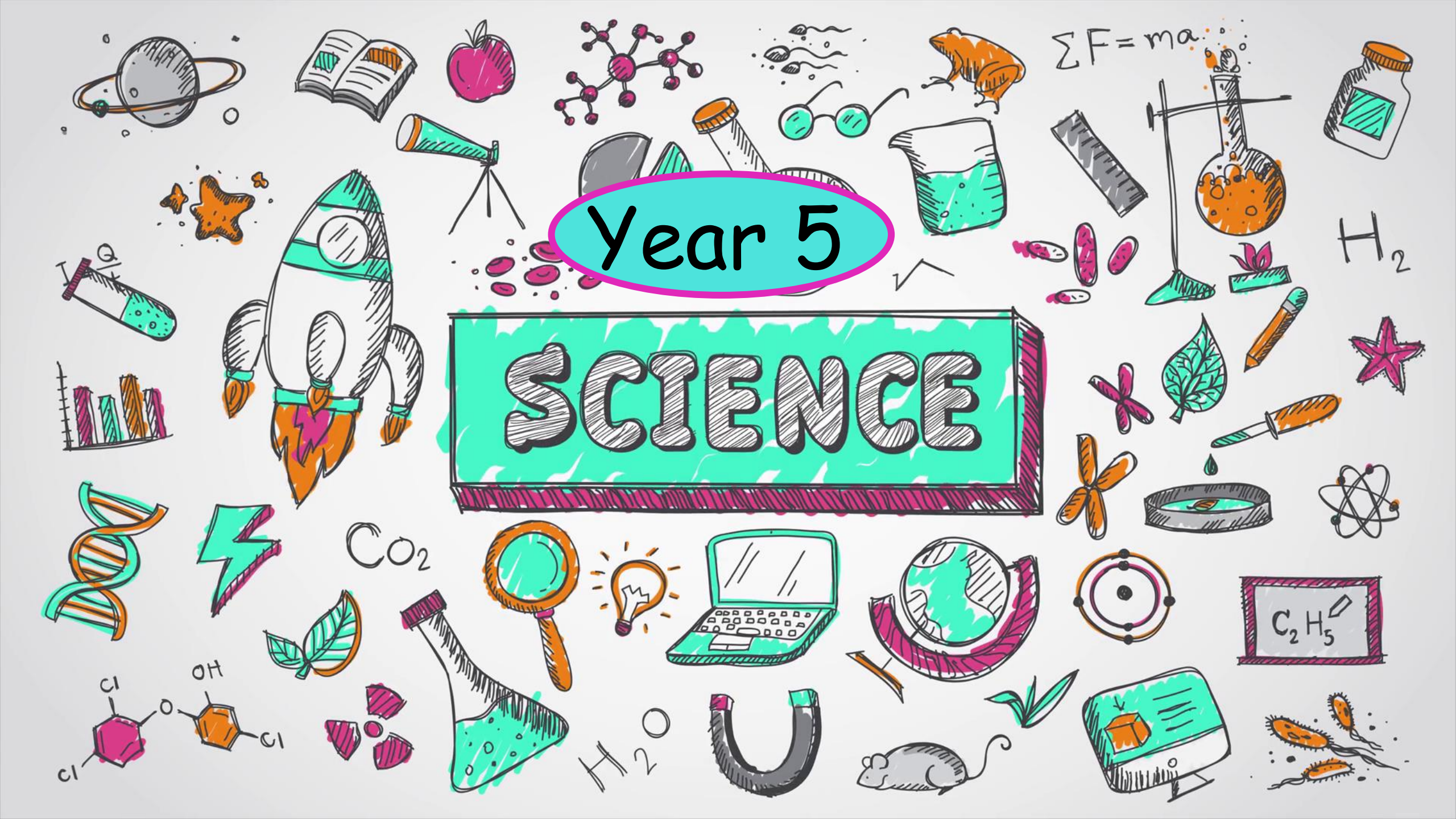

Year 5
SCIENCE

- 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.

