

Welcome to Snap Science Foundation!

Snap Science is a comprehensive and rich resource to support best practice in science teaching and learning in Key Stages One and Two. However, children's science learning does not begin with the National Curriculum Programme of Study for Year One. Therefore, this resource has been created for practitioners in foundation stage settings, supporting them to provide a relevant, stimulating and engaging starting point for early science learners.

Children are intuitive science learners from the day they are born. They are actively curious about the world around them and purposefully investigative. Just like a professional scientist, children make observations, try things out, gather information and use it to test their ideas and make sense of the world. The baby who drops a plate from the highchair repeatedly to check that it always falls to the ground is fully engaged in scientific enquiry. The toddler who is absorbed in watching the ladybird crawl over a leaf to find out how it moves and where it goes is similarly carrying out a scientific enquiry. Both baby and toddler are developing their knowledge and understanding of scientific phenomena, while honing their scientific skills of observation, prediction, data collection and analysis.

Between the ages of three and five years, children show marked development in their understanding of scientific concepts and their ability to test them. This is recognised in the Early Years Foundation Stage, where 'Understanding the world' is specified as a learning goal within the Early Years Framework. Playing and exploring, active learning, and creating and thinking critically also represent the Characteristics of Effective Learning and ways in which young children learn. Snap Science Foundation comprises 24 Activity plans for foundation stage settings, which have been written by expert practitioners. Each Activity plan offers children the opportunity to raise scientific questions, to gather first-hand data to answer their questions and to start to use key scientific enquiry skills that they will continue to develop in KS1, KS2 and beyond.

Snap Science Foundation is designed to fit easily into EYFS planning. Each Activity plan includes activities for an entire setting or class, with clear learning intentions for a focused Enquiry activity that will develop young children's learning as part of the 'Understanding the world' learning goal.

The Activity plan also includes suggestions for a variety of focus and independent activities linked to other areas of learning and development that will support children's progress towards other early years learning goals. It will enable early years practitioners to organise a stimulating and challenging programme of science activities that will both develop knowledge and understanding appropriate to the age and stage, while laying the foundation for the excellent science teaching and learning opportunities that children will meet in Snap Science KS1 and 2. I hope you enjoy using Snap Science Foundation.

Jane Turner

Series Editor, Snap Science

How to use Snap Science Foundation

Snap Science Foundation activities are designed to be integrated into early years programmes for both nursery and reception classes, offering busy practitioners structured activities to use when planning for 'Understanding the world'.¹

'Understanding the world' is about how children get to know about other people, the place where they live and about all aspects of the environment. In the Early Years Foundation Stage framework, 'Understanding the world' is broken down into three areas of Early Learning Goals:

- Past and Present
- People, Culture and Communities
- The Natural World

Snap Science Foundation focuses on 'The Natural World' and covers a wide range of topics in the physical environment, to develop children's awareness of the world around them. Links to 'Mathematics' encourage the use of number in context, while 'Communication and Language' prompts encourage questioning and reinforcement of key vocabulary. The importance of 'Literacy', especially purposeful reading opportunities, is flagged alongside many other relevant links, which encourage broad development in early learners.

Snap Science Foundation helps children make sense of their physical world, as specified in the EYFS educational programme. It does this by providing a wide range of personal experiences and opportunities to visit new places as well as familiar places, on a more regular basis. Links to relevant jobs and role models are highlighted to develop children's understanding about people in society and their local community. Books and stories are used to promote curiosity as well as enrich and embed key vocabulary.

Activity plans may be used to structure one session or lesson within a broader topic, or as the basis for a longer topic.

The Activity plans are arranged in groups to cover different aspects of science learning, and where possible should be used in the order specified to support a progression of ideas and skills. Each Activity plan includes:

- A clear **Learning intention** linked to the big science idea
- An **Explore** session which begins the activity for the whole class, using the Story slideshow and hands on exploration to introduce the scientific ideas, spark curiosity and give children the chance to share previous understanding and raise questions
- **Enquire** activities where a group of children work with an adult on a **Focus** activity to investigate the enquiry question
- **Enquire** activities for children to investigate the enquiry question **independently**
- A **Reflect and review** activity which provides the opportunity for children to consolidate the key learning from the activities
- **Evidence of learning** to guide teacher assessment of children's learning
- **Key vocabulary, Resources and Science at home** activities for children to do with their families
- **Signposts** for practitioners to Background subject knowledge and typical children's **misconceptions**
- Links to other areas of development **Links to people in society** to highlight science related role models, jobs and careers and promote a greater awareness of the local community.

¹ DFE (2021) *Early Years Foundation Stage*

They can be adapted to fit practitioners' own planning models and include learning activities for the whole class, groups and individuals.

The teaching guidance can be used by all adults in the setting.

The activities will provide many opportunities for practitioners to make quality observations of children, capturing what they know, what they can do and what they are interested in.

Evidence of individual children's achievements should be recorded in their Learning Journey or Evidence Logs.

Links are made to Snap Science KS1 and 2, enabling the science subject leader to monitor provision and progression across the whole school, ensuring that learning is sequenced and built on as children move through the year groups.

The best teaching of foundation stage science

There is a wealth of research and good practice evidence about how young children learn science that has informed the structure and content of Snap Science Foundation. At the heart of this resource are a number of principles:

1. Children are naturally curious about themselves and the world around them.

They are eager to make sense of what they observe and they do this by asking questions about themselves, about objects, phenomena, materials and relationships in the world around them.

Every Activity plan in Snap Science Foundation is built around children's questions about a familiar context. These questions are presented in beautifully illustrated Story slideshows featuring Billy, Rubina, Eliza and Jamil, which will motivate children to share their own ideas and gather evidence to answer their questions.

