

## Introduction

'We are at one of the most important, exciting and challenging times in the history of global enterprise. Powered by new technologies, the way we live our lives as workers, citizens and consumers is being transformed across the world...It is not enough just to look at the economy we have. We must make preparations for the economy we need to become.' ([Building a Britain for the Future](#))

Against the backdrop of what many have described as the 4<sup>th</sup> Industrial Revolution, UK governments are acutely aware of the need to equip their people, places and businesses to be able to respond.

To this end Science, Technology, Engineering and Mathematics (STEM) has been the focus of a range of government policy documents published in recent years. This report provides an overview of these policies and makes relevant links with the Peep Learning Together Programme.

The [Peep Learning Together Programme](#) is an established, evidence-based, early intervention/prevention programme, developed by the charity Peep. It is an adult learning programme which aims to improve the learning and development of babies and young children by working with parents/carers and children together.

The Programme aims to improve children's:

- personal, social and emotional development
- communication and language
- early literacy
- early numeracy
- health and physical development.

Across all policies, four relevant key themes emerge:

- Excellence and Inspiration
- Equity
- Lifelong Learning
- Connection

The Learning Together Programme is well placed to support all themes of the STEM policies.

## Excellence and Inspiration

All policies identify that focus must be on:

- delivery of an exciting STEM curriculum, with the provision of stimulating experiences and supporting resources,
- the importance of building 'STEM Capital' (the interest, knowledge, confidence and appreciation of the opportunities available within STEM) amongst children, young people, parents/ carers, families and communities,
- a particular emphasis on mathematics,
- the importance of a highly skilled educational workforce.

The Northern Ireland Strategy, [Success through STEM](#), highlights the importance of 'stimulating interest in, and enthusiasm for STEM' through a curriculum offering 'a wide range of learning opportunities to match

young people's needs, aptitudes and interests irrespective of where they live or the school they attend' and 'providing freedom for teachers to explore STEM-related learning with pupils in an interesting and innovative way'. This is closely linked with 'improving the range and quality of resources available to support teachers and pupils - to promote STEM and make STEM related subjects more interesting.'

It also refers to 'managing STEM sector attractiveness', by finding ways to engage with parents and young people to highlight the opportunities available through STEM.

The Welsh Strategy, [STEM Education and training -A delivery plan for Wales](#) also acknowledges the importance of an inspiring curriculum in its reference to [Successful Futures](#), (Curriculum and Assessment Review 2015) with its emphasis on 'the importance of rich experiences being integral to the curriculum and to deep learning,' and the need for 'common purposes that apply to all our children and young people and promote high aspirations and a determination to achieve.'

[The British Industrial Strategy: Building a Britain for the Future](#) identifies the need for curriculum development with clear focus on Science, Technology, Engineering and Mathematics, and the recognition that Mathematics, 'particularly strong quantitative skills, are increasingly important as an underpinning for all forms of STEM study, but also for highly-skilled employment outside core STEM disciplines.'

The Scottish Strategy, [SCIENCE TECHNOLOGY ENGINEERING MATHEMATICS Education and Training Strategy for Scotland](#), recognises the need to provide an 'inspiring offer of STEM activity', and highlights the importance of building the skills, knowledge and confidence of families to promote and encourage STEM learning at home. Referring to this as 'STEM Capital', it acknowledges the importance of 'challenging outdated views, misconceptions and stereotypes related to STEM'. It states that 'it is critical that we recognise the role that parents and families in particular can play as key influencers of young people's attitudes and choices, including the subjects they study and the careers they pursue.'

It also highlights the need to challenge the 'persisting view within our society that STEM subjects are more difficult to study than others, as well as an under-appreciation of the vital contribution of STEM to our culture,' and 'the need to demonstrate the opportunities STEM presents for all children, young people and adults.'

