

# Event Report

## LONDON STEM ROUNDTABLE

GREATERLONDONAUTHORITY

25 NOVEMBER 2016 | CITY HALL



#LDN\_STEM



# 1. Introduction

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The Mayor of London recognises the role of science, technology, engineering and mathematics (STEM) in tackling modern challenges – from improving air quality to building sustainable homes. Sadiq Khan would like to support scientific learning and translate young people’s engagement with science into aspirations for a career in STEM, regardless of their gender or background. In order to develop our work in this area, City Hall invited key stakeholders to the London STEM Roundtable on 25 November 2016 to ensure the Mayor’s STEM Strategy is evidence-based, collaborative, and will have the best possible impact across the city.

Deputy Mayor for Education and Childcare, Joanne McCartney outlined her and Sadiq’s ambition that every child in London should have the best possible chance for happiness and success, making the most of the city’s great opportunities. The role of education (both in and out of school) is critical in supporting children’s development and inspiring all pupils to reach their full potential.

Today’s children will be London’s future key workers, business leaders and entrepreneurs, on whose skills and capabilities future economic growth depends. A career in STEM means having the opportunity to solve practical problems and push at the frontiers of knowledge itself. Unfortunately many groups face barriers to pursuing this career path<sup>1</sup>, and are hugely underrepresented in the STEM workforce. Women make up just 14% of individuals working in STEM occupations in the UK<sup>2</sup>. Where girls generally out-perform boys in every STEM subject at GCSE and A-level, and where diversity is key to the strength of any sector, 14% is unacceptable.

The percentage of girls choosing Physics hasn’t changed over **30 years**

[Project ENTHUSE report \(2016\)](#)

The Roundtable served as a scoping exercise to collectively identify and understand the issues surrounding STEM, and work together to put forward ways the Mayor can play a role in supporting the solutions. This report summarises the cross-cutting issues and suggestions raised. We will continue to work closely with partners across the sector to take them forward.

***“Appropriately qualified minority ethnic students are less likely to study the physical sciences at university than appropriately qualified white students”***

Teachers’ (often unconscious) stereotyping and lower expectations have been found to be differentiated, with differing expectations stereotypically expressed for different ethnic groups.

– <sup>1</sup> [ARCHER, L., DEWITT, J. and OSBORNE, J. \(2015\)](#)

***“Without action, the gender pay gap won’t close until 2069”***

Women make up just 14% of the UK STEM workforce in the UK.

Men are more likely to go into higher-paid work because of academic choices they made earlier in life. In 2016:

- 3 times more boys than girls took GCSE computing
- 50% more boys took GCSE design and technology
- 40% more boys took STEM A-level subjects

Encouraging and enabling more girls into STEM subjects and towards STEM-related careers will reduce the gender pay gap.

– <sup>2</sup> [Deloitte ‘Women in STEM’ \(2016\)](#)

## 2. Tackling gender stereotypes

Delegates were highly aware of both academic and anecdotal evidence of the continued existence of gender stereotyping and its negative effects on access to STEM education and STEM careers for women.

The recent [Women in STEM Deloitte report](#) emphasised that enabling more girls into STEM-related careers would reduce the gender pay gap, which without action will not close until 2069.

Delegates acknowledged that a cultural shift is still needed. Everyone is susceptible to unconscious bias but not all have the awareness or tools to tackle it. It was identified that equality training is squeezed within Initial Teacher Training and that teachers should have access to continued support on equity so they are more empowered to challenge stereotypes as they arise.

The Institute of Physics [Opening Doors report](#) was identified by attendees as a good source of information on tackling gender stereotypes at all levels within schools, promoting institutional-wide change towards gender equity.

Clear societal issues were also identified, especially gender stereotyping in the media and in the toy manufacturing and retail sectors. Play was identified as an important aspect in the development of children's understanding of gender, societal structure and individual sense of self. The most recent reports on this issue from The Institute of Engineering and Technology reported toys with a STEM focus are [three times more likely](#) to be targeted at boys than girls.



