Teachers: The key to unlocking the STEM supply chain

Baroness Brown of Cambridge
Chair, STEM Learning Ltd.

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"My maths teacher at college said he found me interesting because I think differently in solving problems and I thought wow, no one has ever picked up on that before"

"I got on really well with my physics teacher in my GCSEs and my chemistry teacher absolutely hated me so I would never have even considered doing A Level chemistry"

Clair was verbally warned off studying engineering by her physics teacher and form tutor. When asked if this made her think twice about studying engineering she said "no, because I didn't like them"

"My maths and physics teachers suggested engineering but they said what type of engineering was up to me"

Good teachers promote the further study of their subjects (p175)

Teachers, in relating school study to the real world, can improve and promote their subject and encourage students to continue to study it (p175)

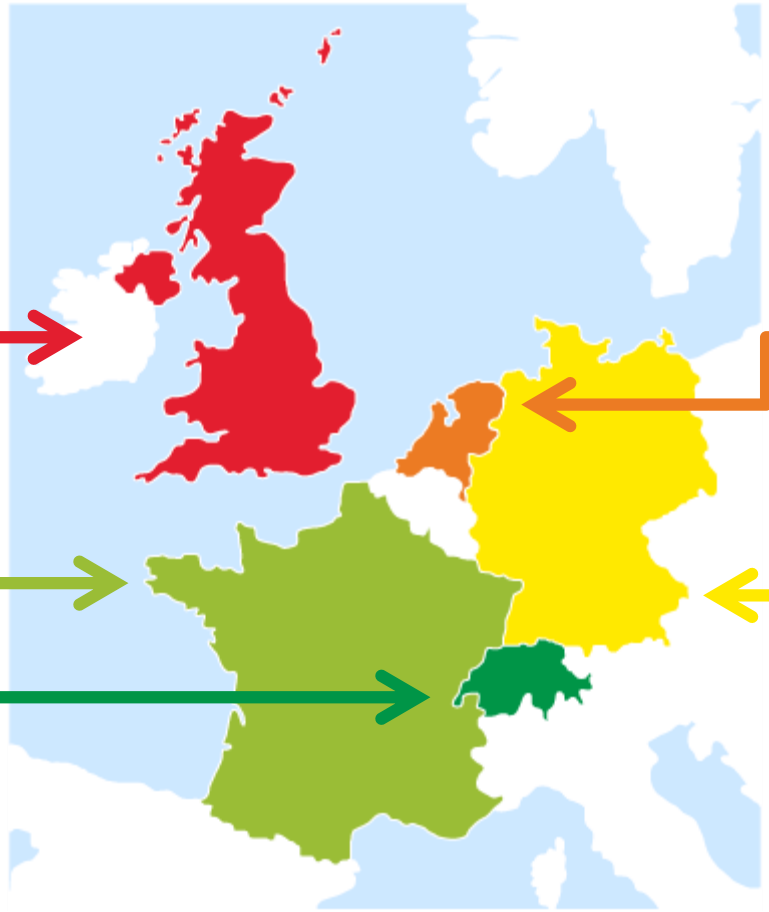
These respondents … sought the approval of teachers regarding their decisions (p175)

Source: "Where do engineers come from" K J Baker, PhD Thesis (2005)

UK
100,000 additional Engineers required per year to 2020 (RAEng, 2012)

France
30,000 new engineers each year vs demand for 40,000 (2012)

Switzerland
2,000 candidates for 16,000 jobs (2009)



Netherlands
More than 25,000 additional technically qualified graduates required each year 2011-2016

Germany
Shortfall of 200,000 STEM graduates, mainly engineers (2012)

