

STEM Education

Science, Technology, Engineering and Maths

Glasgow City Council Education Services Position Statement



Our vision

That our young people, practitioners and partners work collaboratively to support the development of STEM based knowledge, skills and opportunities, increasing the skills for life, learning and work of our young people and supporting Glasgow's economic development.

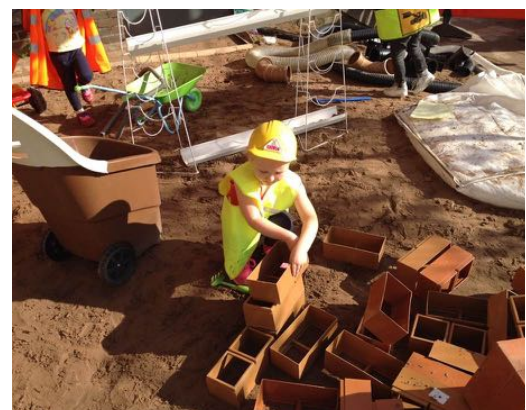
Background

What is STEM?

STEM stands for Science Technology Engineering Maths. However STEM is not just the collation of discrete curricular areas. Rather it represents a key driver for the development of the skills and knowledge across the subjects, skills that are at the heart of the development of Scotland's Young Workforce and of Glasgow's future economy and prosperity. Developing an understanding and knowledge of STEM is also important to all of our daily lives and it is essential that we support our young people to become scientifically and digitally literate citizens.

Why study STEM?

Studying STEM subjects and developing the associated skills offers considerable opportunities for our young people to access opportunities for further study and rewarding careers. It is important to recognise that the development of many of the higher order thinking skills associated with STEM (analytical and creativity, collaboration and innovation) opens doors to employment that may not be initially recognised as associated with STEM. The message that STEM keeps options open is one that needs to be reiterated to our young people, their families and our school staff.



STEM and the city's economy

The key sectors for Glasgow's economy, as defined by [Glasgow's Economic Leadership](#), are Low Carbon Industries, Engineering, Life Sciences, Finance and Business Services, Tourism and Higher/Further education. STEM is integral to most of these and the development of STEM skills in our young people will allow them to be well equipped for these growth areas in their future.

Labour market intelligence from [Skills Development Scotland](#) highlights that the business base in Glasgow is aligned with STEM (e.g. Professional Technical and Scientific represents the highest proportion of businesses at 15%, with Health 8%, information and Communications 6%). The forecast for areas of growth from 2017 – 2022 are highest in Information technology (32% increase) and Health and Social Work (18% increase). This reflects societal shifts with the exponential development in digital technologies (e.g. internet of things) and the demographic changes of an aging population.

Policy Drivers

There are a number of local and national policy drivers that support the development of a STEM strategy for Glasgow. These include [Developing the Young Workforce](#) (Recommendation 12: STEM should sit at the heart of the development), the Digital Learning and Teaching Strategy, the [Glasgow colleges regional STEM strategy](#) and the current development of a National STEM strategy for Scotland. Glasgow's Improvement Challenge has at its core the aim of ensuring that all children and young people develop the wide range of transferable skills required for them to be confident, successful citizens of Glasgow, supporting a thriving economy.

A STEM Strategy for Glasgow Education Services

The development of a Glasgow City Council STEM strategy and associated action plan will focus on three key priorities:

- **Learner experience:** ensure that all learners have an entitlement to high quality STEM experiences throughout their education from 3-18
- **Staff development:** continue to support staff in nurseries and schools to build confidence and understanding in STEM through high quality career long professional learning
- **Partnerships:** develop and strengthen our work with partners including families, colleges, universities, business and public sector

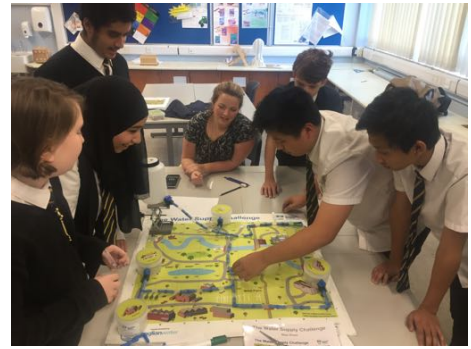
Over the academic year 2016/2017, we will:

- develop an action plan for the next three years, including how we will evaluate the impact of actions and measure progress
- employ a Development Officer to lead on the Allan Glen's STEM academy, based in the City of Glasgow College
- build a STEM website to offer online support for young people, schools and partners
- continue to strengthen our partnerships with colleges, universities and businesses