[WISE Campaign report](#)



**Claire Sweetenham** @drclairesweet · Nov 25

Once heard of female primary teacher, after school trip to Silverstone, say "Great day, but shame there wasn't much for the girls" #WomenInSTEM

### Roundtable suggestions for the Mayor included:

- Harness the global status of London to act as a trailblazer in raising awareness of gender stereotyping.
- Empower London teachers to challenge gender stereotypes in their classrooms through continued opportunity for professional training.
- Support new parents, childcare providers, and nursery and reception teachers to challenge gender stereotyping early during crucial formative years.
- Encourage media, toy and publishing companies to spotlight good business practice in championing gender equality.

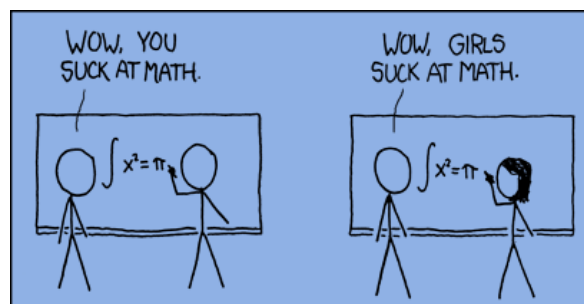


Image source: xkcd.com

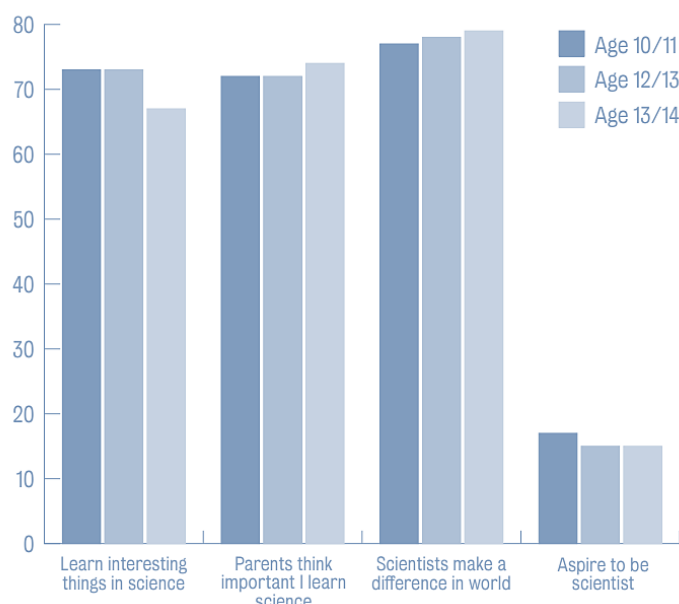
# 3. Driving up STEM aspirations

With the Government's renewed focus on [closing the STEM skills gap](#), it is important to establish the key drivers that attract young people into STEM education and jobs. Engagement with science is widespread in modern society, bolstered by passionate school teachers, plus journalism, TV, film and a plethora of activities driven by science organisations.

However, research from the [ASPIRES study](#) suggests that engagement does not necessarily translate into aspiration (see graph). Professor Louise Archer outlined how 'science capital' is a good indicator of whether students aspire towards STEM careers. This capital includes having science-related qualifications, knowledge about how science works and knowing people already in science-related jobs.

There was an identified need to raise awareness through placing this information into the hands of teachers, and then support ways to increase 'science capital' for students from disadvantaged backgrounds in order to demystify the field.

COMPARISON OF SURVEY RESPONSES FROM YEAR 6, YEAR 8 AND YEAR 9 STUDENTS (% STRONGLY/AGREEING)



[ASPIRES report \(Dec. 2013\)](#)

## Roundtable suggestions for the Mayor included:

- Support schools to make use of individuals working in STEM who students can relate to (e.g. using profiles, careers talks and mentoring – perhaps via alumni networks and the already established [London Ambitions Portal](#)).
- Support the recruitment and retention of passionate STEM-specialist teachers to inspire future generations.
- Create or support targeted programmes and qualifications which allow students underrepresented in STEM to feel like a scientist before selection of GCSE and A-level subjects.
- Support a diversity of educational routes so that students of all levels can access a career in STEM.