2. Science education should develop understanding of a set of big conceptual ideas in science.²

Understanding of science ideas about objects, phenomena, materials and relationships in the natural world begins when children are very young. They form ideas about how the world operates, based on perception and concrete experience. The practitioners' task is to ensure that the ideas children develop are scientifically correct. They do this by helping children to make links between their own experiences and accepted scientific ideas.

Snap Science Foundation has been designed to ensure secure underpinning of the big ideas of biology, chemistry and physics that children will meet in Snap Science KS1 and 2. In the introduction to each Snap Science Foundation activity the big science idea that children are developing is made explicit for practitioners, and also, where appropriate, some idea is given of how it will be built on during later years of primary school. There is guidance on appropriate vocabulary and explanations and, most importantly, the activities all support the development of scientifically correct ideas.

3. Science education should develop big ideas about the process of science.³

Science is an enquiry-based approach to understanding the world. Questions are asked, evidence is gathered to answer those questions and the quality of the answers is evaluated. In KS1 and 2 this is called 'working scientifically'. In foundation stage children begin to develop the skills of working scientifically, learning about the world around them through exploration and problem solving, and

² Harlen, W. (ed.) (2010) *Principles and Big Ideas in Science Education*

³ Harlen, W. (ed.) (2010) *Principles and Big Ideas in Science Education*

learning about cause and effect. They do this by asking questions, collecting evidence in a variety of ways, recording their findings in words, pictures and numbers, and talking about what they did and what they found out.

Every Snap Science Foundation Activity plan is designed to ensure that children will develop early skills of working scientifically, including raising questions, planning, observing, measuring, recording, interpreting and communicating.

4. Developing positive scientific attitudes is an important part of Science education.⁴

Certain motivational, social, behavioural and reflective attitudes are recognised as having particular significance for scientific skills and understanding. Foundation stage experiences are important in children's development of these attitudes. It is therefore important that foundation stage practitioners encourage children's curiosity and enthusiasm and set up opportunities for them to cooperate with other children and listen to their ideas. Practitioners should also help children to persevere with tasks despite difficulties, to be objective and open minded about what they find out and to respect evidence, even when it conflicts with their intuitive ideas. Parents also have an important role to play in developing their children's scientific attitudes.

Snap Science Foundation is designed to help lay the foundations for these positive attitudes, which will support children's development in science as well as other areas of learning. Through exploration, play and interaction children will develop their scientific attitudes and also continue this at home, as each Activity plan includes suggestions for home science activities.

5. Authentic, firsthand experience is a necessary and significant element in children's learning.⁵

Children learn with their whole bodies, using all of their senses. It is through fully investigating small and everyday elements of the real world that children learn to think about big ideas. They cannot do this if their interactions with the world are inauthentic and second hand.

Every Snap Science Foundation Activity plan requires children to engage indoors and outdoors with the stuff of the real world: real animals, real plants, real food, real tools, real materials and objects and real people who use science in their everyday lives. The use of books and other secondary sources to find evidence to answer questions is also supported.

Outdoor learning is a key feature of Snap Science Foundation. It includes a set of Activity plans called, The local environment, which offer young children regular opportunities to explore all aspects of their outdoor environment and to build up a rich understanding of how it changes over the year. The local environment lessons are also a key feature of Snap Science Years 1–6.

6. Social interaction plays a vital role in developing children's scientific understanding.⁶

Although children need time to explore and investigate independently, they also need time to talk to other children so that they can try out and share ideas. Adult intervention is also crucial. The foundation stage practitioner's task is to question the child about their experiences and challenge them to look more closely or to think differently, thereby helping them to make links between their exploratory findings and scientific ideas.

⁴ Johnstone, J. (2005) *Early Explorations in Science*

⁵ Rich, D., Drummond, M.J., Myer, C. (2005) *First-Hand Experience: What Matters to Children*

⁶ Harlen, W. (2001) *Primary Science Taking the Plunge*

Every Snap Science Foundation Activity plan includes opportunities for children to discuss their observations, prior experiences and ideas in pairs or small groups, or to try out ideas in role play activity. Also included are questions for the practitioner to use to challenge children's thinking and to promote the development of correct scientific ideas.

7. Assessment is an integral part of teaching.

Best practice guidance for science teaching and learning is clear: it is informed by accurate and timely assessment of how well pupils are developing their understanding of science concepts and their skills in analysis and interpretation so that teaching can respond to and extend pupils' learning.⁷ Foundation stage practitioners are experts at planning for children's learning and tracking their progress through observing what they do and say.

Every Snap Science Foundation Activity plan includes a final Reflect and review activity where children have the opportunity to tell an adult what they did and what they found out. This, plus observations of children's activities and interactions with other children and adults, will provide rich evidence of their learning. Guidance for practitioner assessment is provided in the Evidence of learning section for each Activity plan. This guidance indicates where practitioners will find evidence of achievement of the Learning intention and what that achievement may look like, in the things that children say, do, write or draw.

8. All areas of the EYFS are important and interconnected.⁸

Foundation stage settings are busy places, made up of indoor and outdoor learning environments, and spaces for both independent and supported activity. Foundation stage practitioners place emphasis on the prime areas of learning: communication and language, physical development and personal, social and emotional development, which are particularly crucial for children's learning and development. There are also four specific areas – literacy, mathematics, understanding the world and expressive arts and design – through which the prime areas are strengthened. The areas are connected, with learning and development in each area contributing towards that of the others.

Every Snap Science Foundation Activity plan has a clear focus on developing an aspect of children 'Understanding the world' through a science enquiry activity. To enable children to explore ideas in a variety of ways there are also suggested linked activities that support progress to the other equally important EYFS goals.

⁷ Ofsted (2013) *Maintaining Curiosity*

⁸ DFE (2021) *Early Years Foundation Stage*