PLAN Primary Science – Supporting Assessment

Plants Year 3-Max

The Association for Science Education
Promoting Excellence in Science Teaching and Learning

This resource has been developed by the Pan London Assessment Network and is supported by the Association for Science Education.

PLAN Primary Science - Supporting Assessment

PLAN Primary Science is a set of resources produced to enable teachers to have a clearer understanding of National Curriculum expectations for meeting the standard. Annotated collections of children's work provide examples of what working at the expected standard for primary science might look like for the knowledge and conceptual understanding statements of the programmes of study (POS).

It is not the intention of these resources to specifically exemplify the working scientifically statements. However, aspects of working scientifically have been shown as an integral part of the teaching and learning of the knowledge and concepts.

The resources provided have been cross moderated multiple times before publishing so that they can be used with confidence by teachers and subject leaders.

Each collection of work shows one example of how a pupil has met National Curriculum statements for a particular area of content but these are not intended to be *the* definitive way of teaching these statements.

Structure of the resources

Each resource contains the relevant National Curriculum statements for the unit of work and prior learning, a planning matrix, annotated work and a summary sheet. The matrix provides an interpretation of the key learning of the National Curriculum statements, and suggestions of key vocabulary. In order to be meet the expectations pupils must firstly understand the key concept and then be provided with opportunities to apply that knowledge. This is a key planning tool.

		Key Learning	**Possible Evidence**
Secure	Show understanding of a concept by using scientific vocabulary correctly	Overview paragraph describing curriculum Key vocabulary – list of words	Possible ways to demonstrate key learning, particularly correct usage of vocabulary
	Apply knowledge in familiar related contexts	Suggestions of contexts to use.	Possible ways to demonstrate that a pupil has gone beyond recall of facts and can **apply** the key learning, for example using the vocabulary and basic principles to produce explanations, usually within Working Scientifically contexts.

Contents of the materials

Please note: The NC statements for each topic area for the relevant year group are stated on the slide. Only the **statements in bold on that** slide have been exemplified. In these cases the teachers have chosen to split the statements within the topic area to teach at different times.

The prior NC statements relevant to the topic area are also stated and use to determine pupils' knowledge at the start of the unit.

Each slide has been annotated with coloured text. Please see key below:

Red	Commentary to explain how evidence meets/does not meet NC statements
Blue	Commentary to highlight features of working scientifically
Green	Pupil Speak
Grey	Other relevant information eg. vocabulary used

Prior Learning Year 1 statements

Pupils should be taught to:

- identify and name a variety of common wild and garden plants, including deciduous and evergreen trees (1-Plants)
- identify and describe the basic structure of a variety of common flowering plants, including trees (1-Plants)

Prior Learning Year 2 statements

Pupils should be taught to:

- observe and describe how seeds and bulbs grow into mature plants (2-Plants)
- find out and describe how plants need water, light and a suitable temperature to grow and stay healthy (2-Plants)

Year 3 statements

Pupils should be taught to:

- **identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers (3-Plants)**
- **explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant (3-Plants)**
- **investigate the way in which water is transported within plants (3-Plants)**
- **explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal (3-Plants)**

Later Statement

Pupils **do not** need to be taught content they will learn in later year groups. They can be challenged by applying the content for their year group in broader contexts.

Pupils in Year 5 will be taught to:

- describe the life process of reproduction in some plants and animals (5-Plants)

	Assessment guidance	Key learning	Possible Evidence
SECURE	Shows understanding of a concept using scientific vocabulary correctly	Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth Key vocabulary Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal – wind dispersal, animal dispersal, water dispersal	Can explain the function of the parts of a flowering plant Can describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination Can give different methods of pollination and seed dispersal, including examples
	Applying knowledge in familiar related contexts, including a range of enquiries	Observe what happens to plants over time when the leaves or roots are removed Observe the effect of putting cut white carnations or celery in coloured water Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space Spot flowers, seeds, berries and fruits outside throughout the year Observe flowers carefully to identify the pollen Observe flowers being visited by pollinators e.g. bees and butterflies in the summer Observe seeds being blown from the trees e.g. sycamore seeds Research different types of seed dispersal Classify seeds in a range of ways including by how they are dispersed	Can explain observations made during investigations Can look at the features of seeds to decide on their method of dispersal Can draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal

Looking for seeds, berries and fruits

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Once every half term the children went out to look for seeds, berries, fruits, buds and flowers.

This bush has round red berries.

This is a holly bush. I can tell because it has prickly leaves. It will have red berries at Christmas.

Plant scavenging

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

The children were asked to scavenge for plant parts that were on the floor. When they returned to class they sorted them in different ways.

We have put all the leaves together and the seeds, berries and fruits together.
NB Berries are a type of fruit.

We have put the fruits and berries together as they both contain seeds.

Max sorts the plant parts in different ways.

