CEYS
Creativity in Early Years Science Education

Curriculum Materials

Learning Journey

Living things and their habitats

Erasmus+

The CEYS project has been funded with support from the European Commission under the Erasmus+ programme (2014-1-EL01-KA201-001644).

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ΙΚΥ

Living things and their habitats

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Living things and their habitats

Setting the Scene

Focus

The focus of this project was to develop children's *questioning and curiosity* and provide them with *opportunities to observe living things and make connections for themselves.*. The difference I wanted to make was to promote children's active role in developing their understanding of life processes and how we group animals through *gathering evidence* from first and second hand sources both in and outside the classroom. I also wanted them to become even more intrigued by the animal kingdom, and thirsty for knowledge.

Rationale

The children are quite strong at collaborating but less so at independent learning. They can sometimes appear to 'wait' for knowledge to happen to them, and are at times very passive learners.

I wanted to foster children's *motivation* to use scientific skills, to get them to feel *actively curious* about scientific observations, both in their construction and execution, as well as to feel excited by the natural world around them. I was keen to work from children's *ideas and questions* when planning the sequence of lessons so that I could foster their *motivation*, and their ability to make *connections* to their previous learning and experiences.

The implications for my planning and teaching were to foster *dialogue and questioning* by building on children's ideas and questions and to promote motivation. I ensured I was offering a range of opportunities for children to develop their questions and ideas through active investigation, and for recording their learning and *offering explanations* in a variety of ways.

Age: 6-7
Learning activities: gathering evidence, making connections, explaining evidence,
Synergies: dialogue and collaboration/questioning and curiosity/assessment for learning
Creative dispositions: motivation, curiosity, making connections
Contextual factors: partner work, working in 3's. Use of outside areas.

Background

School setting: London state school, with outside space and a nearby park.

School policy for science: focus on scientific skills and using the curriculum as a starting point. Active assessment of existing ideas before a unit of work, and then building on children's ideas and questions, rather than letting the curriculum dictate what we teach.

Curriculum links:

- Ask simple questions and recognise they can be answered in different ways
- Identifying and classifying animals and plants
- Use their observations and ideas, and gathering and recording data to answer questions
- Identify differences between things that are living, dead, and have never been alive
- Recognise that most living things live in habitats to which they are suited. Describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other
- Identify and name a variety of plants and animals in their habitats, including microhabitats
- Describe how animals obtain food from plants and other animals, using the idea of a simple food chain, identifying different sources of food.

Overview of the sequence of activities (6 lessons and a day trip)

Starting points - The first three activities were designed to elicit children's ideas and previous experiences.

- **What could this be?** This activity involved showing children a picture of an animal cell. Children came up with lots of different ideas, This activity aimed to foster children's imaginations and curiosity - integral to being a scientist.
- **What's the odd one out ?** Children were given 4 sets of 3 pictures . In each case they had to choose the odd one out and explain their reasoning. This activity was designed to assess children's understanding of four curriculum strands: distinctions between things that are living/dead/never been alive, classification of plants and animals, plants and animals living in different habitats to which they are suited, food sources for different animals.
- **KWL grid (**What do we **know**, what we **want** to know, what have we l**earnt**?**) –** filling in a KWL grid as a class. This helped in planning lessons, along with areas I had identified for development. Across the project we then recorded what we had '*Learnt*'.

Learning journey – Activities were designed to build on children's ideas and further children's understanding of the topic. They aimed to foster children's curiosity and questioning, whilst encouraging collaboration. They were devised to provide ongoing opportunities for Assessment for Learning (AfL) to give insights into the children's thinking and learning. The activities included:

Sorting, grouping and classifying– Sorting objects and photographs into living and non-living.

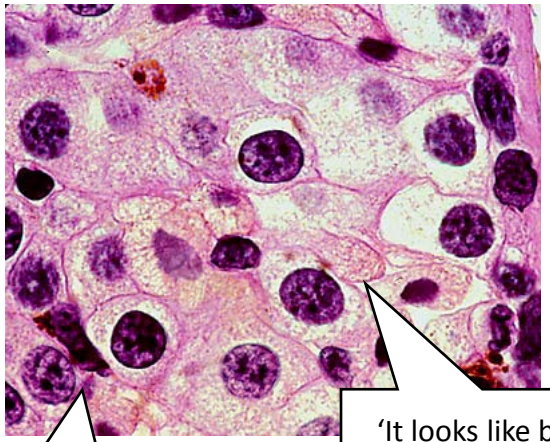
Collecting and recording data – What living things can we find in the playground?