## London Curriculum

The Mayor has collaborated with STEM-focused institutions to ensure the [London Curriculum](#) supports the development of STEM skills and brings the subjects to life.

New primary units will also be available in early 2017.

## 4. Simplifying a noisy STEM marketplace

There are many fantastic opportunities for London schools to partake in STEM activities. The range, number and enthusiasm of STEM organisations attending the Roundtable was testament to this.

Whilst this is very positive, the sheer amount of opportunities make it difficult for schools to navigate this 'noisy marketplace' and thus many of these STEM offers aren't accessed. This is compounded by teachers facing time and resource limitations, forming a barrier to securing high quality and appropriate STEM activities for their schools.

Delegates noted that organisations also have difficulty scoping the extensive STEM landscape, sometimes making it hard to work collaboratively towards the same aims and leading to duplication of activity.

### Roundtable suggestions for the Mayor included:

- Work with partners to declutter the London landscape by bringing STEM learning opportunities together in one place.
- Help STEM organisations to collaborate with further networking events to share ideas, reduce duplication and facilitate collaboration.
- Spotlight and promote innovative educational STEM activities to maximise their impact and reach.



### Quotes from the Roundtable

*"...create a more nuanced picture of STEM industries and help to heal the London skills divide"*

*"...provide more opportunities for meshing of provider services - helping teachers find what they need"*

*"A valuable day - which I hope will be repeated. Possibly more time to exchange ideas and approaches would be helpful"*

**86%  
AGREE** 

that businesses should play a role in helping teachers understand what skills students need to pursue a STEM career.

[Project ENTHUSE Report \(2016\)](#)



### London Ambitions Portal

One way the Mayor is already bringing together opportunities for young people is through the [London Ambitions Portal](#).

With a focus on careers, we are asking that STEM organisations create a free profile and post offers such as careers resources, talks, CV workshops and mentoring opportunities.

## 5. A war of acronyms: STEM vs STEAM

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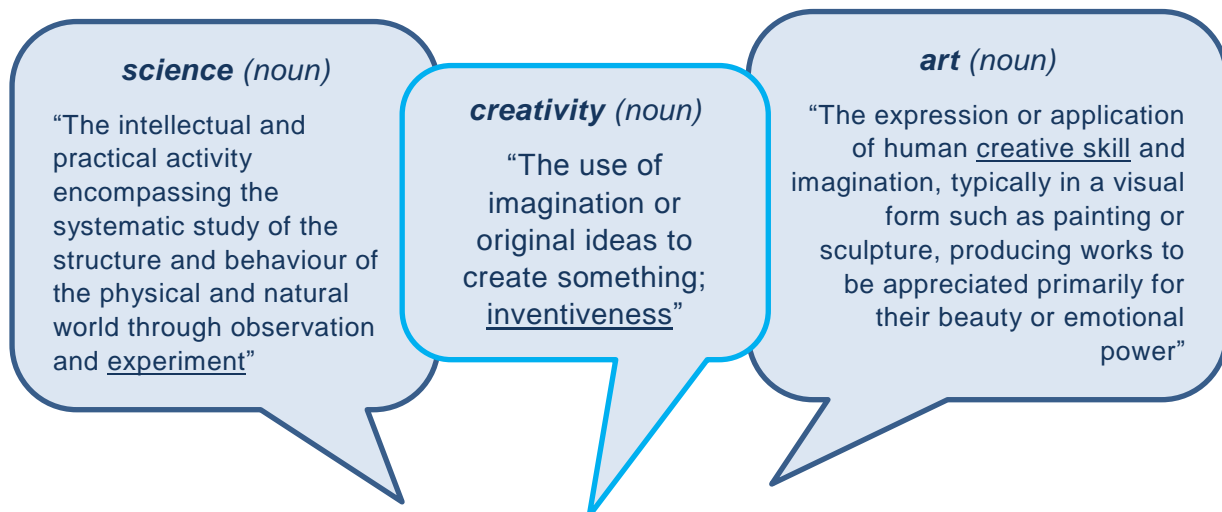
Acronyms can be an efficient way of communicating. However, they are frequently criticised for being exclusive because their use is often limited to a defined group of people who are 'in the know'. This unintended effect then reduces the impact and reach of communication within the wider public sphere.

