Castle View Primary School Science Curriculum

Working Scientifically

Fair Testing:

Fair testing helps us to make sure our science experiments give us *true* and *reliable* answers. Pupils will learn to work with variables to understand the element which has caused change.

Fair testing helps us to:

- Learn the real reasons things happen.
- Make results more trustworthy.
- Build skills in asking questions and solving problems.

At Castle View, we value the importance of developing our knowledge in the subject but also learning how to adopt an experimental approach towards the subject.

We have developed a progressive, scaffolded model which allows all of our pupils to work scientifically at an age-appropriate level.

Castle View Primary School Science Curriculum

Year 1 – Working Scientifically

Statutory Requirements:

To work scientifically in Year 1, pupils should:

- Ask simple questions and recognise that they can be answered in different ways.
- Observe closely using simple equipment.
- Perform simple tests.
- Identify and classify.
- Use their observations and ideas to suggest answers to questions.
- Gather and record data to help in answering questions.

Fair Testing:

Pupils should be provided with a record sheet where a focus questions has been discussed and shared with the class.

Pupils can make simple equipment lists using singular words or images.

Predictions should be made about the outcome of a experiment, which can take various forms:

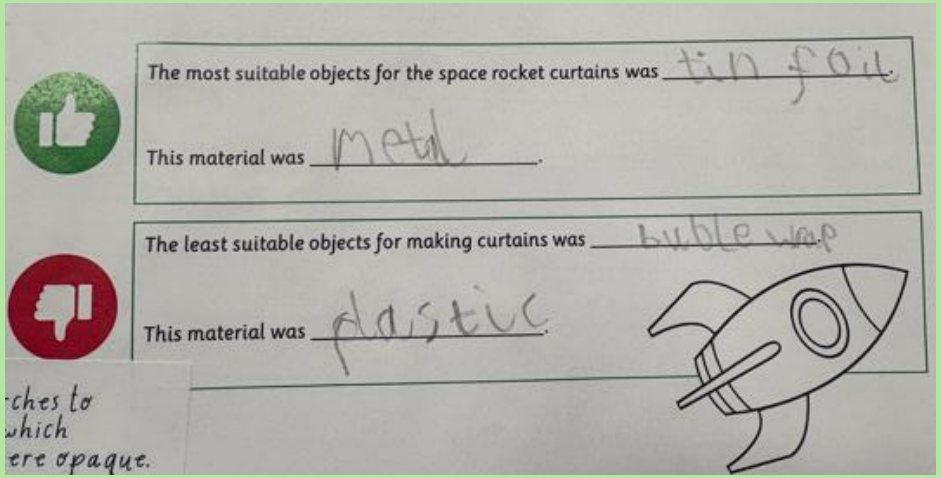
- Tick boxes
- Circling responses
- Simple sentences (latter half of the year)

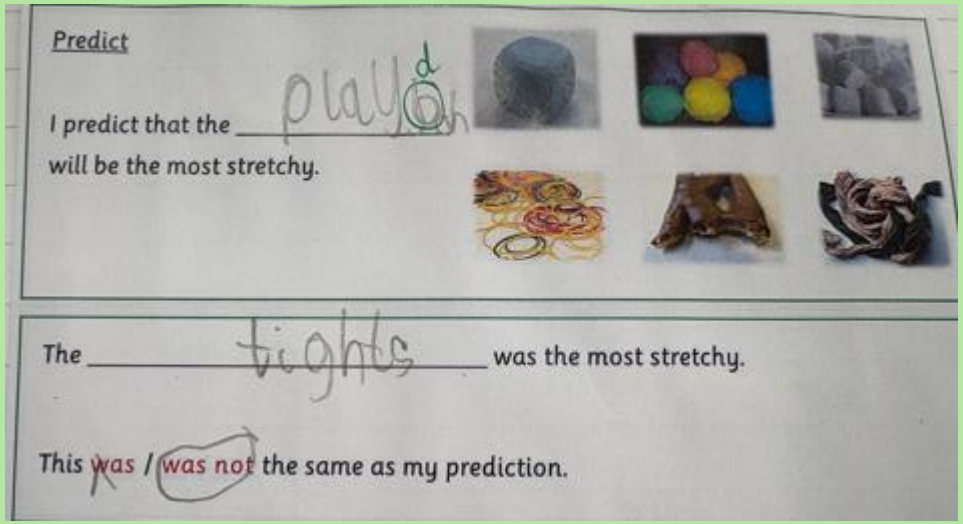
Pupils should draw simple conclusions to suggest answers to questions, which can take various forms:

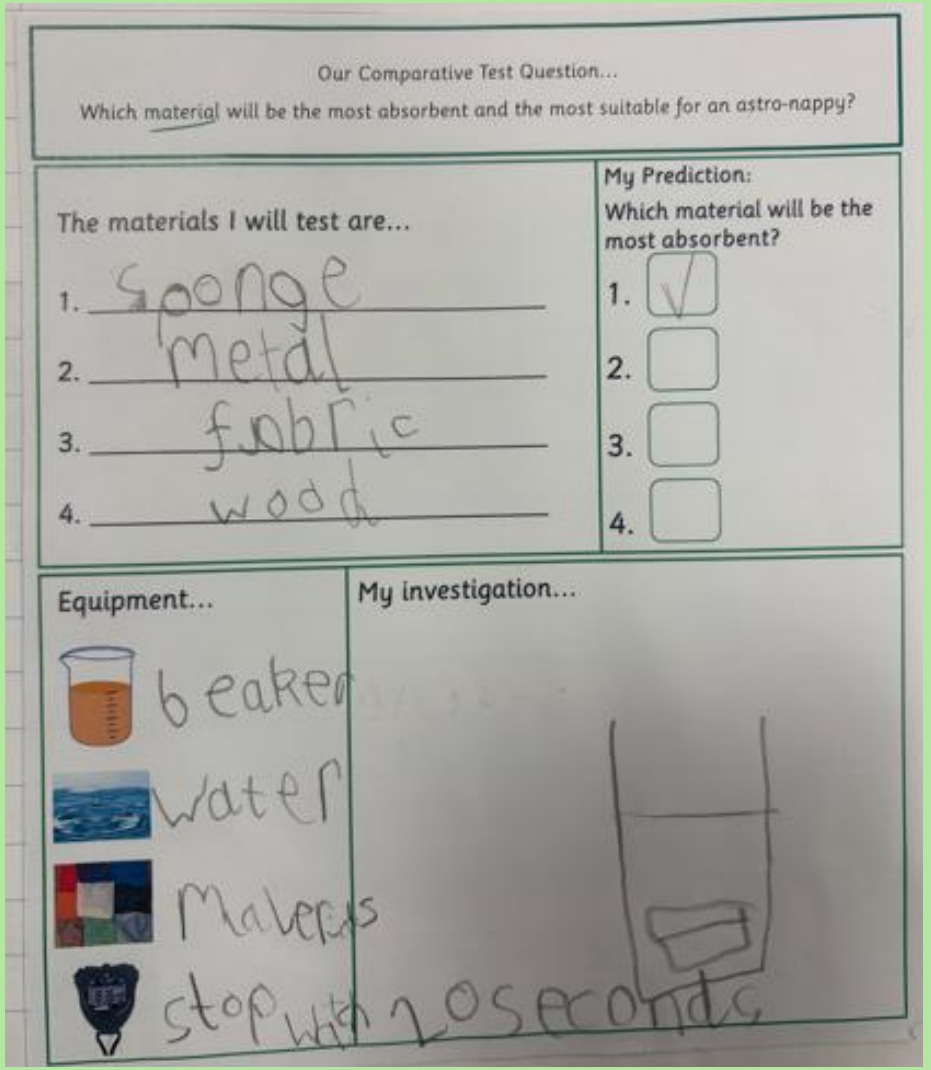
- Tick boxes
- Circling responses
- Simple sentences (latter half of the year)

