

## **STEM Ambassadors: Preparing to develop employability skills through STEM activities**

Many activities and materials produced to support STEM activities with young people have explicit or implicit aims around one or more of the following:

- to enthuse young people about STEM content
  - such as exciting science experiments; designing and making novel objects or technological solutions; or novel mathematics activities
- to teach young people STEM content
  - such as an aspect of science; a science investigation; a design and technology-style project; an aspect of computing/coding; or how to use a specific piece of technology
- to inspire young people to follow certain STEM careers - by providing careers related information and examples
  - such as role models of workers in the field of STEM; or STEM Ambassadors explaining to young people about their jobs and careers
- to provide advice on STEM career pathways
  - such as the presentation of options and qualifications to become a certain type of scientist or engineer etc.

In these, employability skills development is often left out or poorly defined. For instance, young people may be asked to work in teams, use numeracy skills, solve problems or communicate their ideas in such activities, but the reasons for doing this in terms of employability are not prioritised or made explicit for the STEM Ambassador, or for the young people themselves.

It is hoped that this approach will support you, as a STEM Ambassador, through the process of preparing to deliver a STEM activity, and to focus on the development of young people's employability skills as they do this.

It is provided in two parts:

### **1. The importance of clarity of purpose in STEM activities**

This focuses on the inclusion of the top 10 employability skills as a reason to carry out an activity with young people, and to redefine its purpose in terms of a balance of STEM subject knowledge and content, STEM employability skills and STEM careers and opportunities.

### **2. Planning STEM activities**

In schools and colleges, effective teachers/educators know what they are trying to achieve; plan very carefully; draw on the skills of others; provide clear activities that prompt, challenge and support; check whether the learner has made progress; and reflect and look ahead to next steps. STEM Ambassadors can apply the same approach to be engaging, and at their best, inspiring.

## The importance of a clear purpose in STEM activities

What is the outcome you hope the young people will have?

As a STEM Ambassador, before doing anything else, it is critical to be clear on the exact purpose of any STEM activity you may deliver.

This helps you focus on what you are doing and why; sets expectations in the young person's mind; and allows them to work out for themselves what they are getting out of the activity.

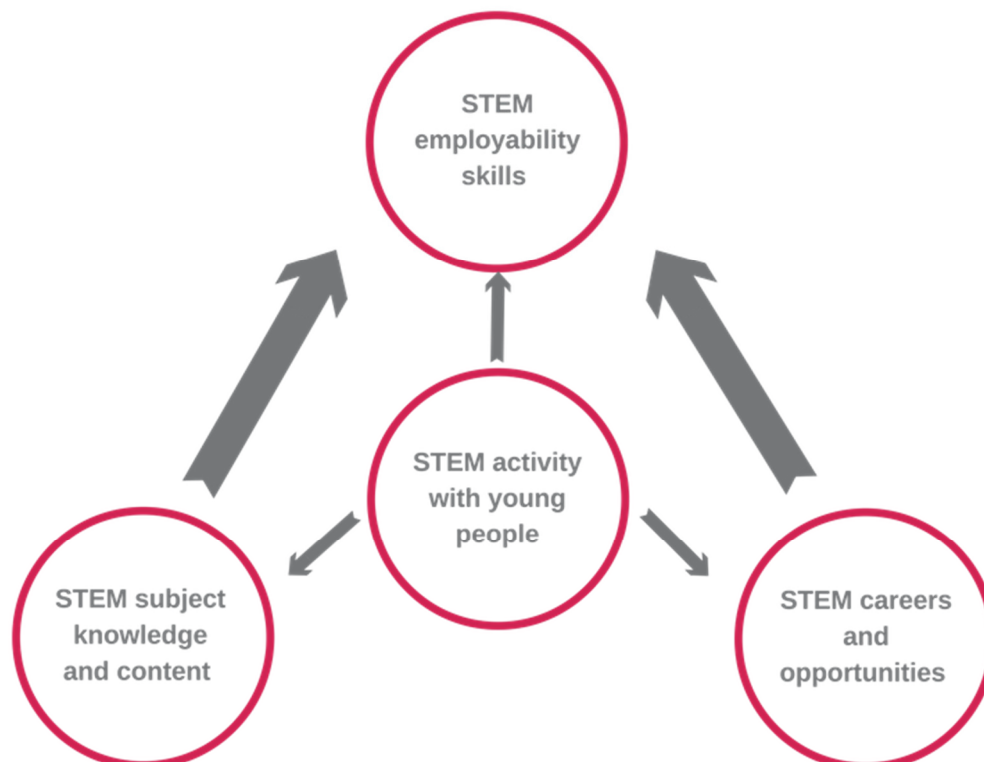
Broadly, the purpose of most STEM activities might have one, two or three of these elements:

