
Royal Air Force
STEM
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Royal Air Force STEM

Introduction

The RAF is a highly technical force and every role is a Science, Technology, Engineering and Maths (STEM) career choice. Building STEM capacity in the emerging workforce is critical to developing the Next Generation Air Force. As an RAF STEM Ambassador (RAF SA) you are uniquely placed to support this work by engaging with young people, encouraging and inspiring a passion to study STEM subjects whilst contextualising STEM learning within the RAF workplace.

Working with young people is a highly rewarding experience and we are sure that you will get as much out of this program as the children with whom you work. This guide aims to provide support and direction to assist you in delivering successful STEM activities to young people.

Why do we need STEM Ambassadors?

In 2016 the Government "committed to ensuring the UK remains at the leading edge of science, research and innovation". Unfortunately, there is a growing shortfall between demand and supply within the STEM workforce. It has been identified that the greatest decline of interest in STEM study and careers happens between the ages of 10 and 18, with a particular drop in interest from young women and people from minority backgrounds.

London's Kings College pioneered the concept of STEM Capital. Their research shows that most students find science interesting and that their science capital is comprised of what they know, how they think, what they do and who they know. Everybody has different amounts of Science capital and this knowledge, attitude, skill and experience affects how young people view STEM subjects and careers. RAF SAs can help to positively influence a young person's STEM Capital by inspiring and influencing them to continue with study of STEM subjects. This will ultimately improve the lives of all children and encourage more students from a diverse range of backgrounds to pursue STEM careers.

Careers Advice In the UK

A Gatsby review of careers advice in schools mandated that all schools have to implement eight benchmarks by 2020. These are:

1. *A stable career's programme.*
2. *Learning from career and labour market information.*
3. *Addressing the needs of each pupil.*
4. *Linking curriculum learning to careers.*
5. *Encounters with employers and employees.*
6. *Experiences of workplaces.*
7. *Encounters with further and higher education.*
8. *Personal guidance.*

RAF SAs can provide a lot of support with schools meeting Benchmarks 4, 5 and 6.

Every role in the RAF utilises STEM skills. Key lines to take when talking with teachers and students about what you can offer to support STEM include:

The RAF encourages development of personal skills. You can help students build skills including problem solving, team building, communication and resilience.

The RAF has opportunities for all, no matter their educational background. For students interested in an RAF career we offer apprenticeships, scholarships and bursaries.

Personal development continues once you are in the RAF. You are supported with opportunities to gain accredited academic qualifications at GSCE, Degree and Masters levels.

RAF STEM Support

The RAF College Cranwell HQ has a dedicated Youth and STEM (Y&S) Team. The Team is headed by an SO1 and has 3 key aims:

To provide policy and guidance on all matters Youth and STEM, including engagement with Govt and other civil sector STEM providers and organisations. They are responsible for the RAF Youth STEM Engagement Strategy and the GAI 1061 that governs administrative, financial and logistic support to RAF STEM and Youth activities.

To deliver an annual national programme of STEM events. The programme includes large scale events such as Big Bang Festival, regional Multi-Actvity Days (MADs), support to Uniformed Youth Organisations and in-school STEM events delivered by our educational partners. As an RAF SA you will be invited to volunteer to support nominated events within the national programme.

To provide support to RAF SAs
.The SO3 STEM Coords are established to provide direct support to RAF SAs to enable effective delivery of STEM activity both on and off Unit.

Why be an RAF STEM Ambassador?

Becoming an RAF STEM Ambassador is rewarding in so many ways:

Challenge

It is fun to work with young people. Bringing learning into real time understanding of problems is exciting and you will be amazed at the innovative interaction you will have whilst teaching young people. Planning and delivering STEM workshops will be a contrast to your primary duty and the children's enthusiasm for what you do will often reflect on your own passion for your chosen career.

Relevant Experience

You do not need to be an RAF Engineer to be an RAF SA. Whatever your Trade or Branch you have relevant STEM-related experience to bring to the classroom. From managing finances to problem solving, map reading, first aid and military planning you can relate your RAF experience to science, technology, engineering and maths.

