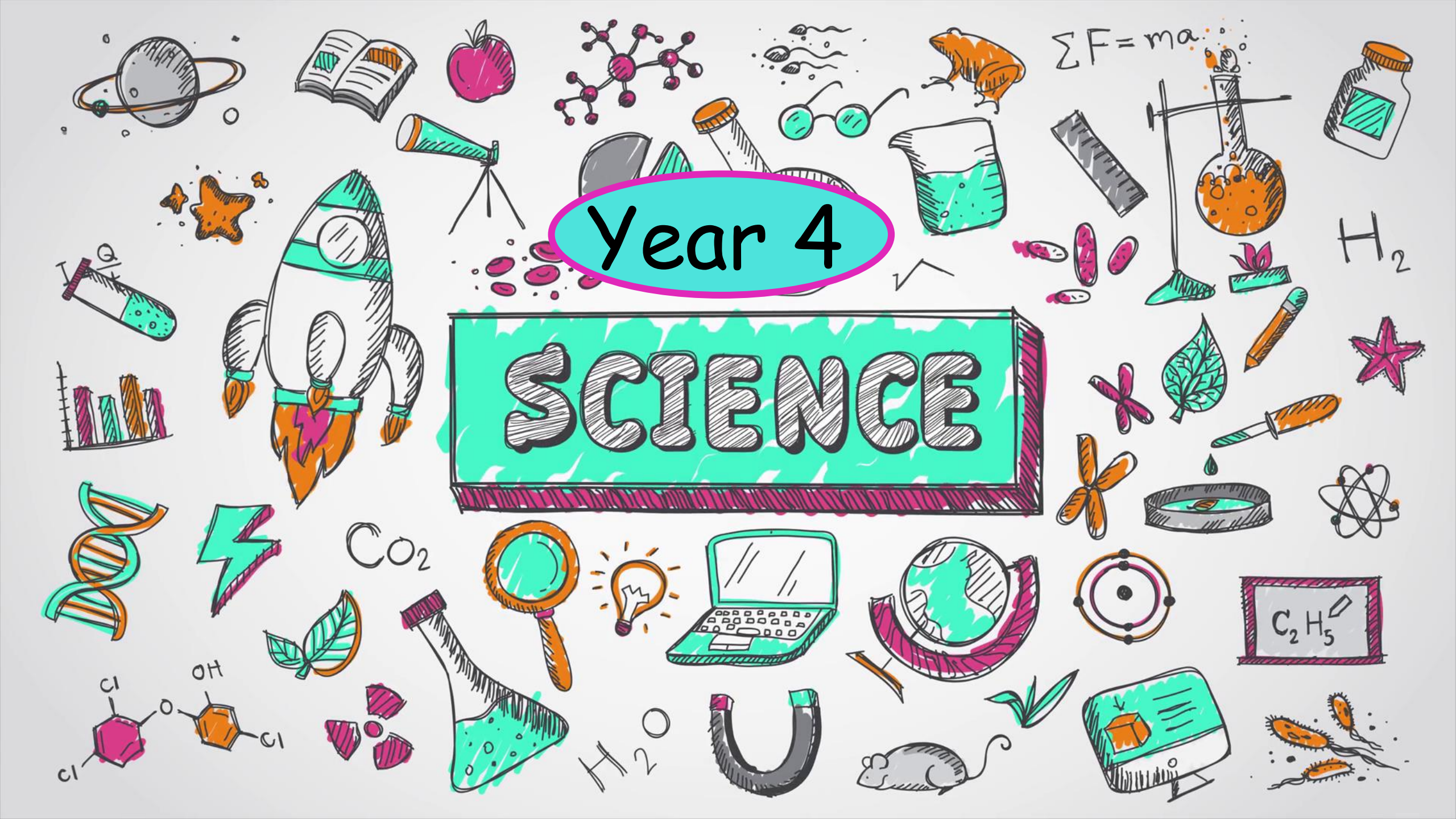

Year 4
SCIENCE

- 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.

