

# What is STEM?

STEM is made up of science, technology, engineering and maths. The STEM Education Policy (Department of Education and Skills, 2017, p. 6) summarises the four areas as follows:

**Science** enables us to develop our interest in, and understanding of, the living, material and physical world and develops the skills of collaboration, research, critical enquiry and experimentation.

**Technology** covers a range of fields which involve the application of knowledge, skills and computational thinking to extend human capabilities and to help satisfy human needs and wants, operating at the interface of science and society.

**Engineering** is about the design and creation of products and processes. Drawing on scientific methods to provide the skills and knowledge to solve real-world problems.

**Mathematics** equips us with the skills needed to interpret and analyse information, simplify and solve problems, assess risk, make informed decisions and further understand the world around us through modelling both abstract and concrete problems.

Each of the STEM areas is relevant and important for young children whose curiosity and drive to explore and understand the world is the starting point for their learning. Adults<sup>1</sup> can support children's engagement with STEM by providing them with opportunities to solve problems, to use their imaginations, to ask questions, to collaborate with others, to experiment, to make things and to try different ways of doing things. Like all learning and development, STEM is best supported through secure and loving relationships, through interactions and through play and playful experiences.

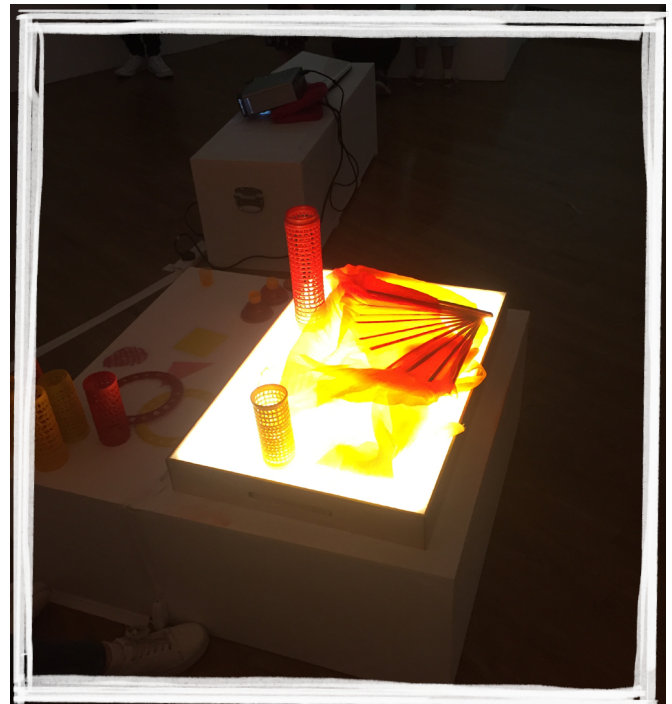
<sup>1</sup> Adult refers to all those who care for and educate children from birth to six in Ireland. This includes parents/guardians and other significant adults in children's lives including practitioners, and other professionals, such as therapists and social workers. (NCCA, 2009, p. 53)

## Science

Children are interested in and curious about their world from birth, and this is the starting point for recognising the science in young children's experiences. Science in early childhood is about children discovering their world through the kind of experiences, particularly play experiences, that are provided every day in early childhood settings, indoors and outdoors. Experiences of the living, material and physical world involve children exploring the world through their senses – tasting, smelling, listening, seeing and touching and providing for sensory experiences will bring you and the children into scientific talk and activity. Talking about those experiences and responding to children's curiosity about, for example, where rain comes from or how many legs a spider has, is a powerful way to support children's interest in and understanding of the world they live in.

## Technology

Young children have daily experiences with technology and learn about its uses very quickly, be it hearing the ping of the microwave, pushing the buttons on the washing machine or swiping a parent's smart phone to look for pictures. Technology, such as digital cameras and voice recorders, can be used to enable children to explore the living world outdoors, and role-play scenarios can mirror the technology that children are familiar with in their everyday lives such as 'tapping' debit cards in the shop or 'typing' on a computer keyboard in the doctor's surgery. These, and other play and exploration activities, offer children opportunities to explore and understand how technology can be useful in helping us to do things we want to do. Supporting children's language ability so that they can explain why they want to use a particular technology is central to their development of a critical attitude to technology in everyday life.



## Engineering

Engineering is about designing, making and building things. Children love to design, make and build as an expression not just of their engineering capacity but also their creativity. Having conversations that give the children choices about what they want to do with, for example, blocks, boxes and art materials supports them in designing. Children love making things, for example, in play that involves cutting and sticking; providing materials such as blocks and boxes of different sizes for construction play, indoors and outdoors, gives plenty of opportunity for building. All of these activities, as well as other play scenarios, give rise to meaningful problem-solving opportunities, providing links with the scientific approaches described above. Adults who listen to children talking about what they want to do with the materials provided, who encourage children to try out their plans and talk with them about the results are fostering children's understanding of engineering.

## Maths

Children are born mathematicians. Research has shown babies in their first year noticing changes in the number of objects in a small collection and reacting to number in other ways as well. Much of young children's learning about maths happens through play and, given that play is central to children's experiences in settings, the stage is already set for maths learning and development. Play is also a great opportunity for adults to help children to develop a positive attitude to maths, as well as a context for plenty of 'maths talk'. Because 'maths talk' is an important contributor to children's mathematical understanding, adults who use maths language accurately are being very helpful.

For example, for babies and toddlers being able to distinguish things that are the same and things that are different helps them to sort objects into sets, an important skill that will support a child's later understanding of 'more' and 'less' and the concept of 'equal'. When toddlers are tidying up, for example, 'maths talk' might be about sorting and organising the tea set based on size (small, medium, large), colour (red, green, blue, multi-coloured), material (plastic, ceramic or tin) or function (pot, plate, spoon). It takes a lot of practice for young children to make these distinctions, and conversations with adults are a big part of that learning. There are five types of maths that are important in early childhood – number, measure, geometry and spatial thinking, algebraic thinking, and data and chance and include things like size, quantity, space, volume and speed<sup>2</sup>. These categories provide a good place to start thinking about the kind of language that will help the children's mathematical learning and development through play.



## Conclusion

It is likely that children are having STEM learning experiences every day in early childhood settings, through play with materials such as sand, water, playdough and in activities such as digging in the garden, climbing, and building with loose parts in the outdoors. These contexts also provide opportunities for exploring and developing skills to use tools, such as measuring tapes, magnifying glasses, calculators and scissors. Loving and secure relationships are the context for the kind of interactions that are central to the language development which underpins STEM learning because mastering language supports children's understanding of their world and building children's understanding of their world is the purpose of STEM.

<sup>2</sup> See the **STEM Glossary**