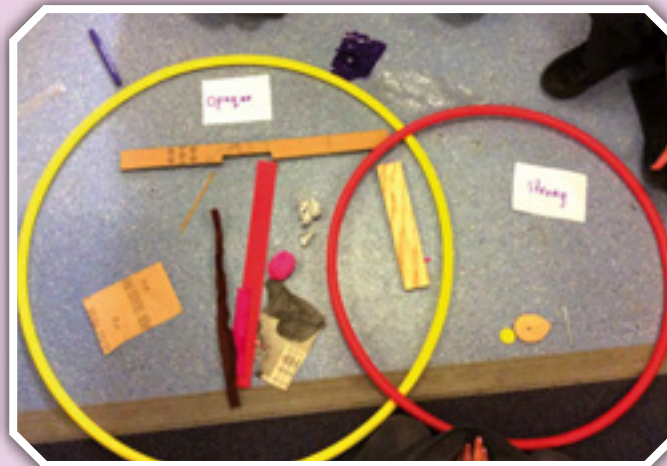


**Figure 2** Reception children take bark rubbings before discussing similarities and differences between the patterns produced



**Figure 3** Sorting materials according to more than one property in year 1



decide whether it applies to a solid, liquid or gas or more than one of these.

**Year 5 (ages 9-10)**

As we move into year 5, the objective in question continues to develop and progress in the same fashion as before, an extension of language and vocabulary:

*Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.* (DfE, 2013: 28)

The introduction of more scientific language ensures that the learners progress in their understanding of new vocabulary and scientific principles. The task set can also be developed to ask the child to compare multiple properties of different objects by, for example, creating their own classification key (Figure 5).

**What has changed?**

Looking back at the objective in the early years, which involved simply stating similarities and differences, and comparing

it to the year 5 objective of grouping objects based on more complex scientific properties, highlights how the progression in this particular subject maps across primary school. The concept of comparing properties has stayed the same throughout but the understanding and language needed is gradually extended each year.

**Working scientifically: asking questions and recognising that they can be answered in different ways**

The National Curriculum for science in England:

*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. (DfE, 2013: 3).

The ‘working scientifically’ objectives give children the chance to achieve these aims and use a wide range of different enquiry skills to help them develop into successful scientists. If we take the concept of asking questions, we can follow how this builds as we move through school (CIEC, 2020).

**Reception (ages 4-5)**

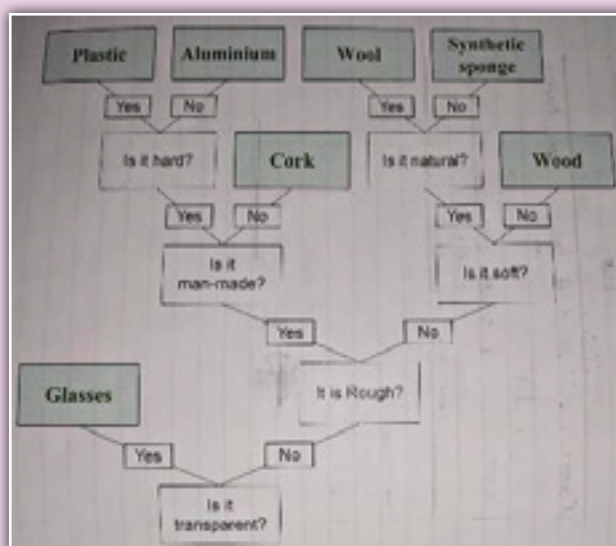
In the 30-50 month age bracket, it is expected that a child: *questions why things happen and gives explanations.* (Early Education, 2012: 20)

In order to develop these skills they need to be exposed to lots of new, interesting stimuli to encourage their curiosity. One example of an activity that can be used here is creating a pool of water in the free-play area and encouraging children to see what happens when they put different objects in the water (Figure 6). The children chose different objects to play with in

Fill all available space	Keep their shape
Takes the shape of the bottom of the container	Can be cut or shaped
Can be poured	Always take up the same amount of space
Can be invisible	Can be squashed
Always have the same volume	Hard

