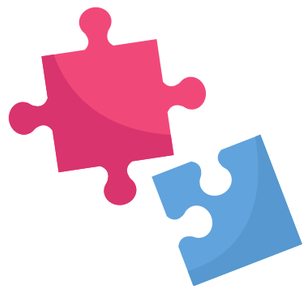
SCIENCE RESEARCH SUMMARY FOR PRIMARY LEADERS AND TEACHERS

(Based on Ofsted's Report)

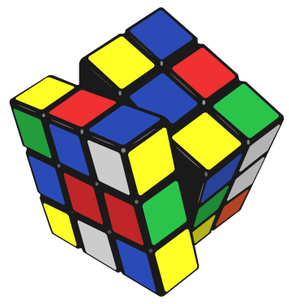
Children begin their formal science learning in **EYFS**. This time should be used to develop a broad **scientific vocabulary** and provide experiences of the phenomena children will learn about later in primary.



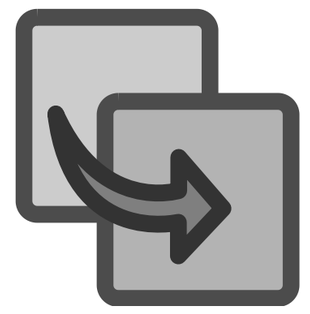
Teaching and learning in science is most effective when it is broken into **small**, manageable **chunks**. This avoids overloading **working memory**, and allows children to understand key components to support their conceptual development.

Working scientifically should be considered as **disciplinary knowledge** about how scientists work and learn. This knowledge contains the what, why, when, where and why of working scientifically skills.

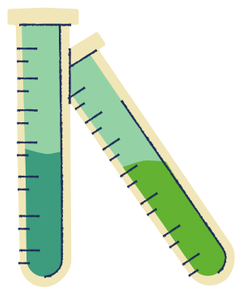
Teachers should identify the best opportunities to teach **disciplinary knowledge** alongside the **substantive knowledge** of the curriculum. This may involve knowledge of how ideas have changed over time e.g. evolution.



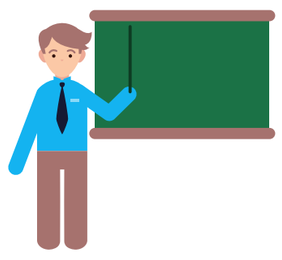
Science is **hard** for pupils to learn because a lot of science contradicts the observations we make in every day life. This means that **misconceptions** are rife and can be enforceable. Only when pupils develop a strong understanding can some misconceptions be ready to address. ..



Pupils do not **transfer** their learning from one context to another that easily. Each time a scientific skill is being used, modelling, explanation and feedback are necessary to lead children to success .

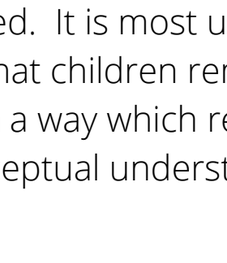


Although **practical work** is often enjoyable, this is not a justification in itself for it to be used. Rather, practical work should be used purposefully in line with curricular goals..

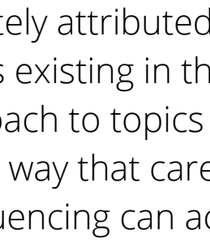


Teacher demonstration is also an equally valuable tool, and can actually be more effective due to the way it can increase working memory capacity for children.

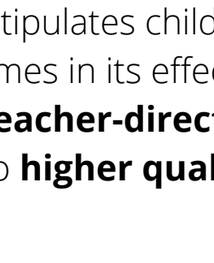
Explanations make a critical difference to the quality of teaching, and are often reliant on excellent subject knowledge. Leaders should prioritise developing teachers' subject expertise to improve teaching and learning.



Retrieval practice in science is effective in preventing children from forgetting what they have learned. It is most useful when it is used so that children remember their learning in a way which reinforces their conceptual understanding.



The **sequencing** of the curriculum is **incredibly important**, and time needs to be appropriately attributed to each of the components existing in the curriculum. An ad-hoc approach to topics does not support learning in a way that careful planning and sequencing can achieve.



Enquiry-based learning - which is different to the scientific enquiries which the National Curriculum stipulates children learn - has variable outcomes in its effectiveness. Ofsted suggest that **teacher-directed instruction** can lead to **higher quality** learning

Language development is strongly associated with achievement in science. This means that every opportunity should be taken where children can not only develop in English, but also learn the language of science through stories, texts, songs, rhymes and poems. Repeated exposures to such texts can help children acquire new information with each reading or recital, thus building their knowledge base and understanding.

For a more detailed summary, check out my blog post at **www.marcrhayes.com**

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