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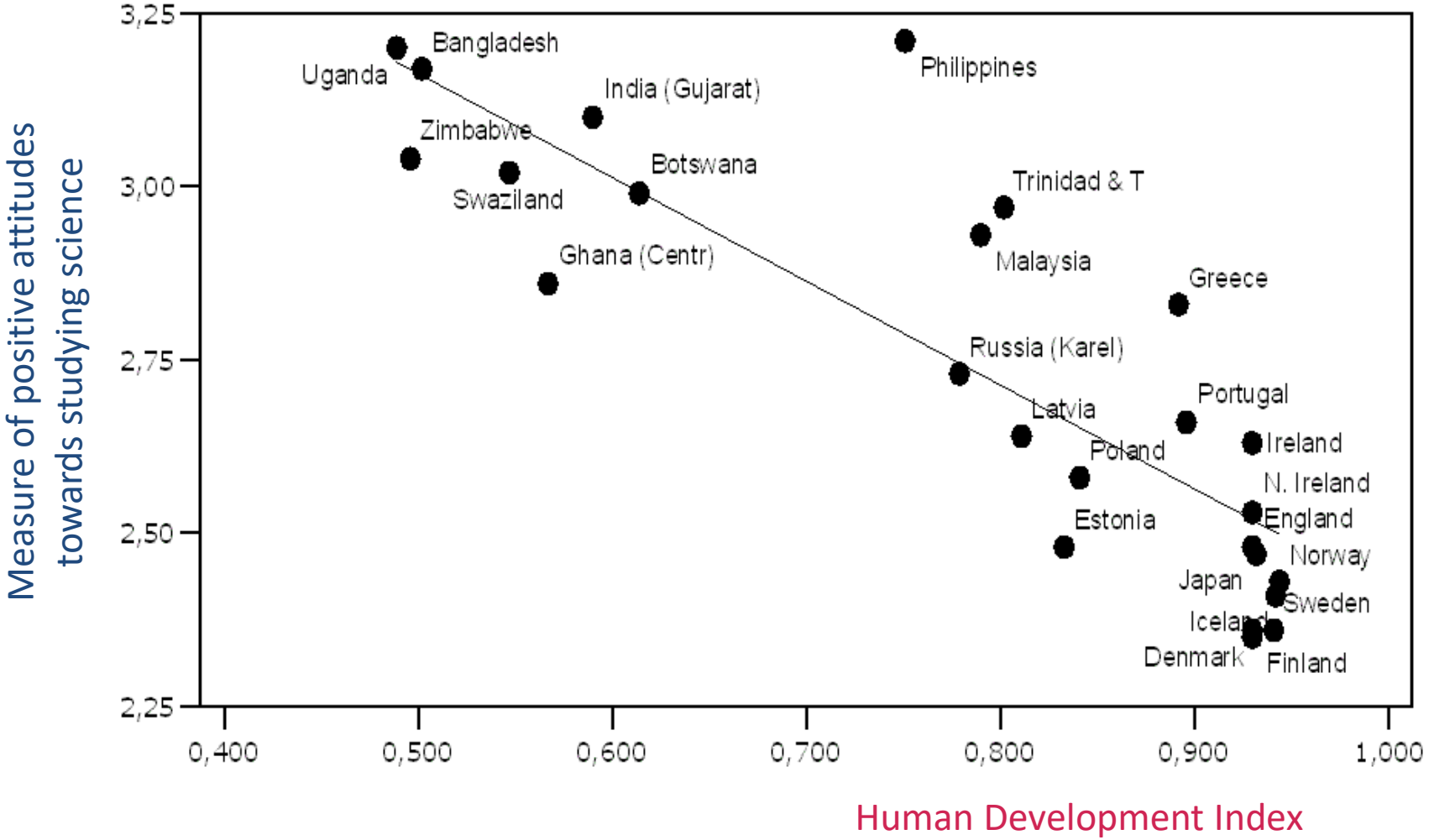

Svein Sjoberg, University of Oslo, Project ROSE

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“Taking more science courses benefits disadvantaged students even more than it does their more advantaged peers. Therefore, exposing disadvantaged students to science learning at school might help close performance gaps”.

“PISA - Against the Odds; Disadvantaged Students who achieve in school”, OECD 2011

Working directly with young people

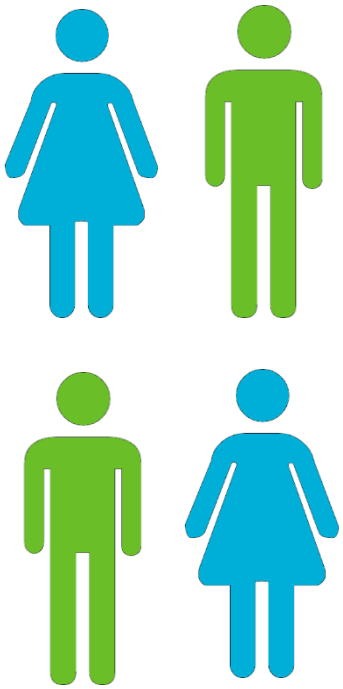
- HE Outreach & Widening Participation
- Big Bang
- Company Outreach
- Primary Engineer
- Smallpeice Trust
- EDT
- CREST Awards
- Engineering Institutes
- STEM Societies
- STEM Clubs
- STEM Ambassadors