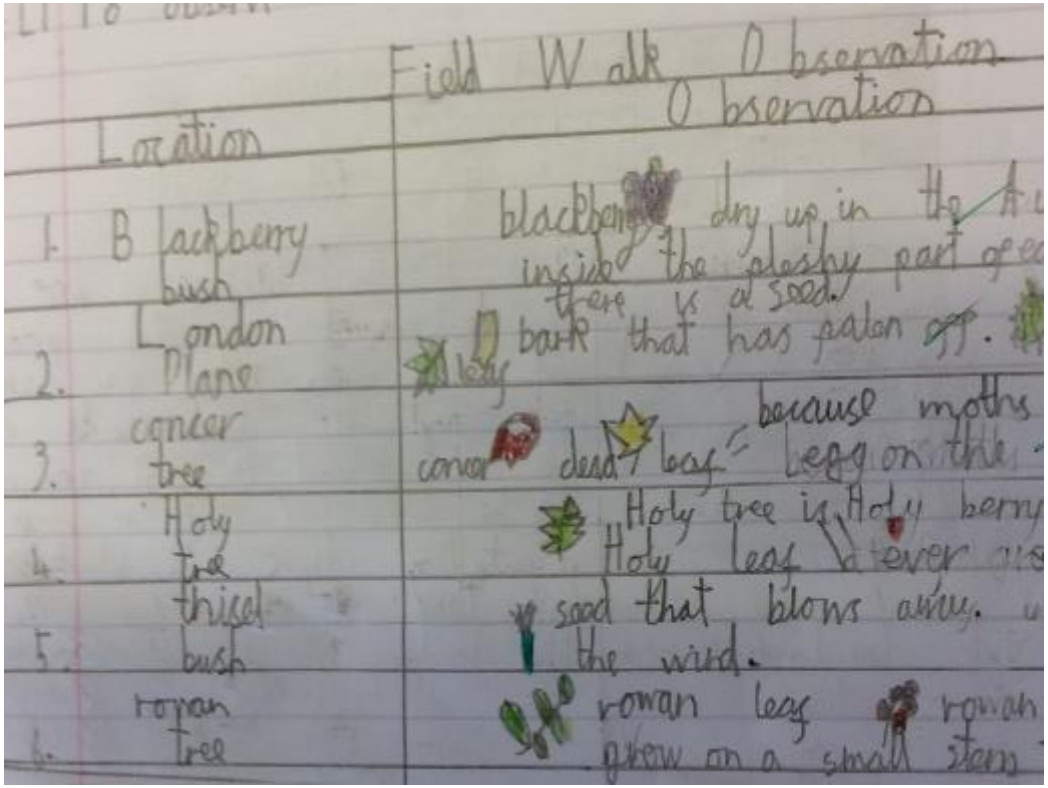
The feather is not from a plant. We have conkers, conker shells, dead leaves and conker in their shells.

Max identifies seeds, berries and fruits.

Close observation of plant parts

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Later in the term the children went out again and this time they were asked to make and record close observations of the parts of a number of different plants which they either already knew the name of from learning in year 1 and 2 or were able to identify using resources the teacher provided.



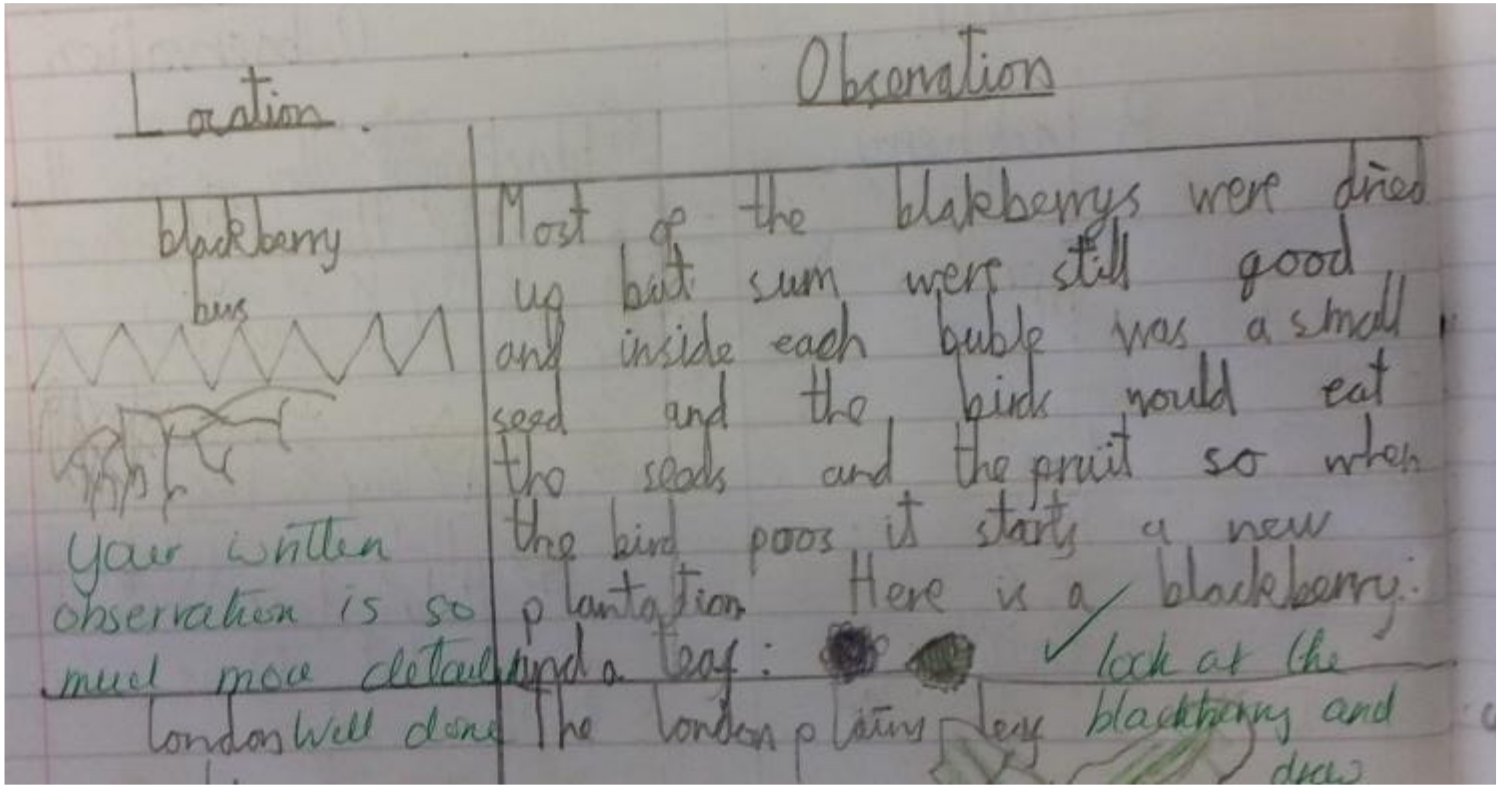
Max draws a table independently to record his observations. He successfully used secondary resources to name the London Plane and rowan tree.

