Briefing Pack

for STEM Careers Ambassadors

SCIENCEANDMATHS.NET
SEE WHERE THEY CAN TAKE YOU

Enthusing Students
Equipping Professionals
Supporting Employers

Acknowledgements

This briefing pack arises from the STEM* Subject Choice and Careers Project undertaken by the Centre for Science Education at Sheffield Hallam University and VT Enterprise, on behalf of the Department for Children, Schools and Families (DCSF). It is intended to support STEM Ambassadors and role models associated with similar schemes who wish to benefit from enhanced training. The STEM Subject Choice and Careers Project would like to thank STEMNET for their support in developing the concept and materials for this resource, and for encouraging local contract holders to offer this enhanced training to their STEM Ambassadors. The project would also like to acknowledge the valuable work undertaken by other STEM role model schemes and would welcome their involvement in using this resource.

http://www.shu.ac.uk/research/cse/stem-careers.html

*Science, Technology, Engineering and Maths

We welcome feedback to inform the updates and supplements to this resource.
Please email us at **info@careersinstem.co.uk**

centre for science education

VT Enterprise

Contents

Introduction

This Training Pack and accompanying guidance notes for organisations form part of the STEM Subject Choice and Careers Project. They are designed to help you enhance your skills and enable you to become even more active in your local schools and communities. As a trained **STEM Careers Ambassador** you will not only be able to enthuse young people about the benefits of choosing a career in STEM, but you will also be able to signpost them confidently to a range of information and guidance resources which can help them make informed career choices at crucial points in their lives. The emphasis within the training pack on challenging myths and stereotypes will also support Ambassadors in encouraging the broadest spectrum of young people to consider careers in and from STEM subjects.

In your own time

Teachers TV

The training was developed and delivered as a pilot for a number of new STEM Ambassadors from the University of Sheffield. Feedback was very positive from Ambassadors and school pupils alike, and the results can be seen in a 15-minute Teachers TV programme entitled 'Role Models and Work Experience' which can be viewed on the Teachers TV website **http://www.teachers.tv/video/36674** Some of the activities in this pack use this and other Teachers TV programmes as a supporting resource.

Background and rationale

Skills shortages in the Science, Technology, Engineering, Maths and Built Environment sectors are well documented, and will continue to be an issue whether we are in a period of recession or recovery. The three year STEM Careers Action programme is one of eleven that make up the National STEM Programme, under its Director John Holman. Action Programme 8 is charged with improving the quality of advice and guidance about STEM careers to inform subject choice. The STEM Careers Action Programme (AP8) is managed by the Centre for Science Education and VT Enterprise, on behalf of the Department for Children Schools and Families (DCSF). The project is part of a substantial national investment to combat the decline in the numbers of students choosing subjects, courses and careers in the STEM field. The key message is that a decision to study STEM subjects leads to a very wide range of interesting and well paid careers, inside and outside the STEM arena.

The National STEM Careers Coordinator, Kate Bellingham, is leading and co-ordinating the campaign, working with stakeholders and the organisations involved in delivery. Kate is a former Tomorrow's World presenter and frequent science and technology broadcaster, as well as being a qualified engineer, a maths teacher and a patron of WISE.

The Centre for Science Education and VT Enterprise are developing a wide range of curriculum resources, careers workforce resources and continuing professional development over the life of the project under the theme of 'enthusing students, equipping professionals, supporting employers'.

The other strands of the campaign are

- Careers Awareness Timeline Project, led by Centre for Education and Industry, University of Warwick
- **www.futuremorph.org** - the Science Council-led STEM careers website aimed at young people
- a communications campaign involving TV and cinema advertising, aimed at young people (website - **www.scienceandmaths.net** - a specific section of the Future Morph website)

Further information

To get in touch with the National STEM Careers Coordinator or to find out more, please email **stemcareers@shu.ac.uk**. To ensure you receive news about curriculum resources and direct access for downloadable resources as they become available, please email **info@careersinstem.co.uk**.

STEM Careers Ambassadors

Role models and STEM ambassadors have long played their part in the process of encouraging young people into STEM, and the power of a well-briefed role model can have a huge impact. Young people can feel overwhelmed by various option choices and the welter of information available to them, and they are often looking for support and guidance to help make sense of those resources. As a **STEM Careers Ambassador** you will be introduced to some of the resources available, so that you can signpost young people to the sources of information and support which can help them.

Benefits for 'STEM Careers Ambassadors' and their organisations

This training can contribute to your continuing professional development. The exercises will support you in feeling more confident talking about your work or research with young people, and this in turn will have an impact on your presentation skills as a whole. Your company/professional institution/employer/university will also benefit from your enhanced skills through your ability to effectively enthuse a broader spectrum of young people about the potential of a career in and from STEM subjects.

What is covered in the briefing pack

Becoming an effective role model

- Activities to enable ambassadors to reflect on own career path and consider how to communicate this to young people
- Suggestions about how to engage with young people and challenging stereotypes
- Activities to help ambassadors reflect on how young people might identify with them
- Activities to draw out young peoples' perceptions of STEM subjects and careers

Awareness of STEM careers information and support

- Scenarios linked to websites and case studies which illustrate examples of support and information available.
- Introduction to the different range of information sources available and how young people might access and use them
- Appendices providing background information on careers education and guidance
- Appendices highlighting activities which can be adapted for use in schools and communities

Becoming an effective role model

What is a role model?

There are many different forms of role model activity. See the grid below which has been adapted from The Royal Society's publication 'Taking a leading role' (The Royal Society 2004 P2):

Duration of contact / Contact type	One off	Fixed period	Ongoing
No personal contact	Posters, TV, DVDs, websites	Video series, DVDs	Newsletters, blogs, magazine articles
Email, phone	Web- based discussion forums, telephone discussions	Mentoring relationship via email/letter	Mentoring relationship, website profiles with an opportunity to ask questions
Face to face	Events, visits, lectures, presentations	Work experience placements, mentoring relationship, residential events	Mentoring relationship, ongoing support in schools to a club or group of young people

Which types of role model activity have you been involved in before? Please note down some details in the box below:

The effective role model

It is likely that you already understand how role models can have a considerable influence on young people's lives in general and on their career decisions in particular. Research has demonstrated that young people base their career and subject choice decisions on a wide range of influences – peers, relatives and close family, community, teachers etc. Where young people have a limited range of information resources and role models on which to draw, they are often limited in their own life choices. This can have a negative impact on both their future income but also on their sense of self and job satisfaction.