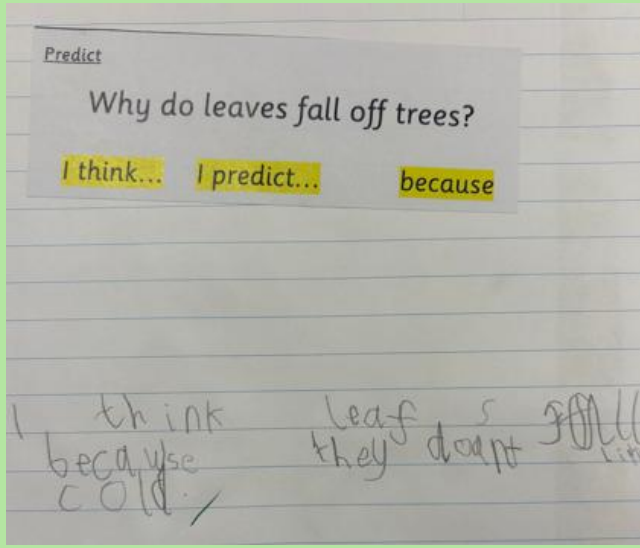
Castle View Primary School Science Curriculum

Year 1 – Working Scientifically









Castle View Primary School Science Curriculum

Year 2 – Working Scientifically

Statutory Requirements:

To work scientifically in Year 2, pupils should:

- Ask simple questions and recognise that they can be answered in different ways.
- Observe closely using simple equipment.
- Perform simple tests.
- Identify and classify.
- Use their observations and ideas to suggest answers to questions.
- Gather and record data to help in answering questions.

Fair Testing:

Some pupils may need to continue to be provided with a writing frame, while others may begin to adopt their own layout.

A focus question should be discussed and generated as a class.

An equipment list should be made using short notes. Pupils should begin to understand why the equipment they've chosen is important.

Through identification and observation, pupils should write their prediction for the outcome of the experiment. Pupils should use the conjunction '*because*' to express reasoning.

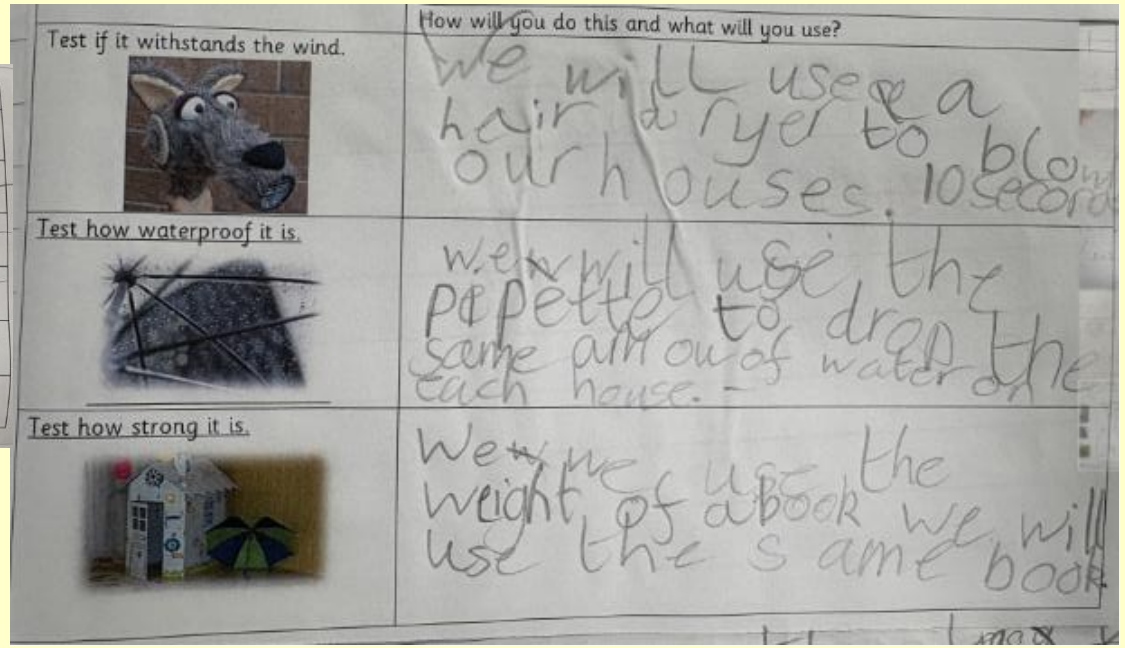
Simple conclusions should be drawn, commenting on positive and negative results.

Pupils should record their results in provided tables; these may include written notes or drawings.

Castle View Primary School Science Curriculum

Year 2 – Working Scientifically

Object	Material	Stretch	Squash	Twist	Bend
Eraser	rubber	X	X	✓	✓
Paper towel	paper	X	✓	✓	✓
pencil	wood	X	X	X	X
Ruler	plastic	X	X	X	✓
hair	Fabric Plastic	✓	✓	✓	✓
window	glass	X	X	X	X



I conclusion the ~~wid~~ strongest brig is the widest because it could hold the most counters

I predict that pepper will move away from the soap.
Conclusens
The bowl with just water the pepp didn't move and the bowl with soap the pepper moved. this is why we sh use soap to keep us clean

Castle View Primary School Science Curriculum

Year 3 – Working Scientifically

Statutory Requirements:

To work scientifically in Year 3, pupils should:

- ask relevant questions and use different types of scientific enquiries to answer them.
- Set up simple practical enquiries, 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.
- Gather, record, classify and present data in a variety of ways to help in answering questions.
- 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.
- Identify differences, similarities or changes related to simple scientific ideas and processes.
- Use straightforward scientific evidence to answer questions or to support their findings.