Interpreting results and drawing conclusions – What we found and why.

Observing and making connections – we went to ZSL to observe live animals.

Reviewing learning across the project – adding what we had learnt to the KWL grid, discussions with focus children about the unit and about science, ongoing assessment in books and discussion.

Developing the learning journey: Starting points 1



Activity: What could this be? (liver cells from a small mammal)
We discussed what this could be. The children talked to their partners to come up with an idea each and then we shared these ideas with each other.

Rationale: The purpose of this activity was to engage children's *imaginations* and foster *curiosity* – offering *alternative ideas and making connections to prior knowledge and experience. I chose this image as it is visually appealing – fascination of seeing something close up. It shows nuclei of cells.*

The number of different ideas the children had, and my positive reactions to all suggestions helped children feel safe and imaginative.

Teacher questions
What could this be?
What makes you think that?
Where might it come from?
Does it look like anything else you've seen before?
Reactions:
'That's an interesting idea'
'How intriguing!'

'It looks like bacteria to me, but the good type like in yoghurt.'
'It's the inside of a fruit, like a blueberry because it's purpley blue and round like a berry'

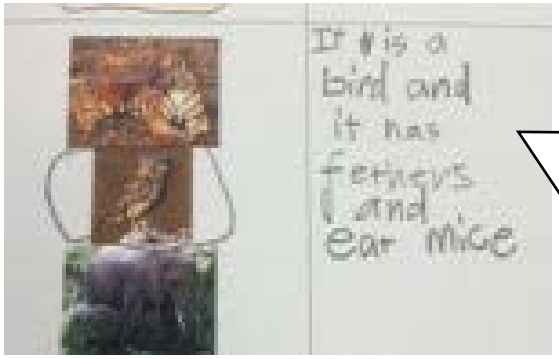
Children's ideas showed me what they were drawing on – primarily colour and shape. Some children were *making connections* with observations and scientific concepts they were aware of, and had experienced through television.

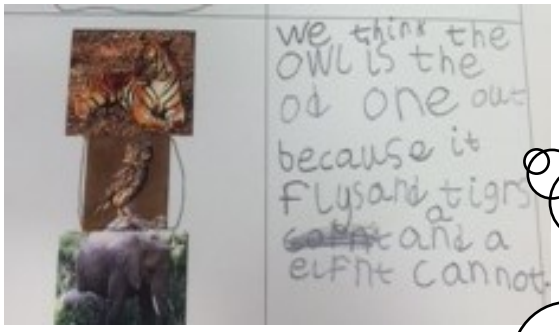
All children were able to offer ideas, **making links** with observations and experiences of living things.
Some children knew it was the 'inside' of something. I to aimed **build on their interest**, extending their knowledge of living things and characteristics they share.

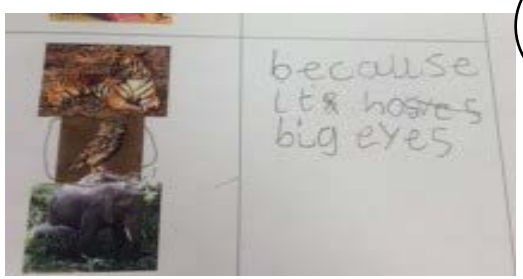
Developing the learning journey: Starting points 2

Activities: What's the odd one out – 4 sets of 3 pictures.. This activity was designed to assess children's understanding : distinctions between things that are living/dead/never been alive, classification of plants and animals, plants and animals living in different habitats to which they are suited, food sources for different animals. They had to give reasons for their choices.

Rationale: This provided an opportunity for children to collaborate in reasoning and debate with each other. It also allowed me to assess the kinds of connections children were making with scientific ideas, life experience and observable features in explaining their conclusions.







Teacher
Why do you think that? How do you know that?
Is there only one correct answer? Can you think of any other similarities and differences?

I could assess which children had a grasp on key vocabulary and concepts such as carnivore, predator, non-living. Issues raised included – there are no right or wrong answers, and children tended to focus on visual differences – for example 'the bird because it has wings'.