Personal Skills

All STEM activities provide you with further opportunities to develop your personal presentation, communication, organisation, leadership and mentoring skills. As members of the RAF your ability to break a task into easy to understand parts, speak to a room of people and enthusiastically engage with a wide and diverse audience will all be of use when working as an RAF SA.

Enhanced profile

On completion of your STEM Ambassador training you will be awarded a JPA competency. In addition, further opportunities exist for CPD on specific STEM equipment and delivery skills. As STEM activities must be supported by your Line Manager comment on your output and performance as an RAF SA can be included in your annual report.

Mythbusting

Many members of society have little or no experience of the Armed Forces and can have very distorted opinions about who we are and what we do. You can teach young people and teachers about our role and the many skills that are required to allow us to fulfil our mission.

How to become an RAF STEM Ambassador

Register with STEM Learning at: https://www.stem.org.uk

When creating STEM profile ensure the following:

1. **Employer Box set to 'Royal Air Force'**
2. **Grey 'Share Information with Employer' box is ticked**

Complete STEM Learning online Induction Module

Local STEM Learning Hub will forward a link to the Govt DBS website so you can complete a DBS Application (PVG in Scotland).

Please note DBS' are setting based so even if you have one for other youth activities you will still require one as an SA

Complete your DBS Application.

Select External Verifier for your ID checks and nominate a WO or Off at your workplace to whom you can easily present your documents for checking.

(Three pieces of ID are required. Most common used are Mil ID, passport and driving licence. Process takes from 3-6 weeks once application submitted. DBS certificates will be forwarded to you in the post and your STEM Learning profile will be updated with cert no and expiry date. (Ensure you sign up for the update service within 30 days!))

Complete the Safeguarding Children Induction L1 Cse available on DLE

Email info below to your Stn STEM Lead and CRN-College-HQ-RAFYouthSTEM-SA1:

Service No

Screenshot of STEM Learning Profile showing DBS Cert No and issue date

Screenshot of completed cert for Safeguading Children Induction L1 Cse on DLE

S03 RAF STEM Ambassador Champion will award:

JPA Competency (Lifed to DBS expiry date)
STEM Polo shirt and Fleece

Password to access Ambassadors private area on the RAF STEM Website (https://rafyouthstem.org.uk)

Planning a STEM Event

The primary target audience for RAF SAs is young people in KS2 and 3 (aged 8 – 14 years), although you can deliver STEM activities for young people aged 14-18.

Most Stns have an active STEM team who will conduct an annual programme of activity at local schools and events. Your team should be your first point of contact when selecting a school or group to interact with as they can guide you on where they wish to focus effort and build up relationships in your region. Personal links and existing contacts im schools are a great way to initiate a STEM event.

Your STEM Learning Regional Hub will also provide you with a newsletter detailing opportunities to engage in non RAF STEM activities.

Know your audience.

Knowing your audience will help inform much of the planning for the day. Consider who you want to attend and communicate this clearly with the school. Is it a girl only event - do you need to limit numbers (e.g. Coding Club). Take time to ensure you know the size and ages of the group you will work with. It is important to be inclusive including whether or not you need to make any provision for students with Special Educational Needs or Disabilities (SEND).

Catering for different age groups doesn't necessarily mean different activities. Many activities can be adapted. Consider the length of time it might take different age groups to complete a given activity and if they will require adult support.

England and Wales operate five Key Stages (KS) of learning :

Primary School

KS1 - Year 1 & 2 (4 -7yrs)
KS2 - Year 3 - 6 (7-11yrs)

Secondary School

KS3 - Year 7 - 9 (11 -14yrs)
KS4 - Year 10 - 11 (14 - 16yrs)
KS5 - Year 12 - 13 (16+) (*Note can be completed at College)*

Scotland operate five levels of learning:

Primary School

Early - Pre-school & P1 (4 - 5yrs)
First - P2 - P4 (6 - 8yrs)
Second - P5 - P7 (9 - 12yrs)

Secondary School

Third & Fourth - S1 - S3 (12-14yrs)
Fifth - S4 to S6 (15 - 18yrs). *(Note Yrs S5/ 6 are not mandatory)*

Delivering a STEM Event

When planning a STEM event there are a number of factors to consider. Below are some pointers to assist your planning.