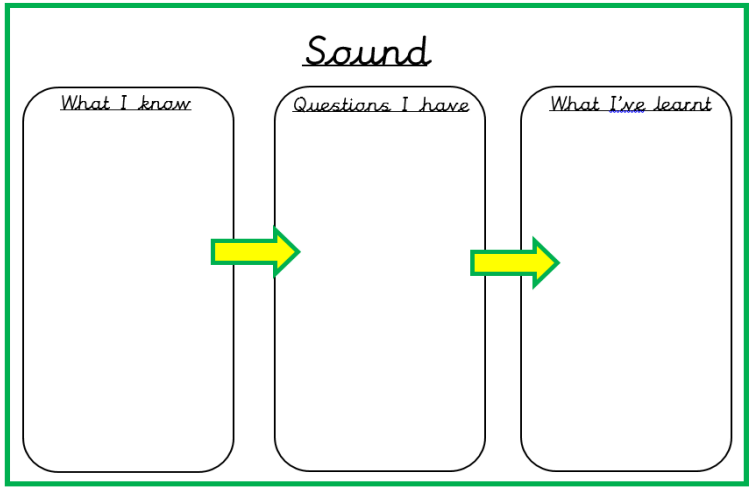
# How we assess.

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.



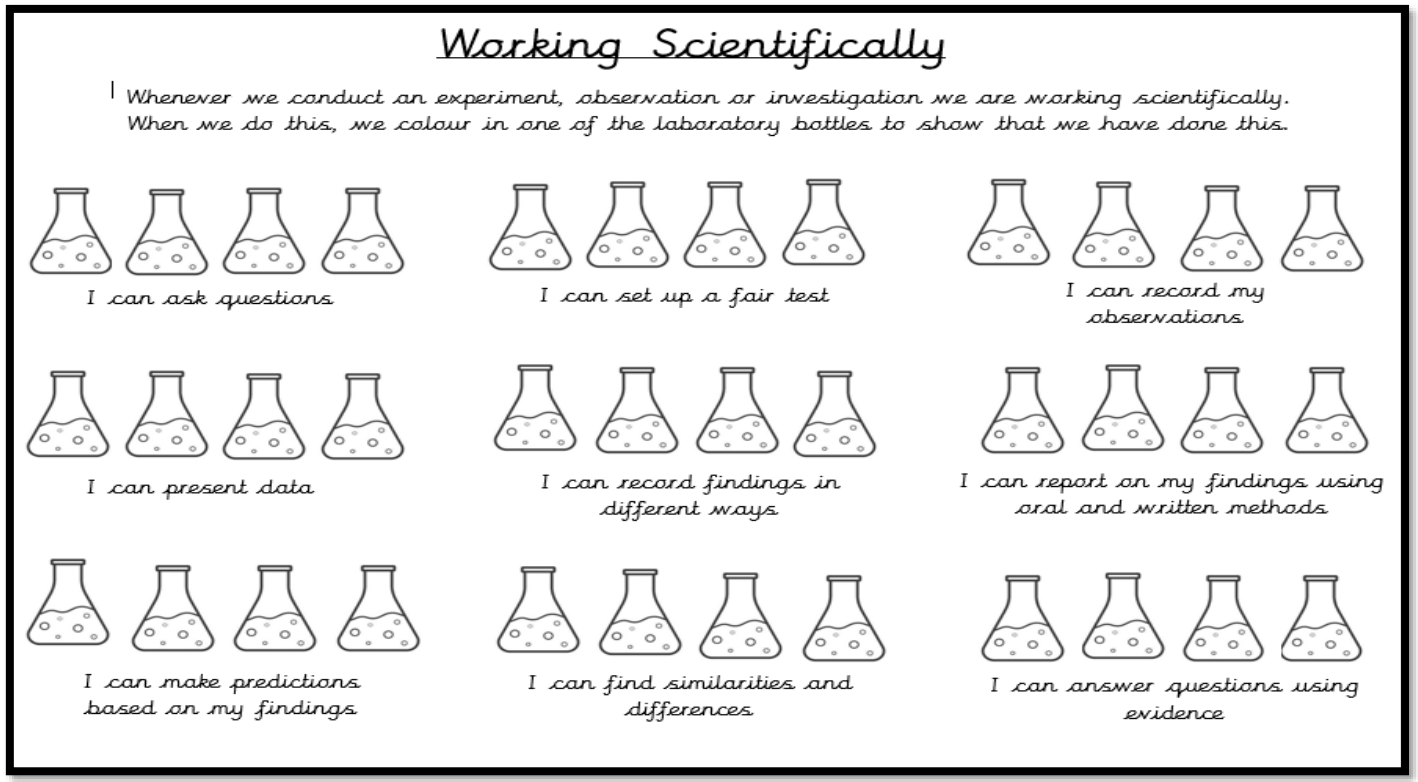

KWL grid used at the start of each topic in Science across the school.

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 the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- describe the life process of reproduction in some plants and animals.

| Equipment needed |
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| Art books |
| Tadpoles – Please let the Science co-ordinator know the half-term before so they can be ordered. |
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| Useful websites |
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| https://www.bbc.com/teach/class-clips-video/the-life-cycles-of-different-organisms/zvh8qp3 |
| https://www.bbc.com/bitesize/clips/zcwk39q |
| https://www.bbc.com/teach/class-clips-video/life-cycle-of-an-ant/zfttscw |
| https://www.bbc.com/teach/class-clips-video/the-life-cycle-of-a-frog-in-spring-and-a-sunflower-in-summer/z4k4jhv |
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| Working Scientifically objective | How we can work scientifically |
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| • 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.<br>• Identify scientific evidence that has been used to support or refute ideas or arguments. | Watch some online footage of insect and amphibian lifecycles to help create your own life cycle illustrations for display. Set up an in-school habitat for your choice of insect and amphibian so that you can observe them over time (tadpoles are easiest!)<br>There's a reading comp in the plants folder to support the teaching. |
| • Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.<br>• Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.<br>• 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. | Learn about Naturalist Scientists such as David Attenborough and Jane Goodall. How they use recordings and observations to learn about animals.<br>Keep recording details of the tadpoles. |

Animals including humans

- describe the changes as humans develop to old age.

| Equipment needed |
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| Useful websites |
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| https://www.bbc.com/bitesize/topics/zgssgk7 |
| https://www.dkfindout.com/uk/human-body/life-cycle/ |
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| Working Scientifically objective | How we can work scientifically |
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| • 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<br>• identifying scientific evidence that has been used to support or refute ideas or arguments. | Bring in a photo of yourself, or your TA. Get the children to order and try and label the ages that you were at those times. Have a class discussion about the changes humans go through. Show children pictures of elderly people too and get them to discuss how else humans can change. Can the children draw you as an elderly person? |
| • 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<br>• identifying scientific evidence that has been used to support or refute ideas or arguments. | Get the children to bring in pictures of themselves at different ages. They can create a poster about the changes they have made e.g height, speech, intelligence. Get them to explain how the human body changes as we get older. |

Properties and changes of materials

- 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
- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- demonstrate that dissolving, mixing and changes of state are reversible changes
- explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda

| Useful websites |
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| http://www.sciencekids.co.nz/gamesactivities/circuitsconductors.html |
| https://www.bbc.co.uk/programmes/p011811q |
| https://www.bbc.co.uk/programmes/p0119tj2 |
| https://www.bbc.co.uk/programmes/p0119lz9 |
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| Equipment needed |
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| Metal cup/coffee<br>Range of containers (see list on server)<br>Video recording devices |
| Items for initial set up (including salty water, pencil, metal spoon, metallic looking plastic, metallic card)<br>Materials to test out for conducting electricity (see table) |
| Bread and cake ingredients<br>Jelly<br>Eggs<br>Access to cooking facilities – order these and claim the money back through the office. |
| An old, rusty roasting tray (or image provided)<br>Range of liquids and nail types (see tables)<br>Apples<br>Lemon juice<br>Salt<br>Sugar<br>Vitamin C tablets - order these and claim the money back through the office.<br>Access to the Internet/photographic equipment. |
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| Working Scientifically objective | How we can work scientifically |
| --- | --- |
| • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.<br>• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.<br>• Record data and results of increasing complexity using scientific diagrams and labels, and line graphs.<br>• Use test results to make predictions to set up further comparative and fair tests.<br>• 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 & presentations. | Children will need to design one cup to keep ice cream cold and one cup to keep coffee hot.<br>They will need to try out different materials and make an advert for their cup explaining why their materials keep the item cold/hot. |
| Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.<br>Record data and results of increasing complexity using scientific diagrams and labels, tables and line graphs.<br>Use test results to make predictions to set up further comparative and fair tests.<br>Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in written form. | See the kitchen science pack for loads of great experiments that show dissolving. Get the children to explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. Get children to experiment with soluble solutions and test different things (see server sheet for details) |

| Working Scientifically objective | How we can work scientifically |
| --- | --- |
| • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.<br>• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.<br>• Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.<br>• 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. | Plan and group together different materials based on their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets |
| • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.<br>• Record results of increasing complexity using scientific diagrams and labels.<br>• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.<br>• Use test results to make predictions to set up further comparative and fair tests.<br>• Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in written forms. | Cook and bake noting the irreversible changes that occur.<br>Plan and carry out investigations into the impact of certain ingredients on an end product. |

| Working Scientifically objective | How we can work scientifically |
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| Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.<br>Record data and results of increasing complexity using scientific diagrams and labels, and tables.<br>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. | Some changes in materials can't be reversed and they can produce new materials in the process. Immerse yourself in the world of oxidisation and observe how rust is formed and how apples spoil when cut open – can you prolong your apple's shelf life or is it all looking brown? |

Earth and Space

- describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- describe the movement of the Moon relative to the Earth
- describe the Sun, Earth and Moon as approximately spherical bodies
- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

| Equipment needed |
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| Various sized fruit |
| Loo roll |
| Rounders post and stand |
| Torch |
| Lego figures |
| Globe |
| Measuring equipment and compass |
| Class sheets (on sever) |
| Small flags. |
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| Useful websites |
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| https://www.youtube.com/watch?v=5xldz4EuV2U |
| https://www.bbc.co.uk/programmes/p00n6zgy |
| https://nrich.maths.org/7753 |
| https://www.bbc.com/bitesize/clips/z6shfg8 |
| https://www.theplanetstoday.com/ |
| https://www.bbc.com/bitesize/clips/zvks4wx |
| https://www.bbc.com/bitesize/clips/zq32fg8 |
| https://www.stem.org.uk/resources/community/collection/12347/year-5-earth-and-space |
| https://apod.nasa.gov/cgi-bin/apod/apod_search |
| http://www.beyondthechalkboard.org/activity/comes-sun-tracing-shadows/ |
| https://www.youtube.com/watch?v=41fh2sp-cD0 |

| Working Scientifically objective | How we can work scientifically |
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| • Record data of increasing complexity using tables, scatter graphs, bar and line graphs.<br>• Identify scientific evidence that has been used to support or refute ideas or arguments. | Use fruit to create a model of the solar system.<br>Calculate scales and ratios for a model of the solar system.<br>Research, collate and create graphs for data about the planets.<br>Paint the planets from known images and the nature of the planets. |
| • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms.<br>• Identify scientific evidence that has been used to support or refute ideas or arguments. | Can you build your own orrery to demonstrate how the solar system works? Children will Know the difference between geo and heliocentric solar system and how views have evolved.<br>Build an orrery of our solar system.<br>Create episode one of Stargazing which explains how the solar system works and what is in it.- use iPads.<br>(To show this- you could take stills from their videos and get them to write a speech bubble to explain what they were presenting) |
| • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary<br>• taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate<br>• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs | Get the chn to put a flag in the UK and a flag in Australia.<br>Turn the lights off in the classroom and shine a torch on the globe. Talk to the children about when it is day time in the UK where is night-time? Children will then record what happens to the globe as they spin it on its axis, keeping the sun (torch) in the same place. Get them to fill in the 'explore' sheet whilst they conduct their investigation into night time and day time. |