[The House of Commons Science and Technology Committee Industrial Strategy: Science and STEM Skills- Thirteenth Report of Session 2016–17](#) acknowledges the importance of STEM Capital as a key element of young people's exposure to inspiring science influences. It recognises parents and teachers as 'the biggest influencers on children's experiences and study choices' but notes that 'half of parents feel ill-informed about the benefits of STEM subjects and associated potential career paths.'

The Welsh Strategy refers to STEM Capital in their linking of the 'Focus on Science Campaign' to the parent-focused [Education Begins at Home](#) Campaign. This highlights the importance of 'promoting key messages about the importance of science and mathematics to learners, teachers and parents/carers'.

Both the Welsh and Scottish Strategies identify a wider issue: that some parents and family members can hold negative views, or perceptions of STEM that are often based on their own prior experiences. The Education Begins at Home campaign also highlights a number of linked areas including, literacy, numeracy and science. The campaign and STEM Strategy aim to increase enjoyment of, and reduce negative attitudes towards, these subjects.

Particular focus on mathematics emerges in the British, Scottish and Welsh Strategies and make explicit links to attitudes in the home. 'All too often, people are heard saying 'I can't do maths', to the extent that it is often socially acceptable. Although people in Wales recognise they use mathematics on a daily basis, many express negative views about mathematics in front of their children. It is recognised that having a negative attitude towards mathematics can readily transfer to children, resulting in poor numerical skills development'. Education Begins at Home focuses on the need for all adults to be more confident when dealing with and talking about mathematics and highlights the importance of the home environment as 'the single biggest factor in educational attainment. By creating an environment that values education and supports a child's learning, parents are giving their child a significant head start in life.'

The Scottish Strategy also identifies the need to focus on maths, following the recommendations of the [Making Maths Count Report](#), aiming to 'transform public attitudes to mathematics, improve confidence and fluency in mathematics for children, young people and their families.'

All strategies include the importance of a high quality, highly skilled and motivated workforce to support the development of excellence and inspiration. The Scottish Strategy identifies the need to ensure high-quality programmes in early learning, primary and secondary schools. It recognises the need for 'sufficient teachers and practitioners ... who are well equipped with the knowledge, skills and confidence to develop and deliver inspirational, high-quality interdisciplinary STEM teaching for all learners, across all ages and stages.' The Scottish Government commits to 'ensure early learning and childcare (ELC) practitioners have the appropriate skills, knowledge and confidence to support young children in relation to STEM...as well as ensuring a good supply of STEM talent into the workforce and keeping practitioners' skills up to date, the curriculum and programmes of STEM learning need to be of high quality.'

The Welsh Strategy, referencing 'Successful Futures', highlights 'the essential nature of pedagogical development and that Wales' 'practitioners need the skills and knowledge necessary, to deliver the curriculum.' It states a key 'priority to support our education workforce in their professional development,' whilst the Northern Ireland Strategy recognises that 'high quality teaching from expert and enthusiastic teachers can make a significant difference to attitudes and aptitudes of young people and their families.'

**The Peep Learning Together Programme** is currently delivered to approximately 800 practitioners a year throughout the UK and beyond. The Programme equips early years professionals with the skills, knowledge and confidence to support families to improve learning at home. Practitioners can gain a [Peep City & Guilds](#) unit accreditation in working with parents and children together and have access to an inspiring, robust curriculum and resources.

The Early Numeracy strand focusses on all aspects of mathematics, directly supporting children's knowledge, skills and attitudes in this key STEM area of learning, whilst also developing the knowledge, skills, positive attitudes and confidence of their parents.

Strands in Early Literacy and Health and Physical Development further support direct STEM learning, while Communication and Language, and Personal, Social and Emotional Development strands support the development of underpinning key STEM skills and dispositions. These include effective communication skills, collaboration and enquiry, together with positive attitudes to learning such as motivation, resilience, tenacity, self-confidence, self-esteem and emotional self-regulation, all vital characteristics of STEM study and practice.