Max describes leaves, stems, fruits and seeds and identifies one type of seed dispersal.

Close observation of plant parts (contd.)

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

On their return the class discussed their written observations and concluded that they had not recorded all the observations that they had made. They were given time to reflect on their observations and record these in more detail.



Max describes the fruit and seeds in more detail.

Max shows that he already knows that seeds grow into new plants (prior learning in year 1 and 2). He also shows that he is aware of another form of seed dispersal.

Plant scavenging (repeated)

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

In later Autumn the children again went out scavenging to collect parts of plants. Max's group sorted in different ways

We have put them into groups. Conkers, bark of the London plane, London plane seed, red berries and yellow leaves.

We sorted them into rough and smooth. We put the London plane in the middle because it is rough on the outside but has soft seeds in the middle.

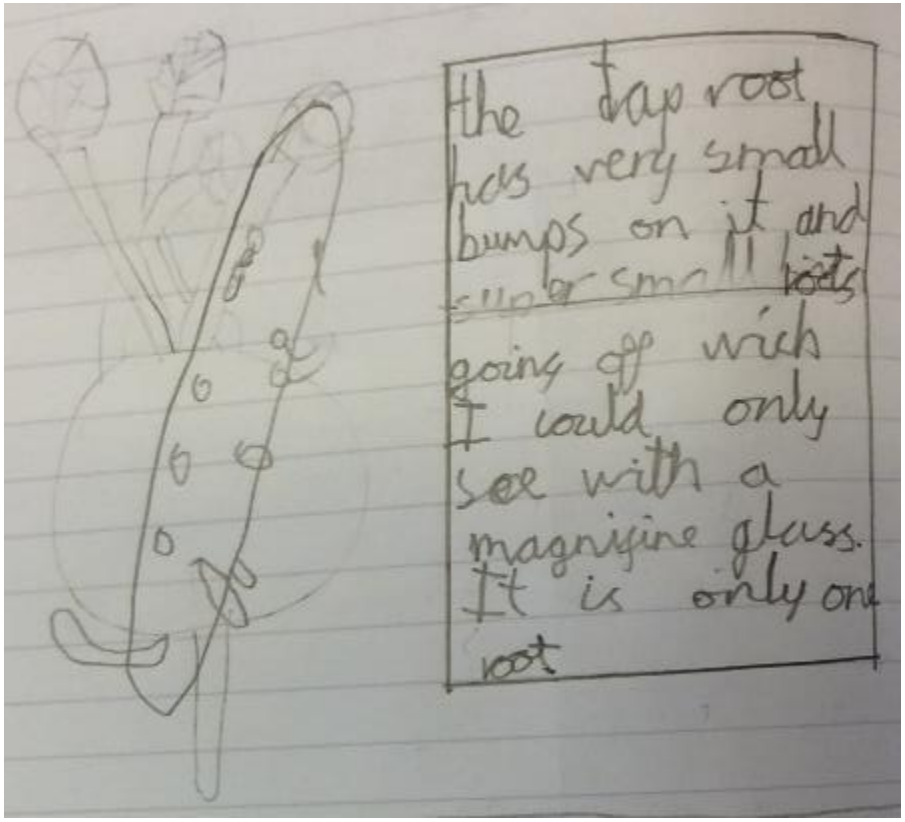
We sorted them into seeds, covering of seeds and leaves.

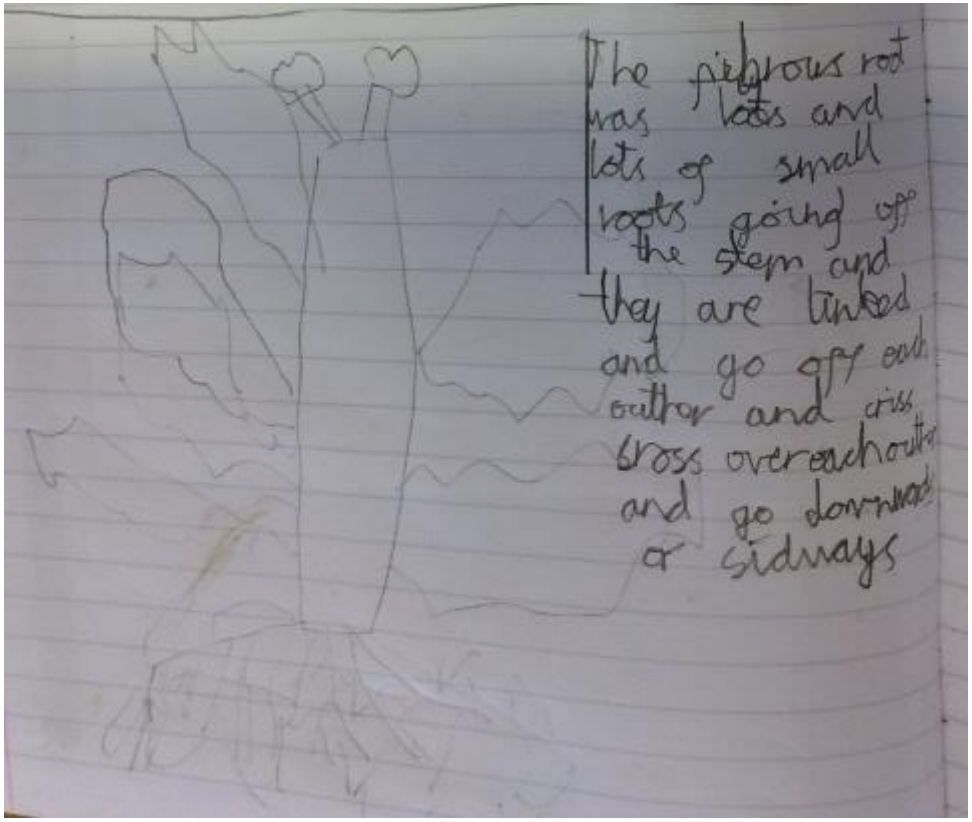
Max sorts using a range of criteria and presents this in an intersecting diagram.