Fair Testing:

Before beginning an enquiry, pupils should be given greater time to explore the most appropriate type of enquiry to answer questions.

After a question has been generated, an equipment list should be written using bullet points. (While there are no grammatical rules here, a lowercase format should be favoured.)

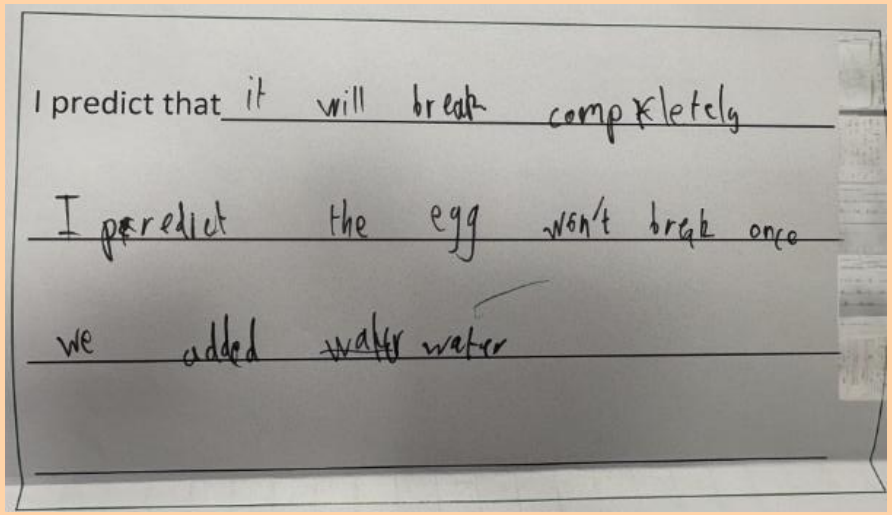
Predictions should be written with thought using the conjunctions *'when'* and *'because'* to provide a logical explanation for their thought.

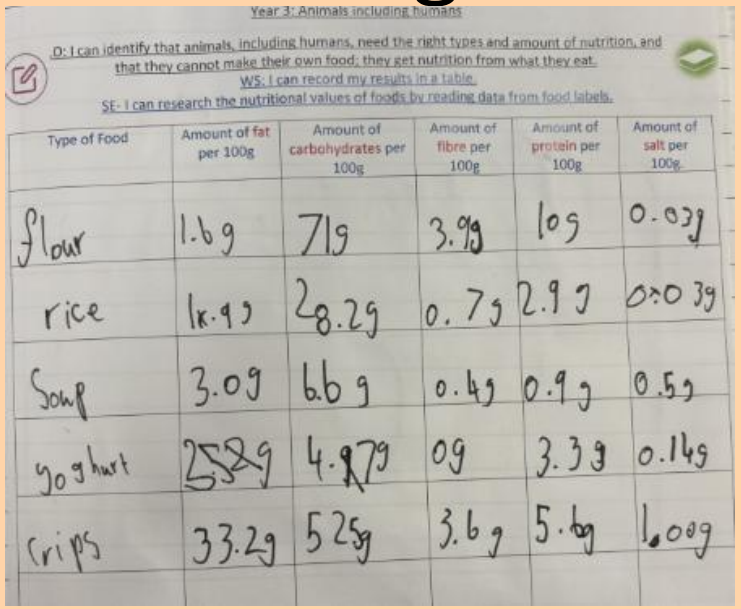
Pupils should record their observations in a variety of ways, including a table of results, drawings and labelled diagrams.

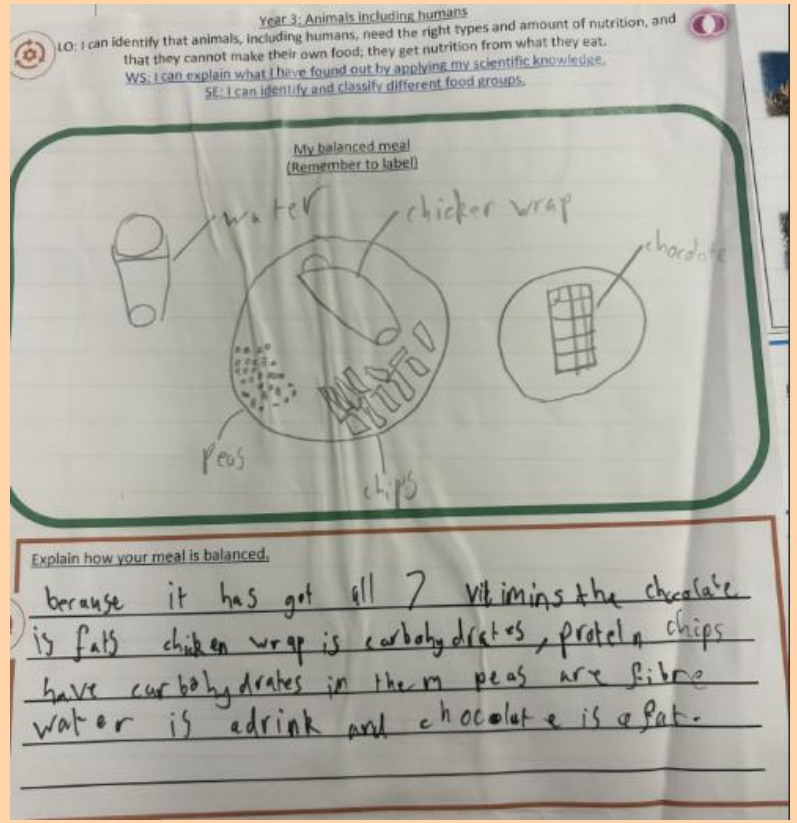
When drawing conclusions, straightforward evidence should be used to support their findings.