Role models come in all shapes and sizes. The most important thing is that young people can identify with you in some way. Have a look at some of the role models available on different STEM careers websites and the examples we have selected below and answer some questions about what makes them successful:

(Future Morph 2009)

Shakila Sathiananthan

Profile

Hi there. I'm Shakila. I work with L'Oreal to help market new high fashion cosmetics and perfumes. It's really important for me to understand the science behind each ingredient, and be able to explain how it works in a simple way, so that people who buy our products understand what they do.

Some people are surprised when they find out I'm a scientist, because I get to work with great beauty products all day. So I thought I'd share my experience on Bebo, and help challenge people's ideas of what you can accomplish with maths and science!

Favourite Music	Hip Hop, RnB
Favourite Films	There are so many, but to pick a couple… Kill Bill and Lock Stock and 2 Smoking Barrels.
Favourite Sports	Tennis, cricket, netball
Favourite Book	A Fine Balance
Happiest When	I'm on Holiday!
Hero	This is a tough one but I'm going to have to say my younger sister

If you would like to see the video about Shakila click on the link below:
http://www.futuremorph.org/scienceandmaths/#/cosmetics-specialist

Dave Inman

Profile

Hi there, I'm Dave and I am a Ride Engineer. My team and I are responsible for inspecting and testing new theme park rides in places like Alton Towers or Blackpool Pleasure Beach, as well as unique designs such as the London Eye to ensure they are up to Government safety standards. I genuinely love the work I do, it is an exciting and unique industry to be involved in and because it is quite niche you get to know a lot of people.

Obviously getting to go on the rides is a bonus as well but if I'm honest, I'm not really a fan of going on roller coasters. I like the old timber ones but the newer ones are just too scary!

Favourite Music	Very broad. The last CD I bought was by Gavin Rossdale from a band called Bush.
Favourite Films	Star Wars – A New Hope
Favourite Sports	Field Lacrosse and attending the gym
Favourite Books	Howard Marx autobiography and also Skulduggery Pleasant
Happiest When	People talk about the great rides they have been on. I know that a small part of the fun they had was because of my job!
Hero	Probably my father and grandfather who were both engineers and inspired me to go into an engineering field of some kind

To see more about Dave and watch the case study video visit **http://www.futuremorph.org/scienceandmaths/#/ride-engineer**

Katie Symons

Profile

Hi. My name is Katie Symons and I'm a Structural Engineer. I get to work along side designers and architects to create modern buildings and structures. I am involved in the whole process from start to finish. From designing the look of the building to choosing the cladding system!

The company I work for is currently involved in the re-development of Anfield Football Stadium, designing the biggest theme park in the world in Abu Dhabi and designing a skyscraper in St Petersberg.

Favourite Music	I love everything from Jazz to pop. I also sing in a choir!
Favourite Films	Mary Poppins, The Usual Suspects, Four Weddings and a Funeral (pretty eclectic!)
Favourite Sports	I used to do a lot of orienteering, then rowing, but now I'm a keen cyclist. I race on the track as well as on the road and enjoy going on cycling holidays.
Favourite Books	Life of Pi by Yann Martel.
Happiest When	Cycling in the French Alps.
Hero	I aspire to be like lots of people: my senior colleagues for their ability to solve engineering problems. Steve Redgrave for his determination and strength. My grandma for her unfailing generosity of spirit.

To see Katie's video click on **http://www.futuremorph.org/scienceandmaths/#/structural-engineer**

Becoming an effective role model – exercise

Questions:

How have the role models featured helped young people understand their type of work?
(e.g. Shakila makes the link between science and beauty products)

How could you help young people understand your type of work?

How have they challenged young people's perceptions of the type of job they might have in STEM?
(e.g. Dave is involved with Rollercoaster rides)

How could you challenge young people's views about the type of work people might do in STEM?

What have they written/said that can help young people identify with them?
(e.g. one example might be Katie Symons referring to work her company is involved with on a football stadium)

How could you help young people identify with you and your type of work/study?

In your own time

More STEM Role Models

You might also like to look at other STEM role models to get ideas about how different people present themselves to a wide audience.

The following websites contain a variety of case studies which you can look at yourself and/or refer young people to:

The Future Morph website has a number of videos and case studies of role models
http://www.futuremorph.org/

The Maths Careers website also includes a range of role models who use Maths in their careers
http://www.mathscareers.org.uk/

Also developed as part of the STEM Careers Project and available through **www.scienceandmaths.net** are some new case studies including the following:

Humanitarian Engineer, Innovation Consultant, Food Technologist Snowboard Designer, Planetary Scientist, Lighting Designer, Environmentalist (from 2012 Olympics sustainability team) and Gemmologist

The STEMNET website **http://www.stemnet.org.uk/home.cfm** has a range of profiles in the Ambassadors section entitled 'Leading Lights'.

The UK Resource Centre for Women in SET has a range of case studies and personal stories
http://www.ukrc4setwomen.org/html/women-and-girls/case-studies/

The New Outlooks in Science and Engineering website includes a range of case studies of young scientists
http://www.noisemakers.org.uk/modules/noisemaker/

Engaging with young people and challenging stereotypes

Young people often have misconceptions about what a career in STEM might involve. Some might assume that unless they are excellent at Maths or really fascinated by a particular science, they should not consider STEM study or work post 16. Many young people will have very limited views of what might be involved, and do not have access to information to help dispel the myths surrounding the sector. Through providing them with the opportunity to talk to a diversity of role models who have entered the STEM sector through various different routes, it is hoped that young people's misconceptions will be challenged.

It will also help the young people to focus on potential careers by getting them to think about their values and likes and dislikes. There are various tools on the internet to help with this process including **The Values Game** and **What might you be?** on Future Morph (See links above). Through reflecting on your own career choices in this way, you will be able to help young people see how their values, likes and dislikes might impact on their future career.