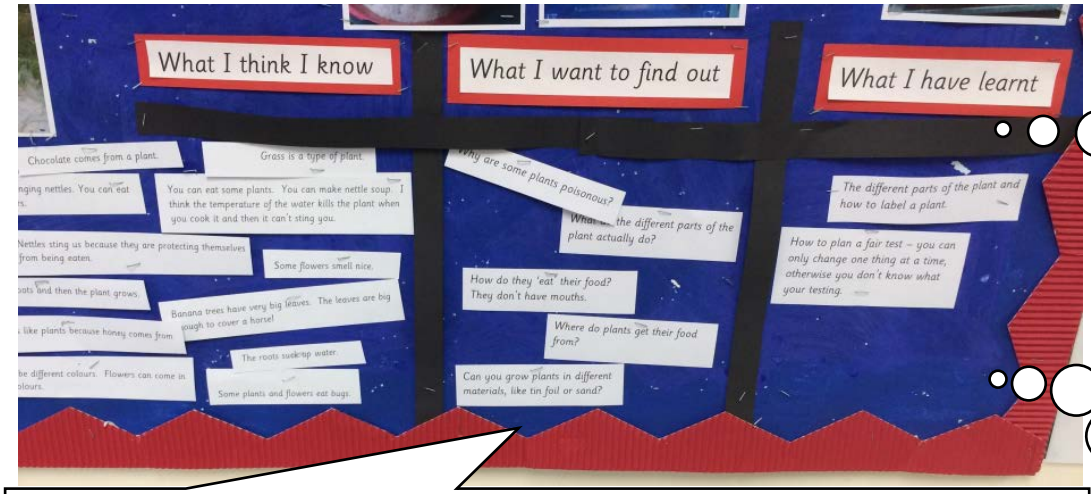
Children needed reminding to 'think scientifically' which made some of them use more scientific vocabulary such as 'carnivore'.

Debate amongst children over the 'correct' answer inspired questions for KWL grid. I then designed lessons to help answer these questions. – Fostering curiosity and agency.

Developing the learning journey 3:
KWL – What we know, want to know, and have learnt grids

Activity: KWL grid - as a class we filled in a KWL grid with me scribing their 'know' and 'want to find out' ideas. These helped me plan the rest of the unit, along with the areas for development I had identified. We filled in the 'learnt' section after each lesson.

Rationale: This was an opportunity to observe children' *motivation and curiosity*, their scientific skills in particular their *questioning* and *recording their questions in writing.*



When pushed to think scientifically, children came up with interesting questions such as 'why do we group animals by their skin type?'

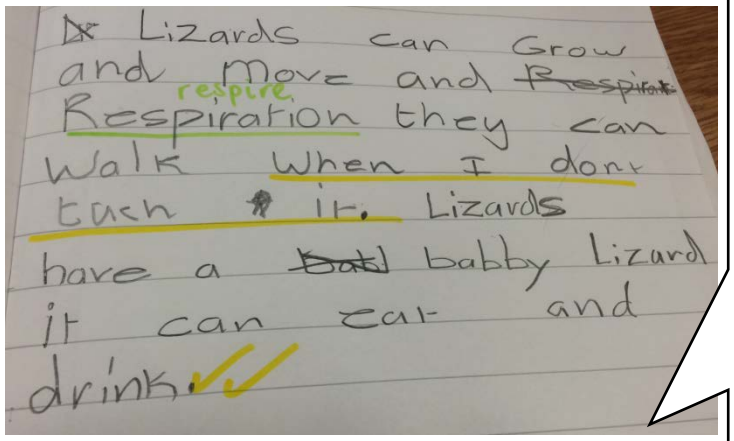
Children were excited to find out more about animals, and why they behave/live the way they do. There were many questions about why certain species 'prefer' certain climates.

'Why do we keep animals in zoos if that's not where they're from?'
'If we lived in a warmer place, maybe we could have a school pet tiger?'
'Do animals have a brain in their head, or is it in their tummy?'
'Why do people say we are like monkeys? We aren't as hairy.'
'Do fish drink water? '

I grouped questions into themes linked to the curriculum, developed a lesson sequence from these – **building on children's curiosity and motivation to answer questions.**

Lesson 1 Living and non-living things – sorting, making connections, asking questions.