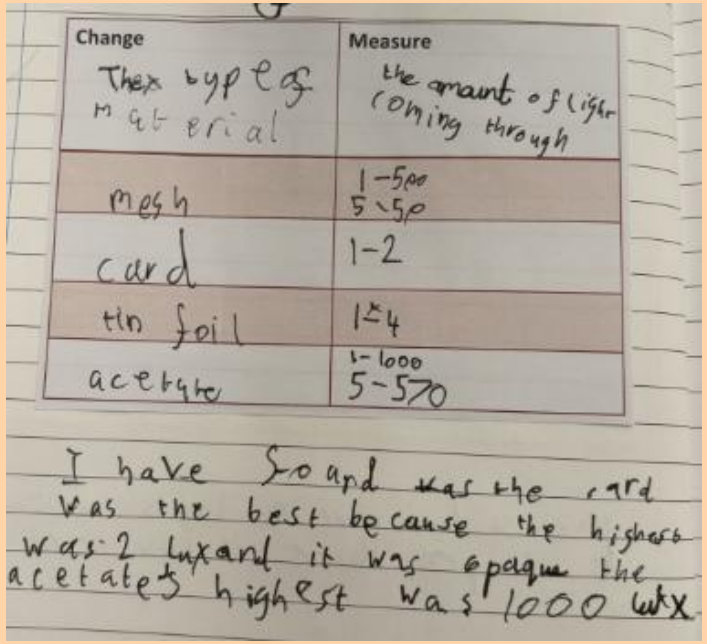
Castle View Primary School Science Curriculum

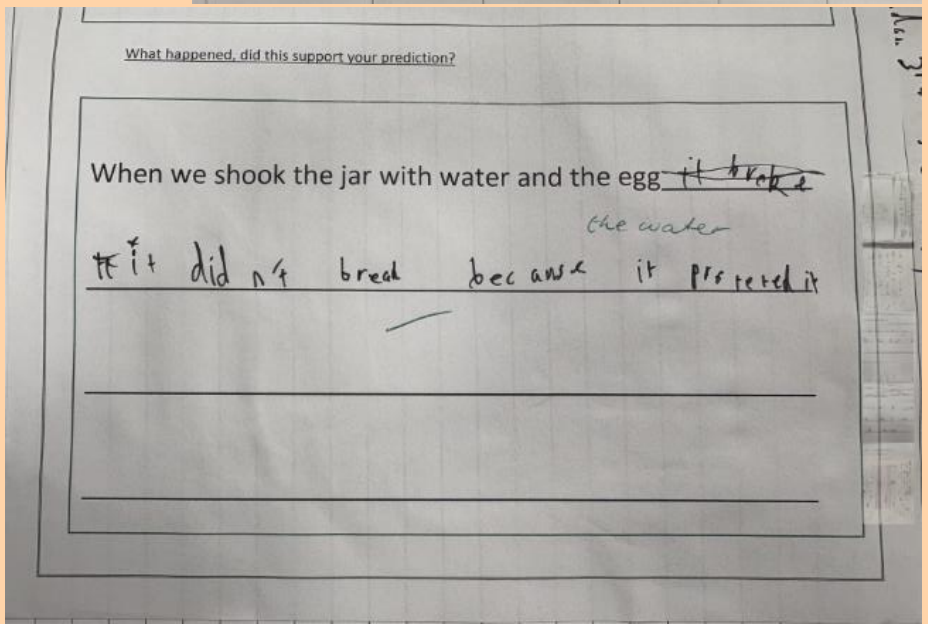
Year 3 – Working Scientifically











Castle View Primary School Science Curriculum

Year 4 – Working Scientifically

Statutory Requirements:

To work scientifically in Year 4, pupils should:

- Ask relevant questions and use different types of scientific enquiries to answer them.
- Set up simple practical enquiries, 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.
- Gather, record, classify and present data in a variety of ways to help in answering questions.
- 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.
- Identify differences, similarities or changes related to simple scientific ideas and processes.
- Use straightforward scientific evidence to answer questions or to support their findings.

Fair Testing:

Before beginning an enquiry, pupils should be given greater time to explore the most appropriate type of enquiry to answer questions.

After a question has been generated, an equipment list should be written using bullet points. (While there are no grammatical rules here, a lowercase format should be favoured.)

Predictions should be written with thought using the conjunctions *'when'* and *'because'* to provide a logical explanation for their thought.

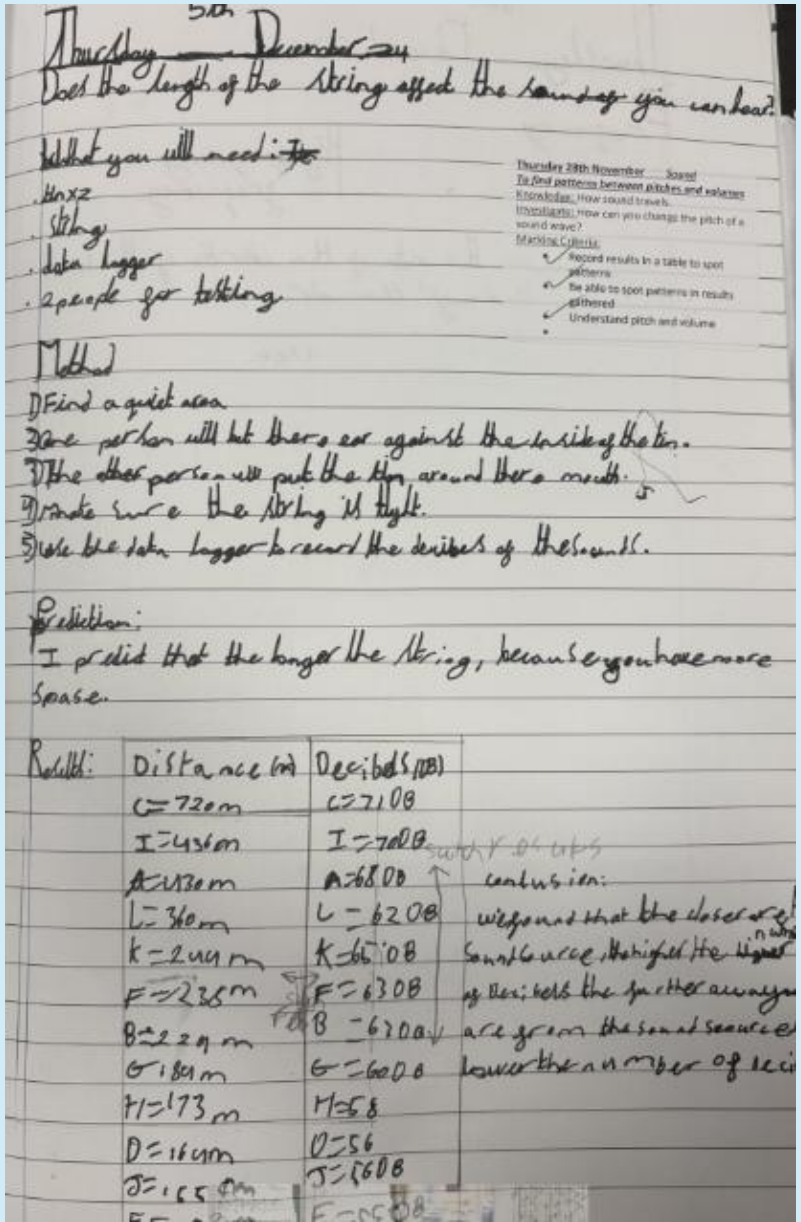
Pupils should record their observations in a variety of ways, including a table of results, drawings, labelled diagrams, bar charts and keys.