## Equity

All strategies focus on the equity gap in relation to STEM, highlighting the need to address equality of opportunity for everyone, from the early years. The role of parents/ carers in recognising the potential of STEM activity and study, and how they influence children and young people's career choices is acknowledged.

The Scottish Strategy identifies the need to 'close equity gaps in participation and attainment in STEM so that everyone has the opportunity to fulfil their potential and contribute to Scotland's economic prosperity.' The Scottish Government aims to ensure there is 'equality of access, opportunity and outcomes in STEM learning and STEM experiences for everyone, regardless of gender, background or circumstance or geography.' It recognises the requirement 'to tackle inequality and inequity, including gender stereotypes, in STEM learning and careers from the early years onwards.'

The British Strategy acknowledges that 'barriers that prevent under-represented groups from realising their full potential need to be broken down.' For example, girls/women, those returning to work, black and ethnic minorities and those with disabilities.

[The British Industrial Strategy: Science and STEM Skills](#) quotes research which found that 'a high proportion of children and young people enjoy science, and believe that it is important for the future, but only a small proportion of students wanted to become a scientist.' It notes that young people's STEM capital 'correlates with the likelihood of pursuing a career in STEM and is less prevalent in disadvantaged groups. Parents and teachers are the biggest influencers on children's study choices, but half of parents feel ill-informed about the benefits of STEM subjects and associated potential career paths.'

A focus of the Welsh Strategy is 'to increase interest and participation in STEM learning, particularly among girls.' It identifies the importance of 'changing people's perceptions of STEM as an appropriate route for study or field in which a career can be sought.' 'Changing perceptions to recognise the reality of contemporary STEM often, therefore, involves attitudinal change from deeply embedded societal stereotypes.' The Strategy also recognises the importance of STEM Capital in terms of knowledge about STEM skills and careers and further learning, highlighting the need to influence young people themselves, parents/carers and educators, aiming to equip all young people with career management skills and knowledge of options available to them in the STEM sector, so they can make better informed decisions about their future.

The [Peep Learning Together Programme](#) is a flexible, accessible and affordable strengths-based approach to working with families, focusing on doing *with* rather than doing *to* parents/carers. The programme values and builds on existing skills, capabilities and potential, helping all families to recognise the relevance and importance of what they do with their children. It aims to achieve equity in educational outcomes and raise the attainment of children living in deprived areas, addressing the poverty-related attainment gap.

Delivery is underpinned by the [ORIM](#) Framework, developed by Professors Peter Hannon and Cathy Nutbrown (University of Sheffield). This supports parents to make the most of learning **opportunities** in day-to-day life, **recognise** and value their children's efforts and achievements, **interact** with them in positive ways, and acknowledge they are their child's most powerful role **model**. This approach helps parents to increase motivation, and ambition for all children, regardless of gender, deprivation, rurality, race, or disability. It also highlights to parents the importance of their own interactions, attitudes and the influences they can have on their children. This frequently develops parents' motivation to learn more for themselves and feel able to

progress into further learning and work. It also supports adults to [gain qualifications](#) which recognise their own learning during the sessions.

Research studies by the Universities of Oxford and Warwick found that the Peep Learning Together Programme:

- successfully reaches isolated families and engages them in their children's learning
- helps parents become more aware of their children's development and how to foster it
- helps children develop good foundations for literacy and strong self-esteem
- enables practitioners from a wide range of professions to develop new skills and fresh approaches to unlock parents' potential rather than focus on their problems.

The Programme is underpinned by The People principles, below, which complement the [United Nations Convention on the Rights of the Child \(UNCRC\)](#):

- We believe in the potential of every parent, every carer and every child
- We believe that relationships are at the heart of learning
- We recognise parents and carers for what they already do, and help them to do more
- We believe that lives can be transformed by building on everyday learning experiences
- We recognise the importance of reflecting on the world through the eyes of others.

## Lifelong Learning

From recognising the importance of promoting STEM skills and knowledge in the early years, with children and their families, through to postgraduate study and into the workplace in the form of training, re-training and re-skilling for adults, opportunities for lifelong learning are identified as key to STEM development and sustainability.