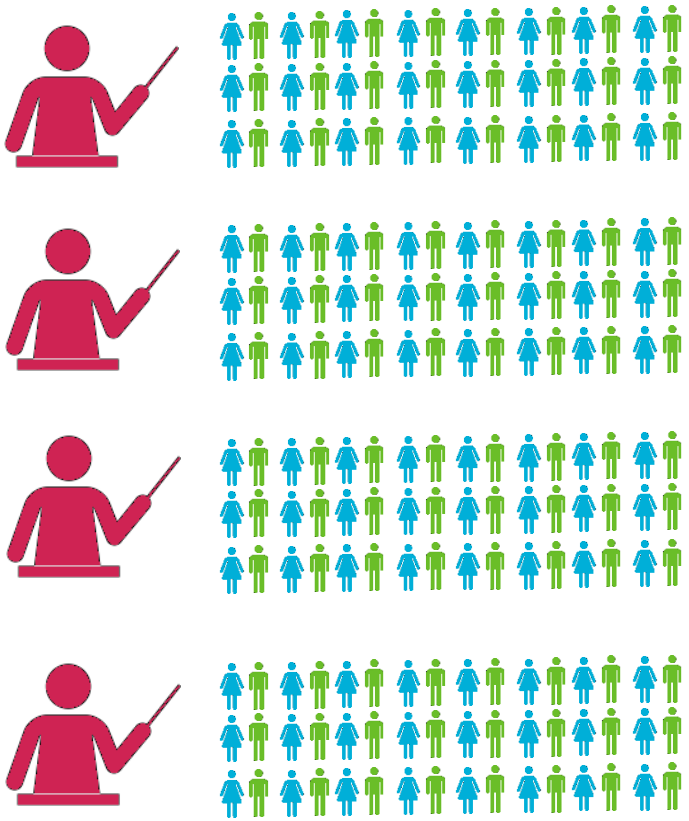
- (libraries and museums)
- (youth and community groups)
- (scouts and girl guides)

Working directly with qualified teachers

- STEM Learning
- Teaching Schools
- PiXL

If we could only work with four people …





Where do young people find careers information & advice?

- Parents / guardians – 70%
- Teachers – 57%
- Friends – 48%
- Relatives – 42%
- General internet searches – 32%
- Professional careers advisers – 27%

Source – “Careers Guidance; Guaranteed”, summary report of on-line survey, AoC January 2014

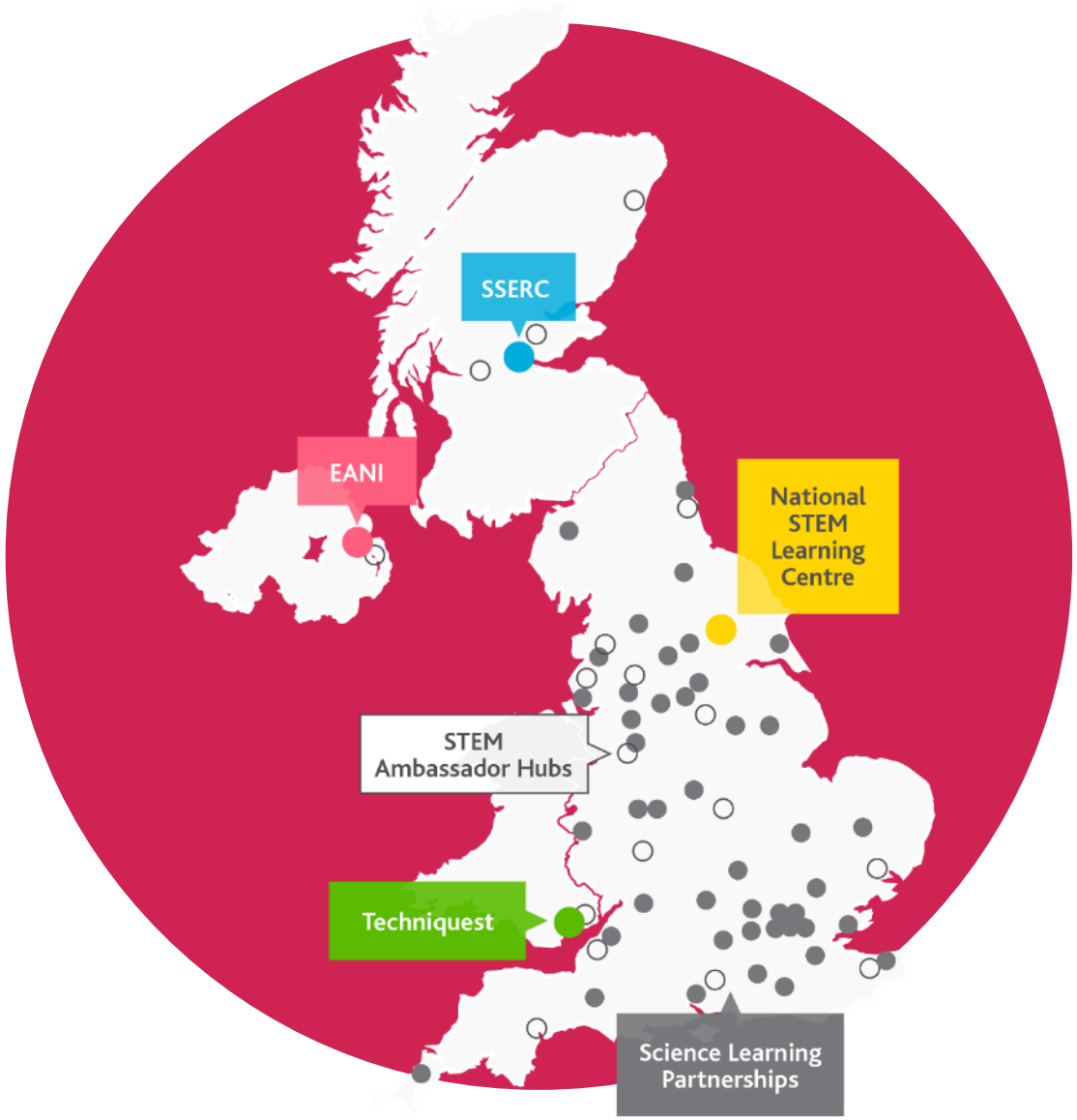
“Young people were asked what had encouraged them to learn science and what had discouraged them:

teaching quality was the most common answer to both questions.

Encouragement – having a good teacher (58%)
Discouragement – having a bad teacher (43%)”

Wellcome Trust Monitor 2013

The UK has a unique infrastructure supporting STEM education, including the National STEM Learning Centre & Science Learning Partnerships.



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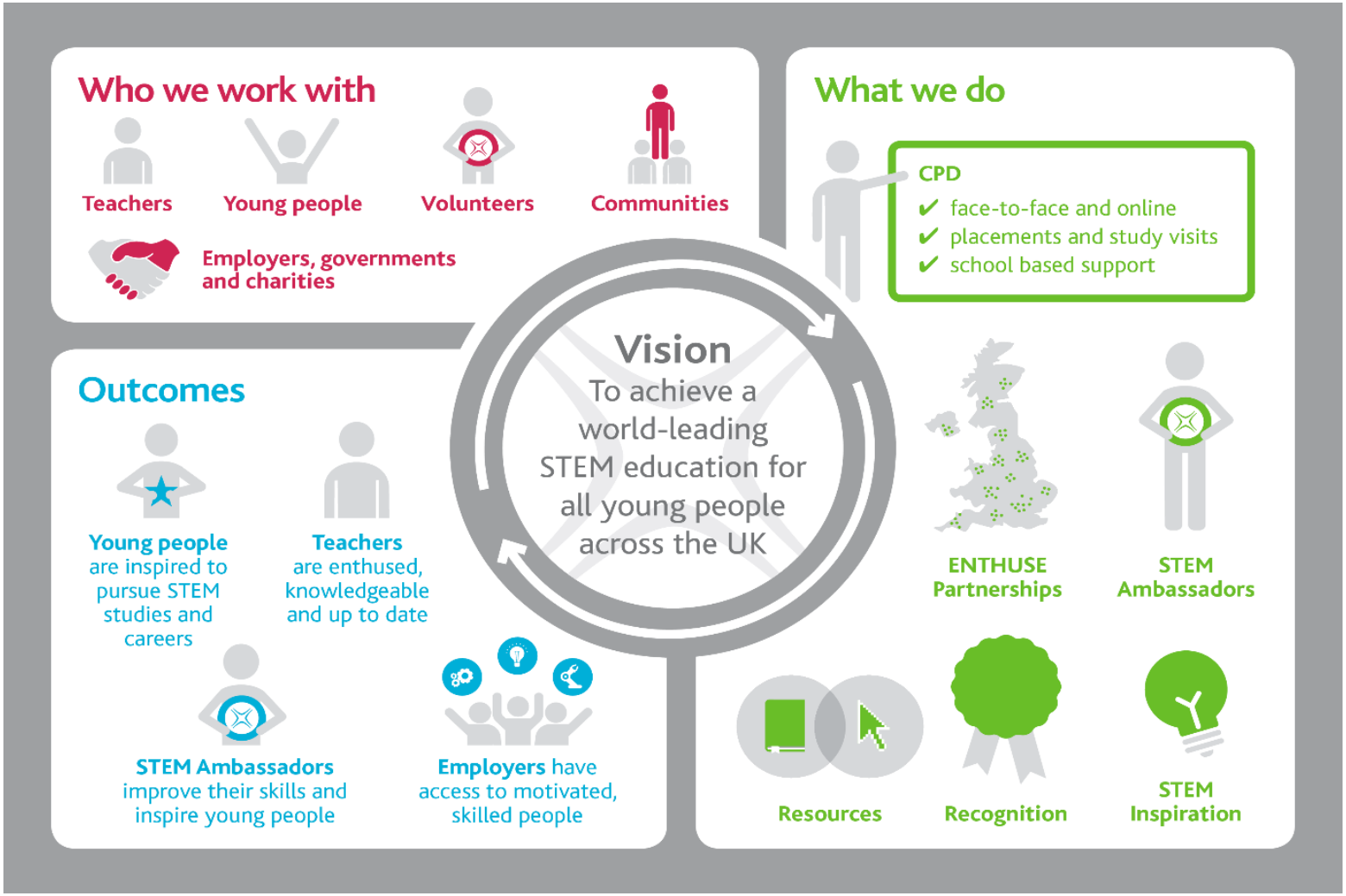

