

Toolkit for Organising Routes through Education Events in Schools

Introduction

It is generally agreed that the UK does not produce sufficient people trained in physics, engineering or technology to meet the needs of the economy in the 21st century. As a consequence, a great deal of attention has been focused on the careers advice given to children, which is generally agreed to be, at best, patchy. One response has been to initiate projects that highlight jobs in the shortage areas, essentially using literature and role models to highlight particular jobs, usually to students in their early teens. However, this approach is questionable for a number of reasons, amongst which are:

- Young people of that age often have unrealistic but highly aspirational ambitions; a focus on specific jobs is likely to be counterproductive particularly if only technical jobs are illustrated. Such work is likely to exacerbate the common view that arts subjects offer more opportunities than science subjects;
- For many students an actual job might be almost ten years in the future, so a focus on individual jobs is not always appropriate;
- If role models do not match a student's self-image, they are as likely to deter students as to encourage them.
- Advice has to be matched to the individual's needs and abilities. Students lose respect for any type of guidance if it is clearly not applicable to them.
- Parental influence, positive or negative, is a major factor in determining career directions and interventions that do not involve parents will have much less impact than those that do.

It is difficult to address all these issues, but it is important to realise that what really matters to students and their parents is the next step on the educational ladder and to understand that choices made at 14 and particularly 16 can make a significant difference to possible career directions available later. Similarly, it is wrong to provide guidance such as "if you choose physics, you can become a civil engineer" without also pointing out that "you can also become a lawyer, a journalist, or an actor."

In this brief report, we provide a toolkit, based on work associated with two, school-based projects in which the Institute of Physics worked with staff to offer *Routes through Education* events for parents and young people. Feedback was very positive and the toolkit has been put together to help schools run similar events. We carried out four different events in total and learned a great deal from each one.

The events were focused both on STEM-based careers and other areas (e.g. law) that our project had identified as popular choices for pupils in the schools. A review of the literature (www.iop.org/publications) and our own student surveys showed that many young people have a very limited view of the types of careers that are available to them, particularly in STEM subjects, and cannot see themselves as a scientist in the future despite having positive views about science in general.

If this is something new to a school, remember engagement may be slow and quiet to start with. It takes time for parents and staff to get used to this kind of event but if they are seen to be useful, they can become regular and well-attended events in a school calendar.

Aims of the events

- To provide information for pupils and parents about the routes available into different careers;
- To highlight the varied number of careers available for those with STEM qualifications;
- To show that STEM subject choices do not close off other career choices;
- To create links between the school and local employers and higher education institutions;
- To provide information about the appropriate subjects and grades needed to enter different courses and/or careers;
- To provide local role models from a wide range of careers and who have a STEM qualification;
- To provide information about applying to university including bursaries and scholarships etc., particularly for children in families without experience of HE.

Key messages will depend on the demographic, aspirations and age of your target audience so these will need to be tailored to your school but may include:

- If you are not sure what you want to do, choose subjects that keep your options open
- Starting salaries and future earning potential of people with qualifications in STEM/physics exceed those in other areas.
- Some A-level subjects are valued by universities for a wide-range of subjects; these *facilitating subjects* include physics and other sciences. See Russell Group report, *Informed Choices*, for more information: <http://www.russellgroup.org/InformedChoices-latest.pdf> .
- Employers do not necessarily see all degrees as being equal: prospective students should think carefully about the subject and university they choose. Choosing A-levels is an important step on this road.
- The importance of coherence of A-level choices, for example taking maths alongside physics or other sciences
- STEM qualifications can offer routes into many careers including law and finance
- There are good employment prospects for those with STEM qualifications
- Physics qualifications are respected by universities and employers as developing valuable transferable skills.

Recommendations

Events for pupils and parents based around career pathways and the different routes through education should ideally include:

- A range of local people, preferably school alumni, in a variety of different jobs; with time for extended conversations with pupils and their parents
- Different routes in to university and employment (including those taking vocational courses)
- Advice on university fees and paying them back, bursaries, prizes, fellowships and other funding opportunities that are available for study post-16
- Information about opportunities for paid, relevant work during holidays
- Information in a range of different formats
- Opportunities to raise awareness of parents' influence in shaping their child's aspirations

Planning

A planning team

Put together a planning team who can plan the event and share out the necessary tasks. Plan the dates for the events as far in advance as possible and start contacting exhibitors as soon as you can. The more notice you give them the more likely they will be able to attend. A minimum of 8-10 weeks is needed to allow time to contact exhibitors, await replies and prepare marketing materials, but if this is spread over a longer period, it reduces the pressure on the organising team.