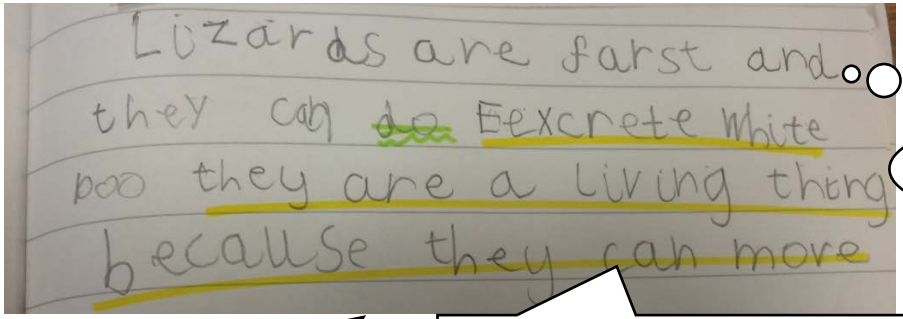
Activity: The children sorted objects & photographs into living and non-living things. They looked at pictures of things which were once living, and debated how they knew they were dead. We discussed the ones they had found difficult, such as an animal skeleton and coral. I introduced children to 'Mrs Gren' and the different characteristics of living things. The children then wrote about a living thing and tried to explain how they knew it was alive, using some of their new vocabulary associated with life processes.



Teacher - How do you know....is a living thing? What scientific words can you use that we have talked about? Can you explain what those words mean?

Rationale: This activity was designed to introduce life processes and vocabulary that children could use in explaining why something was living/non-living.

Initially children relied on something not breathing to determine if it is living. After this lesson and my questioning, children realised that other behaviour and characteristics are important not just what they can observe first hand.



Children made connections between their own experiences & ideas and new vocabulary & concepts. Debate fostered curiosity and questioning such as 'if it isn't moving or breathing is it still alive?'

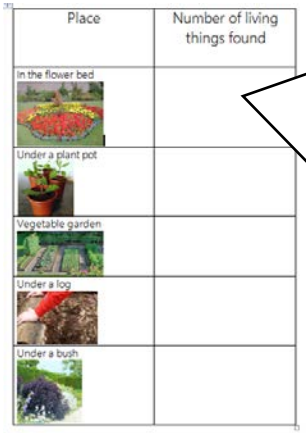
Child 3 - 'Sharks can swim and do respiration under water for a very long time. They catch food hunt to get the fish.'

Child 4 - 'You can tell if it's alive if it has a mouth and breathes' Child 5 – 'But plants don't have mouths and they breathe and are alive'. Child 4 – 'oh yeah...how do plants breathe then?'

Though children were able to describe and identify living and non-living things, they **made limited reference to the variety of living things around us and where we can find living things.** The next lesson aimed to relate these discussions to animals in the local environment .

Lesson 2 – Living things in the playground.

Activity: In response to children saying that there were limited habitats for living things in the local area, we investigated different locations in our playground. We wanted to find out where we could observe the most living things. We counted and recorded the numbers and types of living things we could observe in each location and discussed possible explanations.



Place	Number of living things found
In the flower bed	
Under a plant pot	
Vegetable garden	
Under a log	
Under a bush	

Child – 'It's winter so we won't find any living things'
Child 2 – 'Why look under a pot – the living things will just be dead and squashed'.
Child 3 – 'I wouldn't like to be a worm. It's really muddy and cold under there.'

Child – 'Make sure you count them carefully'
Child 2 – 'let's both count then see we got the same'
Child 3 – 'There were the most under this plant pot, I think the worms like it 'cos it's muddy.'

Rationale: These activities were designed to show children that living things do not all die in the winter (it was winter time), and that there are micro-habitats all around us.

Children were able to gather evidence. They understood the importance of counting carefully so they could draw conclusions later. Some expressed surprise at their findings, prompting them to offer explanations for their findings, for example the need for protection from external conditions or predators.

Children enjoyed the activity, and surprised to find any living things at all because of the weather. They were also intrigued to find worms and woodlice underneath the plant pot because many of them thought they 'might get 'squished' there.