Close observation of roots

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- investigate the way in which water is transported within plants

The children were given two plants – one with a tap root and one with a fibrous root system. They were asked to draw and describe these carefully.





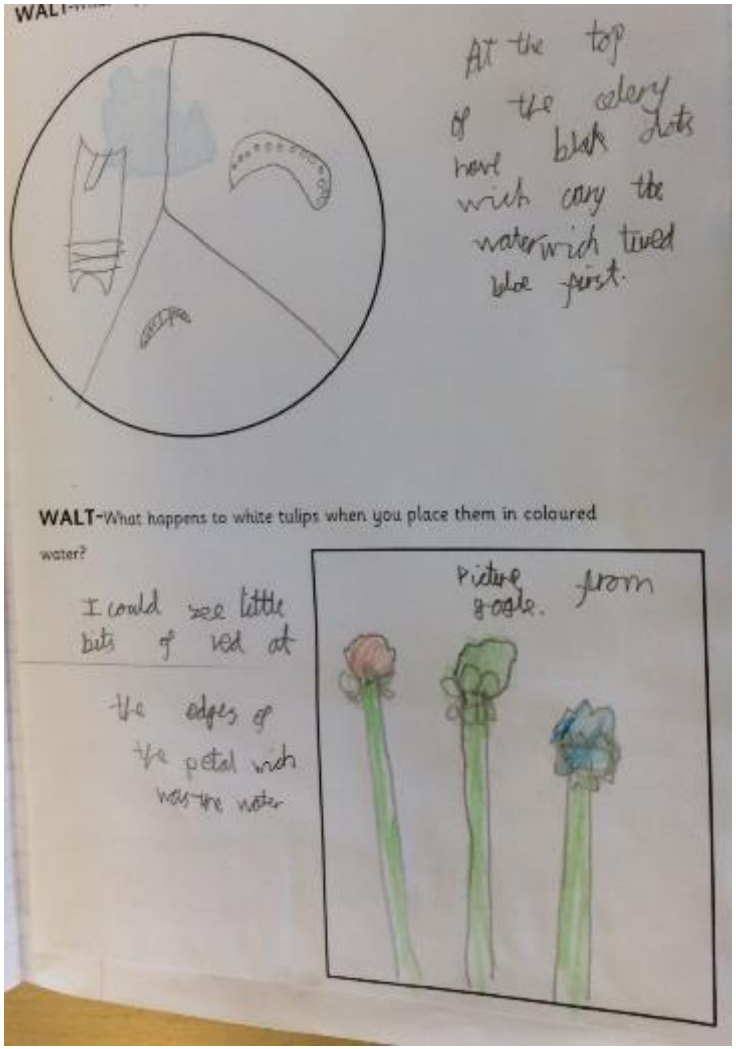
Max uses a magnifying glass to look at the roots in close detail.

The class discussed the role of the root in absorbing water and nutrients.

Observing celery in food colouring

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- investigate the way in which water is transported within plants

The teacher set up some celery in food colouring for the children to observe over time.



Max notices that the change of colour starts as blue dots (where the veins are) before spreading more widely through the celery.

He makes careful drawings of his observations.