The Mayor's pledges are currently expressed as 'STEM'-focused and City Hall is aware of the desire for the Arts to be represented too, with the advent of the acronym 'STEAM' (Science, Technology, Engineering, Arts and Mathematics). This issue was recognised at the Roundtable as part of the wider policy landscape. There was debate, but no conclusion, on a definition that sufficiently encapsulated activities of delegates, their respective organisations and the wider sector.

There is no doubt that creativity is a crucial element of the scientific process and that many London jobs rely on creativity and problem-solving skills. The Mayor recognises this and has pledged support for the arts, culture and creative industries as one of his 'core' priorities, appointing Justine Simons OBE as the first deputy mayor for culture and creative industries.

There remains a fundamental need for the creative element in scientific pursuits to be better highlighted to young people, as well as the essential importance of maths and technological knowledge in arts specialisms. Science may aim for an objective end, whilst art celebrates the subjective - but both are arrived at through experimental processes. This skill set makes our young people competent, talented and well placed to take advantage of the opportunities London has to offer, whilst tackling modern-day challenges.

It is therefore perhaps less about shoehorning in another letter into an already contentious acronym. Instead we should focus on driving forward the reality that creativity found in the arts is too a part of science, technology, engineering and mathematics, and that we should make use of more inclusive language when communicating this in the public domain.



### Roundtable suggestions for the Mayor included:

- Create space for further debate and continue to listen to the voice of the sector regarding shifts in the use of language and definitions
- Look for opportunities to bring scientific and creative careers to life, such as better showcasing of emerging interdisciplinary fields

# 6. Appendix I: Agenda

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## Welcome

*Susan Crisp – Education Policy Manager, Greater London Authority*

## Introduction: Understanding the STEM Challenge

*Maggie Philbin – CEO and Co-Founder, TeenTech*

## Session 1: Scoping the Problem

Roundtable discussions and forming questions for panel

## Session 2: The STEM Pipeline

- ❖ *Chair: Joanne McCartney AM – Deputy Mayor for Education and Childcare*
- ❖ *Professor Louise Archer – SPIRES Project Director, King’s College London*
- ❖ *Dr Tony Sewell CBE – Founder, Generating Genius*
- ❖ *Becca Knowles – Head of Network, STEM Learning*

## Workshop sessions

<b>Challenge 1: Early Years &amp; Primary</b> Tackling stereotypes early	<b>Josie Todd</b> - London Curriculum, GLA <b>Carole Kendrick</b> - London Teacher Innovation Fund Award
<b>Challenge 2: Secondary</b> Making STEM Apprenticeships work	<b>Daisy Greenaway</b> - Education & Youth, GLA <b>Paul Jackson</b> - Engineering UK
<b>Challenge 3: Secondary</b> GCSE pathway choices	<b>Jason Lever</b> - Education & Youth, GLA <b>Dinah Caine CBE</b> - Creative Skill Set
<b>Challenge 4: KS5</b> Boosting A-level uptake	<b>Dan Rowson</b> - Education & Youth, GLA <b>Sue Sissling</b> - Harrow Chemistry Hub
<b>Challenge 5: KS5/HE</b> Mandatory Digital Fluency?	<b>Catherine Knivett</b> - Digital Talent, GLA <b>Dr Rosalind Mist</b> - The Royal Society