1. **STEM subject knowledge and content** – to enthuse and teach young people about an area of STEM knowledge or to develop a STEM skill eg an experiment; design of a novel solution; a research and presentation project; using a specific piece of technology; learning about a novel or unfamiliar topic.
2. **STEM employability skills** – to develop the skills needed to make a person 'employable' (their knowledge, skills and attitudes, and how they present them to employers). STEM employability skills can be grouped into a 'Top 10' as follows:

How you work	<ul style="list-style-type: none"> <li>• using your initiative and being self-motivated</li> <li>• organisational skills</li> <li>• working under pressure and to deadlines</li> <li>• ability to learn and adapt</li> </ul>
How you work with others	<ul style="list-style-type: none"> <li>• communication and interpersonal skills</li> <li>• team working</li> <li>• negotiation skills</li> <li>• valuing diversity and difference</li> </ul>
How you think	<ul style="list-style-type: none"> <li>• problem solving skills</li> <li>• numeracy</li> </ul>

3. **STEM careers and opportunities** – to inspire young people to follow STEM careers by providing careers-related information and examples (eg job descriptions and career retrospectives) and advice on STEM career pathways to get there (such as, options and qualifications to become a certain type of scientist/engineer etc.)

**STEM employability skills can nearly always be developed in some way in most STEM activities:**



If you think an activity is mostly about STEM subject knowledge and content also ask yourself:

- which of the ‘Top 10 employability skills’ are also being developed in this activity – those that the school or college might not have the time or resources to focus on?

Example of STEM activity	Examples of possible key employability skills involved
<ul style="list-style-type: none"> <li>• design of a novel solution using a piece of software</li> </ul>	<ul style="list-style-type: none"> <li>• problem solving; numeracy; ability to learn and adapt</li> </ul>
<ul style="list-style-type: none"> <li>• a research and presentation project in groups, on the ways to prevent flooding</li> </ul>	<ul style="list-style-type: none"> <li>• using initiative and being self-motivated; communication and interpersonal skills; team working</li> </ul>
<ul style="list-style-type: none"> <li>• a “Dragon’s Den” style project to design a technological product, and ‘sell’ the idea in some way</li> </ul>	<ul style="list-style-type: none"> <li>• communication and interpersonal skills; negotiation skills; numeracy; working under pressure and to deadlines</li> </ul>
<ul style="list-style-type: none"> <li>• STEM club project to build a model car, over a few weeks</li> </ul>	<ul style="list-style-type: none"> <li>• using initiative and being self-motivated; working under pressure and to deadlines; team working; valuing diversity and difference</li> </ul>

If you think an activity is mostly about STEM careers and opportunities also ask yourself:

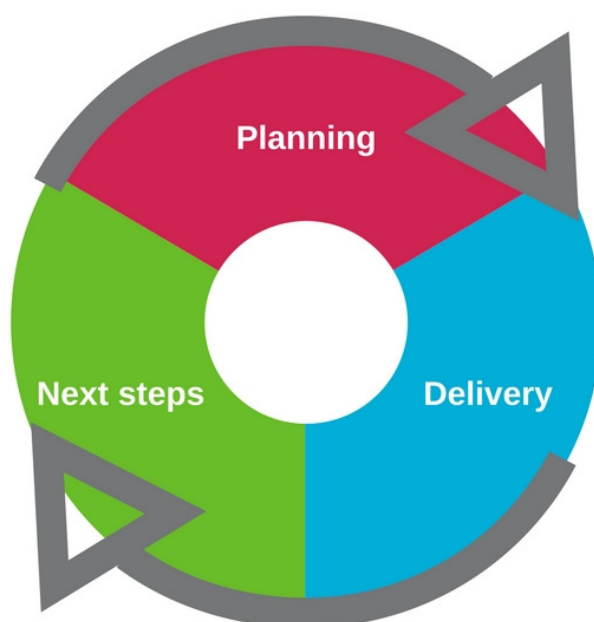
- which of the 'Top 10 employability skills' does your job use most, day-to-day?
- what did I do, in school, college or elsewhere, to develop these employability skills - and how did I show them when I applied for the job or further study?
- what sorts of things might young people be doing now, in school, college or elsewhere, to develop these employability skills?

<b>Example of STEM activity</b>	<b>Examples of possible key employability skills involved</b>
<ul style="list-style-type: none"> <li>• presentation from an engineer to outline what they do for a living and their career path to date</li> </ul>	<ul style="list-style-type: none"> <li>• instances of where any of the Top 10 employability skills were especially useful in the career</li> </ul>
<ul style="list-style-type: none"> <li>• presentation from a scientist about what their job involves, what they study, what they like about the job</li> </ul>	<ul style="list-style-type: none"> <li>• instances of where <u>any</u> of the Top 10 employability skills were developed in school, college or university, and how they are applied in the workplace</li> </ul>
<ul style="list-style-type: none"> <li>• mock interview preparation for STEM jobs</li> </ul>	<ul style="list-style-type: none"> <li>• interview coaching that draws out examples of where any of the Top 10 employability skills have been developed</li> <li>• interview questions that encourage young people to present their employability skills</li> </ul>

## Planning and delivery of employability skills using STEM activities

Once the purpose of the STEM activity is clear and how employability skills will be incorporated, what else do you need to think about when planning and delivering the activity?