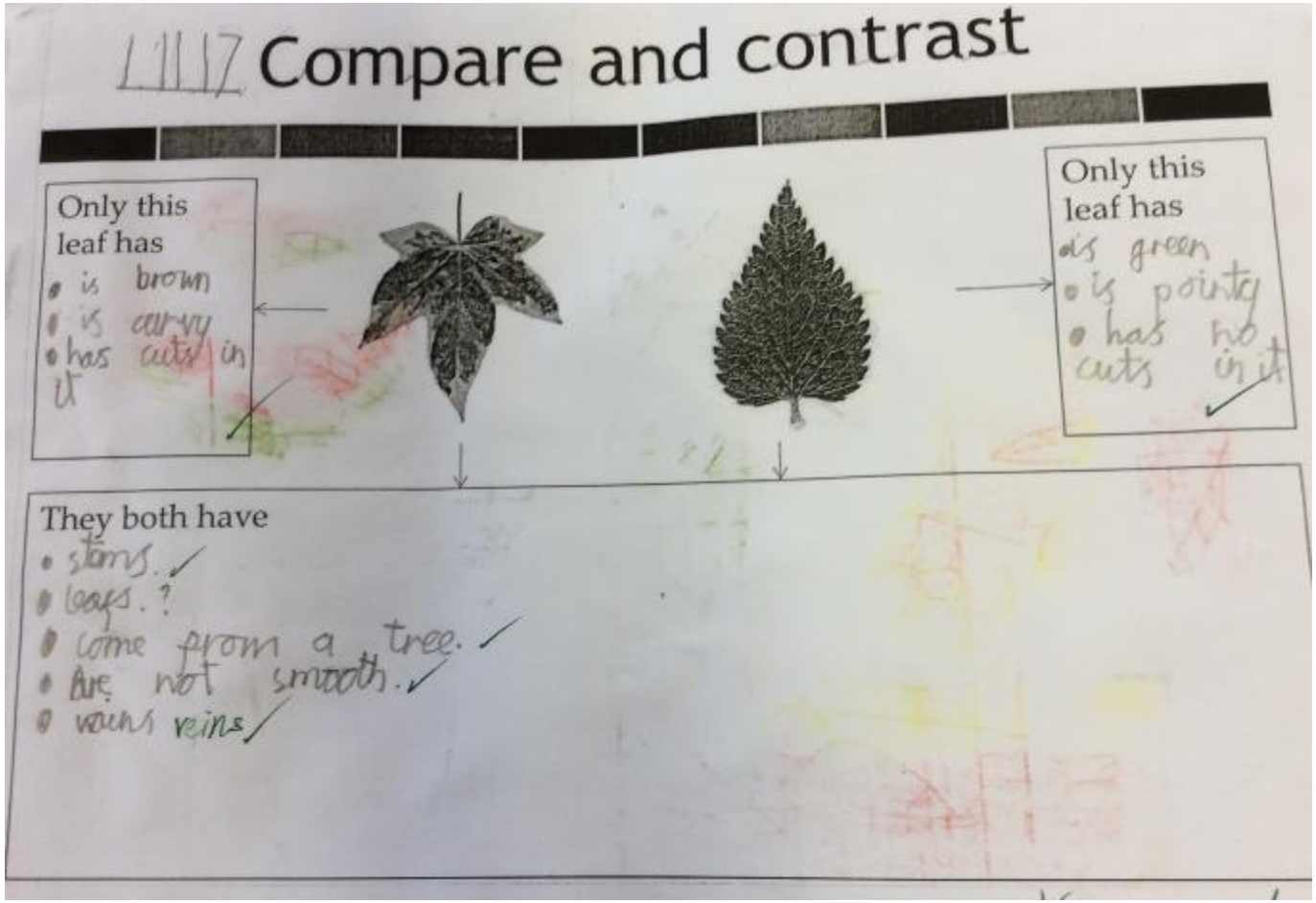
The teacher then asked to use the internet to find out what would happen if white tulips were put in food colouring.

Max uses a search engine to find various pictures which he compares and looks at in detail.

The class discussed how water and nutrients are transported from the roots through the stem to the leaves and flowers.

Comparison of leaves

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- investigate the way in which water is transported within plants



How does the water get into the leaves?
From the roots, up the stem and through the veins.

Outside the children gathered two leaves to compare. They used the sheet to prompt them to look for similarities and differences.

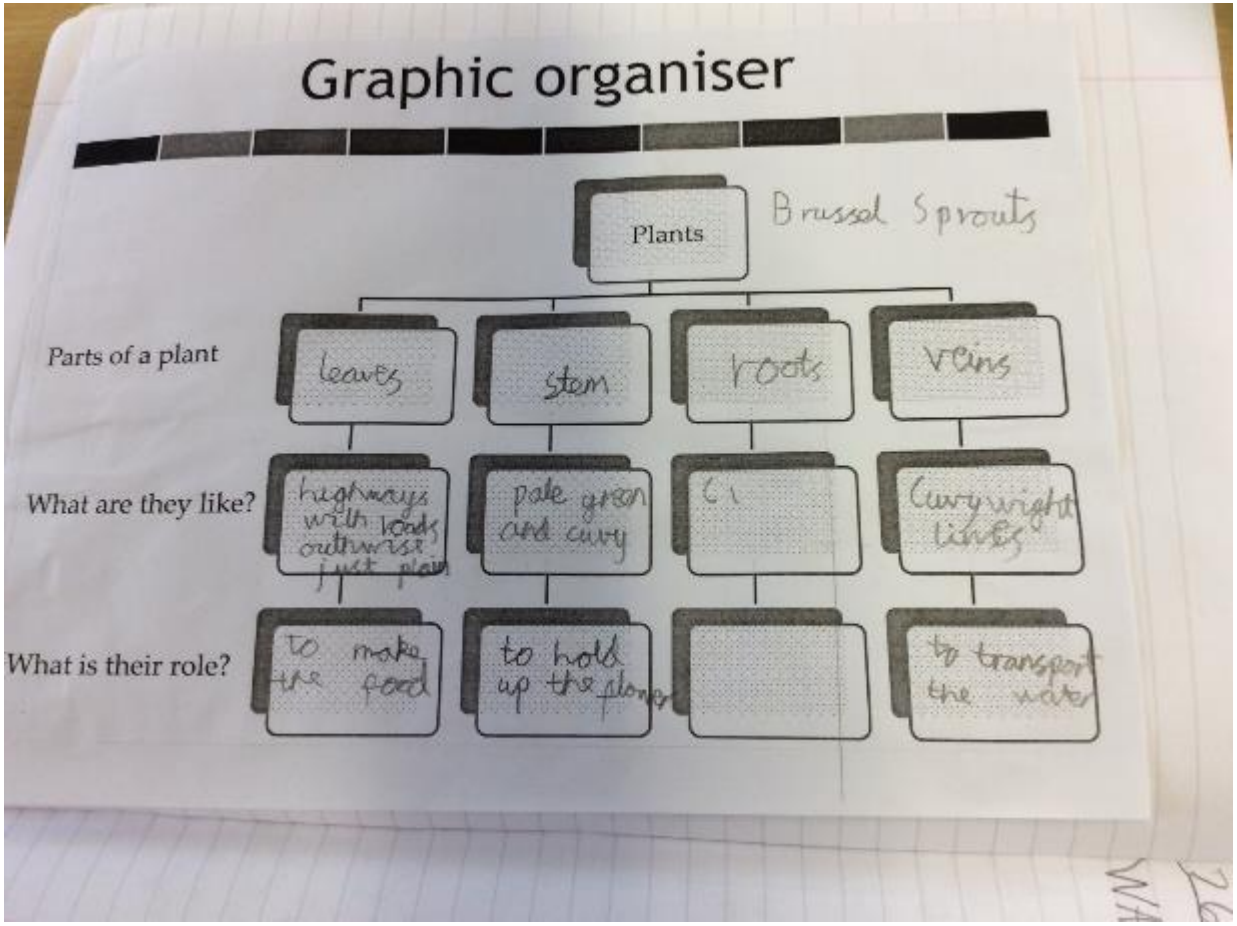
Max uses the word veins when describing the leaves.

