

## STEM Subject Choice and Careers: Table for Good Practice

To consider	What works	Case study examples
<p><b>Images</b></p> <p><b>People</b></p> <ul style="list-style-type: none"> <li>• Monitor ratio of female to male images - Are numbers appropriate?</li> <li>• Monitor number of images that indicate a BME background</li> <li>• Avoid images where males are active and females passively look on</li> <li>• Consider age- Does it denote seniority that challenges or promotes stereotypes?</li> <li>• Monitor the number of people with visible disabilities</li> </ul> <p><b>Object</b></p> <ul style="list-style-type: none"> <li>• Does it engage the audience you are aiming at?</li> <li>• Is it relevant?</li> <li>• Does it broaden understanding of the subject, or confirm existing stereotypes?</li> </ul>	<ul style="list-style-type: none"> <li>• Use images of girls/women</li> <li>• Use images of BME students/role models</li> <li>• Images of girls/BME students looking engaged and proactively involved.</li> <li>• Use images of female/BME role models which overtly demonstrate their occupation</li> <li>• Use images of objects that broaden the understanding of the subject</li> <li>• Use images that have cultural relevance</li> <li>• Even stereotypical images can introduce diversity, i.e. Waterloo Bridge was built by women.</li> </ul>	<p><b>The Young Engineers Posters</b> To address the issue of general lack of awareness of the different applications of engineering, the posters illustrate 4 themes; the environment, sports, medicine, and entertainment, each demonstrating how engineering impacts on our lives.</p> <p>The theme of medicine was specifically chosen to attract the interest of girls from cultural backgrounds where they may be expected to go into this area</p> <p>The environmental poster featuring a recent disaster was carefully selected so that of direct relevance to young people and does not simply perpetuate images from the developing world.</p> <p><b>Royal Society of Chemistry: '175 Chemists Project</b></p> <p>The project profiles and celebrates diversity in Chemistry. . <a href="http://www.rsc.org/diversity/175-faces/">http://www.rsc.org/diversity/175-faces/</a></p>

## STEM Subject Choice and Careers: Table for Good Practice

<h3>Design</h3> <ul style="list-style-type: none"> <li>• Font/overall appearance-does your publication look friendly?</li> <li>• Overall appearance - does it confirm or challenge stereotypes of the subject?</li> <li>• Students will understand that a publication that is predominately pink is aimed at girls, predominately blue/grey is aimed at boys</li> <li>• How computer literate are your audience? Not all students have access to IT, not all adults are proficient</li> <li>• Are the colours or font appropriate for those with visual impairment</li> <li>• Are the colours or font appropriate for those with dyslexia?</li> <li>• Go through your publication, note what colours are used and count how often.</li> </ul>	<ul style="list-style-type: none"> <li>• Use more gender-neutral colours such as orange/bright green/purple</li> <li>• To ensure girls feel welcome in an activity they may already feel is aimed at boys, overtly use colours that are girl-identified</li> <li>• Use bright colours, variation of font</li> <li>• Include case studies that feature non-traditional role-models</li> <li>• If you find a predominance of male-identified colours that you cannot change, i.e. company logo, sky, sea.</li> </ul> <p>Provide balance by ensuring you have female-identified colours where you can, i.e. borders, in-fill</p>	<h3>The Brightside Trust-e-mentoring</h3> <p>The web design and content is designed to appeal to young people by including:</p> <ul style="list-style-type: none"> <li>• lots of pictures and tasters</li> <li>• short and snappy text</li> <li>• brighter colours</li> </ul> <p>Also, when working with the students it became apparent that, contrary to expectations, not all the students were IT literate, particularly those from less advantaged backgrounds who did not have access to a computer at home. To cater for this Brightside clean and simple.</p> <h3>The London South Bank University: The Engineering Islam Flyer</h3> <p>Devised to specifically target the most under represented group in engineering: girls from a Pakistani and Bangladeshi community. The front image is a very visually pleasing example of Islamic engineering and the design colours chosen so girls will appreciate, it is aimed at them. The back cover is beautiful, emphasising the artistic side of engineering, and culturally appropriate. The poster can be seen on the welcome page of this site.  <a href="http://www.stem-e-and-d-toolkit.co.uk/home/welcome-the-equality-and-diversity-toolkit">http://www.stem-e-and-d-toolkit.co.uk/home/welcome-the-equality-and-diversity-toolkit</a></p>
---	---	--