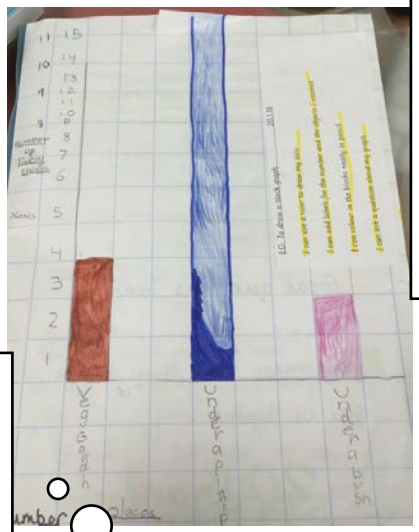
Teacher questioning was needed to foster the idea that living things could thrive under the pot – despite little room, light and visible food sources. 'Why might worms like living there? What might be beneficial to them?'

Children were excited and had lots of ideas about what they found and why and wanted to share these in classroom **– curiosity fostering scientific discovery and new understanding**..

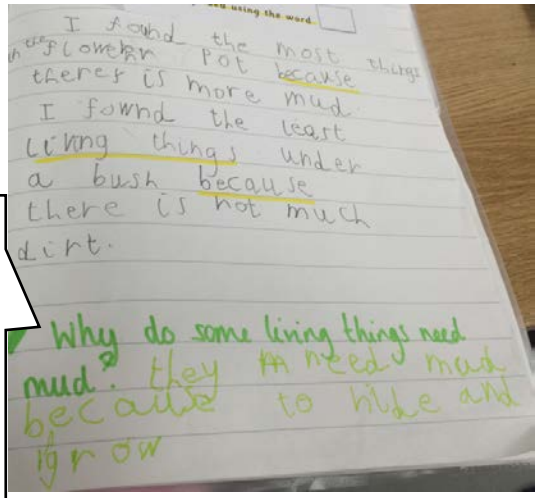
Lesson 3 – interpreting our results and drawing conclusions – what we found and why.

Activities: Children presented their results in a block graph in mathematics. This helped children compare findings from different areas of the playground.
Role play – imaging what it would be like to live in the playground as a woodlouse or a worm – explaining why they liked living where they were found.

Rationale: These activities allowed the children to consider the data collected in a variety of ways – visually, in words, charts and through role play.

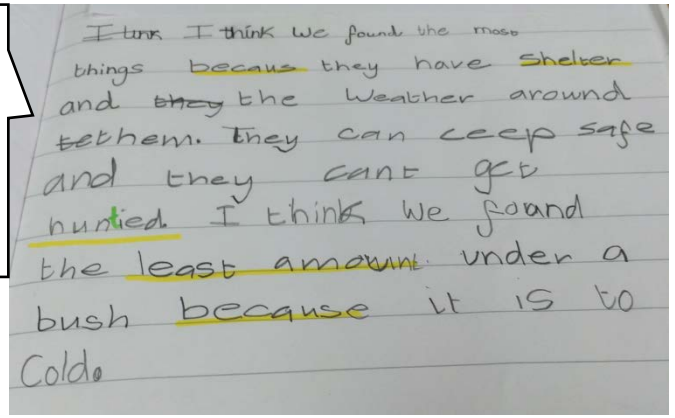


'I found the most living things under the pot because there is more mud. I found the least living things under a bush because there is less mud.' A simple explanation, pushed on by my question about why he thinks the living things need mud.



In the role play many children went to the place where we found most of these living things and in role answered questions about why they liked living there. 'It's warm and my friends are here'
'There's juicy mud to eat'
'It's dark and cozy for me to stay warm.'

This child discusses shelter provided in certain areas we observed, and the way the weather may affect living things in these microhabitats.



All children were confident in drawing conclusions in one or all forms, and made connections between findings and their own experiences.

Wider **questions** of biodiversity and habitats were raised– children were interested to see 'how do zoo keepers keep so many animals happy?'

Lesson 4 - Trip to the zoo – classifying animals, how animals are suited to their habitats

Activities. During our visit to the zoo we had a session on animal sorting We discussed why the animals were grouped the way they were at the zoo. Children identified the key aspects of the different animal groups during our tactile session.
We visited the animals and made our own animal observations at the zoo, We linked this to being a scientist in the field. We had much discussion about the moral implications of using animals in science.

Children planned what animals they were most interested in seeing in advance. Many of them chose species they hadn't seen before, and animals they had come across in our learning.

Child 1 - 'It's definitely a reptile. It's scaly.'
Child 2 - 'It's so hot in here too, the animals like it being warm like their natural habitat.'