Members of the planning team could come from the following areas of the school:

- Science department
- Design & Technology/Engineering department
- Gifted and Talented/enrichment staff
- Work experience/work related learning coordinator
- Information, advice and guidance (IAG)/ careers advisor.

Someone with the authority to authorise use of space/staff/students etc. should be on the planning team.

An initial planning meeting can be used to arrange event dates, decide the target audience and allocate initial responsibilities within the group. After the meeting, an action plan (see appendix) can be circulated so everyone is clear on their role and the date for the next meeting should be set. For the first event, about 4-5 meetings will probably be needed with fewer, shorter meetings for later sessions. These meetings should be used to report on progress and flag any potential concerns so they can be resolved.

Format of the event

Decide on when you will run your event. Will you run it alongside another event in-school or offer it to a targeted group of pupils as a standalone event? Whatever the format, the event needs to take place in an environment where parents and pupils feel comfortable and are encouraged to ask questions. It is always helpful to start with a brief talk to the families about the exhibition and to prime them on the types of questions they might want to ask.

Alongside an existing event

The Routes through Education event runs alongside an existing event that parents and pupils are invited to; for example:

- Y8/9 options evening (when pupils choose their GCSE or equivalent options),
- Post-16 open evening (where Year 11 pupils are invited to consider the sixth form courses on offer)
- Year 6 prospective pupil event.

Advantages: parents and pupils are likely to attend and be receptive to advice on career choices etc. Attendance is likely to be higher

Disadvantages: RTE becomes lost in the main event; people might not have time to visit the exhibition.

As a standalone event

Invite a targeted group of pupils and parents to a special after-school Routes through Education event.

Advantages: Allows time for an introductory talk and primes families to ask the right type of questions to the exhibitors that are attending. Specific groups (such as low SES groups can be targeted)

Disadvantages: attendance might be low, although that risk can be countered to some extent with well-targeted publicity.

One model that we found did not work as well was a Routes through Education event alongside a whole school parent-teacher meeting day. There was some interest but we suspect pupils and parents thought the event was 'not for them' but for another year group. Also families were only 'popping in' for their meeting so not in the right frame of mind to visit the exhibitors and talk to them. Again, proper marketing may be able to overcome the issue but it is clear that many parents do not always feel comfortable in the school and real efforts are needed to make them feel welcome.

Choosing themes

School communities differ in their aspirations and interests. One way to start contacting exhibitors is to choose career themes based around the interests of the pupils at the school. Then you can try and contact exhibitors to fit into the themes. In our case, we wanted to highlight the usefulness of STEM qualification for a range of different careers so we chose careers where post-16 qualifications in physics (or other sciences) would be look upon favourably.

Examples include:

- Music
- Sport
- Health/medical science/pharmaceutical
- Engineering
- Law
- IT including computer games
- Teaching
- Finance
- Renewable energies/climate change/weather
- Astronomy
- Research/Academia

Additionally, local universities often have recruitment and/or outreach departments that will be willing to come to your event. They are normally very good at answering general questions that families have about going to university and the specific courses on offer at their institution. You may also want to contact specific university departments e.g. physics or engineering as the staff and/or students in those departments may be able to bring along equipment and activities linked to their field. We also made sure that at least one of the exhibitors was knowledgeable about routes into and from apprenticeships, as there are many misconceptions about these training pathways. Exhibitors that have interactive displays tend to be more appealing.

Contacting potential exhibitors

Most organisations we contacted were happy to help but it can be difficult to find the right contact in an organisation. A template invitation email can be found in the appendix for you to alter and send out.

