

IT'S NOT FAIR, OR IS IT?



A guide to the different
types of science enquiry
used in primary schools.

**Second
Edition**

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OBSERVATION OVER TIME ENQUIRIES: Introduction

	Explore	Plan	Do	Review
Late Primary	This stage provides an opportunity for exploration	<ul style="list-style-type: none"> I can pose a science enquiry question. I recognise when an observation over time enquiry is the best way to answer my question. I decide how detailed my observations need to be, and what equipment to use, to make my measurements as accurate as possible. I suggest how data could be recorded and plan how to do this, designing a table if appropriate. 	<ul style="list-style-type: none"> I make detailed observations to collect qualitative data. I use equipment accurately to collect measured data using standard measures. I record data appropriately. I predict what will happen next and why based on the pattern in the data and my scientific knowledge. 	<ul style="list-style-type: none"> I present data in line graphs. I draw conclusions about changes from my data. I recognise the effect of changing the timing and number of observations. I explain using scientific knowledge how I have observed over time and apply what I have found out. I evaluate my methods.
Middle Primary		<ul style="list-style-type: none"> I talk about things changing and recognise when questions can be answered by observation over time enquiries. I decide what observations to make, how often and what equipment to use. With help, I design a table, or plan how to use another format for recording my data. 	<ul style="list-style-type: none"> I make detailed observations to collect data. I use equipment to collect data using standard measures. I make records using tables. I make suggestions for what will happen next and why. 	<ul style="list-style-type: none"> I present data in bar charts. I draw simple conclusions from the changes I observe. I talk about changes using relevant science vocabulary. I apply what I have found out through observing over time. I suggest improvements to the ways in which I observe over time.
Early Primary		<ul style="list-style-type: none"> With help, I ask questions about how and why things change. With help, I identify changes to observe and measure and suggest what to do. 	<ul style="list-style-type: none"> I make observations and use simple equipment, including cameras, to record changes using non-standard measures. I record my observations in words or pictures, or in simple prepared formats such as tables and charts. I make suggestions for what change will happen next, based on what I have observed. 	<ul style="list-style-type: none"> With help, I present my findings in logs, simple images and graphs. I identify simple changes. I sequence the changes. I use simple science vocabulary to talk about changes that I have observed. I talk about whether the change was what I expected. I respond to prompts to apply what I have found out through observing over time.
Foundation		<ul style="list-style-type: none"> I notice and am curious about things that change. With help, I ask questions about things changing. With help, I talk about my ideas for finding out how things change 	<ul style="list-style-type: none"> I use my senses to observe changes. With help, I use simple equipment to observe and record changes, for example, magnifiers, string. With help, I make simple records of how things change, in drawings, or using a camera. I can make suggestions for what change will happen next. 	<ul style="list-style-type: none"> I talk about what I have done and the changes that I noticed. With help, I present my findings in simple ways.

Progression from simple to complex, familiar to unfamiliar, concrete to abstract. Children become more independent, systematic and accurate in their working, and increasingly build on scientific ideas in their predictions and explanations.

SEASONAL CHANGES



The seasonal nature of the year provides an excellent focus for children to observe changes. Children may notice differences around the school, on their journey to school and in their local environment. Through an observation over time enquiry, children can observe changes in the weather, plants and animals across autumn, winter, spring and summer.

Focused observations should be timetabled at least four times across the year, with other regular check-ins to maintain children's interest. Children can collect data to demonstrate how the seasons change over the year and this can be recorded through visual means such as classroom displays, digital interactive whiteboard records and floor books. Children will need access to a variety of plants. This should either be within the school grounds or a local green area.

The teacher will need to be sure that there are opportunities for the children to experience the following:

- how weather changes across the year and how the weather can change within a season, but that the overall weather each season, particularly the temperature, is similar;
- that different types of weather are associated with a particular season but can happen across the year (for example, rain can happen in all four seasons);
- day length changes across the year;
- how some animals (and their habits) can change over the year; and
- how some plants change across the year.