Challenging perceptions and stereotypes

Your task when you go into schools to meet young people is to attempt to challenge their prejudices and stereotypes, not only about STEM Careers in general, but also about **who** can do certain types of jobs. The very fact that you are engaging in this enhanced training shows that you are already interested in trying to make a difference.

Try to use your answers to the questions to explore different aspects of working in a STEM career and to challenge young people's perceptions. Examples might be:

- In general STEM careers pay better than average salaries, so even if you don't travel with your job you are more likely to be able to afford nice holidays
- If a young person enjoys Art, there are many creative and design elements to working in STEM which might not be immediately apparent (give examples)
- Many STEM related jobs are not in laboratories or on construction sites or factory shop-floors. Many are office based and certainly most require good people skills.
- Many young people will have a strong commitment to current issues (e.g. the environment and nuclear fuel, poverty versus globalisation) and they may well be able to find a role in a STEM career which can further their commitment to their value or belief
- Take the opportunity to tell the young people about things you enjoy outside of work too. It is often easier for a young person to engage with role models who come across as real people i.e. talk about their outside interests, family etc. and ask the young people about their own interests and lives.
- Young people may have misconceptions about the type of people who undertake particular jobs. Try to use every opportunity you can to dispel myths and stereotypes and encourage young people to think broadly about the type of careers they and their peers can have.

In your own time

The Equality and Diversity toolkit

A new toolkit has been developed by the STEM Subject Choice and Careers Project to help organisations ensure that they present STEM careers to the broadest spectrum of society. When you are designing your own event or supporting a session in school, check by looking through the Toolkit that you are making the most of this opportunity to dispel myths and stereotypes, and engage as many young people as possible in your activities. To access the toolkit, contact the STEM Subject Choice and Careers Project at **info@careersinstem.co.uk**

Explaining your course/job to young people:

In the box below try to find a way to get your work/study across to young people (try to keep it short and simple)

10 things you like about your course/job and the skills you use:

Values, likes and dislikes etc.

Think about the things that are important to you or that you really enjoy about your work/study.

Here are some examples to get you thinking:

- I like working and learning in a team
- I can be creative
- I discover new things
- I can travel with my job
- There is a lot of variety
- I can use my problem solving skills
- I design or build things
- My work helps the environment
- I think my work helps other people
- I help to make things work

Please complete your top ten below (don't be limited by the list above - this is just to help you think):

1

2

3

4

5

6

7

8

9

10

In your own time

Values, likes and dislikes

To explore more about the type of issues which might affect young people's career choices, have a go at the exercises in Future Morph entitled 'What might you be?' and 'The Values Game' - click on the links below to go direct to the games themselves:

http://www.futuremorph.org/11-14/game_-_what_might_you_be.cfm
http://www.futuremorph.org/11-14/values_game_-_who_are_you.cfm

Responding to questions

Being prepared to answer questions from young people is part of the role model experience. The Future Morph website contains 3 short video clips about the type of issues young people might like to ask scientists when they meet them. The link to the clip is as follows:

http://www.futuremorph.org/viewitem.cfm?cit_id=4693

http://www.futuremorph.org/16-19/viewitem.cfm?cit_id=4694

http://www.futuremorph.org/14-16/viewitem.cfm?cit_id=4708

Have a look at the link above and see how the role models respond.

http://www.futuremorph.org/search.cfm?search_text=quiz+the+scientist
This link takes you to all the clips

The questions include the following. In the spaces below, write some notes to help you think about how you would respond:

What subjects did you enjoy at school?

Why do you think this is?

What did you find difficult at school?

Did you always have a clear idea of the type of course/career you wanted?

Do you need to be good at maths to do your job/study on your course?

Did you have a favourite teacher who inspired you?

What is /was it like studying at University/college/work?

Do/did you live at home or away from home? What is/was it like?

What about the cost of studying? is it very expensive?'

Do/did you have to have a part-time job too?

How many girls were on your course (compared to boys)?

What type of job do you have/hope to have?

What are salaries like in your field of work/the type of work you hope to secure?

Do you work inside or outside or both?

Do you travel/hope to with your work?

What is the most dangerous thing you have ever done?

Can you think of any other questions that school pupils might ask you/that you would like to discuss with them? Please write below:

Have you overcome any particular barriers to be where you are now?

Perhaps you struggled with a particular subject but found a way to compensate/cope? Or maybe you were determined to take a particular career path but found it was not possible and had to rethink your ideas? Remember that school pupils like to be able to identify with the role models they meet and they may be facing difficulties at school/with particular subjects/with making career choices. In the box below please write down any barriers you have had to overcome:

STEM careers information and resources for young people

There is a wide range of information and support available about STEM Careers. Appendix 1 provides a non-exhaustive list of websites which can support young people in making more informed choices about their future careers. For a comprehensive list, visit the Future Morph website at **http://www.futuremorph.org/_db/_documents/STEM-section9.pdf** to view 'STEM Choices - A Resource Pack for Careers Education and Information, Advice and Guidance Practitioners'. This link takes you directly to the section within the resource which includes a list of websites offering very detailed information on a full range of STEM-related careers.

The Jobs4U website at **http://www.connexions-direct.com/Jobs4u/** also allows you to explore a full range of career options in job families and it is possible that young people may have already accessed this resource.

The careers scenarios below are designed to get you to think how to respond to some of the inevitable questions you will get from young people asking for information and advice about their futures. We do NOT want you to become experts in advising young people. In fact, this is most certainly NOT your role. Your role as a **STEM Careers Ambassador** is to **signpost** young people to the resources available and to help them make sense of them.

Careers scenarios

Imagine that you are visiting a school and the young people have a chance to ask you questions. Please read through the different scenarios and think how you would respond. For ideas about how you might respond, please the short list of suggestions at the end of the careers scenario exercise.

1. Yasmin says that she is being encouraged by her family and the school to study medicine but that she wants to find out more about other careers. How do you respond?

Which sources of help, support and information could you guide her towards?