Context

Developments in the field of STEM offer considerable opportunities within a challenging context for effective implementation of a strategy:

- *Scale*: our strategy must support the development of STEM skills and knowledge for all children and young people, 3-18, regardless of which one of our 300+ establishments they attend, ensuring equity of access
- *Breadth*: STEM covers a significant part of the curriculum
- *Confidence*: research evidence shows that there is a lack of confidence in teaching STEM skills and knowledge in many staff in primary schools and nurseries nationally
- *Teacher numbers*: there remain particular challenges nationally in ensuring that there are sufficient numbers of appropriately qualified teachers of STEM subjects in the secondary sector
- *Perceptions of careers in STEM*: The [Aspires](#) report highlights that ingrained perceptions remain, such as that it is predominantly for male, white and middle class and for the “brainiest” students, as well as a lack of awareness in young people and families of the range of STEM careers and pathways, and importantly, the transferability of STEM qualifications.



Education Services support for the development of STEM skills and knowledge

Education Services directly support schools and practitioners to develop their approaches to delivering STEM education, as well as facilitating a wide range of activities, such as talks from leading engineers and scientists.

Hillpark Secondary Cluster participated in the National STEM cluster project, with two nurseries presenting a seminar on their STEM journey at the national Scottish Learning Festival 2016. Currently two learning communities (Shawlands and Notre Dame/St Thomas Aquinas) are taking part in the SSERC primary cluster programme Science and Technology. The evaluation of these projects will help shape the recommended model for schools in the city taking forward STEM.

Education services staff supporting the development of the STEM strategy

- Mark Irwin – Principal Officer STEM
- Jacqui Nimmo – Area Education Officer
- Jim Wilson – Head of Service
- Hannah Christie – Development Officer (Allan Glen’s STEM Academy¹)

¹ Due to difficulties securing appropriate supply staff, the development officer has not yet been able to be released from school (as of October 2016)

Examples of current STEM partnership work

Digital

- *Mini Game Jam*: Scratch Coding competition for primary schools in partnership with Amanda Wilson, West College and Glasgow Life. More than 450 pupils participated from 25 schools, with 120 taking part in the competition final in the Mitchell Library
- *Rookie Oven Academy*: a six week digital business project for 16-18 year olds based in Fairfield, Govan. Supported by Tech Start-up hub Rookie Oven, other start-up businesses in Glasgow and SDS. First cohort May/June 2016, second cohort early 2017
- *Financial Services*: ongoing partnership with Morgan Stanley to support the development of code clubs through volunteers

Engineering

- *Get into Engineering*: a partnership with Scottish Water for four Southside secondary schools. Engineering challenges based on the water industry, with business mentors and graduates working with teams of pupils
- *Primary Engineer*: more than 80 teachers trained in the Primary Engineer Programme, supported with match funding from Allied Vehicles
- *European Conference on Climate Adaptation (ECCA)*: schools developing engineering solutions to climate adaptation in a Glasgow context, education strand for the ECCA conference in 2017
- *Go4Set* – 18 secondary schools participating in ten week STEM challenge, partnered with mentors from industry and the city council. Sponsored by Viridor and delivered by EDT (Engineering Development Trust)

Science

- *Glasgow University College of Life Sciences*: 4th year honours students working with secondary biology classes and teachers to develop learning and teaching resources for the young people. Counts as 20% of students' final grade.
- *STEM at the Glasgow Science Centre (@GSC)*: funding visits for all primary aged children from both mainstream and Additional Support for Learning schools in Glasgow to visit the Glasgow Science Centre, and participate in curricular linked science activity with access to the Science Mall
- *Young chemical ambassadors*: training and support from Strathclyde University for S3 young people interested in a career/further study in the chemical sciences.

Employability

- *My World of Work Live!*: funding 3000 places for S1/S2 pupils from Glasgow schools to participate in STEM employability workshops in the Glasgow Science Centre
- *Employability Bites*: industry linked "bite sized" contextualised learning in STEM. Developing these with in partnership with industry on STEM knowledge and skills e.g. Nature's Chemistry on fuels/hydrocarbons for National 4.
- *Routes into STEM*: a new programme from the Engineering Development Trust to offer career long professional learning for teaching staff on pathways into STEM (university, colleges, apprenticeships)