Health and Safety Notes

- Make sure that children wear appropriate footwear and clothing.
- The apparent position of the Sun in the sky across the year could be studied as part of a 'seasonal change' topic, but it is best avoided as part of an observation over time enquiry in the early primary phase as a young child may be tempted to look at the Sun with their naked eye.
- Ensure that you follow the school's guidelines for working with children outdoors, including levels of staff supervision.
- Additional guidance can be found by consulting CLEAPSS, SSERC and ASE *Be Safe!*.

THE SCIENCE ENQUIRY

EXPLORE

Build on children's spontaneous observations and questions

Children should already have an awareness of the different seasons. Links can be made to the clothes that they wear in different seasons depending on the weather. The length of daylight can be highlighted.



'The tree outside my window has no leaves on it any more. Why has this happened?'

'I don't need my coat any more. I was sweating when I wore it yesterday.'

'It's snowing. Does it ever snow in the summer?'

'I haven't seen any bees for a long time. Where have they gone?'

Provide starting points for exploration

Ask children where and when they have noticed that plants, animals, daylight hours and the weather have changed throughout the year. Encourage children to think and talk about their experiences outside of school. Children's observations of, and questions about, seasonal change can be focused by the teachers through more precise questions or statements.



'Do all trees lose their leaves in the winter?'

'You have all been noticing changes in the visitors to our bird feeder. Do we see birds in every season?'

'What happens to the temperature at different times of the year?'

'It snowed last week, didn't it? Were we expecting it to snow at this time of year?'

'Does it always get dark at 6 o'clock?'

PLAN

Plan the science enquiry

Children will need help in deciding what observations to make and how often and how they will record the data collected. This could be through an individual or group diary. Photographs, drawings or simple sentences may be used to do this. The following are suggestions for observations:

1. Pick two trees – an evergreen and a deciduous tree – and note the changes over the year and/or look at bulbs/other flowering plants.
2. Set up a bird feeder/bird table and note any changes to the animals that visit and/or look for invertebrates in the school grounds.
3. Record the weather over a week (at the same time each day) and repeat four times during the year for each season. Recording could include aspects such as: temperature; rain/snow; cloud/mist/fog; sunny; windy/stormy.
4. Sunrise and sunset.

This example will use the context of an observation over time enquiry focusing on two trees. Support children to develop an observation over time enquiry question. From this point forward, for the purpose of this science enquiry, the question is: 'What happens to our two trees over the four seasons?'



'Let's go to our local park and choose two trees to observe over the year.'

'You need to think about how to organise your observations. What sort of observations about the trees shall we make? What do you think might change?'

'How will you record your observations?'

'How often shall we make observations to record what happens to the trees?'

Health and Safety Notes

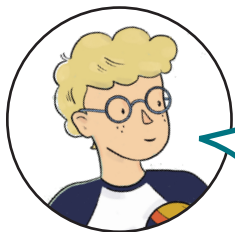
- Work on a non-slip surface and mop up spills promptly to avoid slipping.
- Additional guidance can be found by consulting CLEAPSS, SSERC and ASE Be Safe!.

THE SCIENCE ENQUIRY

EXPLORE

Build on children's spontaneous observations and questions

Encourage children to put a range of different materials, objects and containers (monitoring for suitability) into the water tray or other large container and talk about what they see and feel. NB: If not using a water tray, this will work with as little as a litre of water, depending on the size of the objects.



'The stones have all sunk to the bottom because they are heavy.'

'All the corks are floating on top.'

'It's hard to push the big ball down. When I stop pushing it just comes back up again.'

'I can make my plasticine into a boat.'

'If I put too many animals in the boat it will sink.'

Provide starting points for exploration

Children's observations of, and questions about, different objects in water can be focused by the teacher through exploratory questions or statements.

They need to encounter natural and made objects of different shapes, weights and sizes, some of them hollow, and made from different materials.



'Can you find any heavy objects that float?'

'Can you find any small objects that sink?'