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- STEM Ambassadors – role models providing inspiration and excitement for young people, teachers and families
- STEM Clubs – providing opportunities for scientific exploration in a fun and more informal setting
- STEM Insight - lifting the lid of STEM-related businesses and careers
- ENTHUSE Partnerships – embedding a positive STEM culture across schools, colleges, teachers and young people

STEM Ambassadors

Classroom

STEM Club activities

Careers talks

Speed networking

Online mentoring

Site visits and hosting work experience

Large science festivals and fairs

Non-school group

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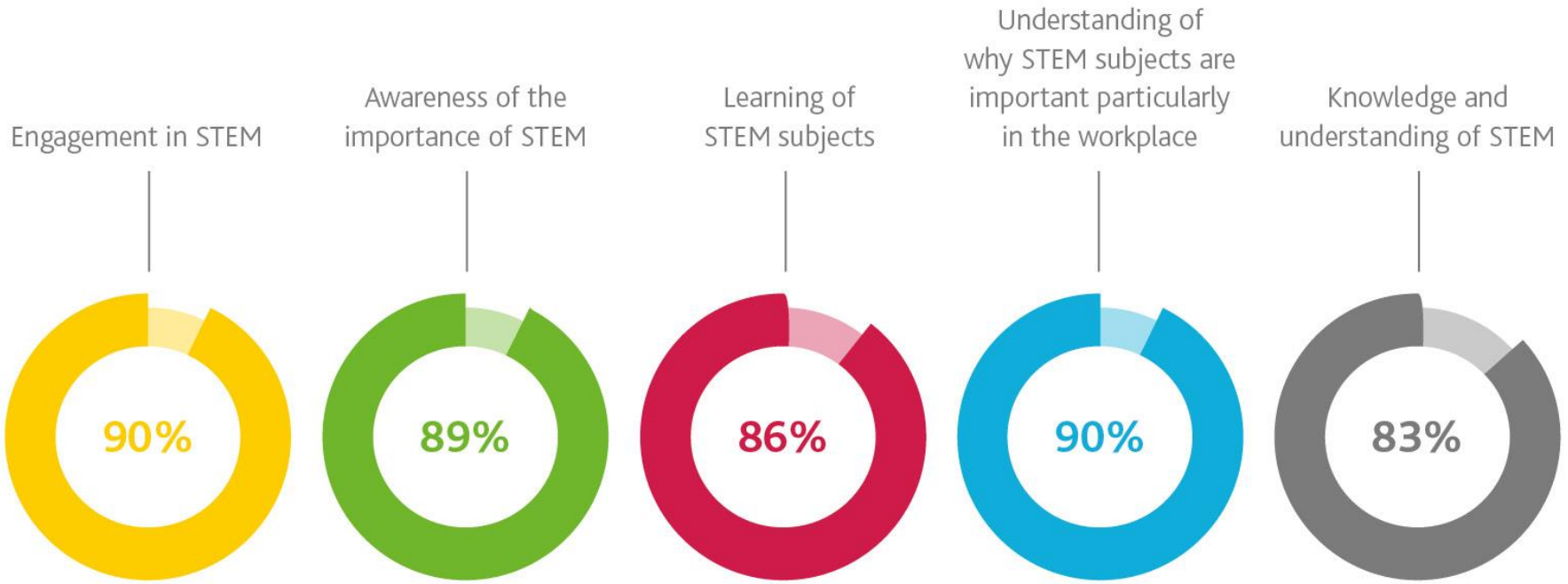
STEM Ambassadors evaluation



(Source: STEM Ambassadors Impact Report, 2016)

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STEM Clubs Programme

Leader Support	Inspiration	Employer Engagement
Recognition	Activities	STEM Ambassadors engagement
Online community group	Practical support (e.g how to set up a STEM Club)	Bespoke club activity development
Regional teach meets	Competitions & Challenges	Regional support for STEM Clubs
Regional CPD	Possible clubs which could be established	
Online/blended learning	Case studies	
National Conference		
Mentoring		