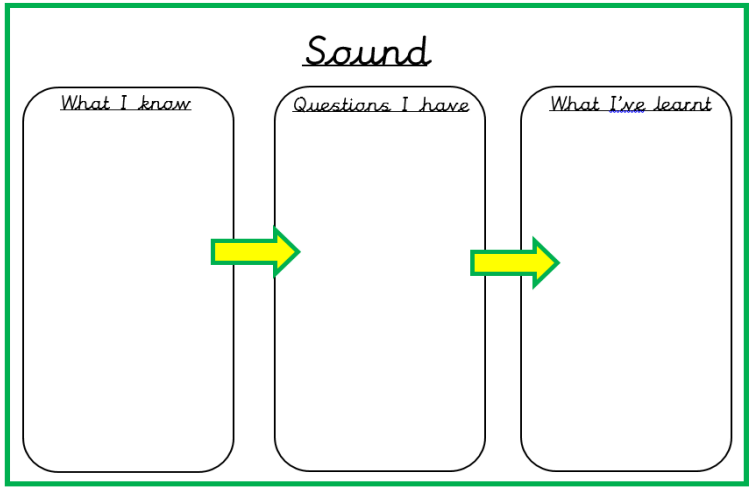
How we assess.

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.



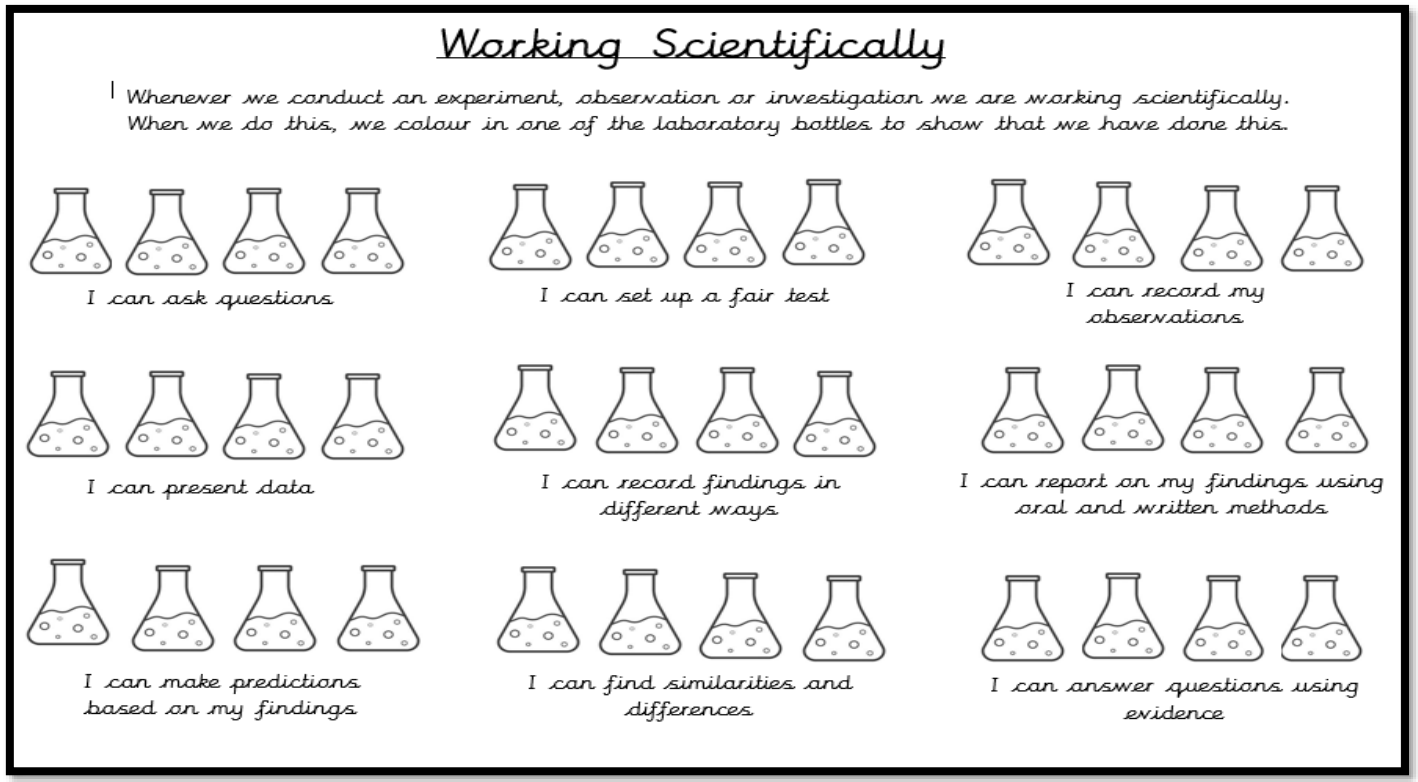
KWL grid used at the start of each topic in Science across the school.