2. Ben tells you that he doesn't think he is clever enough to work in Science, Technology, Engineering or Maths. He thinks that you have to go to University and he doesn't think his family can afford it. How do you respond?

Which sources of help, support and information could you guide him towards?

3. Holly tells you that she wants to work with children and that she is thinking about becoming a nursery nurse like her elder sister and mother. How do you respond?

Which sources of help, support and information could you guide her towards?

4. Josh tells you that he enjoys Design and Technology and is doing well at school. However he thinks he will give it up after GCSE because he can't think of any careers related to D&T apart from being a teacher and he doesn't want to teach. How do you respond?

Which sources of help, support and information could you guide him towards?

5. Rachel has always wanted to work in fashion or beauty and tells you that she has no interest in STEM. She says she likes make-up and nice clothes and thinks she will have to wear a lab coat or overalls and will have to be work in a cold or dirty environment all the time. How do you respond?

Which sources of help, support and information could you guide her towards?

Sample responses to careers scenarios:

1. Yasmin may have a very limited idea of any jobs outside of medicine. The NHS careers website will provide her with a clearer view. **http://www.nhscareers.nhs.uk/index.shtm** She may also be experiencing some pressure from her family to enter a career that she doesn't really want. Start by finding out which subjects she enjoys and encourage her to look at websites like Future Morph and Jobs4U to find out about a range of different options.

2. Ben could think about an apprenticeship or some sort of vocational route if this would suit his circumstances better. Try to think of examples of different routes to train for your career, if possible, or direct him to websites that will give helpful case studies. It might be helpful for him to find out about possible bursaries to help with study too.

3. Holly may have never thought of alternatives to the types jobs her own family do. Try to help her think about the financial implications of any career choices and emphasise that STEM careers frequently pay more than the caring professions. She might have her heart set on working with children, but it might be worth considering some alternatives before making a definite choice.

4. It might seem surprising that Josh can only think of teaching, but many young people find it difficult to relate studying at school to the world of work. Try to get him thinking about how the things around him have been designed and manufactured and find some role models on Future Morph who might be inspirational for him.

5. Rachel might not have thought about the STEM related processes that go on behind the design and manufacture of beauty products and this might be a way to get her interested. You could also tell her about careers you are familiar with which might challenge her ideas about lab coats and overalls and difficult working conditions!

Careers Guidance and Education in school

Careers Guidance and Education in schools - Quick Quiz

Understanding the system - Match the information exercise

Careers guidance and education in schools is a complex and constantly changing area. We have devised a simple exercise to introduce you to some of the issues and terms used. For more information read Appendices 2 and 3 and have a look at 'STEM Choices - A Resource Pack for Careers Education and Information, Advice and Guidance Practitioners'.

Draw an arrow which links the information on the left hand column to the corresponding 'answer' on the right hand column (see the correct answers in Appendix 7 at the end of this document)

Key Stage 4	Vocational qualifications available at levels 1, 2 and 3
Options	Year groups 7,8 & 9
Key Stage 3	Young people's ability to manage their progression and finances effectively
National curriculum	Provider of advice on education, careers, housing, money, health and relationships for 13-19 year olds in the UK
Diplomas	Personal, Social, Health and Economic Education
PA	GCSEs (Year groups 10 & 11)
AS level	Framework for teaching and learning with associated assessment arrangements laid down by Statute
Connexions	Vocational training open to people of all abilities who prefer hands-on training
Work Experience	Not in education, employment or training
Self-arranged placement	Equivalent to half an A level (Y12)
PSHEE	Any curriculum activities that link to the world of work
IAG	Normally offered in schools at key decision points (e.g. Options, FE/HE, leaving school). However many young people do not have access to this opportunity.
Economic Wellbeing	GCSE subject choices usually made in Year 9
NEET	Information, Advice and Guidance
Careers Interview	School allows young people to make own arrangements for work experience (this can compound disadvantage if young people have limited access to opportunities)
Apprenticeships	Personal Adviser
Work-related learning	Usually a two-week placement undertaken in Year 10 or 11

Planning activities

It is likely that you are going to be arranging a visit to a school to undertake a specific activity. You may have complete control about how the activity will be run or you may be working with another organisation/ambassador and your involvement might be fairly limited in the first instance. Whichever situation you find yourself in, the first thing to remember is that you must plan very carefully. Young people are used to very fast-moving, multi-functional activities and you will need to have a detailed plan to guide you through any event in which you are involved. Appendix 4 contains two exemplar session plans which detail what will happen when.

When planning your activity, it can be helpful to encourage young people to reflect on their employability and transferable skills and how these relate to careers in STEM. Please see Appendix 5 and 6 for examples of adaptable resources which could be used in schools to help young people feel positive about their potential.

In order to ensure that your activity is appropriate for the year group/young people involved, it is essential to make contact with the school prior to your session. If possible try to find out from the relevant teacher how it ties in with or compliments the young people's Careers Education/Guidance. See Appendix 2 and 3 for information on Careers Education and Guidance in schools.

In your own time

STEMNET

The Ambassadors section of the STEMNET website **http://www.stemnet.org.uk/home.cfm** provides examples of visits to schools entitled 'Activity case studies'. Have a look and see if you could adapt any of the sessions or possibly add your own.

Interactive exercises:
The following link takes you to a section of the Future Morph website which includes suggestions about a range of activities to be used with young people. 'Match the character / statement to the job title' enables young people to gain a greater understanding of jobs that uses science or maths knowledge in some way.
http://www.futuremorph.org/careers_staff/inspire_your_students/suggested_activities.cfm

'Why study Science and Maths' presentation for use by Ambassadors
There is an adaptable PowerPoint presentation plus a range of downloadable resources and useful materials on the Future Morph website which STEM Careers Ambassadors can utilise or adapt as appropriate. It is entitled 'Options Presentation' and can be found at the bottom of the following web page: **http://www.futuremorph.org/teachers/introduction_to_resources.cfm**

Review and action plan

Now that you have completed the face-to-face element of the STEM Careers Ambassador Training, please reflect on what you have learnt and the action you plan to take as a follow up:

Key elements of the STEM Careers Ambassador role:

Activities / sessions/ opportunities where I could use my new skills:

Follow-up action I need to take:

Now that you have completed your STEM Careers Ambassador training, we hope that you will feel more confident about encouraging young people to consider careers in and from STEM study. Please read through the various appendices supplied and familiarise yourself with the information resources suggested.