The nocturnal animals were very popular, as were the African hunting dogs who had had a litter of pups – children were very surprised at the number in litter and one said 'imagine if humans had that many babies at once!'

The zoo visit provided a rich opportunity to **make connections** to our work across the project. It fostered much **interest, dialogue and questioning**

Reflections on children's progress

- Children demonstrated growing understanding of key concepts and an ability to apply these concepts **making connections** across different contexts – in classroom activities, in the playground and visit to the zoo.
- They began to explore **questioning as a route of discover**y in science – working from a question, not a fact.
- **Group work skills** improved – result of adopting a more group work focus in all lessons.
- Children are better at **posing questions** now – realised how explicitly skills like this need to be taught.
- They also have begun to develop understanding that is not always possible to do a fair test and how one investigation can not tell you everything.
- Children recognised the **inter-related themes** of the curriculum and applied their learning to other topics – e.g. plant habitats – 'i think the plant is growing here because it likes the habitat. The conditions are right for it to grow.'
- Children were able to articulate their thoughts on science and the importance of **thinking critically** and **questioning** as modelled throughout the unit.
- Children **made cross curricular links** – e.g, decided to write non fiction reports on animals in English.

Interview comments from focus children about the unit and science:

'I like when we ask questions and try to work them out together. (You don't) tell us any answers really.'

'I like working in a three or two…because if I have a problem or I'm stuck, my friend helps me…not by just saying the answer to me. It helps me learn I think.'

'Science is my favourite lesson.'

'choosing time is mine, but science is second.'

'if I ask [Phoebe] a question, she helps us find out the answer by making us do different activities. She never just tells us. It's more fun that way.'

'it also means next time I have a question in science, like 'why do plants need to eat' I can think about other experiments we've done where we've found out the answers ourselves.'

'Science is my teacher's favourite subject, and it's mine. Its about asking 'why questions'.

Focus child A – progress in creativity and curiosity

Before the project	During the project	After the project
• Interested in science: 'science lessons are for doing experiments. I have a chemistry set.' • Finds asking questions difficult – both in terms of articulation, but also knowing that you can ask 'why' and 'how' in science and find answers. • Lack of fundamental understanding of processes like how ice is formed which children normally encounter early: 'ice just comes out of the freezer. It's not water it's ice.' suggests lack of early play and exploration. • Knows some 'facts' about animals, but they seem unrelated and unconnected. • Finds it hard to reflect on learning and think about how he has come to a conclusion.	• Thinking and talking became more structured: 'first we should do this….' • Explaining scientific phenomena still difficult for him, but more resilient to confusion – doesn't just 'switch off'. • Focused on his target of using 'because' to explain his thinking: eg, 'the owl is the odd one out because it is not a reptile.' – helped to further his thinking.	• More confident in asking questions – put up own post it note on the KWL grid during play 'why do owls need such large ears and such large eyes?' • At the zoo, put up hand to ask several questions about the length of the alligator skin and also how the zoo had procured their objects. • Helped a person in his group to 'take a proper' photo of an animal, for 'our information books'.