## STEM Subject Choice and Careers: Table for Good Practice

<h3>Events</h3> <ul style="list-style-type: none"> <li>• Do you have good numbers of girls and boys?</li> <li>• Do the students reflect the diversity of the institution?</li> <li>• Are speakers diverse? Do they challenge or confirm stereotypes of the subject?</li> <li>• Are the girls getting an equal opportunity for hands-on activity</li> <li>• Are the facilitators aware of equality and diversity issues?</li> <li>• Are you actively targeting students who are statistically less likely to progress in the subject?</li> </ul>	<ul style="list-style-type: none"> <li>• Ask schools to send equal numbers of girls and boys.</li> <li>• Ask the school to ensure the participants reflect the ethnic make up of the school.</li> <li>• Monitor and evaluate the above. Take action as necessary to ensure equality of participation</li> <li>• Provide speakers that challenge stereotypes of who succeeds in your subject.</li> <li>• Instigate girl-only groups at mixed events, particularly if you anticipate girls being in a minority.</li> <li>• Girl-only events</li> <li>• Provide a pre-event equality and diversity training for all facilitators.</li> <li>• If necessary, implement structure which ensures all participants equally access activities</li> </ul>	<h3>The London Engineering Project</h3> <p>'For example, one teacher said, but I allocate my 20 residential places on a first come first served basis. It was suggested that he put up 2 sheets, first come, first served 10 places for girls; first come first served 10 places for boys. This school used to send 17 boys and 3 girls. It now sends 10 girls, 10 boys.</p> <h3>Stimulating Physics Project</h3> <p>Instigated single –sex physics lessons for year 9, with positive feedback from both girls and boys</p> <h3>Young Engineers.</h3> <p>Monitoring indicated that participation of girls in the secondary school clubs had fallen to 36%.</p> <p>The fieldworkers reviewed all their approaches, sent female role models and ambassadors to give presentations to the schools, visited the clubs and arranged a gender awareness training for all teachers running the clubs.</p> <p>WISE run discovery workshops for girls, teachers and parents to explore opportunities in engineering and construction for young women between 15 and 22.</p>
---	---	--

## STEM Subject Choice and Careers: Table for Good Practice

<h3>Content of activities</h3> <ul style="list-style-type: none"> <li>• Is there a context to the activity which provides a social application for the subject? It is important for girls to understand why they are doing something and how it contributes to society.</li> <li>• Ensure the scenario has a positive message</li> <li>• Is the activity appealing to both genders and students from different ethnic backgrounds? Could it be viewed as catering traditionally for boys? (E.g. cars, rockets, weapons, trains etc...) If so, what have you done to ensure it equally appeals to girls?</li> <li>• What have you done to ensure interest from students from different backgrounds?</li> <li>• Or do you need to devise/find a new activity?</li> <li>• Can you Incorporate design/decoration into activity</li> <li>• Can the students relate to the activity?</li> </ul>	<ul style="list-style-type: none"> <li>• Show the social context</li> <li>• Introduce a cultural focus i.e.</li> <li>• Provide local references.</li> <li>• Set a scenario that displays your subject in a positive light</li> <li>• Introducing ethically dimension to the subject</li> <li>• Introducing environmental application of the subject.</li> </ul>	<p>Instead of ‘add a light to an existing bell circuit’ present them with the challenge ‘how would you adapt the bell circuit in a deaf person’s home to alert them that someone was at the door?’</p> <p>Produce an alarm that reminds the students of a specific date or time in the religious calendar</p> <p><b>London South Bank University</b> Ran a girls' only engineering weeks summer school, focusing on robotics, included discussion on prosthetics in top level sport.</p> <p>University of Sussex ran a Drug Discovery week as part of their Headstart programme focusing on Alzheimers disease.</p> <p><b>Project Navy Wise</b> Young women undertook a week’s residential work experience with the Royal Navy. Activities were designed and to be inclusive and hands –on: removing and replacing a propeller, 1 day survival course in the New Forest, releasing and repacking a parachute. Team building activities included to promote friendships and teamwork.</p> <p>A competition to redesign an airport lounge may not be appropriate for children who have not had the opportunity to travel abroad.</p>
---	---	--