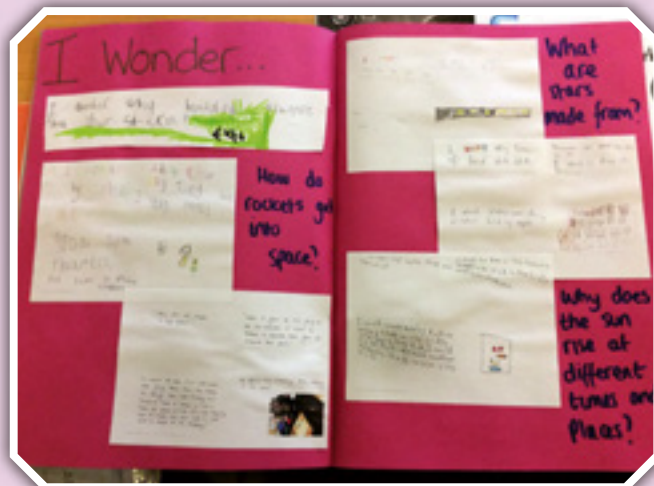
**Figure 4** Children discuss whether the statement on each property card applies to a solid, liquid or gas or more than one (source, PLAN, 2018a: 13)

**Figure 5** Classification key activity for year 5 materials objective (source, PLAN, 2018b: 23)





**Figure 6**  
A reception child begins to ask questions when investigating floating and sinking



**Figure 7**  
A key stage 1 'I wonder ...' floorbook for collecting children's questions

the water and began to ask questions such as 'Will this toy float?', 'Why does this boat not float?' and 'Does it sink because it's heavy?'

**Key stage 1 (ages 5–7)**

Moving into key stage 1, the associated objective is:

*asking simple questions and recognising that they can be answered in different ways. (DfE, 2013: 6)*

This builds from the previous statement as it involves children developing their questioning skills while exploring the world around them. An 'I wonder ...' floorbook, that is a scrapbook filled with questions from all the children in a class, works well to address this objective (Figure 7). The questions can be about anything, so children can use topics that are familiar or of more interest to them, which allows more focus on the question itself. These questions can then be shared and a few selected for the class to think of ways to investigate and answer them.

**Lower key stage 2 (ages 7–9)**

In lower key stage 2, the questioning objective develops further to:

*asking relevant questions and using different types of scientific enquiries to answer them. (DfE, 2013: 14)*

The first change between the key stage 1 and lower key stage 2 statements is moving from 'simple' to 'relevant' questions. The focus is less on learning to form the question itself and more on using their prior knowledge to relate questions to the topic being discussed. The second change between the two objectives is the emphasis on using different scientific enquiry types to answer the questions. Activities to cover this aspect start to involve children being involved in making decisions about the most appropriate type of scientific enquiry, as well as what observations to

make and equipment to use, to answer questions they ask. In class, this involves lots of scaffolding around planning and undertaking experiments and activities and works well with greater amounts of planned-in time for discussion and the sharing of ideas.

**Upper key stage 2 (ages 9–11)**

As we move into upper key stage 2, the scaffolding begins to be removed, giving children more responsibility for their enquiries. The associated 'working scientifically' objective here is:

*planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary. (DfE, 2013: 25)*

Here the focus has moved almost fully from forming the questions to planning ways to answer them. Teaching here covers the different types of enquiry and the style of question each is suitable to help answer. For example, 'observing over time' enquiries can be used for questions where time is one of the variables, such as 'What happens to ice when it is heated up?' or 'How does our shadow change during the day?', and 'researching using secondary sources' enquiries can be used for questions such as 'How do we digest our food?' or 'Why does the Moon change every night?'

**Conclusion**

My move to early years was certainly a big step; however, I have thoroughly enjoyed the challenge and learnt a lot in the process! For many people, early years is seen as separate to the rest of primary school, but now I see how the skills children develop at this young age play a key role in supporting them all the way along their journey through school.

As a science lead, my new understanding of the intricacies of

teaching in early years has given me a better understanding of how the different strands of science fit together and progress, and how to best set children up to succeed right from the start. If, in the future, I move to teach in a different year group again, I would definitely adapt my practice, using what I have learnt this year and knowing how to build on earlier opportunities to play, explore and think critically. Building more opportunities for independent exploration into my teaching would be a must, along with ensuring that the ideas from the characteristics of effective learning are present in my planning.

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