To help us find exhibitors we asked:

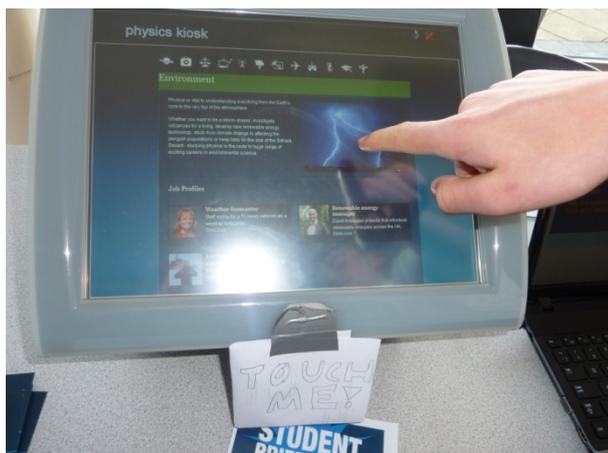
Routes through Education toolkit, November 2014



Example of exhibitor's name badge

- Existing contacts such as friends and family in different organisations to either help themselves or point you in the right direction of someone who can.
- Newcastle Science City initiative (local to one of the schools)
- Our regional STEMNET.
- Local universities - student recruitment, science outreach teams or science ambassadors as well as physics departments
- Local engineering and science-based companies. Note that such events can be very useful to engineers in maintaining their chartered status.

Exhibitors were more apprehensive about attending the events for younger pupils. However, research suggests that this is the time when pupils need access to relevant careers information and is also when their aspirations are relatively high across the board but more realistic than at primary school. Offering Routes through Education events across the school allows parents and pupils to get used to the idea of the events and become more confident in attending them and approaching exhibitors.



Touch screen 'physics kiosk' from the Institute of Physics

It is important to have people who can interact with families in an appropriate way and that you try to maintain diversity to reflect the local community. In some instances we (politely) turned people away as they only wanted to present a standard slide show. It is important to manage the expectations of the exhibitors so they know they will be expected to encourage people to come to their

stand and to talk about how they got to their job as well as about their field of work in general. Feel free to give people suggestions of activities they could bring and keep track of what different people are bringing so two people don't bring the same thing.

We had representatives from the following companies and organisations at the events we held in Newcastle:

- Representative from student recruitment department/ Raising Aspirations Partnership (A joint partnership between Newcastle, Northumbria and Sunderland Universities)
- STEM Graduate ambassadors from Newcastle University
- Physics department at Northumbria University
- Food science department at Northumbria University
- STEM PhD students and outreach team at Durham University
- Physics department at Durham University
- Medical physicist at Newcastle University and NHS
- Engineers from a large engineering firm with a local office (Arup)
- Engineer from Engineering Development Trust (talking about apprenticeships)
- Sunderland Software City
- Royal Navy
- Local law firm (Muckle LLP)
- Local GP
- Institute of Physics (regional officer)
- Institute of Civil Engineers
- Proctor & Gamble
- STEM Ambassadors
- Connexions

On reflection, this list probably contained too many overtly STEM occupations and it might be a good idea to include a broader range of more general careers, albeit offering representatives with STEM backgrounds.

Most exhibitors will be supporting events on a voluntary basis, possibly outside of their normal working hours, so it is necessary to ensure they are well looked after and their expectations of the event are clearly managed. If the event is after school, most people will come straight from work so will not have time to eat. Providing light refreshments such as sandwiches and tea and coffee will be very much appreciated.

Exhibitors need to be carefully briefed so they know what is expected from them. They should be ready to answer questions about what they do on a daily basis, what routes there are into their career (or similar field) and they should bring some props or an activity to encourage people over to their stand.

Let them know details about:

- What time to arrive in order to set up (about half an hour should suffice) and if there is space for them to bring pop-up stands and banners etc.
- If there is somewhere secure they can store valuables
- What time the event starts and when you expect it to finish
- If you will provide any refreshments and what will be provided. If you cannot provide refreshments, let them know if they can eat their own food on site.
- Where they can park
- Directions to the school (please check where your school postcode brings people as if often is not to the car park!)
- The approximate numbers of visitors you expect
- The age of the pupils
- The reason for the accompanying event (if applicable) for example if it is a GCSE-options evening it can be helpful to provide some stands with a copy of the different pathways available to students.

See Letters in appendix: invitation and details

Exhibitor activities

In schools where pupils and parents are shy, props or activities can really help to break down barriers and encourage conversations. We found the following activities worked very well:

- Simple props such as colour changing mugs
- Real pieces of equipment that people can try (e.g. medical equipment)
- Short experiments e.g. handwashing effectiveness
- Activities and challenges e.g. building from spaghetti and marshmallows
- Giveaways such as pencils, stickers (although the activities were better)

Powerpoints, ipads and quizzes were not as effective at engaging pupils and their families. Some activities are more suited to younger age groups (e.g. spaghetti and marshmallows for Year 8 rather than year 11).