## STEM Subject Choice and Careers: Table for Good Practice

<h3>Role-models and Ambassadors</h3> <ul style="list-style-type: none"><li>• Do they challenge or confirm stereotypes of the subject?</li><li>• In terms of age, can your audience relate to them?</li><li>• In terms of background; class, gender, ethnicity, disability, family situation, can your audience relate to them?</li><li>• Are they aware of equality and diversity issues?</li><li>• Are they an engaging speaker?</li><li>•</li></ul> <p><b>"I have tried, but all the role models available are white, middleclass, middle-aged men"</b></p> <ul style="list-style-type: none"><li>• A good, inspirational speaker is an asset regardless of their background.</li><li>• Can atypical role models be introduced in any other way?</li><li>• Can your role models refer to colleagues who reflect greater diversity?</li></ul>	<ul style="list-style-type: none"><li>• Provide briefs. Ensure role-models understand your aims.</li><li>• Do not use role-models who you feel may engender a negative response.</li><li>• Provide equality and awareness training.</li><li>• Review any materials they may want to use, i.e. power-points. If they do not meet your aims, ask them to change or decline to use then</li><li>• Use posters that feature atypical role models</li><li>• Ensure all materials use i.e. power points, handouts prominently feature atypical role models</li></ul>	<h3>The London Engineering Project:</h3> <p>Student ambassadors were recruited from the London South Bank University Faculty of Engineering, Science and the Build Environment, to reflect the diverse ethnic background of the students from the targeted schools. Their proximity in age also made them easier to identify with.</p> <p>To ensure a high standard and time commitment, the methods employed were:</p> <ul style="list-style-type: none"><li>• Strict recruitment and selection process</li><li>• Very good hourly rate</li><li>• Provision of tailored Gender Equality Training</li></ul> <h3>Stimulating Physics Project</h3> <p>Role models are encouraged to bring in photos or materials from their working environment</p> <h3>Young Engineers.</h3> <p>To encourage the Young Engineers clubs to participate in the Green Power Challenge, the LEP fieldworkers took the clubs to the final race day.</p> <p>To counteract the fact that the LEP students would be in the minority, as the vast majority of the other students attending being white boys, the LEP ensured the ambassadors included female BME students with a good background in mechanics. The fieldworkers also arranged for the students to talk to a winning all girls team</p>
--	--	--

## STEM Subject Choice and Careers: Table for Good Practice

<ul style="list-style-type: none"> <li>• Can your role models reference high achieving, atypical members of their profession?</li> </ul>	<ul style="list-style-type: none"> <li>• Remind; role models of inspirational, high achieving atypical members of their profession, i.e. Zahar Hadid, Architect,  Tanya Budd (winner of Young Engineers for Britain 2005),  Dr Maggie Aderin, physicist,</li> </ul>	<p><b>Project Navy Wise</b></p> <p>An informal evening event has been arranged to which the role models, all carefully chosen RN personnel, have been invited. The girls are provided with a list of questions to prompt conversation.</p>
<p><b>Questions on publications</b></p> <ul style="list-style-type: none"> <li>• Considering your target audience, what is the likely response to the question?</li> <li>• Is the question likely to illicit a positive response?</li> <li>• Are some groups, for example girls, inner-city students likely to give a different response to those from a background more typically likely to chose a STEM career i.e. middle-class white boys?</li> </ul>	<ul style="list-style-type: none"> <li>• Having open ended question such as ‘consider the challenges’</li> <li>• avoiding using words such as ‘engineering’ which may have negative connotations</li> <li>• questions that introduce different aspects of the subject that the audience may be unfamiliar with</li> <li>• questions that challenge the stereotypes of the subject</li> </ul>	<p><b>Young Engineers:</b></p> <p>Experience has shown that non-traditional students may have very little knowledge of what an engineer actually does, and any ideas they do have can be limited and stereotypical.</p> <p>Therefore when asked if they could see themselves as an engineer, they may understand, ‘<b>can I see themselves as a large white man covered in oil?</b>’ the response being an emphatic <b>no</b>.</p> <p>While those questions may be suitable for the students who have traditionally joined the Young Engineers clubs, it is entirely possible for an atypical student to reply no to all five questions.</p> <p>The strap line ‘Consider the possibilities’ neatly introduces the creative aspect of engineering, with the various questions designed to further illustrate the social and practical uses of engineering.</p>