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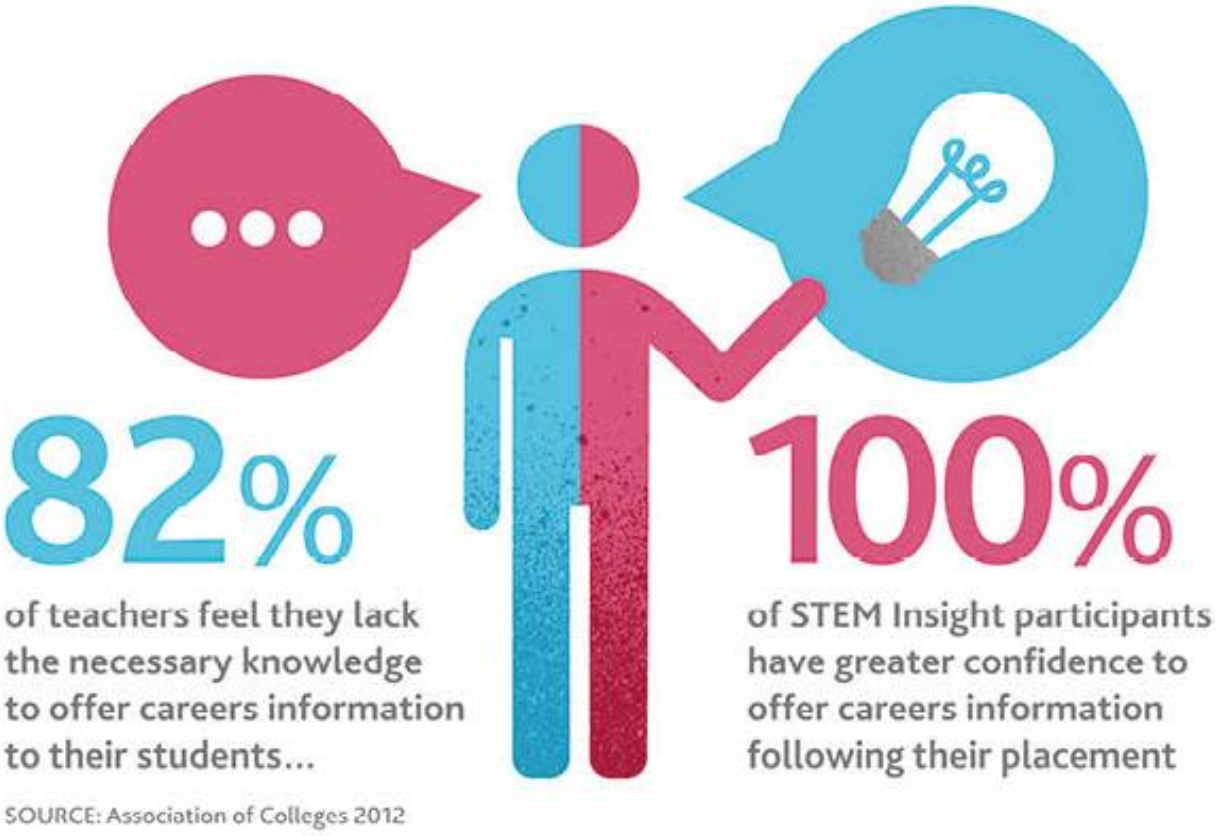
STEM Insight



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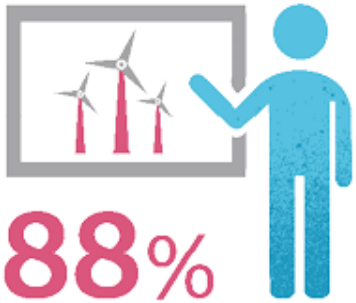
Benefits of going on a STEM Insight placement

100%

STEM Insight participants increased their understanding of current STEM jobs and career pathways



88%

of teachers are using their STEM Insight experiences as teaching examples

100%

of STEM Insight participants feel better informed to provide young people with personal advice on progression and potential career choices

80%

of STEM Insight participants reported improved STEM subject and pedagogical understanding, and increased confidence and enthusiasm for STEM