All strategies place a clear focus on developing excellence and inspiration in STEM with families of the youngest children.

The British Strategy identifies the early years as 'crucial in providing a foundation in STEM skills and in inspiring and igniting children's enthusiasm. The outdoor learning environment, in particular, provides a rich and exciting context for young children's STEM learning.'

The Industrial Strategy: Science and STEM skills, recognises that encouraging children from an early age to have an understanding of science needs to be priority in the work to tackle the STEM skills gap; encouraging students from an early age to have an understanding of science needs to be a priority if the UK is to stay at the forefront of research and innovation. It also focusses on the importance of the education system in allowing people to learn and train throughout their lives. It highlights the need to 'develop pathways of learning and training for people in work and returning to work...to enable them refresh their skills after a period out of the labour market' and 'to access training in order to transition or develop their skills as their sector changes in response to technological shifts.' It also recognises 'we need to do even more to widen participation for those from disadvantaged and under-represented groups looking to re-skill and up-skill.' The government commits to 'supporting adults to secure meaningful and productive employment, and equipping them with the skills they need to maximise their earning potential.' It also commits to providing 'accessible ways of delivering learning to adults,' particularly those with low or intermediate skills. In addition, the

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strategy states that more must be done ‘to help people of all ages navigate our labour market ... providing people with access to the information, advice and guidance that will help them make choices as they progress through the education system and their careers.’

The Scottish Strategy emphasises the ‘crucial early years’ when STEM skills can be promoted and enthusiasm for STEM can be fostered. It also focusses on equipping young people with the skills that employers need, and ensuring adults have opportunities to acquire the flexibility to respond to changes in the labour market demand.

The Welsh Strategy focusses on the importance of the Home Learning Environment in the ‘Education Begins at Home’ Campaign, promoting key messages about the importance of science and maths to children, teachers and parents/carers, and supporting them to develop their own skills.

The Northern Ireland Strategy particularly focusses on developing ‘innovative ways in which to better engage with parents and young people to highlight the opportunities that exist within the STEM sector.’ This includes from the early years, through school experiences and into training and employment.

Research supporting STEM learning and teaching in the early years, with clear links to the relevant skills, knowledge and learning dispositions is provided in [The Roots of STEM](#) (Center for Childhood Creativity 2018).

The **Peep Learning Together Programme** provides an exciting range of topics, activities, experiences and resources for families to share and highlights the importance of a stimulating [Home Learning Environment](#) in supporting children’s early learning. It values and extends what parents/carers already do and helps them to do more. It aims to build the skills, knowledge and confidence of families to promote and encourage learning at home, recognising the role that parents and families can play as key influencers of children’s attitudes, choices, interests and skills they develop.

It also supports parents to identify their own strengths and potential areas and routes for development, helping them to recognise the relevance of their own prior experiences and attitudes and how these can influence their children’s learning and development.

[Nationally-recognised adult learning units](#) are embedded within the Programme with further education pathways to FE colleges in place. These units are based on what parents/carers already do to support their child’s development, and how they have put into practice the knowledge gained while taking part in the Programme.

In addition to recognising what parents/carers are doing to support their children’s learning, it supports adults to re-engage with learning, recognising adult learner progress and achievement, building confidence and ability in their own skills, capabilities and potential and developing motivation.

As a result, many Peep parents go on to courses to further their own Maths, Literacy and ICT skills, modelling positive attitudes and approaches to learning in these key STEM subjects. This helps them to recognise potential in their own children, builds parental capacity and their own ‘learner identity’, which research shows makes further progression into volunteering, further learning or work more likely.

This approach supports parental empowerment and employability, ensuring they have opportunities to acquire the flexibility to respond to the inevitable changes in labour market demand.



## Connection

All strategies acknowledge the importance of partnership working at national, regional and local levels; using the skills of professionals from a range of organisations, resources available within communities and sharing good practice - all with a strong focus on engaging with families.