| Working Scientifically objective | How we can work scientifically |
| --- | --- |
| • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary<br>• taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate<br>• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs<br>• using test results to make predictions to set up further comparative and fair tests | Tracing shadows. Discussing their shape and size, and then making predictions as to whether these shadows will change over the course of the day, and if so, how. Use the class recording sheet and take it in turns for small groups to go outside and observe how an object's shadow has changed. Talk about the validity of the experiment and how to keep the test fair. Follow up lesson- children to use the 'interpret' the data and what we can learn about the sun from this. |

Forces

- explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

| Equipment needed |
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| Parachute equipment |
| Video recording equipment if desired |
| Force meter |
| Relatively 'heavy' cars/vehicles for testing |
| Access to mud, tarmac and a tiled floor |
| Plasticine |
| Equipment for boat investigations (see guidance) |
| Tin foil |
| Hair dryers/hand held fans |
| Half drain pipe full of water |
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| Useful websites |
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| https://www.creativeeducation.co.uk/video/1399 - from 5 minutes |
| https://www.bbc.com/bitesize/clips/zpvs34j |
| https://www.bbc.com/bitesize/clips/zsjd7ty |
| https://www.bbc.com/bitesize/clips/ztqw2hv |
| https://www.bbc.co.uk/programmes/p019bh9c |
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| Working Scientifically objective | How we can work scientifically |
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| • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.<br>• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.<br>• Record data and results of increasing complexity using scientific diagrams and labels, and tables.<br>• Use test results to make predictions to set up further comparative and fair tests.<br>• Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral form. | Explore parachutes and air resistance, identifying enquiry questions for investigating effective parachutes.<br>Set up and carry out a parachute investigation to determine which one travels the slowest (and safest). Recording data and drawing conclusions.<br>Calculate the area of the parachute and its scaled up speed.<br>Video recommendations for the best parachute design and materials for the job, based on findings. |
| • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.<br>• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.<br>• Record data and results of increasing complexity using scientific diagrams and labels and tables.<br>• Use test results to make predictions to set up further comparative and fair tests.<br>• Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in written forms. | Investigate how levers work and how the position of the fulcrum impacts on its effectiveness.<br>Scale weights and lengths.<br>Investigate how pulleys work and note the correlation between effort required and the number of pulleys.<br>Set out instructions for forces on the ground to help them implement findings from investigations. |

| Working Scientifically objective | How we can work scientifically |
| --- | --- |
| • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.<br>• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.<br>• Record data and results of increasing complexity using scientific diagrams and labels, tables, scatter graphs, bar and line graphs.<br>• Use test results to make predictions to set up further comparative and fair tests.<br>• 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. | Children need to decide, in teams, which path is the best path to travel on. They need one that is not too fast and not too slow.<br>Investigate the effect of ground friction on the force needed to move a toy car.<br>Recommend a ground covering that creates the right level of friction for the safe onward journey of a bike.<br>Predict the likely speed of a bike on different surfaces, based on findings from friction investigation. |
| • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.<br>• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.<br>• Record data and results of increasing complexity using scientific diagrams and labels, tables, scatter graphs, bar and line graphs.<br>• Use test results to make predictions to set up further comparative and fair tests.<br>• 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. | Investigate and identify which shape of boat is best to beat the water resistance of a river, offering an explanation.<br>Make recommendations for the best boat shape and waterway to get the meteorite across, based on scientific evidence. |