References

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Morton P and Nix C (2009) "STEM Courses and Careers - Explore the possibilities", handout for the British Science Association Festival of Science event, September 2009

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STEM Subject Choice and Careers Project (2008) 'STEM Choices - A Resource Pack for Careers Education and Information, Advice and Guidance Practitioners', as part of the 'STEM Subject Choice and Careers' project being delivered by the Centre for Science Education, Sheffield Hallam University and VT Enterprise on behalf of Department for Children, Schools and Families (DCSF)

The Royal Society (2004) "Taking a Leading Role: A Good Practice Guide". England

Appendix 1

Sources of information and support

1. STEM Subject Choice and Careers Project
If you want to know more about the project visit **http://www.shu.ac.uk/research/cse/stem-careers.html**
To ensure you receive news about the project and gain direct access to a full range of downloadable resources as they become available please email **info@careersinstem.co.uk**
There are links to many of the resources and websites listed below.

2. Future Morph
http://www.futuremorph.org/
Aimed primarily at school students, "this website is designed to show you just some of the amazing and unexpected places that studying science, technology, engineering and maths can take you". Also has sections specifically for careers staff, parents and teachers. This is where you will find lots of role model case studies and the options presentation which you can download and adapt.

3. STEM Choices
http://www.futuremorph.org/_db/_documents/STEM-section9.pdf
The STEM Subject Choice and Careers Project team have also produced a comprehensive guide for Careers Professionals entitled 'STEM Choices - A Resource Pack for Careers Education and Information, Advice and Guidance Practitioners'. This link takes you to the section within the resource which includes a list of websites offering very detailed information on a full range of STEM-related careers.

4. Maths Careers
http://www.mathscareers.org.uk/
Information for 11-14, 14-16, and Post 16 pupils as well as Careers Advisers plus sections for Undergraduates, Graduates and Employers.

5. Connexions service
http://www.connexions-direct.com/jobs4u/
The Connexions service website has a searchable database of careers and job families. The link below takes you to a section about careers relating to science and Maths
http://www.connexions-direct.com/jobs4u/index.cfm?pid=35

6. Teachers TV
The following links will take you directly to a range of Teachers TV programmes commissioned by the STEM Subject Choice and Careers Project

http://www.teachers.tv/video/36674 Role Models and Work Placements
http://www.teachers.tv/video/36359 Economic wellbeing
http://www.teachers.tv/video/36358 Equality and Diversity
http://www.teachers.tv/video/36360 STEM Information, Advice and Guidance
http://www.teachers.tv/video/31980 - Science
http://www.teachers.tv/video/31982 - Engineering
http://www.teachers.tv/video/31981 - Maths
http://www.teachers.tv/video/31983 - Choosing Careers

7. Equality and Diversity Toolkit
This toolkit has been produced as part of the STEM Subject Choice and Careers project. It can be accessed by emailing the project at **info@careersinstem.co.uk**

8. CRAC: The Career Development Organisation
www.icould.com
A site that provides access to the career experiences of real people through their stories.
It includes many inspiring examples of STEM careers at a variety of levels, and through the stories, describes the pathways of people who used their STEM courses as a springboard into other opportunities

Appendix 2

Careers Work in Action – The Challenges and Opportunities for STEM

Extract from Barnes A (2008) " STEM Subject Choice and Careers Project - National Standards for Information, Advice and Guidance", Sheffield, Sheffield Hallam University

The evolving structures and systems for ensuring effective Careers Education, Information, Advice and Guidance (CEIAG) provision for young people present a number of opportunities as well as challenges to STEM organisations working with schools and colleges.

Maintained schools have a statutory responsibility to provide careers education for pupils in Years 7-11 (11-16 year olds). Schools and colleges must also provide a range of up-to-date careers information. The key role of CEIAG was recognised in the White Paper, "Your child, your schools, our future; building a 21st century schools system" which introduced a new Pupil Guarantee to be underpinned by legislation. This includes a commitment that "all secondary school pupils will have access to high-quality choices about learning, work and lifestyles and are well-supported during transitions."

Although practice varies, most schools provide careers education as part of their programmes for work-related learning and PSHE (personal, social and health education) and/or citizenship. Some schools provide elements of careers education through other subject teaching and their tutorial programmes. Timetable arrangements vary considerably. Tutor periods may be as short as 20-25 minutes while some events may be timetabled for a whole day. Significant career-related learning activities are offered on a voluntary extra-curricular basis, e.g. neighbourhood engineer schemes.

From September 2008, schools will be implementing new non-statutory arrangements for careers education. Two programmes of study for Personal, Social, Health and Economic Education (PSHEE) have been developed by the Qualifications and Curriculum Authority. The Personal Wellbeing programme of study covers the social awareness aspects of preparation for careers and working life. The Economic Wellbeing and Financial Capability programme of study covers areas such as self-awareness, career exploration, positive attitudes to risk and enterprising behaviour. Schools are also being encouraged to be more innovative in curriculum and timetable design. 'Themed' learning opportunities will enable young people to address issues such as globalisation and sustainable development. Timetables will become more flexible with greater use of different blocks of time. These developments provide considerable scope for enhancing STEM subject choice and career learning.

Most schools and colleges have a Connexions Resources Centre where careers information is housed and interviews take place. Since 1991, careers information has been match-funded through the Connexions and formerly Career Service budgets but it is not clear whether these arrangements will continue in the future. Increasingly, schools and colleges are providing additional careers information online through their intranets and VLEs. Online area-wide prospectuses have been introduced to provide young people with access to the full range of information on courses in their local area.

Specialist roles in careers education and IAG are also in transition. Three years ago, the restructuring of teaching and learning responsibilities in schools led to an increase in the number of non-teachers with the main responsibility for careers. The identification of responsibilities and professional development for individuals in these posts is still a little haphazard although some schools have made significant progress in securing effective leadership and developing a team approach to CEIAG.

