#### **Primary Science for ECTs**

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#### Spring Learning





#### Learning outcomes

- •Share experiences of ITT science and teaching science
- •Explore curriculum coverage and content
- •Plan Science Lessons
- •Explore the 5 types of enquiry
- •Gain some practical ideas for teaching science



#### Action Planning









#### Your experiences of teaching science





# What do you think the aims of the Primary Science Curriculum are?

#### Aims

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.



#### Planning a science lesson

• Where do I start?

The national curriculum in England

Key stages 1 and 2 framework document



Google











52

#### Science Lessons

All good science lessons should have both a conceptual understanding and a working scientifically objective.

There should be opportunities for pupils to make progress and opportunities for assessment.





#### Conceptual Understanding

### The national curriculum in England







## Working Scientifically in the Curriculum

There are non-statutory notes and guidance giving examples of how 'working scientifically' might be embedded, focusing on the key features of scientific enquiry.

#### Plants

#### Statutory requirements

Pupils should be taught to:

- observe and describe how seeds and bulbs grow into mature plants
- find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

#### Notes and guidance (non-statutory)

Pupils should use the local environment throughout the year to observe how different plants grow. Pupils should be introduced to the requirements of plants for germination, growth and survival, as well as to the processes of reproduction and growth in plants.

Note: Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.

Pupils might work scientifically by: observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or observing similar plants at different stages of growth; setting up a comparative test to show that plants need light and water to stay healthy.



#### 5 Types of Enquiry

#### The nature, processes and methods of science

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.



## 5 Types of Enquiry

- Observing over time
- Pattern seeking
- Identifying, classifying and grouping
- Comparative and fair testing
- Research using secondary sources



# 5 Types of Enquiry in EYFS

ELG: The Natural World

Children at the expected level of development will:

- Explore the natural world around them, making observations and drawing pictures of animals and plants;
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.





## **Progression in Working Scientifically**

'KS1 - pupils should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests and finding things out using secondary sources of information.'

Science programme of study 2014



#### **Progression in Working Scientifically**

'LKS2 - Pupils should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information.'

Science programme of study 2014



#### **Progression in Working Scientifically**

'UKS2 – Pupils should select the most appropriate ways to answer science questions using different types of scientific enquiry to answer their own questions, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information.'

Science programme of study 2014



#### **Comparative and Fair Tests**





#### Research using secondary sources





#### Pattern seeking





https://www.google.com/url?sa=i&url=https%3A%2F%2Flink.springer.com%2Fchapter%2F10.1007%2F978-3-030-22757-9\_21&psig=AOvVawOotwbtLHkd2CN5hSLLl6Bc&ust=1637672001010000&source=images&cd=vfe&ved=0CAsQjRxqF woTCLCo8ZiCrPQCFQAAAAAAAAAAAAAAA

#### Observing over time





## Identifying, classifying and grouping



https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.vecteezy.com%2Fvector-art%2F682467-set-of-random-objects&psig=AOvVaw2m4mmZ99sdcP6w1fcw\_wZ1&ust=1587707769153000&source=images&cd=vfe&ved=2ah UKEwjnmPy97v30AhUP2eAKHUnbCowQr4kDegUIARCeAg



#### Resources to support the 5 types of enquiry

#### lt's not fair or is it?

a guide to developing children's ideas through primary science enquiry



Written and edited by Jane Turner, Brenda Keogh, Stuart Naylor and Liz Lawrence With contributions from

The ASE Primary Science Committee





making physics matter





# Planning for the 5 types of enquiry

Year 2	Observing over time	Pattern seeking	Identifying, classifying and grouping	Comparative and fair testing	Research using secondary sources
Living things and their habitats					
Plants					
Animals including humans					
Uses of everyday materials					



#### Planning for Working Scientifically



#### Planning for Working Scientifically

To identify the effects of air resistance

To plan a fair test, recognising and controlling variables where necessary What is the relationship between the size of the canopy and the speed at which it falls?

Fair testing



#### Planning for Working Scientifically

Compare and group together a variety of everyday materials on the basis of their simple physical properties

How can we group these materials?

Identifying, classifying and grouping



Identifying and classifying

#### Action planning and evaluations



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