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.

Living things and their habitats

- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- recognise that environments can change and that this can sometimes pose dangers to living things.

Equipment needed
Camera/ ipad
Printed photos
Different classification grids

Useful websites
Hamilton Trust
Terrific Scientific
BBC Science KS2
STEM KS2 science
Wikipedia for teacher's knowledge
Videos of Our Planet (Attenborough)

Working Scientifically objective	How we can work scientifically
• Identifying differences, similarities or changes related to simple scientific ideas and processes • Using straightforward scientific evidence to answer questions or to support their findings.	Group photos of different living things and explain their reasoning building upon their previous scientific knowledge. Look at using a classification grid to support their reasoning.
• Making systematic and careful observations • Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	Go into the woods and photograph things that we have seen that are living things. Next lesson, look at using a classification grid to sort the things we found into categories.
• Using straightforward scientific evidence to answer questions or to support their findings.	Look at the different types of environment and the dangers and benefits of environments changing.

Animals including humans

- describe the simple functions of the basic parts of the digestive system in humans
- identify the different types of teeth in humans and their simple functions
- construct and interpret a variety of food chains, identifying producers, predators and prey.

Equipment needed
Ingredients for Digestive experiment-
See activity card.
Human and Animal teeth pictures.
Food chain sheets
Classification grid for teeth
Activity sheets for digestive system
evaluation and experiment sheets
What I know, what to know, have learnt sheet

Useful websites
Hamilton Trust
Terrific Scientific
BBC Science KS2
STEM KS2 science
Wikipedia for teacher's knowledge
Videos of Our Planet (Attenborough)

Working Scientifically objective	How we can work scientifically
• Setting up simple practical enquiries • Recording findings using simple scientific language, drawings, labelled diagrams • Using straightforward scientific evidence to answer questions or to support their findings.	Conduct an experiment about how food travels through the body thinking about the names of the different parts that are involved in the digestive process looking to answer the question ‘ What happens to food once we have eaten it?’
• classifying and presenting data in a variety of ways to help in answering questions • Using straightforward scientific evidence to answer questions or to support their findings.	Compare pictures of teeth and sort into animals and humans, giving explanation as to their reasoning based on the question ‘ How do you know these teeth belong to an animal/human?’ Looking to answer Why do we have different teeth.
• classifying and presenting data in a variety of ways to help in answering questions	Constructing a food chain and identifying the predators, producers and prey.

States of matter

- compare and group materials together, according to whether they are solids, liquids or gases
- observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Equipment needed
Equipment for sorting solids, liquids and gasses
Equipment to make rice crispy cakes
Data loggers
thermometers
rulers
Plastic seal bags
Sheets for investigations and experiments

Useful websites
Hamilton Trust
Terrific Scientific
BBC Science KS2
STEM KS2 science
Wikipedia for teacher's knowledge

Working Scientifically objective	How we can work scientifically
• Making systematic and careful observations • classifying and presenting data in a variety of ways to help in answering questions • Recording findings using simple scientific language and tables • Identifying differences, similarities or changes related to simple scientific ideas and processes	Look at a mixture of real life materials and group them into solids, liquids and gasses. Work as a group- record into their books in a table.
Using straightforward scientific evidence to answer questions or to support their findings. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers	Observe the state of something when it is heated or cooled. Children will work in small groups to make rice crispy cakes- chocolate is melted from a solid to a liquid- watching the temperature for this.