ID

When visiting schools, you will be required to show and carry photo ID and present a valid DBS certificate. Schools are required by law to check this but will normally only do so on your first visit.

Mobile Phones

Most schools will not allow personal mobile phones in lessons. Check the school policy and obtain permission if you are on call and need to keep your phone on you.
Do NOT take photos of STEM activities on personal mobile devices.

Car Parking

Many schools will not have access to Car Parks. Call ahead to confirm access for loading/unloading of equipment for STEM events.

Travel and Subsistence

All RAF SA activity is covered under GAI 10 61. RAF SAs are to familiarise themselves with this document and apply for travel and subsistence accordingly where required.

Space

Decide what type of space you need and find out what is available – hall, classroom, outside or a combination. Will participants require tables/ chairs? What about a gazebo to shelter from sun/rain?

Teacher Support

Establish early on with teachers/ group leaders the amount of support they will be expected to give during an activity. Be clear that the behaviour of the students is not your responsibility and that a member of school staff or a group leader must be present at all times. If children with additional needs are participating, discuss who is providing that support and how the child can be included in the activity.

Facilities

What other facilities will you require? Access to toilets and hand washing, water, power, internet, whiteboard, PowerPoint?

Resources

Aim to take along all resources you require including banners, handouts, activity equipment and stationery. Schools can often be short on basic supplies such as paper, scissors, glue, pencils so check before assuming these will be available.

Planning Activities

An important part of STEM outreach is hands-on learning. Young people have a natural curiosity and can develop a creative approach to problem solving and idea generation via practical tasks. The RAF STEM Website has ready-made activities that you can download and deliver using STEM equipment that is available from your Stn or HQ Y&S. Many activities can also be completed using everyday items such as tape, glue, scissors etc.

Delivering STEM Event Top Tips

Keep explanations of tasks simple. Use inclusive language and avoid military jargon. Check understanding regularly.

When presenting to a large group, ask all the children and teachers/support staff to sit down. Children will focus on you better if you are the only adult standing.

**Encourage creative thought by using open leading questions such as:
How could you?
why and when could you?**

Encourage self-evaluation to move students forward on the activity. Don't be tempted to give them the answer, do things for them or assume they can't do them. Praise them for their problem solving strategies, perseverance and overcoming obstacles.

Accurate time planning is essential to success. Plan for less time but have a back-up and extension activity in case some young people finish early. Make sure you allow time for reflection and tidying up at the end of the activity.

**A student's lack of confidence can lead to questions such as " is this right?" or "Shall I put that there?".
Encourage the student to answer their own question by asking
"How can we test that?"
or "What do you think is right?"
or "Let's see what happens if we do that?"**

Try to keep teaching by talking to a minimum. Get the students involved in planning and making as soon as possible.

Role model STEM as Gender inclusive. Often girls may be shyer about getting involved or be more unsure of their ability in the activity. Talk to them about the tasks you have worked on with women colleagues or use historical role models to highlight women who have achieved amazing things in STEM.

Use of icebreaker games/challenges to get everyone involved works very well in Secondary settings.

**Use a code for 'quiet': especially in Primary. Many students will be used to a non-verbal signal for quiet attention - such as a series of claps the children repeat. Ask the children what they normally use and get them to teach you as a trial run! Then use as required to bring attention back to you.
Don't try to talk over children who are talking but focus on praising those who are listening and sitting quietly.**

STEM is NOT a recruitment activity, but you are encouraged to talk freely about your day to day job and role. Discretion and diplomacy should be used to deflect or redirect questions that focus on operational locations and experiences that could cause distress to other students. All questions about current recruitment opportunities should be referred to the RAF Website.

RAF STEM Website

The RAF has a dedicated STEM website https://rafyouthstem.org.uk. All RAF SAs will be issued a password to access an RAF SA only area of the website that allows you to exchange and share information as well as access resources, requests for volunteers and record your STEM activities.