At the same time, new arrangements introduced for the commissioning of Connexions services for young people have ushered in a further period of change for schools and colleges. Connexions personal advisers are attached to schools and colleges for one or more days per week. Their priority is to support young people with problems and difficulties. This means that other ways have had to be found to meet the CEIAG needs of all young people including innovative uses of ICT and the greater involvement of school or college-based staff. Some schools and colleges have responded by appointing their own personal/careers advisers on a shared or part-time basis.

Appendix 3

Exerpt from Qualifications and Curriculum Authority publication (2008)'

Framework for economic wellbeing 11–19: career, work-related learning and enterprise

Elements of provision for all learners	Suggested minimum provision at each key stage	Through this provision learners can:
1. Recognise, develop and apply their skills for enterprise and employability.	Learners have the opportunity to develop and apply their skills in two work-related activities. Learners have one discussion about the skills they developed.	• understand and demonstrate the main qualities, attitudes and skills needed to enter and thrive in the working world • evaluate the usefulness of a range of skills for gaining and sustaining employment and self-employment • manage their continuing career development, including transitions • take risks and learn from mistakes • apply their functional skills and personal, learning and thinking skills (PLTS).
2. Relate their own abilities, attributes and achievements to career intentions, and make informed choices based on an understanding of available options.	Learners undertake activities to develop their skills for career management, including a guidance interview focusing on career progression.	• demonstrate an understanding of the concept of 'career' • recognise and respond appropriately to the main influences in career choice • identify, select and use a range of information sources to research, clarify and review career options and choices, including financial support for post-16 and higher education • assess their needs, interests, values, skills, abilities and attitudes in relation to options in learning, work and enterprise, and use this process to make creative and realistic choices for progression • access and use an interview with a career guidance specialist to progress their plans • make, review and adapt their individual learning plan for transition into, through and beyond the 14–19 phase • complete application procedures for their next steps, including a CV, personal statement and preparation for interview.
3. Develop an awareness of the extent and diversity of opportunities in learning and work.	Learners undertake two tasks that investigate opportunities in learning and work, and the changing patterns of employment.	• understand the range of opportunities in learning and work (local, national, European and global), and the changing patterns of employment • understand the significance of the changes happening in the world of work and relate them to their career plans • explain the chief characteristics of employment, self-employment and voluntary work • recognise and challenge stereotypical views of opportunities in learning and work.
4. Use their experiences of work to extend their understanding of careers and work.	Learners have two experiences of work. 14–19 learners have the equivalent of half a day of preparation and half a day of debriefing and follow up of their work experience and/or part-time work.	• identify what they have learned about work from their experiences • understand what motivates people to work • identify the qualities and skills needed for enterprise and employability • understand the importance of lifelong learning to employability and progression • apply learning gained from their experiences of work to their curriculum and to their career planning.

Elements of provision for all learners	Suggested minimum provision at each key stage	Through this provision learners can:
5. Learn from contact with people who work.	Learners have contact with two people from different occupational sectors.	• understand the career motivations and pathways taken by individuals • understand the importance to employers of skills, attitudes and qualifications • appreciate the benefit of further learning and personal development.
6. Learn about how and why businesses operate.	Learners undertake two curriculum activities that develop their understanding of work and enterprise.	• outline the main types of business and what motivates them • understand how different businesses are organised and structured • give examples of rights and responsibilities at work, work roles and identities, and attitudes and values in relation to work and enterprise • demonstrate a basic knowledge and understanding of a range of economic and business concepts and terms, including the connections between markets, competition, price and profit.
7. Learn about working practices and environments.	Learners have two opportunities to use work practices or environments as contexts for learning.	• understand how and why working practices and environments differ • understand the main hazards associated with particular types of workplace and how these hazards are minimised • relate knowledge about work to their learning and career development.
8. Undertake tasks and activities set in work contexts.	Learners have two opportunities to use work as a context for learning within the curriculum and record evidence of their learning.	• understand the relevance of curriculum subjects to the world of work and to their own career development • demonstrate an understanding of economic and business terms • analyse how examples of learning within the curriculum can be applied to work contexts • evaluate their experiences and learning to inform future progress and career plan.
9. Engage with ideas, challenges and applications from the business world.	Learners undertake one business challenge, problem-solving or enterprise activity.	• know and understand important enterprise concepts • demonstrate enterprise skills, including decision making, leadership, risk management and presentation • demonstrate enterprise attitudes, including a willingness to take on new challenges, self-reliance, open-mindedness, respect for evidence, pragmatism and commitment to making a difference • demonstrate enterprising qualities, including adaptability, perseverance, determination, flexibility, creativity, ability to improvise, confidence, initiative, self-confidence, autonomy and the drive to make things happen.

Appendix 4

Exemplar session plans

1. Bath bombs activity
The session plan below was used as the basis for a Teachers TV programme entitled Role Models and Work experience which illustrates STEM Careers Ambassadors in action. The link takes you to the Teachers TV website where you can view or download the programme: **http://www.teachers.tv/video/36674** . This activity was designed for thirty Year 9 girls who were about to make their GCSE option choices so the timing was particularly relevant. The Ambassadors were chosen because they had Chemistry backgrounds and were able to relate the activity to their area of study and/or work. They were supported by a Facilitator.