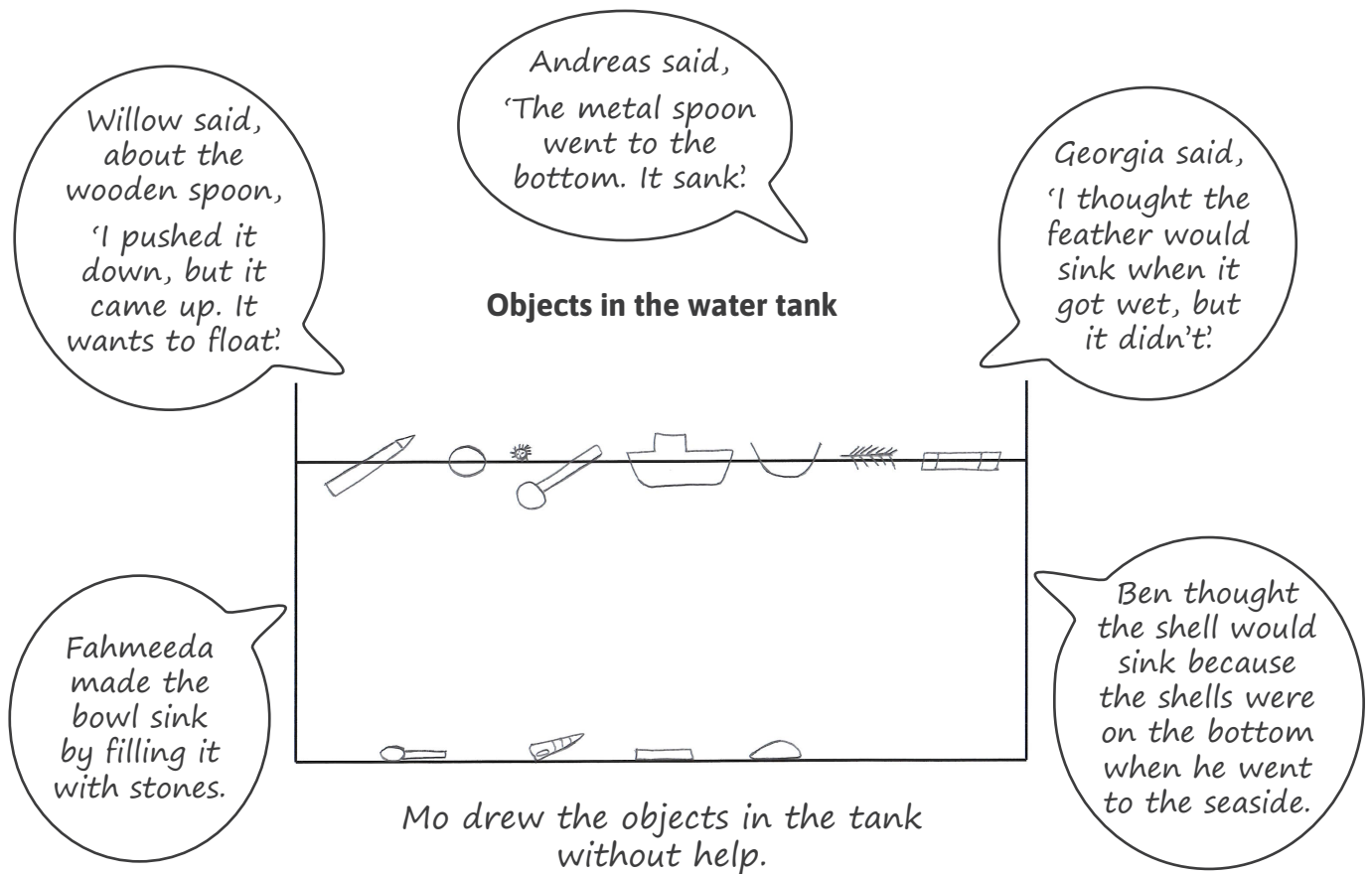
'My stick floats? Do all the sticks float? What about the wooden toys?'

'The milk carton floats. What will happen if we take the top off?'

'Let's make boats. What can we use? What shape does it need to be?'

Which objects float?

On Monday Rabbits class tested lots of objects to see which ones would float and which ones would sink.



We sorted the objects into ones that float and ones that sink. Green group needed help to put them in the correct box. On Wednesday Imran and Alfie chose to test their own objects and sort them into boxes.