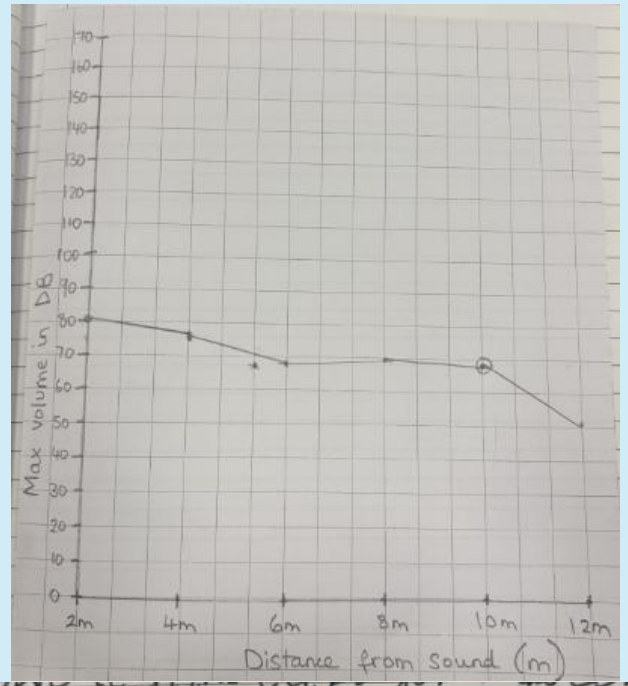
When drawing conclusions, straightforward evidence should be used to support their findings, and they should comment on similarities and differences that they have found. Pupils should also learn to comment on or suggest improvements for further investigative work.

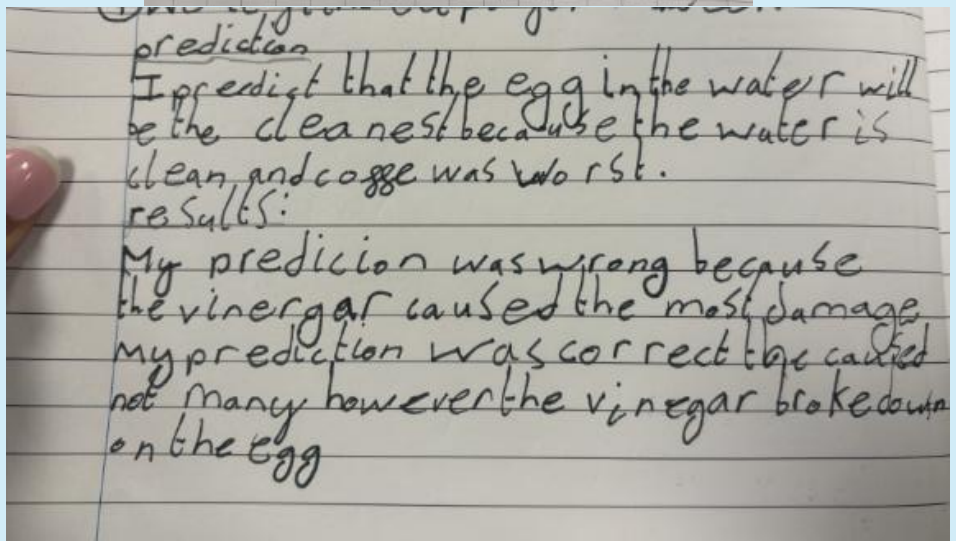
There should be careful thought in Year 4 about the presentation and layout of a written fair test.

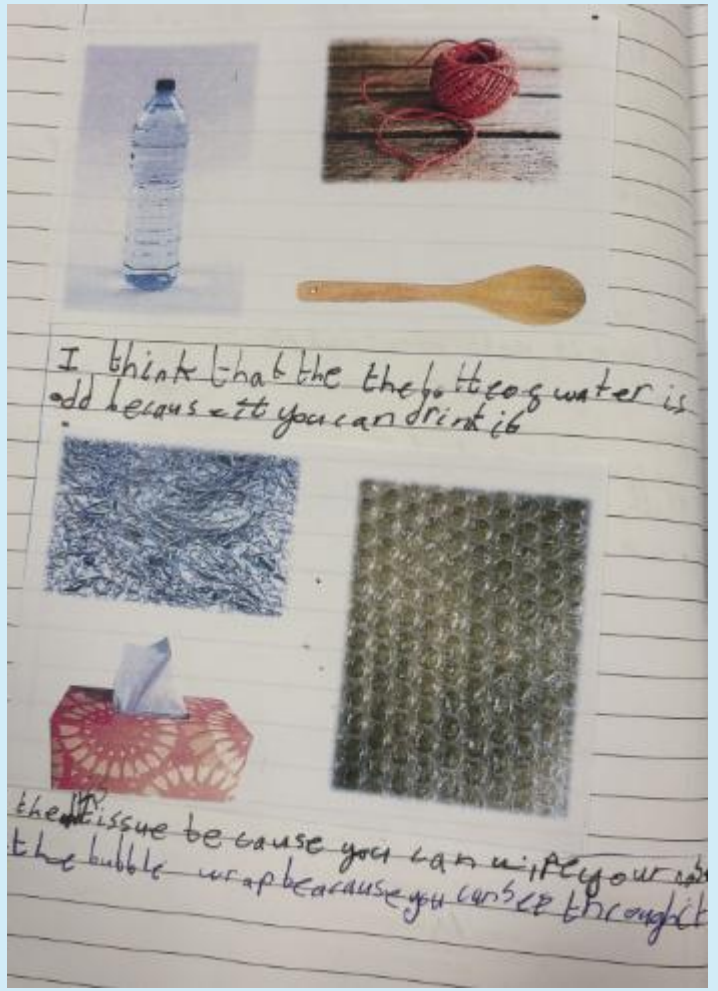
Castle View Primary School Science Curriculum

Year 4 – Working Scientifically









Castle View Primary School Science Curriculum

Year 5 – Working Scientifically

Statutory Requirements:

To work scientifically in Year 5, pupils should:

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- 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.
- Identify scientific evidence that has been used to support or refute ideas or arguments.

Fair Testing:

In Upper Key Stage Two, pupils should use their scientific experiences to explore ideas and raise questions. They should plan different types of scientific enquiry, knowing where to control variables.

Pupils should write an equipment list following the questions, where bullets points are favoured to present the equipment. Pupils should be aware of grammatical rules and ensure that bullets points are written with lowercase information.

Pupils should have a clear understanding of variables and be aware of which variables must be kept the same and which must be changed in order to achieve an outcome.