Session plan

Timing	Activity	Who/resources
10 mins (timing flexible)	**Introduction** and explanation of **session outline** **Poster exercise** to demonstrate gender stereotyping Gender **pay gap** exercise **Q&A** - each group gets to ask questions with a yes/ no answer and have to **guess** the role model's job	Facilitator to lead the exercises from the front and STEM Careers Ambassadors to work with groups **Give out workbooks**
2-3 mins	**Set context for bath bombs** Chemistry behind the activity (use a YouTube video?)	STEM Careers Ambassador
2-3 mins	**Materials** we are using (Sodium bicarbonate and citric acid)	STEM Careers Ambassador asks groups to think about what the materials are used for in the home/ elsewhere
5 mins	**Demonstration** How to make the bath bombs and what happens when they are in water	STEM Careers Ambassador to demonstrate task All the girls to watch the demo (Might have to gather at the front)
20- 30 mins	**Bath bomb making** **Packaging** - options to use all the materials to create gifts	STEM Careers Ambassadors to set up and support groups **Bath bomb briefs**
5 mins	**Industrial application** - Presentation with questions for the groups to consider (e.g. if you wanted to make thousands of bath bombs, how would you go about it)	STEM Careers Ambassador
5-10 mins	**Role models' career paths** (including subjects at school, further study, career choices, current work and career plans for the future) Questions from group	STEM Careers Ambassador give a brief overview of their own career, answer questions from small groups and offer suggestions of where to find information on careers
10 mins	**Science Quiz** (like pub quiz)	Facilitator with support from STEM Careers Ambassadors **workbook**
5-10 mins	**Complete work books** with skills used and things enjoyed Collect bath bombs and chemistry careers handouts	**Group** **Chemistry careers handout**
5-10 mins	Thanks, evaluation and close - and watch last video **http://www.bebo.com/scienceandmathsjobs/ - Shakila**	Facilitator

2. Science on a Soapbox

This activity was designed for young people attending the British Science Festival in 2009. The Ambassadors delivering it were asked to engage passers-by in a short activity. This was adapted from an intial concept developed for the Researchers in Residence programme run by Sheffield Hallam University.

Description of the activity:

Meet lively young role models from all areas of science and ask them whatever you want to about a career in science. We guarantee the answers will be honest and enlightening.

Objectives of the session:

To give young people an insight into a career in STEM (Science, Technology, Engineering and Maths) through talking to a STEM Careers Ambassador about their experience of studying and working in STEM. The intention is to keep the interaction as informal as possible so that the young people can ask the questions they might feel nervous of posing in a more formal setting. The 'activity' which illustrates your area of study or work is being used as a device to engage the young person. The real resource is YOU and YOUR EXPERIENCE. It will be helpful for the young people to hear about any problems or barriers you faced when thinking about your career. You can point them towards all the other sources of support and information available (in school, through the Internet etc), and if there are specific enquiries which you think need a personal response, please make a note of them and pass them on to the appropriate person (STEMNET Co-ordinator, School staff etc).

Resources needed:

You will need resources to help you illustrate your own career, copies of the prompt questions (see below) and information about the Future Morph and the Maths careers websites so the young people can do their own research following their discussions with you.

Science on a Soapbox - suggested activity/outline:

Timing	Activity and objective	Resources
2 minutes	**Engage the group:** Ask passers-by if they would like to talk to you and ask you questions about your study/career. You might have to engage teachers and parents first rather than trying to engage the young people themselves. Tell the group what you are going to do and tell them that it will only take 10 minutes. A group can be just a couple of people or as many as you feel you can cope with!	**Science on a Soapbox sign** (to attract attention)
5 minutes	**Guess my role:** Tell the young people that they can ask you 10 or 20 questions to try to work out what you are studying/researching/ what type of job you have. You can either use prompt questions - see below - or artefacts/images.	**Prompt questions** (which they can ask you) AND/ OR one or more artefacts/images relating to your work to give some ideas about your role
5 minutes	**Task related to your work:** This is a chance for you to devise something which the young people can engage in to develop a better understanding of your work. If you are a civil engineer for example, you could ask the young people to look around them and identify 5 things that might relate to your work. They could do this in pairs and you could give them 2 minutes to look and come up with their own list. The final few minutes is them giving feedback and you responding to their suggestions.	**Your own ideas for how best to illustrate your work/study/ research.** Remember that the group may well be varied in age and experience so try to keep the activity straightforward.
3 minutes	**Thanks and questions:** Please thank the group for taking part and tell them that there is lots of information about careers in STEM on the Future Morph and the Maths careers websites **http://www.futuremorph.org/ http://www.mathscareers.org.uk**	**Information about relevant websites.** **Paper to take notes of questions you cannot answer**

Science on a Soapbox - Guess my role prompt questions

- Do you work outside?
- Do you work in a laboratory?
- Do you design things?
- Do you test things?
- Why did you choose your career?
- Do you use Maths in your study/career?
- What do you like best about your job/study/research?
- What do you like least?
- Does your job help the environment?
- Do people in your career area have to go to college or can they learn on the job?
- Can you name some well-known people who have worked in your subject area?

Appendix 5

Example of workbook to help young people reflect on their employability skills

(taken from the Building for Success in Quantity Surveying workbook designed by Women in SET, Centre for Science Education, Sheffield Hallam University. This was used with girls from Y10-12)

In the space below please tell us what you think a Quantity Surveyor does. If you would like to, you can also include details of where/how you found your information.

To be a Quantity Surveyor you will need to show that you have the skills listed below. In the table tell us how you are developing some of these skills already.

Skills needed to be a Quantity Surveyor	How you have used these skills in school/at home/on this course/in your hobbies etc.
Communication and negotiation	
Making presentations and writing reports	
A logical and practical mind	
Co-ordinating different projects	
An entrepreneurial (business) streak	
Use this box to tell us about any other skills you have that you think might be relevant	

Appendix 6

Example of a checklist to help young people understand transferable skills

Taken from Built Environment Girls Day Workbook designed by Women in SET, Centre for Science Education, Sheffield Hallam University. This checklist can be used after young people have been involved in a practical STEM activity to highlight the range of skills used.

Skills used in STEM Careers

All the skills you have used today will be useful to you in your future career - whatever you decide to do. Tick the skills below which you think you have used today, and then tick the skills you think would be useful in your chosen career.

Skill	Have you used this skill today?	Would it be useful in your career?
Designing		
Building/creating		
Measuring		
Testing		
Following instructions		
Asking questions		
Listening carefully		
Solving problems		
Offering suggestions		
Working as a team		
Leadership		
Staying motivated		
Working to a deadline		
Thinking about what you have learnt		
Thinking 'outside the box'!		

