

Science Key Considerations

Teachers will not be able to complete 18 months'- worth of objectives when they return to school in one academic year. It is important that they, and SLT, see the catch up of science as a 'long game' and not a 'quick fix'. For all children and for Y1 and Y5 in particular, a focus on working scientifically and key scientific knowledge and conceptual understanding will be key.

1. Identify key National Curriculum objectives and ensure that they are secure. Any not taught will need to be taught. Any not secure will need to be revisited.
2. It is helpful to write two objectives for science, one which focuses on knowledge and conceptual understanding; and one which focuses on working scientifically. The science curriculum is predicated on five different investigation types:
 - Observing over time
 - Pattern seeking
 - Identifying, classifying and grouping
 - Comparative and fair testing
 - Researching using secondary sources

For progression in working scientifically, see STEM's summary of progression statutory requirements, referenced at the end of this document.

3. As a school, decide whether to teach topics not covered at the start of the next academic year, or in more depth when they would normally be covered (this will involve tracking back into previous year group's objectives and teaching two years of objectives at the same time). STEM materials are supportive here. This is manageable for working scientifically because the objectives for working scientifically are set over two years, i.e. Years 1 and 2; Years 3 and 4; Years 5 and 6. To distinguish between them, in the younger years of each pairing, it is helpful to insert the word 'begin'. So, for example, in upper KS2, the first objective is to: *plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary*. So, this is what needs to be achieved by the end of Y6, so in Y5 – and for current Y5 children going into Y6 who have missed this as part of lockdown – this could be thought of as *to begin to plan different types of scientific enquiries...*
4. Assessment of where the children are needs to be planned carefully. ASE PLAN materials may support here (some units are free, others require subscription) as they include examples of children's work, who are working at the standard by year group and topic and are annotated (referenced at the end of this document). Strategic use of AfL to understand where children are at is also important. Techniques such as the following may be useful here:
 - Group elicitation
 - Sorting and grouping
 - KWL grids (K – what pupils know; W – what they want to know; L – what they have learnt)

- PMIs (Positive, Minus, Interesting) or Odd One Outs
- Pre unit thought showers
- Use of concept cartoons or hinge questions. PLAN identify key misconceptions by topic and year group at (see link at the end of this document)
- Annotated drawings
- Incorrect texts which need to be corrected
- Produce a model to explain reasoning

TAPs materials are really supportive here and the link is also provided at the bottom of this document.

5. This grid includes all of the units, not just the units that appear only once. The catch up has been included in the following year; not the year it appears. For example, electricity which appears in Y4 is included as catch up in Y5, so although electricity appears in Y4 it has been placed in Y5 (the catch up year). Very urgent units appear in red. This has been mapped out, see the other attached document: where units can be caught up in science.
6. Use starters in science lessons to revisit learning from other areas of science. This allows assessment and recap for those who are not secure.
7. Link science across topics as this will enable smart coverage and recap of objectives. Linking to maths and statistics and history and geography may be particularly fruitful.
8. As lockdown measures begin to be eased, consider the key priorities for transitioning children back to school, to prepare them personally and academically for return. Does some specific work need to be set to support this as part of the transition from remote learning to school based learning? Can ICT support this, such as a Zoom lesson or a class challenge or quiz?
9. Over the last few weeks, for many children, there would have been a loss of routine, structure, friendship, opportunity and freedom. These need to be carefully rebuilt and the learning environment needs careful consideration to support this.
10. Also, support children with writing. Many children will have lost writing stamina and have spent a lot of time not writing or working digitally. Short focussed writing will support their overall writing and grammar, punctuation and spelling and this will need closer attention than usual. This will include the use of modelled answers and a scaffolded approach so they can communicate their methodology and/or scientific understanding appropriately.
11. Many children too, especially the most disadvantaged, may not have had the opportunity to read much over the lockdown period. Again, science can be a useful forum to support this and key science linked fiction and non-fiction books, which will both engage and excite a love of scientific learning and support reading skills can be found here: <https://www.geekwrapped.com/science-books-for-kids> (A website with links to Amazon for easy purchase)

<https://www.stem.org.uk/teaching-science-through-stories> (Science stories organised into year groups)

<https://www.whizzpopbang.com/schools/#subscribe> (Whizz Pop Bang magazine is available to subscribe to)

12. When schools return, it will be to a new normal, as we will be living with a virus rather than having been able to eliminate it through vaccine, appropriate treatment or effective and definitive testing for immunity. Social distancing and control over the spread of infection will significantly shape our pedagogical practices moving forwards. Therefore, children investigating science collaboratively together is unlikely to be possible for a significant amount of time. Consider how investigative work can continue, such as via demonstration lessons; children working at home or in very small groups and recording their investigations to share more widely; children working outside to support social distancing etc.

13. The current pandemic does provide a fertile platform to teach the third aim of the National Curriculum: are equipped with the scientific knowledge required to understand the uses and implications of science today and for the future? For older children, scientists here and abroad have been key in the country's fight against the virus. The work of key scientists could be explored here and direct comparisons can be made with Jenner and the Smallpox vaccine and the Black Death.

<https://imascientist.org.uk/> (This website allows children to interact with scientists and vote for their favourite scientist. This is carefully monitored)

<https://curiositybristol.net/> (Curiosity Connections pools together ideas and resources for teachers to use in Bristol)

<https://www.stem.org.uk/news-and-views/news/stem-ambassadors-now-offering-online-activities> (STEM Ambassadors are scientists that are available to work with children. Contact can be made through this website)

<https://www.bbc.co.uk/programmes/p015gmdn> (A very engaging look at the work of Edward Jenner, with a clear explanation of vaccinations)

14. Transition will be key for progress to be made by children when they begin a new academic year. Teaching and learning for the class will need to be discussed in detail by the current and new class teacher to ensure:

- areas that were not covered are highlighted
- topics that the class found challenging and were not 100% secure with are revisited

Alongside these ideas, it is key that staff, and school leaders, should not make any assumptions about the children when they return to school. Some children will have done no formal science learning while they have been at home and it is likely that these children will have 'lost' some of the knowledge that they had gained in the 6 months that they had in school.

Useful websites:

<https://www.stem.org.uk/home-learning> (home learning)

<https://www.stem.org.uk/home-teaching> (home teaching)

<https://www.stem.org.uk/online-cpd> (online CPD)

<https://www.ase.org.uk/plan> (PLAN units ASE)

<https://www.planassessment.com/copy-of-plan-knowledge-matrices-tea> (misconceptions)

<https://www.planassessment.com/copy-of-plan-knowledge-matrices-tea> (annotated evidence of children working at the standard)

<https://drive.google.com/file/d/1IWVsjqSB8f0vx12cwOWdIbX7MurXdmN-/view> (progression in knowledge)

<https://drive.google.com/file/d/1H0gzz6wcx4odNcPTH2PysRqp91sWKdXy/view> (progression in working scientifically)

TAPS: <https://pstt.org.uk/resources/curriculum-materials/assessment> (Teacher Assessment in Primary Science)

Primary Science Teaching Trust: <https://pstt.org.uk/resources/curriculum-materials/Science-Fun-at-Home>

Crest awards which can be carried out at home <https://www.crestawards.org/>

29.4.20 Charlotte Thomas and Jenny Brookes