. Chn will record which surface the car travels best on.
• Ask relevant questions and use different types of scientific enquiries to answer them. • Set up simple practical enquiries and comparative and fair tests. • Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.	Discover that gravity is a force that doesn't need contact – but is it the only one? No: magnetism can also pull objects from a distance. Drop different things such as plastic bags, balls etc with different weights and talk about how quickly they will fall. Look at magnetism and conduct an experiment to find out what things a magnet can pick up (give them things that are metal and things that are not) Get the children to sort pictures of the items into a venn diagram of 'magnetic' and 'not magnetic.' Notice that magnets can work at a distance.
• Use straightforward scientific evidence to answer questions or to support findings.	Explore how magnets behave towards each other in a variety of different exciting challenges. Discover that magnets have 2 poles and that same poles repel whilst opposite poles attract. Learn that the world itself is a giant magnet.- look at the power point for magnet games.