Appendix 7

Careers Guidance and Education in Schools - Quick Quiz Answers

Key Stage 4	GCSEs (Year groups 10 & 11)
Options	GCSE subject choices usually made in Year 9
Key Stage 3	Year groups 7,8 & 9
National curriculum	Framework for teaching and learning with associated assessment arrangements laid down by Statute
Diplomas	Vocational qualifications available at levels 1, 2 and 3
PA	Personal Adviser
AS level	Equivalent to half an A level (Y12)
Connexions	Provider of advice on education, careers, housing, money, health and relationships for 13-19 year olds in the UK
Work Experience	Usually a two-week placement undertaken in Year 10 or 11
Self-arranged placement	School allows young people to make own arrangements for work experience (this can compound disadvantage if young people have limited access to opportunities)
PSHEE	Personal, Social, Health and Economic Education
IAG	Information, Advice and Guidance
Economic Wellbeing	Young people's ability to manage their progression and finances effectively
NEET	Not in education, employment or training
Careers Interview	Normally offered in schools at key decision points (e.g. Options, FE/HE, leaving school). However many young people do not have access to this opportunity.
Apprenticeships	Vocational training open to people of all abilities who prefer hands-on training
Work-related learning	Any curriculum activities that link to the world of work

Appendix 8

Handout developed by the STEM Subject Choice and Careers project to highlight to parents the benefits of STEM careers

STEM Courses and Careers - Explore the Possibilities

Science and maths - where can they take you?

In this world of challenges and opportunities science and maths skills are vital for our future...but will there be enough young people with the skills needed?

Science and maths skills can open doors to a successful career...

What can families do to help young people make the right choices and keep their options open?

Our Top Ten Tips

1. Talk to young people about the topics they are following in Science, Technology, Engineering (if they do it) and Maths (STEM) classes. Help them to make the link to the real world and to see the relevance to their future careers and to helping them develop their abilities and confidence.

2. Take young people to science festivals, science and technology exhibitions and museums that explore the application of STEM subjects in innovative ways. Look out for science and maths related TV programmes like Bang Goes the Theory, Springwatch and Numb3rs or even Top Gear and the Discovery Channel.

3. Encourage young people to explore the full range of opportunities in STEM. People in STEM careers can save lives, travel the world and often need good people skills. Good internet sources to start on are www.futuremorph.org and www.scienceandmaths.net and www.mathscareers.org.uk

4. Talk to your school about opportunities for enhancement and enrichment activities that enable young people to enjoy STEM subjects and learn from real people working in STEM. These include After School Science Clubs, Computer Clubs for Girls, STEM Ambassador visits, CREST Awards. The numbers of girls choosing to study some of the STEM subjects after 16 is still small, but there are a number of schemes working to change things. Check out www.wisecampaign.org.uk and www.wiset.org.uk

5. Support involvement in STEM related work experience that broaden horizons. Can you support a work placement or do you know someone who can? Remember that STEM related placements can be found in unexpected places.

6. Talk to the school to make sure you are aware of any special events and extra –curricular careers activities for families that may be happening locally e.g. STEM careers events and Science and Engineering Week activities in March each year. www.britishscienceassociation.org

7. Make sure young people are aware of the value of STEM subjects in the world of work. The demand for STEM graduates will continue to rise. Research shows that chemistry, physics and maths graduates will earn on average 30% more in their working lifetime than other graduates. Girls should be aware that STEM careers have higher earning potential than more traditional careers often chosen by girls.

8. Explore the wide range of education pathways and routes at Key Stage 3 and Key Stage 4 and post 16 to ensure young people do not rule themselves out

of a career that draws on STEM subjects. The national Choices publications **Which way now?** and **It's your choice** guides are there to help on the full range of options 14–19. Ask at school about the option to take Triple Science. Remember information on the full range of courses available locally is included in the online 14–19 prospectus. (www.direct.gov.uk/14–19prospectus)

9. Help them investigate the wide range of routes available into STEM related careers. See www.futuremorph.org, www.connexions–direct.com/jobs4u, www.enginuity.org.uk and www.mathscareers.org.uk for more information on different ways into careers from STEM subjects.

10. Keep the dialogue open – talk to young people after they have taken part in STEM activities. Young people may need encouragement and support to achieve in subjects they may find challenging. Take advantage of a number of schemes that provide residential opportunities for young people interested in STEM careers. Examples include Go4SET and Headstart run by Engineering Development Trust, Smallpeice Trust courses including Get Ahead with STEM and Salter Chemistry Camps.

Some useful websites

STEM careers information and resources at:

www.futuremorph.org

www.mathscareers.org.uk

Information for parents on careers and education at:

http://www.connexions–direct.com/jobs4u/

http://www.connexions–direct.com/parentcarer/

http://www.direct.gov.uk/en/Parents/Schoolslearninganddevelopment/HelpingYourChildToLearn/index.htm

http://www.bbc.co.uk/schools/parents/

Other STEM initiatives and careers information

Sites with a focus on girls www.wisecampaign.org.uk, www.wiset.org.uk and women in SET www.ukrc4setwomen.org and Computer clubs for girls http://www.cc4g.net/

Pharmaceutical careers http://abpi–careers.org.uk/giving–career–advice/parents–folder

Science information for parents http://www.planet–science.com/parents/

A focus on engineering careers and pathways into engineering www.enginuity.org.uk

A wide range of courses to promote engineering www.etrust.org.uk and www.smallpeicetrust.org.uk

Chemistry residentials www.salters.co.uk/camps

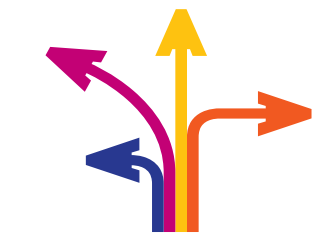
Widening participation into STEM www.getaheadwithstem.org.uk

Widening access to higher education: http://www.thelep.org.uk/home and www.stimulatingphysics.org , Chemistry for our Future and More Maths Grads are combining into one scheme www.stemprogramme.com

www.britishscienceassociation.org – festivals, CREST awards and science and engineering week www.stemnet.org.uk –STEM ambassadors and after school science clubs

www.24hourmuseum.org.uk a site promoting museums and heritage sites across the UK

A Department for Children, Schools and Families initiative to promote subject choice and careers in Science, Technology, Engineering and Maths (STEM) delivered by the Centre for Science Education at Sheffield Hallam University and VT Enterprise



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