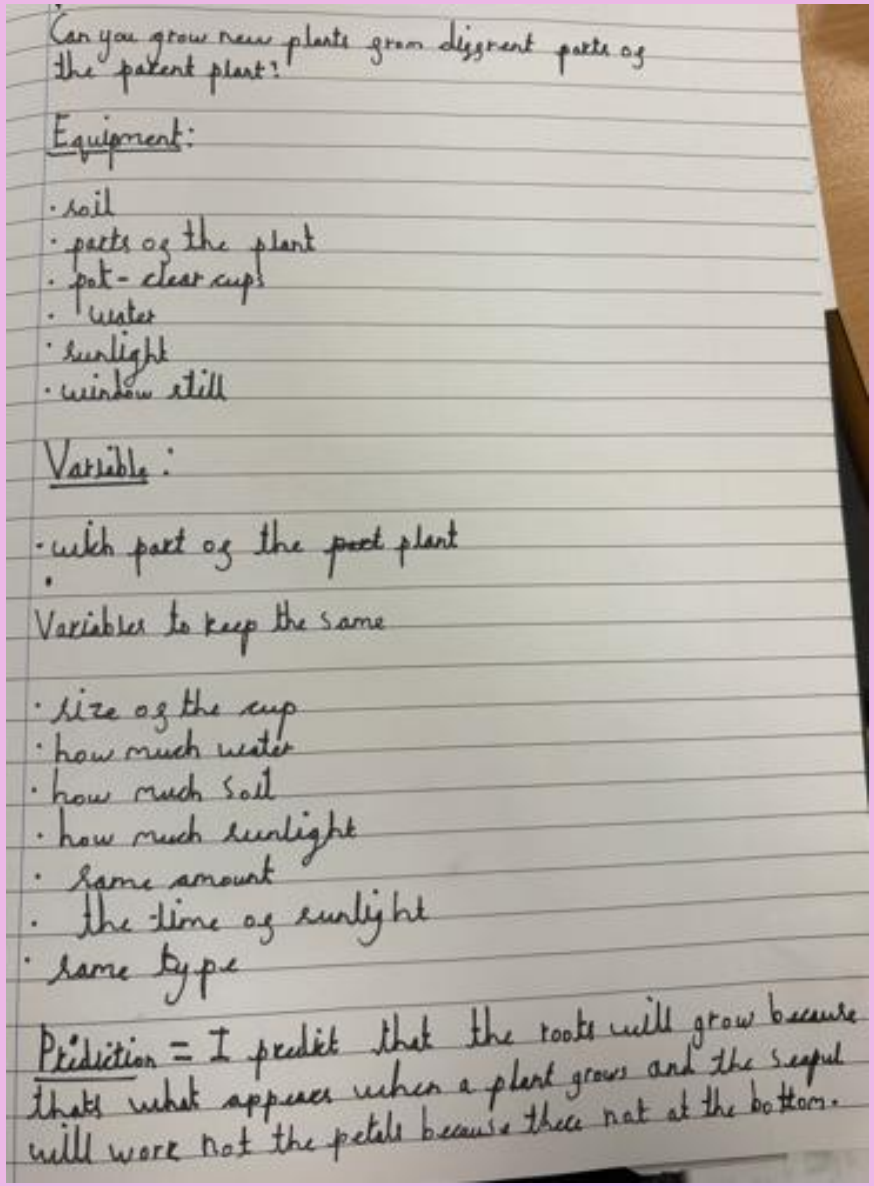
When writing predictions, it is important that pupils draw upon prior or existing knowledge to support their reasoning.

When reporting on findings, pupils may present their information in tables, labelled diagrams, graphs and charts. Pupils should have more precision when drawing tables, including accuracy with plotting results.

When drawing conclusions, evidence should be used to support their findings, and they should comment on similarities and differences that they have found. Pupils should also learn to comment on or suggest improvements for further investigative work. Pupils should include test results within their conclusions to provide evidence for their findings.

Castle View Primary School Science Curriculum

Year 5 – Working Scientifically



Can you grow new plants from diffrent parts of the parent plant?

Equipment:

- soil
- parts of the plant
- pot - clear cups
- water
- sunlight
- window still

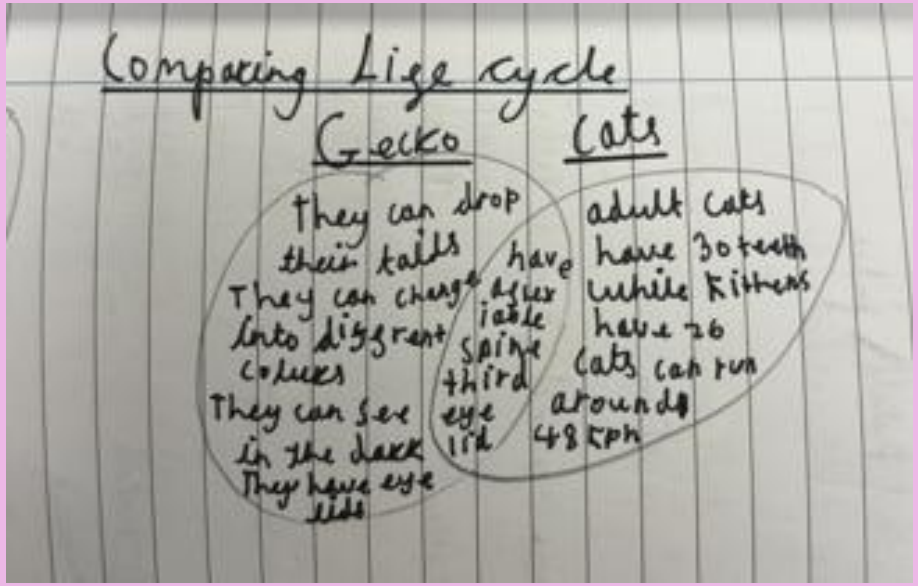
Variable:

- with part of the root plant

Variables to keep the same

- size of the cup
- how much water
- how much soil
- how much sunlight
- same amount
- the time of sunlight
- same type

Prediction = I predict that the roots will grow because that's what appears when a plant grows and the seeds will were not the petals because there not at the bottom.



Comparing Life cycle

Gecko

Cats

They can drop their tails

They can change into diffrent colours

They can see in the dark

They have eye lids

have eyes

eyelids

saliva

third eye lid

adult cats have 30 teeth

while Kittens have 26

Cats can run around 48 KPH

Castle View Primary School Science Curriculum

Year 6 – Working Scientifically

Statutory Requirements:

To work scientifically in Year 6, pupils should:

- Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
- 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.
- Identify scientific evidence that has been used to support or refute ideas or arguments.

Fair Testing:

In Upper Key Stage Two, pupils should use their scientific experiences to explore ideas and raise questions. They should plan different types of scientific enquiry, knowing where to control variables.

Pupils in Year 6 should be competent in selecting the equipment they need themselves and setting up an enquiry independently. They should be familiar with using a range of materials to support their research, including data loggers, thermometers and pulsometers.

Pupils should write an equipment list following the questions, where bullets points are favoured to present the equipment. Pupils should be aware of grammatical rules and ensure that bullets points are written with lowercase information.