Even if materials are prepared and provided by others, time is well spent thinking through in some detail the way you will actually run the activity itself. A three part 'planning – delivery – next steps' format can be used to prepare for the three phases of any STEM activity.




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### Planning

#### Involve the teacher/educator

The first step is to discuss the purpose of the STEM activity with the teacher/educator.

- what are they hoping a STEM Ambassador can provide that they can't?
- how does this activity fit with work they do in school, college or elsewhere?
- what experience can the young people draw on?
- how can this activity be made to feel relevant?
- explain to the teacher/educator where you think employability skills can be highlighted in the activity you are planning and obtain their feedback on the relevance
- what can the teacher/educator do to support during the activity?

**Clarify the purpose and outcomes**

Which specific knowledge, skills or attitudes do you want them to take away from the activity?

While it may be clear in terms of the STEM subject knowledge and content, or the STEM careers and opportunities, it is important to be explicit about which STEM employability skills you hope to develop through the activity. Eg one or more of these skills:

- using your initiative and being self-motivated
- organisational skills
- working under pressure and to deadlines
- ability to learn and adapt
- communication and interpersonal skills
- team working
- negotiation skills
- valuing diversity and difference
- problem solving skills
- numeracy

Do not try and tackle all of these in one session – most STEM activities lend themselves to developing a few skills well, rather than all skills poorly.

**Think of the delivery as a series of short episodes**

Good employability skills-related resources, and other STEM activity resources, usually provide timing estimates and step-by-step guidance about what to do.

Right from the start of the session, what will the young people be doing, when and for how long? What will you be doing at this time?

What will you all do next? ...and after that? ...and after that?

Is it a too much of one type of activity? (Eg too much listening to you talk, looking at slides, reading?)

'Chunk up' very long activities where you can. Think in minutes.

It is a good idea to build in some contingency time for the unexpected.

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**Delivery**
**Engage from the start**

How you start really matters – introducing yourself, setting the scene, and then perhaps providing a question, image, object or problem to solve, to try and 'hook' the attention of as many as possible.

**Convey your expectations and outcomes**

You want them to be able to answer the question that they will ask themselves: Why might this be important or interesting for me, now?

Do not assume that young people will appreciate the importance of employability, or what a specific term means. The 'Top 10 employability skills' documents and resources suggest words to use to help explain this. Eg for negotiation skills:

- you think about what other people want and need, as well as what you want and need
- you 'give and take' fairly when working with other people, so that everybody feels like it is a 'win-win' situation

Express your expectations by phrasing it to the young people as an outcome eg:

- "what I'm looking for from you throughout this activity, is..."
- "what I hope to see by the end of this activity is ..."
- "by the end of this activity, you should be able to..."
- "to be successful in this activity, you will have to..."

A negotiation skills outcomes example could be:

What I'm looking for from you is:

- you can appreciate another person's needs
- you can use the language of compromise to negotiate successfully

STEM subject knowledge and careers related outcomes can be expressed in similar ways. Some activities involve setting and using criteria to meet a standard, or to be judged highly in a competitive situation. It is good practice to explicitly share these with young people before they begin, so they can see the standards they are aiming for.

**Manage the STEM activity itself**

How will you try and involve all of them?

How will you give instructions?

How will you group them, if needed? How big will each group be? Will they choose their own groups or will you?

How long do you expect each part to take? Give relatively short time targets. How will they know how long they have?

What will you do while they are working on something?

What will be the balance of observation and support?

What will you do if they have too much time? What will you do if they run out of time?

**Involve the teacher/educator**

What can the teacher/educator advise you about the *individual young people*? This is especially important when considering the skills involved with 'how you work' and 'how you think' eg:

- using your initiative and being self-motivated
- organisational skills
- working under pressure and to deadlines
- ability to learn and adapt
- problem solving skills
- numeracy

What can the teacher/educator advise you about any grouping or team work? This is especially important when considering the skills involved with 'How you work with others' Eg:

- communication and interpersonal skills
- team working
- negotiation skills
- valuing diversity and difference

What can the teacher/educator do to support you in meeting your intended outcomes? What ideas does the teacher/educator have on what they could do to support you?

What does the teacher/educator need to do that you can't? (Eg discipline, safety, equipment, register)

How will they know what you need them to do?

**Next steps**
**Consolidate and plan ahead**

You want the young people to remember their work around STEM employability skills as much as STEM subject knowledge or careers.

Refer them back to the intended outcomes – remind them what the whole purpose of the activity was eg if the intention was to develop certain employability skills, in what way have they been doing that?

Can they self-assess against the intended outcome or other criteria? Some STEM employability skills and other resources include reflective tasks to support the young people in doing this.

You could draw on your own experience of how certain employability skills are involved in your work, day-to-day.

You can ask them and discuss:

- what are they good at now, what do they need to work on? How do they know?
- what might they do next?