The Northern Ireland Strategy states ‘that all departments continue to work together to identify the role they can play.’ A key priority is to develop regional STEM links between the local representatives and provision of these departments, particularly utilising the role of museums and libraries to engage with families.

The Scottish Strategy identifies partnership working as a key approach to promote the recommendations, with a strong focus on working with families. Community Learning and Development (CLD) is recognised as having a key role in supporting equity and the development of STEM Capital by engaging with disadvantaged families. The Strategy supports the focus of Regional Improvement Collaboratives to promote effective strategies and approaches for parental engagement and family learning in STEM in early learning and childcare settings and schools.

The British Strategy also identifies the importance of connections and capacity being in place at local levels, recognising that ‘different areas and regions often face particular challenges, as well as opportunities, and that these need tailored approaches to meet them.’ It acknowledges ‘there are a variety of institutions at local level with valuable contributions to make to skills development.’ As part of Local Industrial Strategies ‘we need to ensure they work together to deliver the best possible outcomes for their community and for the local economy.’

The Welsh Strategy promotes a focus on working with practitioners and key organisations, Pioneer Schools, STEM experts and stakeholders, to provide local support, develop programmes and share good practice across localities.

**The Peep Learning Together Programme** promotes partnership working to achieve its aims for children and their families. This strategy is recognised as having a key role in supporting equity by engaging with disadvantaged families, through working with the professionals who are already engaged with them, in their local environments.

The Programme can be used to support the suggested focus of locality collaboration to promote effective strategies and approaches for parental engagement and family learning in STEM in early learning and childcare settings and schools.

The Programme:

- is relevant to *all* parents/carers and children
- was designed to be used flexibly by Peep-trained practitioners, to meet the needs and interests of local families
- can be used in the home, in universal or targeted groups, in drop-in sessions including stay and play or child health clinics, in a school or nursery – wherever families spend time. It can be used as part of a multi-agency approach to working with families – Peep-trained practitioners work within health, education, childcare, adult and community learning, social care, family support, youth work, psychology, libraries, volunteering.

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## Links to relevant strategies and supporting information

**The Northern Ireland Strategy- Success through STEM** ( <https://www.economy-ni.gov.uk/sites/default/files/publications/del/STEM%20Strategy-Success%20through%20STEM.pdf> )

**The Welsh Strategy: STEM Education and training -A delivery plan for Wales**  
(<https://gov.wales/docs/dcells/publications/160311-stem-delivery-plan-en-v2.pdf>)

**Successful Futures** (Curriculum and Assessment Review 2015)  
(<http://learning.gov.wales/news/sitenews/successful-futures/?lang=en>)

**Education Begins at Home Campaign**  
(<https://gov.wales/topics/educationandskills/schoolshome/parents/education-begins-at-home/?lang=en> )

**The British Industrial Strategy: Building a Britain for the Future**  
([https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf))

**The House of Commons Science and Technology Committee Industrial Strategy: Science and STEM Skills- Thirteenth Report of Session 2016–17**  
(<https://publications.parliament.uk/pa/cm201617/cmselect/cmsctech/991/991.pdf>)

**British Industrial Strategy: Science and STEM Skills** 29 March 2017  
(<https://publications.parliament.uk/pa/cm201617/cmselect/cmsctech/991/991.pdf>)

**The Scottish Strategy- SCIENCE TECHNOLOGY ENGINEERING MATHEMATICS Education and Training Strategy for Scotland** ( <http://www.gov.scot/Resource/0052/00526536.pdf>)

**The Roots of STEM** (Center for Childhood Creativity 2018) ([http://centerforchildhoodcreativity.org/wp-content/uploads/sites/2/2018/02/CCC\\_The\\_Roots\\_of\\_STEM\\_Early\\_Learning.pdf](http://centerforchildhoodcreativity.org/wp-content/uploads/sites/2/2018/02/CCC_The_Roots_of_STEM_Early_Learning.pdf))