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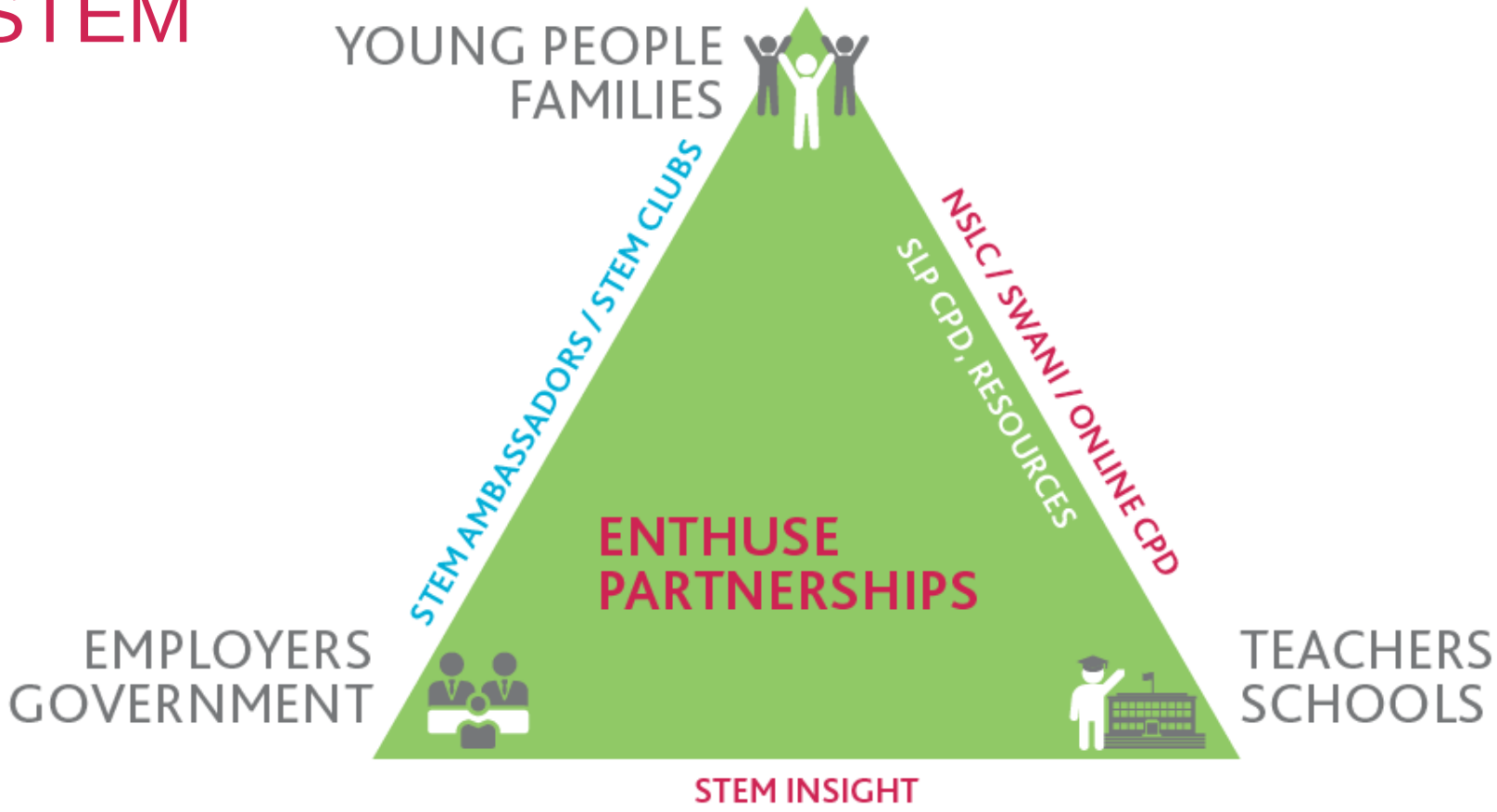
ENTHUSE Partnerships - changing school, college, teacher and young people attitudes to STEM



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ENTHUSE Partnerships

THE IMPACT OF BRINGING INDUSTRY AND SCHOOLS TOGETHER

84%

of teachers agree that ENTHUSE Partnerships positively impact young people's attainment in STEM subjects

90%

of teachers report that young people's engagement and interest in STEM subjects have increased

92%

of Partnership leaders increase collaboration with other schools

82%

of Partnership leaders report that involvement in the programme help inspire them to remain in teaching

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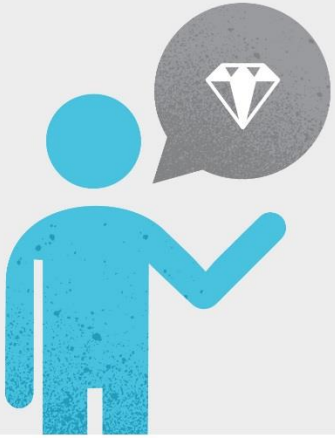
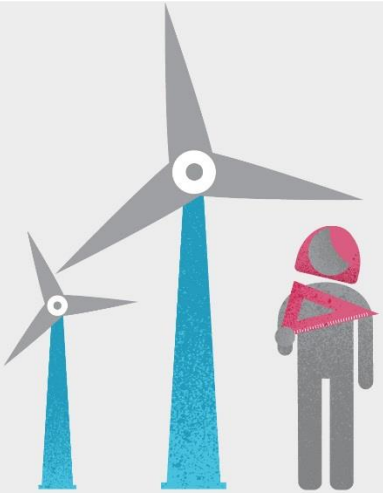
Over 80% of teachers who work with us improve the quality of their STEM teaching