## STEM Subject Choice and Careers: Table for Good Practice

<h3>Publications</h3> <ul style="list-style-type: none"><li>• If you are targeting a specific audience, is the information cultural appropriate?</li><li>• Does the information challenge unhelpful stereotypes</li><li>• Quotes-consider the names of those quoted, have you gender equality, do the names indicate diversity of background</li></ul>	<ul style="list-style-type: none"><li>• Benefit from the diversity within your workplace.</li><li>• Get feedback from those in the target group. Make changes as required.</li><li>• Be bold with the information supplied</li><li>• Be brief</li></ul>	<h3>The London South Bank University -the Engineering Islam Event</h3> <p>'Shireen' specifically put her full name on the front, with contact details, to reassure any members of the community who may be unsure if their cultural need will be met.</p> <p>The information includes several cultural references ; Ramadan, Iftar and it is stated that a prayer room will be available and that families are invited</p> <h3>Royal Aeronautical Society (RAS) Website:</h3> <p>Focus groups were set up-comprising of teachers, career professionals, members and non-members of the Royal Aeronautical Society to evaluate the proposed changes.</p>
--	---	---

## STEM Subject Choice and Careers: Table for Good Practice

### Appendix

#### Stimulating Physics Project

The Stimulating Physics Project aims to improve the uptake of A level Physics including addressing gender imbalance.

<http://www.stimulatingphysics.org/>

**WISE:** The WISE campaign aims to encourage women into science, technology and engineering. <https://www.wisecampaign.org.uk/>. WISE website also hosts the legacy materials from UKRC including good practice materials. **Project NAVYWISE:** - evaluation of the project is available through the WISE website. [https://www.wisecampaign.org.uk/uploads/wise/files/Final\\_RAF\\_Report\\_2013.pdf](https://www.wisecampaign.org.uk/uploads/wise/files/Final_RAF_Report_2013.pdf)

#### Royal Aeronautical Society Website

The website aims to provide a one stop shop for careers in Aeronautics. <http://aerosociety.com/Careers-Education>. The website was developed to promote a positive perception of women in the aeronautical sector.

#### The Young Engineers

The Young Engineers run after school clubs. They produced a range of posters to attract a wider range of students to the clubs. These can be seen by logging onto <http://www.nationalstemcentre.org.uk/elibrary/collection/1892/young-engineers>. Young Engineers is open to schools, home educators, small family groups and guides, scouts etc. to increase access. [www.youngeng.org](http://www.youngeng.org)

#### The Brightside Trust-e-mentoring

<http://www.thebrightsidetrust.org/what-we-do/online-mentoring/> The Brightside e mentoring project is recognised as a clear leader in online mentoring and has a range of partners including the NHS and the Royal Academy of Engineering.

#### The London South Bank University and the London Engineering Project

[http://www.hestem-sw.org.uk/upload/Engineering\\_Islam.pdf](http://www.hestem-sw.org.uk/upload/Engineering_Islam.pdf). Describes the project led by London South Bank University with the London Engineering Project celebrating Islamic culture particularly in the areas of science and engineering. Details of the London Engineering Project can be accessed from logging onto the National STEM Centre site.

<http://www.nationalstemcentre.org.uk/elibrary/resource/1643/london-engineering-project-girls-into-engineering>

#### The Royal Society of Chemistry

175 Faces of Chemistry was launched by the first female President of the Royal Society of Chemistry (RSC) to celebrate diversity.

<http://www.rsc.org/diversity/175-faces/>. Leading to 23 February 2016 when the RSC celebrates its 175<sup>th</sup> anniversary the Royal Society will profile and celebrate the diversity of individuals within the community.