Resources and Equipment

A large range of both industry and STEM Ambassador designed resources are hosted on the RAF STEM Website under the 'resources' and 'links' tabs. In addition, the HQ Y&S team hold a variety of STEM equipment that can be loaned to support your event. RAF SAs may submit bids for new equipment via your Stn STEM leads. We are always keen to hear about new resources you have designed and new STEM equipment you are interested in using during activities.

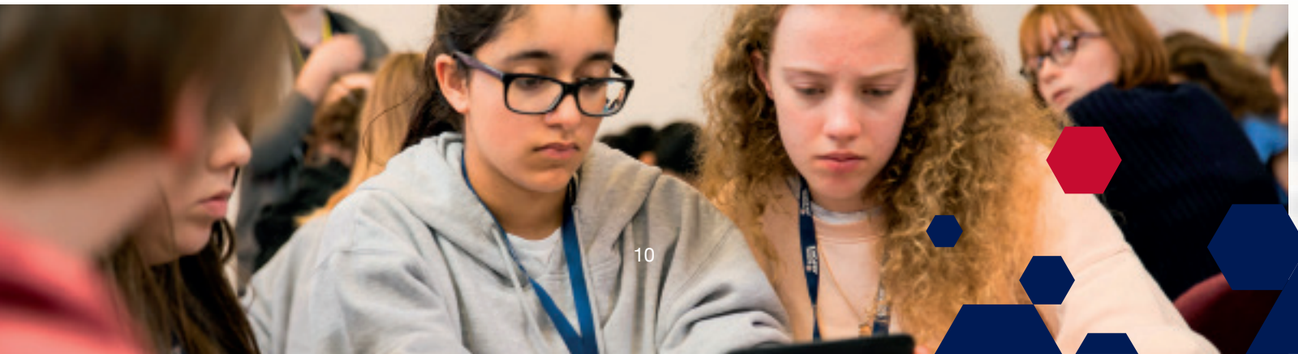
STEM Activity Ideas

There are many ideas for STEM activities available online. Take your time to choose one that you feel comfortable to deliver, and where possible, draws on your own knowledge and RAF experience. Both the RAF STEM and STEM Learning websites host a range of preplanned, curriculum mapped activities that are free to download with supporting student and teacher guides. Some activities require use of specific equipment that you might find within your Stn STEM team or can be loaned from the RAF Y&S Team at Cranwell; but many use everyday items found at home or in school. RAF SAs are encouraged to develop their own bespoke STEM activities where you wish to. The SA Co-ords are very happy to discuss concepts and provide resource help where appropriate. If you create your own STEM lesson or content we would encourage you to share it with other RAF SAs via the RAF STEM Website.

Recording Events

All RAF STEM activity must be recorded on the RAF STEM Website. The data is captured for management reporting and is shared with STEM Learning to ensure your profile remains active. Please check with your Stn STEM Team as they often have a coord who inputs data for team events. However, if you are operating an independent event you will need to upload the data yourself. The HQ Y&S team will input data for any support you provide to one of their programmed events.

Please note that you may still upload your activities to the STEM Learning website direct - that is an individual choice.



Social Media

Social media is a great tool that is heavily used to target and inform large audiences of both young people and their gatekeepers. Here are some do's and don't's:

You must have parental permission to take/ use photo/film of people under 18 yrs and be able to discreetly identify those young people who do not give consent. Where you do not have permission consider taking non-identifying photos to give an impression of the day (e.g photo the activity from behind the children over their shoulders.

Best practice is to ask the school or adult chaperone to take photos during the event and share them with you afterwards as they should always know which young people have permission for photos to be taken. Do NOT use your personal camera/ phone. If you do require photos use your works or book your Stn photog for events held on Unit.

Share relevant hashtags and social media handles with the teachers/responsible adults so they can share the day with parents.

Do NOT exchange any personal social media details with young people under any circumstances.

Platforms we use are (note # is a label that helps people search for relevant information and photos. A @ address takes you to a specific place)

Twitter @rafyouthengage

Facebook Royal Air Force Youth Engagement Team

Instagram raf_youth_stem