Pupils should have a clear understanding of variables and be aware of which variables must be kept the same and which must be changed in order to achieve an outcome.

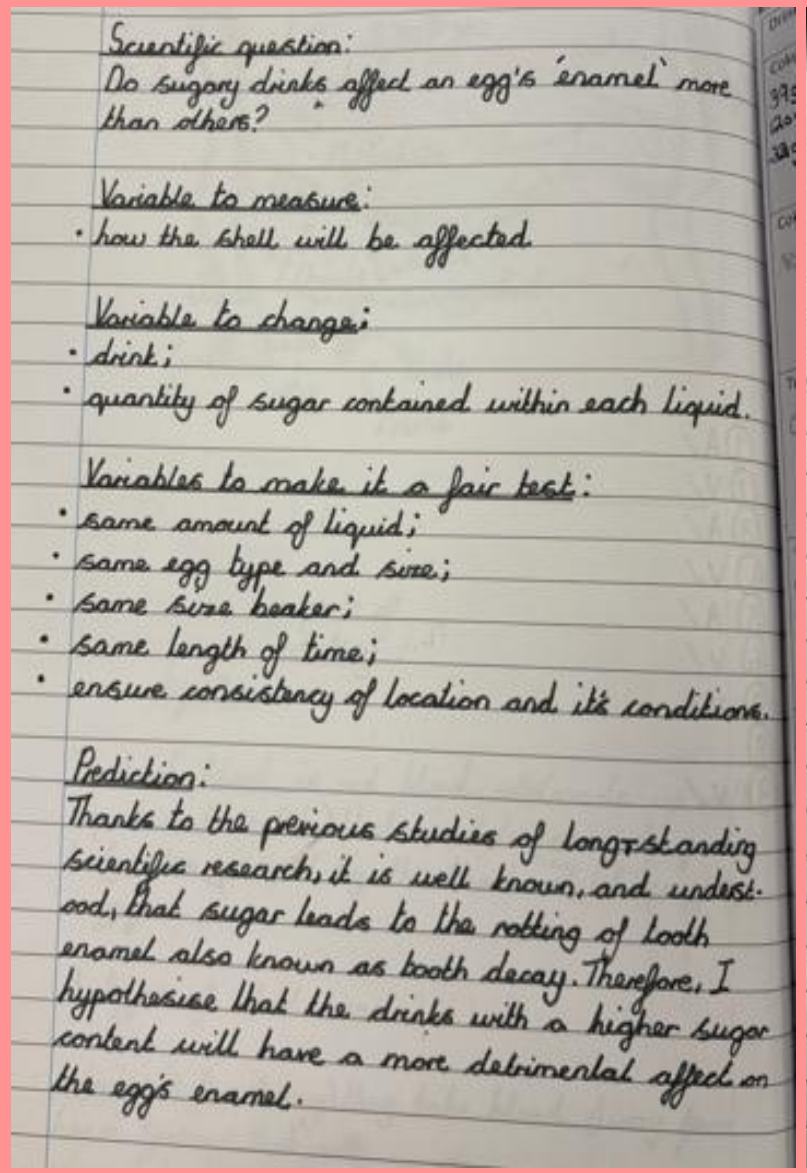
When writing predictions, it is important that pupils draw upon prior or existing knowledge to support their reasoning.

When reporting on findings, pupils may present their information in tables, labelled diagrams, graphs and charts. Pupils should have more precision when drawing tables, including accuracy with plotting results.

When drawing conclusions, evidence should be used to support their findings, and they should comment on similarities and differences that they have found. Pupils should also learn to comment on or suggest improvements for further investigative work. Pupils should include test results within their conclusions to provide evidence for their findings.

Castle View Primary School Science Curriculum

Year 6 – Working Scientifically



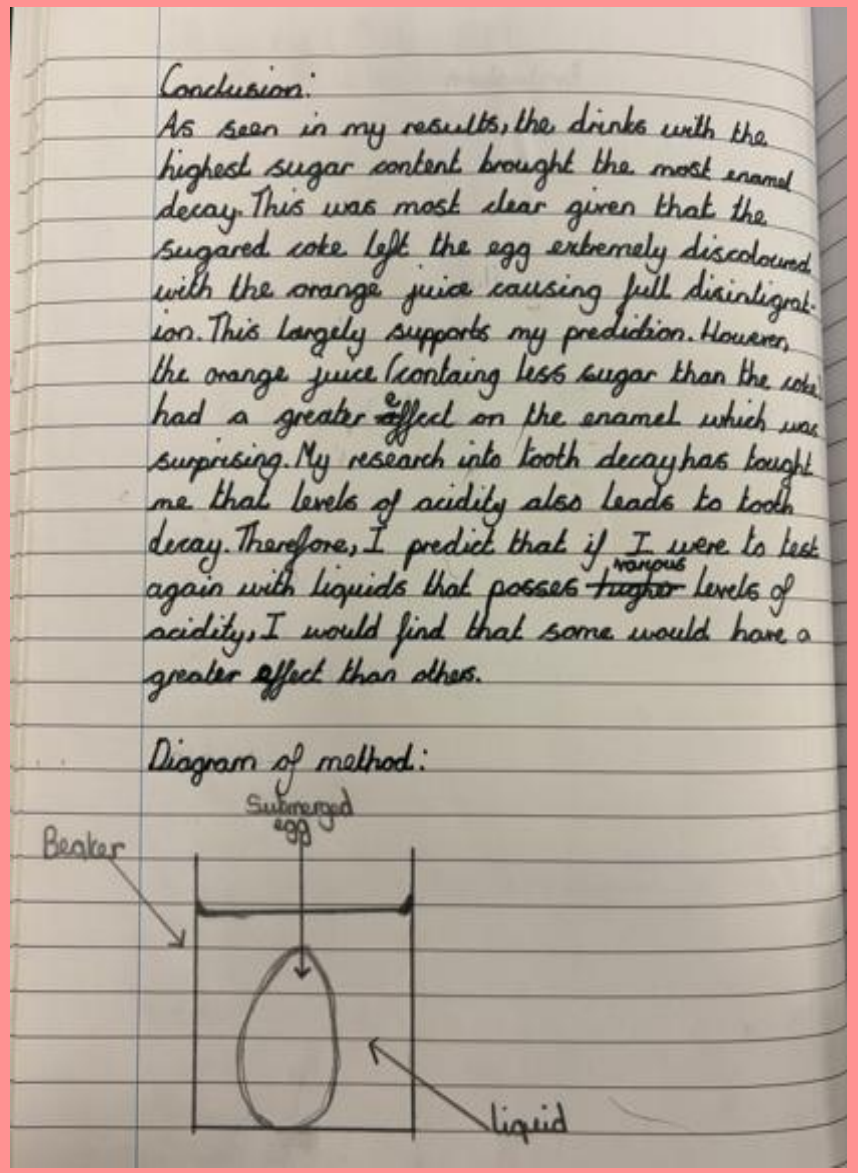
Scientific question:
Do sugary drinks affect an egg's 'enamel' more than others?