The class discussed the role of leaves in producing food for the plant using water and sunlight.

Close observation of roots (assessment activity)

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- investigate the way in which water is transported within plants

The children were given a plant to look at whilst completing the graphic organiser about plant parts.



By the end of the lesson Max had not completed the boxes about roots so on exit the teacher asked - What do the roots do to help the plant?

They get the water and nutrients from the soil, which then goes through the stem to the veins in the leaves so they can make food.

Plant scavenging (repeated)

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Half termly the children went out and gathered parts of plants. Sometimes back in class they spent time sorting. They then identified the seeds and kept these for later in the year.

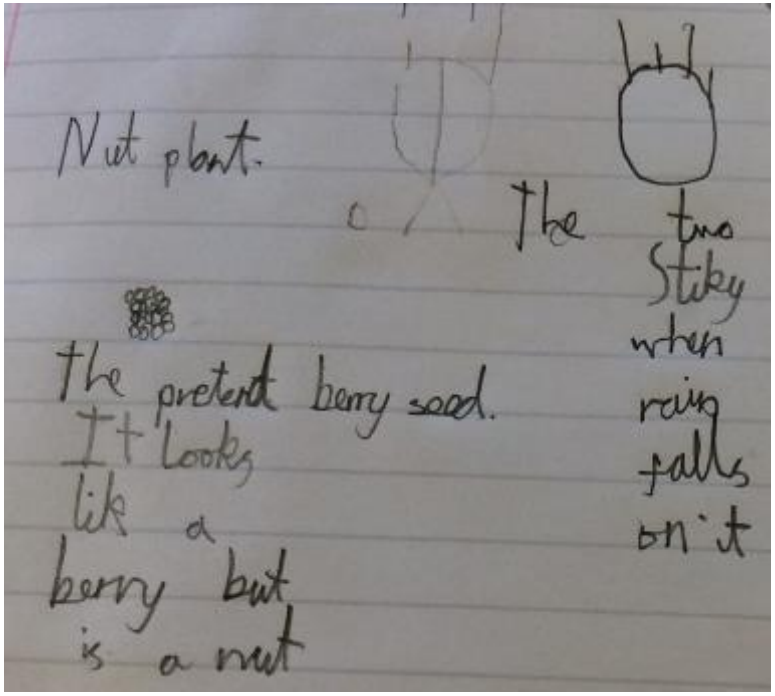
The children were shown the different types of seed dispersal
Blower – wind dispersed
Banger – opens on impact
Animal disperser – animals eating and then pooing
Clinger – sticks to animal fur or clothing

The children then looked at the seeds that they had gathered over the year and discussed how they were likely to be dispersed.

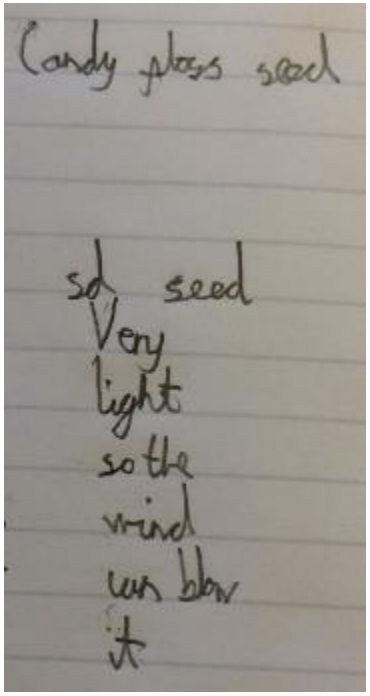
The dandelion is a blower. The wind or people blow them away and they land and the seeds are inside. It's very light and small and fluffy. Holly is an animal disperser. The red berries get taken by the birds and they fly away. They eat them and poop out the seeds. The thistle bush is a clinger. They stick to our clothes and animal fur and then they fall off. The horse chestnut is a banger. It bursts open when it hits the ground. It's in a spiky shell and then it falls down and most of them open but some don't. It crashes and rolls away from the plant hopefully. It's good for the seed to get away from the main plant or it wouldn't get enough light.