Physics lecturer from Northumbria University, experimenting with hydrophobic "magic" sand



From left to right: Medical physicist from the NHS using equipment to detect nerve impulses, PhD student from Durham University with chemistry based props, Food scientist from Northumbria University with a range of short experiments.

Event promotion

As soon as possible, confirm a date and the physical space you can use and start contacting exhibitors. The more notice you give them, the more likely they will be able to attend.

Once you have confirmation from exhibitors, you can find out their IT requirements, book refreshments and create a list of exhibitors for any marketing information. If the budget allows, order tea, coffee and sandwiches for the exhibitors, staff and student helpers and tea/coffee and maybe scones/biscuits for the parents. Depending on the school community, you may need to provide translations of printed materials in other languages.

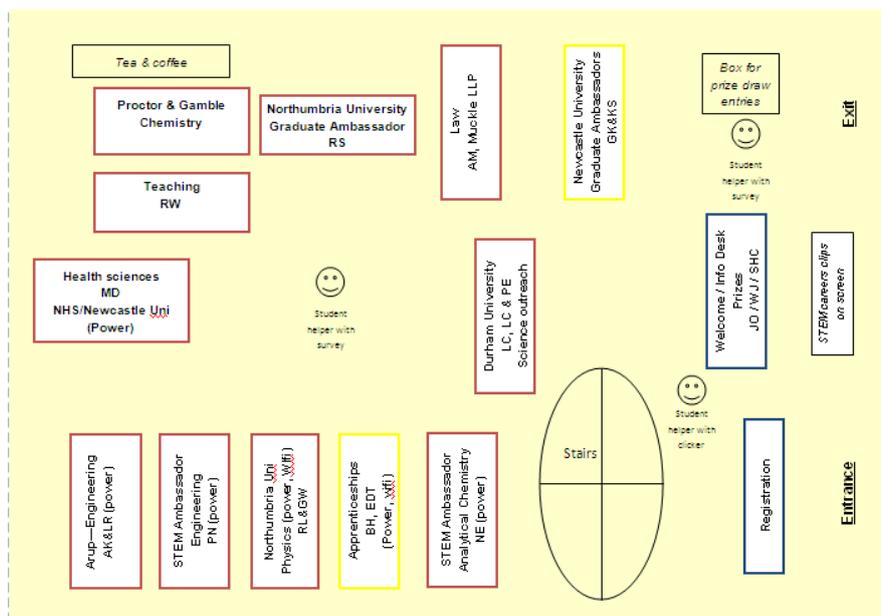
Marketing leaflets for two of the events and the reverse side with a list of exhibitors.



Layout of the area

Plan the layout of the space. We used a large dining hall with round tables. Be careful that the tables do not become a barrier between the exhibitor and the visitors. When laying out the stands consider who needs access to a socket and who needs WiFi as this may influence where they can be placed. It is better to arrange a natural pathway through the stands rather than having them randomly placed. If you can put refreshments for parents at the back of the hall, people are more likely to visit the stands.

If exhibitors cannot use their own computers (for connecting to the internet) are there school machines that they can use instead? Check that any websites exhibitors want to use can be accessed through the school's internet security settings.



Floor plan of exhibitors including power socket requirements

are accessed through the school's internet security settings.

There are also some useful careers based websites and DVDs that you may want to make use of if space/IT requirements allow. It may be worth contacting different professional bodies who can often send careers posters and leaflets that might be useful, especially if you cannot get an exhibitor from a certain subject area (see appendix for a list of useful resources to get you started).

Arrange for staff and student helpers to be available on the night. We used students from years 9 & 10 as helpers. Make sure they know what time to arrive so you can brief them before the event starts.

Gathering feedback

To monitor the success of the event and find out what else pupils and parents would like in the future, a simple feedback form can be used. To encourage families to visit a number of stands, the student sheets had a number of boxes where they collected a stamp from each stand they visited. If they collected a certain number of stamps they could enter a prize draw. By making a note of the stamps at each stand, we had a useful way of tracking which stands were visited.