• Working Scientifically objective	How I can work Scientifically
• Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Setting up simple practical enquiries, comparative and fair tests	Conduct evaporation experiment in plastic sealed bag- Place each group's in a different place so that we can discover the link between temperature and evaporation.
Asking relevant questions and using different types of scientific enquiries to answer them	Conduct the 'puddle experiment' using the knowledge they have learnt so far, what do you think will happen to the puddle over the course of a hot day. Measuring the change and making predictions about what they expect to see.

Sound

- identify how sounds are made, associating some of them with something vibrating
- recognise that vibrations from sounds travel through a medium to the ear
- find patterns between the pitch of a sound and features of the object that produced it
- find patterns between the volume of a sound and the strength of the vibrations that produced it
- recognise that sounds get fainter as the distance from the sound source increases.

Equipment needed
noise dosimeter
Sound walk sheet (Server)
Silent powerpoint
Drum and beater Bowl of water and tuning fork (1 set per table) Paper or plastic cups (with a small hole punched in the bottom) Long lengths of string

Useful websites
https://www.bbc.com/bitesize/articles/zstr2nb
Section 1 - soundproofing investigation from http://resources.hwb.wales.gov.uk

Working Scientifically objective	How we can work scientifically
• Ask relevant questions and use different types of scientific enquiries to answer them. • Use straightforward scientific evidence to answer questions or to support their findings.	Go on a 'sound walk' through the school and begin to think about how sound is made. Consider which areas of the school will be quiet, which will be loud and which will have no sound at all. Walk around the school listening for different sounds. Begin to consider sound and how sounds are made. Understand the term 'noise pollution'.
• Ask relevant questions and use different types of scientific enquiries to answer them. • 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.	Explain that sounds are made when an object vibrates and begin to understand that we hear sounds when the vibrations travel from a source through a medium to our ears. Get chn to hit a tuning fork and put it into some water to see the vibrations. Chn will then make paper cup phones.
• Ask relevant questions and using different types of scientific enquiries to answer them. • 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, including thermometers and data loggers. • Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • 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. • Use straightforward scientific evidence to answer questions or to support findings.	Investigate sound-proofing materials by planning and conducting a fair test, considering all the variables and how to record the results. Consider reasons needed to reduce sounds and reasons for not reducing sounds. Work in a group to plan an investigation that will find out which material will best reduce sound. With help, consider the different variables of their test and plan how to ensure their investigation is fair. Record the results of the investigation and use the results to draw a conclusion.

Working Scientifically objective	How we can work scientifically
• Ask relevant questions and use different types of scientific enquiries to answer them. • 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.	Measure how loud a sound is the further away we get. Using trundle wheels and a noise dosimeter to record what happens as the 'listener' gets further away from the point of sound. Discuss a fair test and how we will create the noise, ensure we are recording fairly etc. Create a graph to show our findings.

Electricity

- identify common appliances that run on electricity
- construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- recognise some common conductors and insulators, and associate metals with being good conductors.

Equipment needed
Batteries
Light bulbs
Wires
Different materials to test conductibility

Useful websites
Terrific scientific
Hamilton
BBC Science KS2
STEM KS2 science
Wikipedia for teacher's knowledge

Working Scientifically objective	How we can work scientifically
Asking relevant questions and using different types of scientific enquiries to answer them	Identify that things run off electricity and how we use it safely.
Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Reporting on findings from enquiries, including oral and written explanations, Using straightforward scientific evidence to answer questions or to support their findings.	Let children experiment with making a light bulb light up –Get them to write the questions they ask each other as they try to make the light bulb work. Talk about why the circuit only works when it is in a full loop, why do you think that is as a reasoning question for the plenary.
Setting up simple practical enquiries, comparative and fair tests Asking relevant questions and using different types of scientific enquiries to answer them • Setting up simple practical enquiries, comparative and fair tests Reporting on findings from enquiries, including oral and written explanations	Find out what a conductor is and which materials are conductors and which materials are not.

Working Scientifically Objective	How we can work scientifically.
Using straightforward scientific evidence to answer questions or to support their findings.	Use electricity to create simple circuits with cells, lights, buzzers and motors.
Using straightforward scientific evidence to answer questions or to support their findings. • Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions	Understand how a switch works. Use paperclips to show the physical movement of opening and closing a circuit. Children to make their own circuit with a switch and discuss why a circuit doesn't work unless it is a full loop.