Designing seeds

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.



How is the nut seed dispersed? Animals go to it because it looks like a berry. If it is raining it is sticky so it sticks to the animal. When the animal is dry it falls off. It is a clinger.

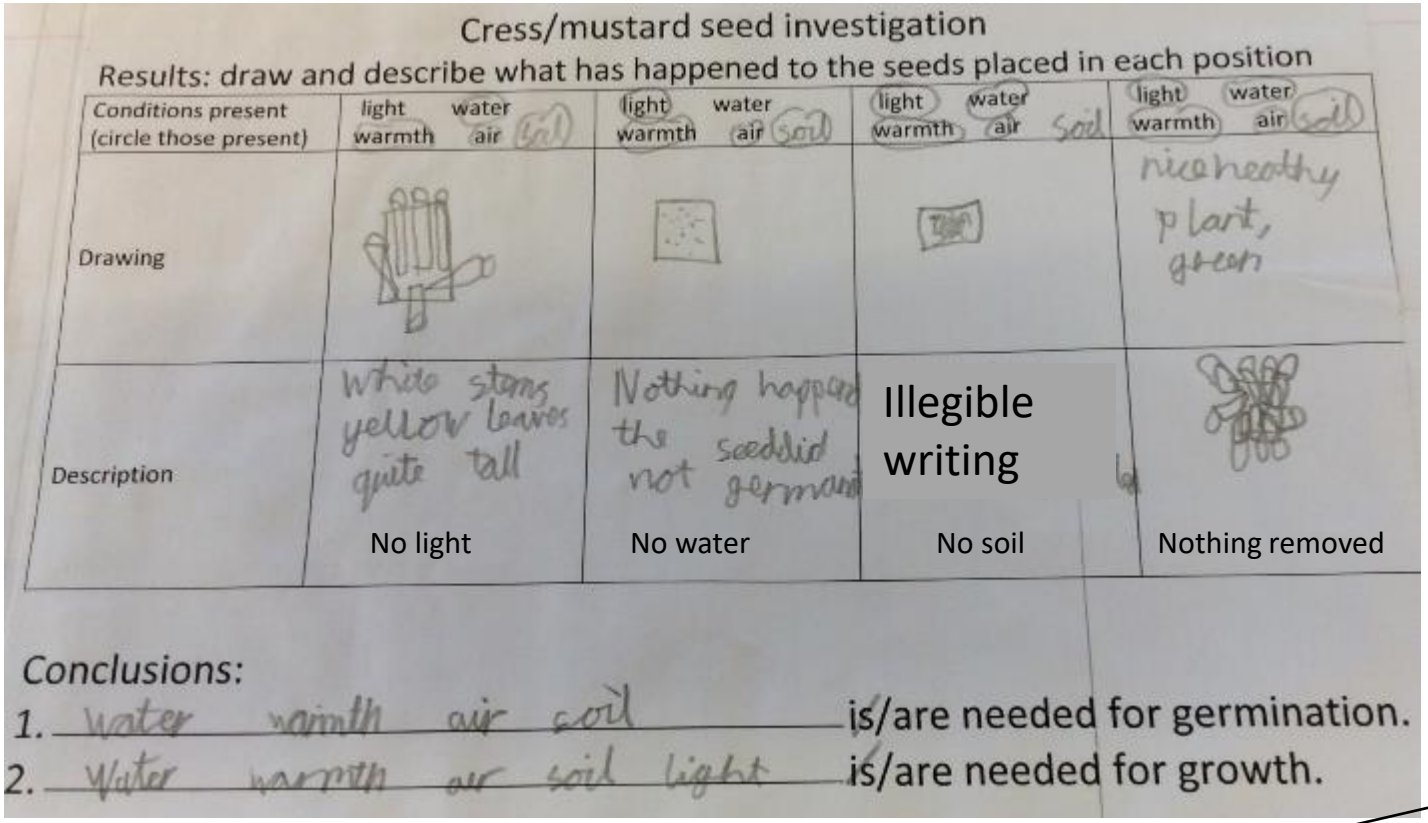


The candy flow seed is a blower. It is dispersed by the wind.

Max understands that seeds are dispersed in different ways depending on their characteristics.

Growing seeds in different conditions

- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant



Cress/mustard seed investigation

Results: draw and describe what has happened to the seeds placed in each position

Conditions present (circle those present)	light warmth water air soil	light warmth water air soil	light warmth water air soil	light warmth water air soil
Drawing				nice healthy plant, green
Description	White stems yellow leaves quite tall	Nothing happened the seed did not germinate	Illegible writing	
	No light	No water	No soil	Nothing removed

Conclusions:

1. Water warmth air soil is/are needed for germination.
2. Water warmth air soil light is/are needed for growth.

Max uses the words power and energy instead of nutrients.

We put the seeds in the treasure box because they had no light. They grew really tall and yellow. When they are under the soil they don't need sun. They have enough power from the seed to grow into a plant. They managed to grow in the dark. After a while they would not have lived because there is only so much energy in the seed. When the plant grows the plant makes energy in the leaves. They use the sun to make energy so they would need light eventually.

Discussing cacti

- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant

The children were shown an image of a cactus and ask to think about how a cactus was different to other plants they had been exploring

A cactus can live in the desert even though there is very little water as it hardly ever rains. Also there isn't proper soil as it is just sand. There is lots of sun to make food. They have spikes not leaves.

Do you think holly bush would grow in the desert?

No, there wouldn't be enough water. It might also get too hot and dry up and die.

Max talks about the different conditions in which a cactus can grow.