A simple tick-box questionnaire can be used to gather feedback from parents; again, completed forms can be entered into a prize draw. We found having separate pieces of paper with a student prize and a parent prize worked better than having them double sided. The prizes were placed near the entrance and their visual appeal caused people to stop and ask what they were for.

The student form consisted of a blank table for collecting stamps from the exhibitors. The parent feedback forms had a few statements for them to tick whether or not they agreed with them. We thought about the aims of the event and created statements to try and see whether we had met the aims. Statements included "I enjoyed the event" and "I found out about types of jobs I didn't know about before". Ensure you use simple language and straightforward grammatical constructions.



Prizes and boxes to enter completed forms at two of the events

Signage for the exhibition area

We printed and laminated A3 signs with subject headings on to help visitors know what each stand was about. Example questions were also put up around the room. These were printed and laminated on A3 paper.



A few days before the event

- Send a list of attendees to reception if necessary
- Create name labels for the exhibitors, staff and student helpers
- Print out the feedback forms and prize draw forms, print out exhibitor feedback forms (one per stand)
- Some larger organisations bring their own signage, tablecloths etc, but others have nothing, so provide as necessary
- Confirm numbers for catering

The day of the event

- Set up the hall and arrange the tables; put table cloths on the tables; add signs to the tables e.g. science, engineering, Health sciences etc. Set up a welcome table near the entrance with prizes and feedback forms
- Brief the student and staff helpers and allocate jobs

During the event

Jobs for staff and student helpers during the event:

- Counting visitors: 1-2 people using clickers to count people coming into the exhibition
- Photos: ask helpers to take pictures of exhibitors and visitors – ensure you delete photos with faces of children unless you have permission to use them.

- Futuremorph website: this is a good website with lots of STEM careers information. Have a couple of helpers nearby to help people use this or other relevant websites (see appendix for list of useful resources).
- DVD screening: a large screen showing a relevant video helps to add atmosphere to the space and encourages people to come in. The IOP has a careers DVD that can be used for this (see appendix for list of useful resources).
- Parent feedback forms: student helpers could ask parents more detailed questions and fill in the questionnaires on their behalf. They will need to be briefed on the questionnaire beforehand.
- Give directions to visitors if necessary: have a few student helpers at various places around the school or entrance to direct people into the exhibition – this is particularly useful if the event is running alongside something else.



Student helper directing visitors to the Routes through Education event

Collecting feedback

Numbers attending

Decide whether to count absolute numbers or family groups.

We had two people (student helpers and/or staff) using clickers to count family groups as they entered the exhibition area. We then took an average of the numbers they clicked in (they were actually very close).

Feedback from visitors

This is one area where we were not very successful. We could tell from the atmosphere and informal conversations with families and staff that the events were very welcome and informative but we were unable to capture this information on paper.

We gave out very brief feedback sheets with the potential to win attractive prizes but still only a small proportion of visitors filled them in. We also tried using pupils from other year groups to ask parents questions and fill in the sheets for them. This was slightly more successful but still only a small proportion of responses were received. It is difficult to see how parental feedback can be recorded in a cost effective way. Try a range of different techniques and let me know what works.

Feedback from exhibitors

The feedback from exhibitors was very useful as they gave us a good idea of what was working in engaging the parents and we also obtained some useful suggestions to improve the events. Note that the range of experience of STEM Ambassadors can be very broad. Some will be novices who have never done anything like this before; others will be university staff who were used to attending careers fairs in and out of school.

Optional extras

You will accumulate a rich resource of local contacts through organising these events. We found most of the exhibitors were happy to fill in a short questionnaire about their education and the pathway they took to their current job; these could be used to create profiles that can be used or displayed in school.