Reflections on teaching and learning approaches

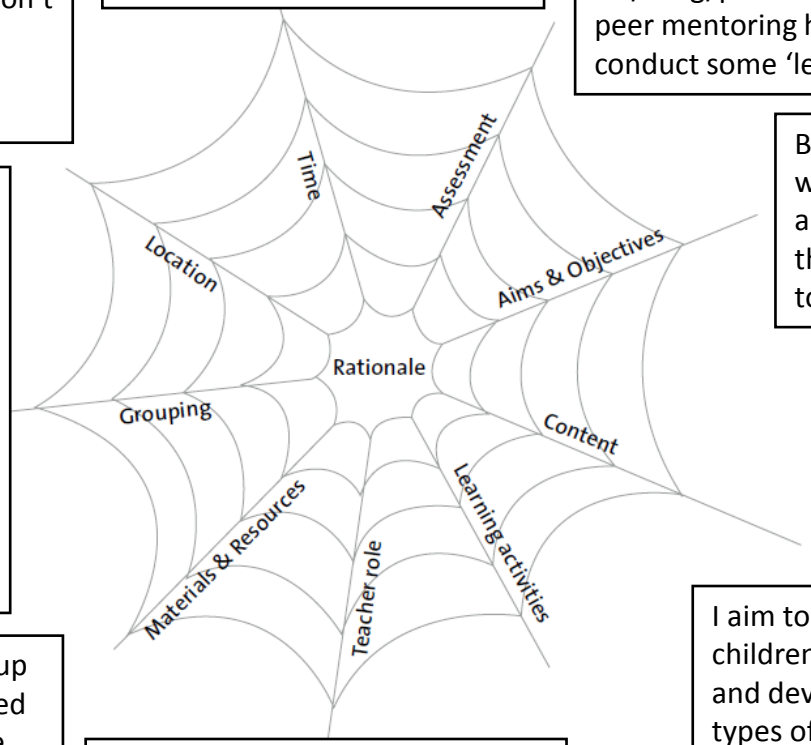
- Lesson planning stemmed from children's ideas, understanding and questions. This was key in fostering motivation. children asked most of the questions! I tended to further their thinking by helping them understand how they had got there – metacognition
- Going from children's ideas, motivations and confusions is possible in a year 2 setting – not just in the Foundation Stage!
- I aimed to foster an classroom environment, where questions, connections and ideas were given priority over anything else. This helped children recognise that scientific innovation is a creative and curious endeavour as seen by children's willingness to make suggestions and their more vocal nature in class – no more sitting and waiting for learning to happen to them!
- We also discussed issues linked to knowledge of animal welfare and being a responsible scientist
- **Different ways of representing ideas** are important and emphasising the role of recording as a scientist in collecting and interpreting data. We recorded in different ways across the topic – children took some photos at the zoo but we need to do more of this.
- **The KWL grid on display had an important role -** Each week we added to the 'what I have learnt' section, using key skills children had learnt, not just the content**,** for example: **'to compare my findings with another group and draw a conclusion',** not just **'that some animals like to live under pots to stay safe and warm.'**
- **Group work** played a key role – many opportunities for taking different roles in a group, working collaboratively and helping each other further their thinking (e.g.,gathering data – couldn't't be done solo).
- Many of our discussions, findings and activities led to further **questions from the children** which prompted them to research during spare time and I noticed an increase in the amount of non-fiction books children were choosing to read.
- Importance of **classroom environment** - living thing books added to book corner – photos up 'what could this be?', to help children continue to be curious, ask questions, make links.
- **Importance of continuous assessment**– marking against skills in each lesson (not just content), with feedback questions to address confusion, furthered children's thinking and create dialogue.

Next steps for learning and teaching

Disseminate across staff the necessity of spending at least an hour a week on science. Discuss value of cross curricular links with maths etc.

Use other methods of assessment than written evidence in books, conversations and 'listening in' approach. Children could be more creatively engaged in this by, for example, creating a play/performance/piece of art/song/poem based on their learning. Explore value of peer mentoring here – eg, could year 2 children go and conduct some 'lessons' with EYFS into bugs now?

Encourage more outdoor learning where applicable. Don't be confined to tables when recording and gathering evidence.



Be clearer about unit's aims at start with children and adults. Eg, these are the skills we will be covering….by the end of this term you will be able to….

Groups of 3 seem to work well in this age group, although these groups need to be carefully chosen so that higher attaining children are appropriately stretched and challenged. Also, language models needed for children to help them structure language and thinking more clearly.

Model of continual assessment important so that learning can be deeper, and more about skills and scientific thinking than subject knowledge.

Work towards gathering group materials which can be reused for different topics – eg, true and false activities, sorting activities, and equipment used most commonly.

Continue to explore children's reactions to teacher taking a back step, and reflect systematically on my role in the classroom through evaluations and peer observation.

I aim to teach more lessons where children do the research themselves – and develop understanding of different types of enquiry, including fair testing. Children to plan and record findings with more choice – let them design and investigate and conclude from it. Keep activities practical, provide opportunities for 'wow' moments (eg, in school science week and assemblies)

Reflection questions for the reader

- How do you identify children's ideas and questions?
- What opportunities do you provide to link learning in and outside school?
- How do you encourage children to connect experiences?
- What different strategies do you use to assess development in children's concepts and skills and understandings associated with scientific investigation?

ACKNOWLEDGEMENTS

CREATIVITY IN EARLY YEARS SCIENCE EDUCATION (2014-2017)

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The CEYS project has been funded with support from the European Commission under the Erasmus+ programme (2014-1-EL01-KA201-001644).