Variable to measure:
- how the shell will be affected

Variable to change:
- drink;
- quantity of sugar contained within each liquid.

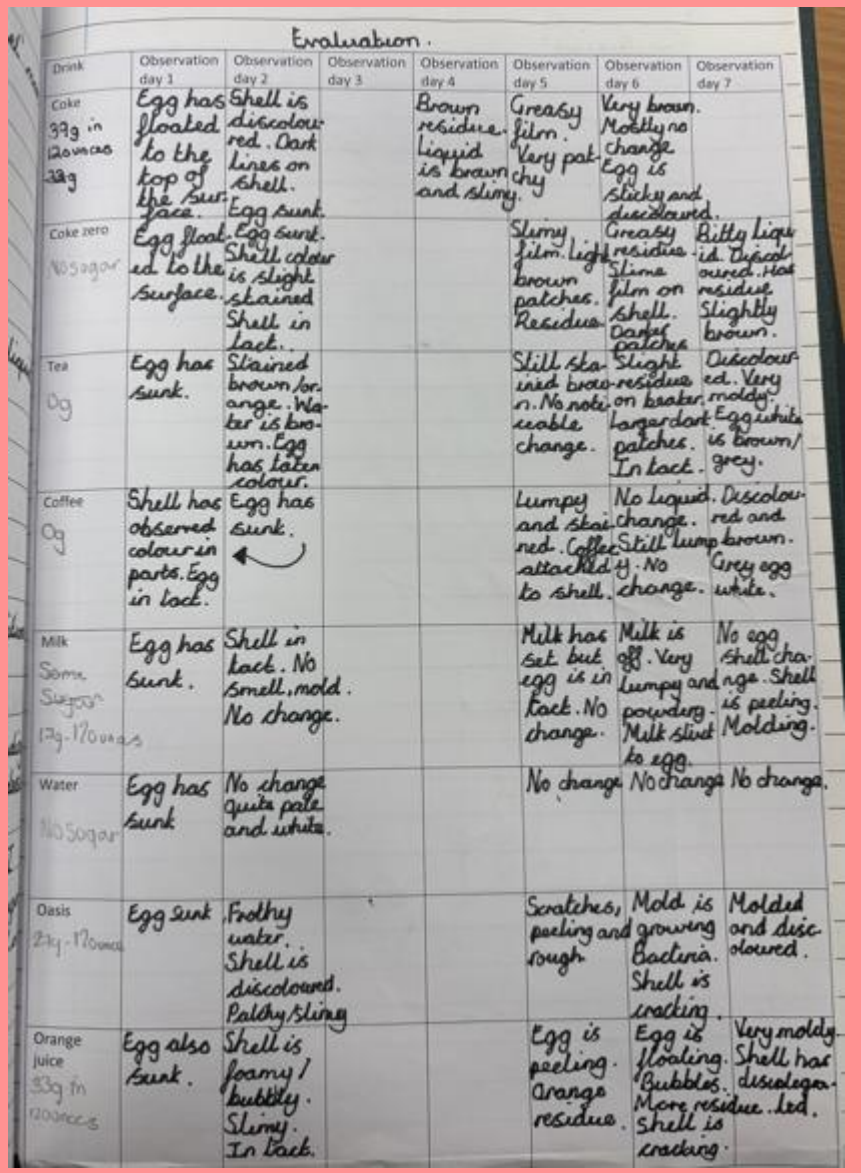
Variables to make it a fair test:
- same amount of liquid;
- same egg type and size;
- same size beaker;
- same length of time;
- ensure consistency of location and it's conditions.

Prediction:
Thanks to the previous studies of long-standing scientific research, it is well known, and understood, that sugar leads to the rotting of tooth enamel also known as tooth decay. Therefore, I hypothesise that the drinks with a higher sugar content will have a more detrimental affect on the egg's enamel.



Conclusion:
As seen in my results, the drinks with the highest sugar content brought the most enamel decay. This was most clear given that the sugared coke left the egg extremely discoloured with the orange juice causing full disintigration. This largely supports my prediction. However, the orange juice (containg less sugar than the coke) had a greater ~~effect~~ on the enamel which was surprising. My research into tooth decay has taught me that levels of acidity also leads to tooth decay. Therefore, I predict that if I were to test again with liquids that posses ~~higher~~ various levels of acidity, I would find that some would have a greater effect than others.

Diagram of method:



Evaluation.

Drink	Observation day 1	Observation day 2	Observation day 3	Observation day 4	Observation day 5	Observation day 6	Observation day 7
Coke 39g in 12ounces 39g	Egg has floated to the top of the surface.	Shell is discoloured. Dark lines on shell. Egg sunk.		Brown residue. Liquid is brown and slimy.	Greasy film. Very patchy	Very brown. Mostly no change Egg is sticky and discoloured.	
Coke zero No sugar	Egg floated to the surface.	Egg sunk. Shell colour is slight stained Shell in tact.			Slimy film. Light brown patches. Residue	Greasy residue Slime film on shell. Darker patches	Bitty liquid. Thick covered. Has residue Slightly brown.
Tea 0g	Egg has sunk.	Stained brown/orange. Water is brown. Egg has taken colour.			Still stained brown. No noticeable change.	Slight residue on beaker. Larger dark patches. In tact.	Discoloured. Very mouldy. Egg white is brown/grey.
Coffee 0g	Shell has observed colour in parts. Egg in tact.	Egg has sunk.			Lumpy and stained. Coffee attached to shell.	No liquid. change. Still lumpy. No change.	Discoloured and brown. Grey egg white.
Milk 50ml Sugar 17g-170ounces	Egg has sunk.	Shell in tact. No smell, mold. No change.			Milk has set but egg is in tact. No change.	Milk is off. Very lumpy and powdery. Milk stuck to egg.	No egg shell change. Shell is peeling. Molding.
Water No Sugar	Egg has sunk	No change quite pale and white.			No change	No change	No change.
Oasis 2kg-170ounces	Egg sunk	Frothy water. Shell is discoloured. Patchy/slimy			Scratches, peeling and rough	Mold is growing Bacteria. Shell is cracking.	Molded and discoloured.
Orange juice 33g in 12ounces	Egg also sunk.	Shell is foamy/bubbly. Slimy. In tact.			Egg is peeling. Orange residue.	Egg is floating. Bubbles. More residue. Shell is cracking.	Very moldy. Shell has disolega-ted.

Castle View Primary School Science Curriculum

Year 6 – Working Scientifically