Appendix

Example action plan template

Items	Actions & person(s) responsible	Progress
Date and location	Decide on a suitable date for your target audience, arrange the venue and for movement of tables, chairs etc if necessary. Check what time you will be able to access the venue to set up.	
Contact exhibitors	Decide on a maximum number of stands based on the floor space and the time – about 10 worked well in our events. Email potential exhibitors to invite them to be involved. Keep track of responses and contact details. Keep track of activities that people will bring (to ensure no-one brings the same thing). Organise different stands – numbers, who is going to be on them and what they are doing Ensure balance of male/female and different pathways to current careers.	
Marketing leaflet	Create attractive leaflet to market the event with list of exhibitors and/or subject themes. Send out to parents and pupils. Include permission for photos and filming for use by school if necessary Plan when to distribute and set print deadline accordingly Ask form teachers to remind pupils about event a few days before	
Stamp collecting and Feedback	Design feedback sheet and stamp collecting sheet, source stamp pads. Source prize - Potential prizes: family pass for science centre, stationery, Easter egg, food hamper, sweet tree etc.	
Refreshments	Arrange tea/coffee and sandwiches for exhibitors if possible Arrange tea/coffee for parents if possible	
Route through hall & layout	Decide on layout so people are encouraged to walk through the exhibition e.g. have entrance and exit at opposite ends.	
Contact parents	Ring/email/text parents a day or two before event to remind them about it if possible	
Safeguarding	Check if any issues with having visiting adults on school premises (children will be accompanied and staff present so shouldn't be a problem)	
Publicity of event	Is there a school newspaper, website or TV programme that could record the event. Also think about using twitter, facebook, intranet etc if appropriate. Could students be involved to design a logo and hashtag as part of another course?	

Option blocks	Provide information about GCSE/A-level option blocks available in the school to exhibitors	
Helpers on the day	Arrange of staff and student helpers during the event.	
Evaluation	Have 2 people with clickers to count numbers Stamp collecting forms Parent feedback forms Pens or pencils available for people to fill in forms Exhibitor feedback form	

Supplies list

- Stamps (self-inking) – one for each stand
- Pens/pencils for people to fill in forms
- Wrapped cardboard box for prize draw entries
- Tablecloths – cheap plain plastic ones that can be re-used are fine and can be found in discount shops for about 25p each.
- Prizes: one for adults and one for pupils the sweetie tree and chocolate bouquet worked well – perhaps you could purchase these from a small business in the local community.
- Clickers (tally counters) to count families as they enter the area
- Clipboards for students to ask questionnaires
- Camera to take photos of event
- Careers related DVDs to show on big screen or computer screen.
- Any giveaways for example posters and postcards from Institute of Physics or Tomorrow's Engineers
- Signs and posters to put around the room
- Pins/blutac/ sticky tape



Different stamps were collected at each stand

Invitation to potential exhibitors

Provided as separate editable word document

Information for confirmed exhibitors

Provided as separate editable word document

Useful websites and resources

Institute of Physics (IOP)

A list of all physics courses at UK universities and entry requirements

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

Interactive website with Information about careers from physics and job profiles

<http://www.physics.org/careers>

Tomorrow's Engineers

Careers information for different age groups

<http://www.tomorrowseengineers.org.uk/>

Resource packs including postcards and posters to order (for free)

http://www.tomorrowseengineers.org.uk/Careers_resources/

Institute of Physics and Engineering in Medicine (IPEM)

Careers resources for teachers including poster, careers film and quizzes

<http://www.ipem.ac.uk/CareersTraining/Schools/ResourcesforTeachers.aspx>

Royal Astronomical Society

Links to fact sheets and information about astronomy and geophysics

<http://www.ras.org.uk/education-and-careers/for-schools-and-teachers>

Royal Meteorological Society

Information about different meteorological careers

<http://www.rmets.org/our-activities/careers-accreditation-academic-and-vocational-qualifications/spotlight-careers>

Information on courses and qualifications and downloadable flyers

<http://www.rmets.org/our-activities/careers-and-courses>

Society of Biology

Links to a range of free downloads about the biosciences

<https://www.societyofbiology.org/careers-and-cpd/careers/career-resources>

Make a difference with a career in biology - Website with information about different careers in biology and six posters that can be ordered.

<http://www.biology-careers.org/Home.aspx>

Royal Society of Chemistry

Website includes information about options at 14 and 16 and going to university as well as a range of job profiles.

<http://www.rsc.org/careers/future/>

Futuremorph

Online game to find out what kind of scientist you could be

<http://www.futuremorph.org/14-16/play/game-what-might-you-be/>

The website also has a lot more information about science careers aimed at pupils and teachers.

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

National STEM Centre e-library

A range of downloadable resources including documents and videos.

<http://www.nationalstemcentre.org.uk/elibrary/careers/>