Observing pollinators

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

The children watched a video clip about pollination. They then went out to look for pollination in action. They saw bumble bees buzzing around the wild flowers that the year 2 children had planted.

The bees are going from flower to flower, to collect the nectar. You can see the yellow pollen stuck on their legs. That is how the pollen gets from one flower to another. The bees are pollinating the flowers!

Max learns about pollination through watching the video and recalls this when looking at the flowers outside.

Classifying flowers

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers

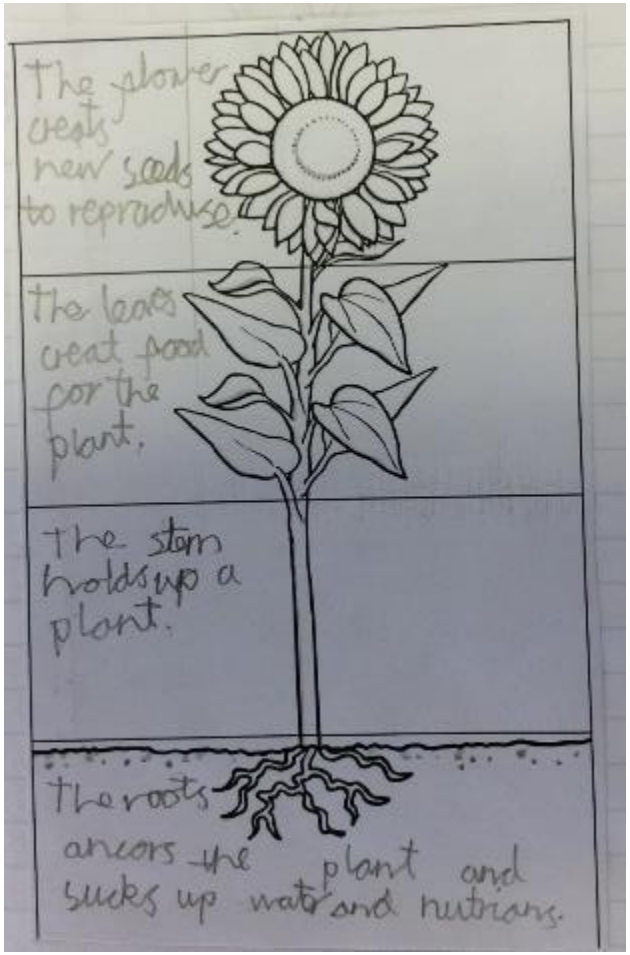
After a trip out to look at flowers the children were then given pictures of flowers to sort. The teacher wanted them to be aware of the great variety of flowers.

Some flowers have spiky petal and others are more round. Some flowers turn into seeds and some turn into berries. Some are one colour and others are multi-coloured. Because they are colourful the insects see them and visit them to get nectar.

Max is developing an understanding of the life cycle of flowers as he recognises that seeds and berries are formed from flowers. He also talks about the role of flowers in the process of pollination, although he does not use the word pollination.

Assessing knowledge of the function of the different parts of the flowering plant

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- investigate the way in which water is transported within plants
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation



At the end of the unit the teacher wanted to assess children's knowledge of the functions of the different parts of flowering plants, in order to see if anyone needed consolidation support.

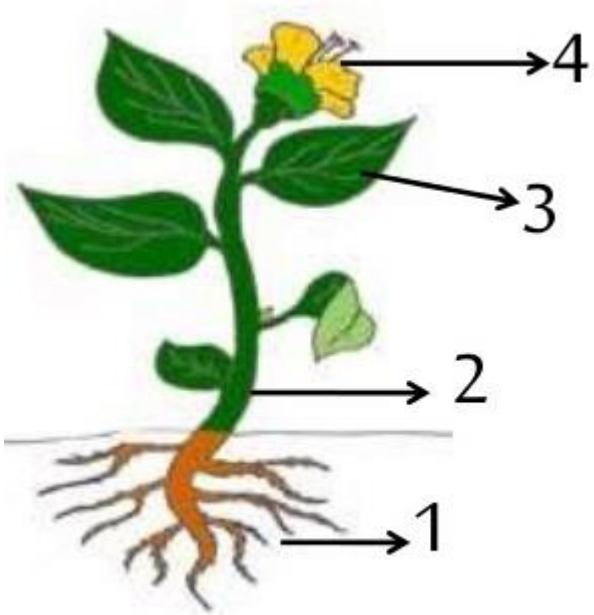
Max needs to develop the use of absorbs rather than sucks. This was common amongst the children and addressed by the teacher before the final talk activity.

Max shows a good understanding of the function of the parts of the plant, except for the use of the term 'sucks'. This terminology was addressed by the teacher before the next talk activity.

Debating the importance of different parts of the plant

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- investigate the way in which water is transported within plants
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation

The children were put into groups of four and each were given one part of the plant. They had to justify to the rest of their group why they were the most important part. Max was the stem.



Without me, you (talking to flower and leaves) would not get any water. You (leaves) would be on the floor so you wouldn't get the light you need. You (flower) would be on the floor so you might not get insects visiting to get your pollen so you won't make any seeds. Your seeds won't be properly dispersed from the ground so the seeds will all be in one place. I guess you (roots) will be OK. You can still absorb water and nutrients.

Whilst talking Max draws on his knowledge of the functions of different parts of flowering plants. He refers to the processes of pollination and seed dispersal. He now uses the word 'absorb'.

Overall Summary

Secure

Max identifies and describes the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. He explores the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant, as well as investigating the way in which water is transported within plants. He also explores the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Acknowledgements

All worksheets were created by the school