## Session 3: STEM Solutions for London

*Benita Mehra - President of the Women’s Engineering Society*



# Appendix II: Attendees

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Dr.	Jack	Abramsky	MathsWorldUK
	Matt	Allen	St Catherine's Catholic School
	Niroshan	Anton	Royal Academy of Engineering
Prof.	Louise	Archer	King's College London / ASPIRES Project
	Elizabeth	Avery	Royal Observatory Greenwich
	Ellie	Baptista	National Literacy Trust
Dr.	David	Barlex	DandTforDandT
	Trevor	Bragg	Townley Grammar School
	Lesley	Brenton	Burntwood School
	Geoff	Butler	St Clement Danes School
	Dinah	Caine	CBE Creative Skillset
Dr.	David	Cameron	Institute of Physics
	Joanne	Carr	HS2 Ltd.
	Dan	Chandrakumar	St. Marylebone School
	Vicky	Clark	Haringey Council
	Samantha	Clarkson	Into Film
Dr.	Alison	Clark-Wilson	UCL Knowledge Lab, Institute of Education
	Richard	Clay	Millais School, Horsham
	Jamie	Costello	Sutton Grammar School
	Susan	Crisp	Greater London Authority
	Claire	Custance	Royal Horticultural Society
	Sarah	Dalmedo	Royal Society of Biology
	Sophie	Deen	Bright Little Labs
	Sarah	Devonport	EngineeringUK
	Olivia	Dickinson	Let Toys Be Toys
	Mark	Dorling	Digital Schoolhouse
	Pete	Dudley	London Borough of Camden
	Aulden	Dunipace	BLOODHOUND SSC
	Eliza	Easton	Creative Industries Federation
	Anna	Gawthorpe	Active Learners in Numeracy
	Sam	Green	Turinglab
	Daisy	Greenaway	Greater London Authority
	Rebecca	Hill	Royal Academy of Engineering
Dr.	Sarah	Hutton	Department of Physics and Astronomy, UCL
	Paul	Jackson	EngineeringUK
	Beth	Jones	Gatsby Foundation
	Carole	Kenrick	Gillespie Primary School
	Catherine	Knivett	Greater London Authority
	Becca	Knowles	STEM Learning
	Riddhi	Kunchwar	Canons high school
	Imman	Laksari-Adams	Greater London Authority
	Jason	Lever	Greater London Authority
	Cassie	Liversidge	Grow your own playground/ Capital Growth

	Monica	Lobo		Tideway
Prof.	Averil	Macdonald	OBE	WISE
	Hope	McAdam		Mayor's Fund for London
	Sarah	McEwan		Royal Horticultural Society
	Michael	Mckenzie		Alexandra Park School
	Benita	Mehra		Womens Engineering Society
Dr.	Rosalind	Mist		The Royal Society
	Andrew	Moffat		Team London
	Suzanne	Moroney		ICE
	Tom	O'Leary		Science Museum Group
	Richard	Palfrey		Exscitec
	Charlotte	Pascual		Stemettes
Dr.	David	Perks		East London Science School
	Laura	Pope		National Literacy Trust
	Elizabeth	Poulter		London Transport Museum
	Helen	Robertson		Field Studies Council, London Region
	Dan	Rowson		Greater London Authority
	Jessica	Rowson		Institute of Physics
	Wendy	Sadler		Science Made Simple Ltd
	Davina	Salmon		Wandsworth Borough Council
	Laura	Service		London Transport Museum
Dr.	Tony	Sewell	CBE	Generating Genius
Dr.	Ajay	Sharman		STEM Learning Ltd
	Sue	Sissling		Centre for STEM Education, University of Hertfordshire
	Ann-Marie	Soyinka		Greater London Authority
	Tess	Sullivan		Mayors Fund for London
	Gareth	Thistleton		Shell
	Josie	Todd		Greater London Authority
	Mary	Vine-Morris		Association of Colleges
Dr.	Jess	Wade		Imperial / King's College London
	Jane	Waite		CAS London
	Patrick	Wigg		The Prince's Teaching Institute
	Siobhan	Williams		Greater London Authority
	Andy	Wilson		The WKCIC Group
	Yen	Yau		Into Film