More young people pursue STEM careers as a result of our support



Disadvantaged students are even more likely to benefit from our support

Science teachers are 160% more likely to stay in teaching after participating in our CPD

(Source: STEM Ambassadors Impact Report, 2016)

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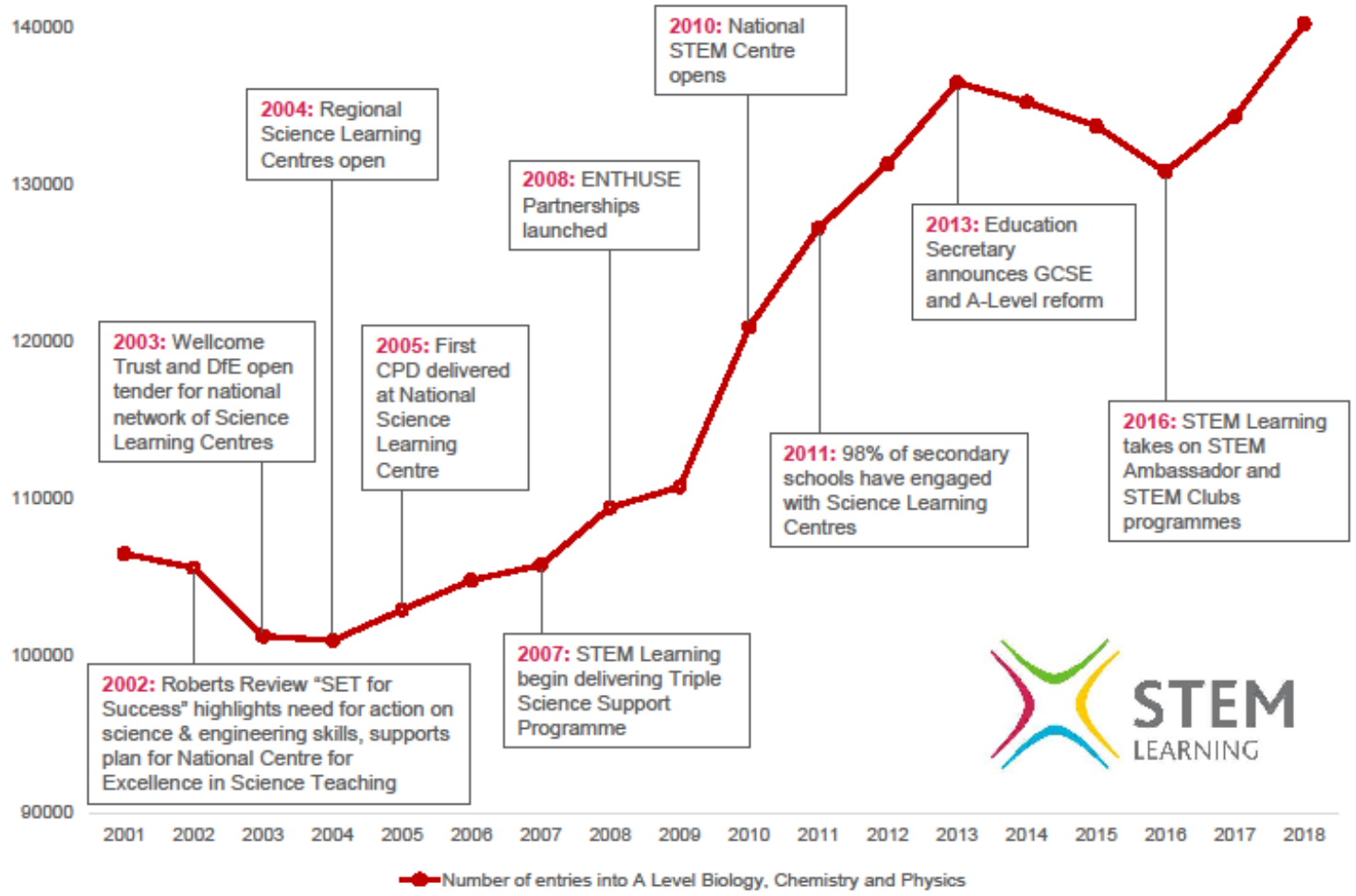
Year on Year A Level Entries - Biology, Chemistry and Physics combined



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How can HE get involved

- Encourage sign up of students and staff to the STEM Ambassadors programme
- Support or set up a STEM Club … a Summer STEM Club to counteract the learning deficit?
- Support a STEM Insight placement or an Enthuse partnership (fit with WP activities but also work in a further away region)
- Lobby OFS to recognise work with teachers in WP areas as being as important as working with the young people themselves

… but remember, the wrong people can deliver a negative impact as easily as the right person can deliver a positive one!