Careers in Initial Teacher Education

User guide and presentation notes

Contents

Careers in Initial Teacher Education (CITE)

Introduction

Careers information, advice and guidance has traditionally focussed on students in secondary school. However, there is a growing understanding that children are starting to think about 'what they want to be' at a much younger age, and that they are 'ruling out' possible careers before they leave primary school.

The aim of these CITE training materials is to support primary trainee teachers to include careers related learning in their teaching from the start of their career. However, it could also be used as CPD for teachers who are already teaching in a school.

The subject focus of the careers introduced are science and maths, nonetheless, the underpinning principles in each session are suitable for a whole school approach to career related learning.

Outline of the resources

The CITE training materials consist of three training sessions and associated 'gap' tasks. Each training session should last about 1.5 hours to allow for discussion. The time required for each gap task will vary. After each gap task, participants will complete a reflective evaluation writing exercise.

Session 1: Careers Education and Unconscious bias
This session provides an introduction to the gendered nature of subject and career choices that children and young people make, and how unconscious bias can contribute to this. It also explores how to reduce these effects.

Gap task 1: Exploring unconscious bias in primary schools.
Three analysis and reflection tools that look at different aspects of the school environment, ideal for trainee teachers on their first placement.
- Tool 1 – Classroom Interactions Analysis Tool
- Tool 2 – Literature Analysis Tool
- Tool 3 – Display Content Analysis Tool

Session 2: Career aspirations in primary school
This session explores NUSTEM research on the career aspirations of children aged between 8 and 11. It then introduces the Primary Careers Tool[1] – an online resource to support the inclusion of careers related learning into curriculum planning. The Tool is a database of over 100 different jobs which can be sorted by National Curriculum topic in Science and Maths. A simple model of adding the job into lessons is also demonstrated.

Gap task 2: Planning and teaching using the Primary Careers Tool

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[1] https://nustem.uk/primarycareers/

Trainee teachers choose a maths or science topic that they will be teaching in the weeks after the session and then, using the provided powerpoint template, include a career linked to that topic in their teaching.

Session 3: Employability characteristics and role models
This session considers some of the characteristics that help to make people successful in their chosen careers. It introduces the STEM Person of the Week[2] resource and presents findings from research on the use of role models and STEM Person of the Week.

Gap Task 3: Planning and teaching using STEM Person of the Week.
Trainee teachers choose a maths or science topic that they will be teaching in the weeks after the session and then use one of the STEM Person of the Week cards to introduce characteristics, and then identify and praise pupils showing those characteristics during the lesson.

Using the CITE resources

Who can deliver the training?

CITE training can be delivered by university and school-based teacher trainers, or careers professionals. They could also be delivered by teachers responsible for CPD in school.
The presenter notes provide comprehensive guidance on how each session should be structured, what resources are required, participant activity (and indicative points to make) and details of background reading that the presenter should be aware of, prior to leading the session.

How should the training be structured for ITE students?

There are two suggested delivery structures that could be used to deliver CITE to trainee teachers. The timings will need to be synchronised so that the training sessions are delivered just before, or during, the placements that students will undertake.

Model 1: Three year B.Ed course
In this model, the CPD is embedded through the three years of the course. In year 1, as part of their professional practice studies, all students attend training session 1 on unconscious bias and complete gap task 1.

In year 2 and 3, all students can attend training sessions 2 and 3, or they can be offered as an option for those students that are specialising in either maths or science. This will depend on the structure of the B.Ed course.

Model 2: One year course e.g. PGCE, SCITT
In this model, the CPD is delivered over the space of a single year. The sessions should be timed to coincide with the first and second placement. The gap task for training session 1 is an observation activity, so fits in well with the first placement. The gap tasks for training sessions 2 and 3 are teaching activities so fit with the second placement that the student undertakes. Table 1 indicates possible timings for the activities. Careful consideration will need to how the additional contact hours required to deliver the CITE materials are scheduled into the curriculum. The gap tasks

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require less scheduling because they fit well into the preparation, planning and reflection that the students will already

Model 3: Current teachers

The CITE materials are also suitable for use as a year-long CPD for all teachers within a school. This could be led by an external provider or by a senior teacher in the school. The timings are the same as for Model 2.

Table 1: Suggested timeline for delivery of CITE in 1 year

Timing	Training activity	Student activity
Half term 1 or 2 (September or October)	CPD 1: Careers Education and Unconscious bias	
		Gap Task 1: Exploring unconscious bias in primary schools
Half term 3 (February)	CPD 2: Career aspirations in primary school	
		Gap Task 2: Planning and teaching using the Primary Careers Tool
Half term 5 (May)	CPD 3: Employability characteristics and role models	
		Gap Task 2: Planning and teaching using STEM Person of the Week

What resources will be needed?

The resources required to deliver the session are provided in the CITE materials. Each session includes additional reading and references, and the presenter will need to obtain these for themselves if they are required. All training sessions will require standard IT projection equipment.

Session 1: Unconscious bias	**Scissors** – 1 pair between 2 participants (including scissors suitable for left-handed people) Session Powerpoint Slides 6, 7, 10 – print 1 copy for each group of 2 – 4 participants Slide 21 – print 1 copy between 2 participants Analysis Tools – print 1 copy per participant
Session 2: Career Aspirations in primary school	Session powerpoint Top aspirations cards – print out and cut up 1 set between 2 – 3 participants Top aspirations sorting activity - print 1 copy between 2 – 3 participants Slide 16 – print 1 copy between 3 – 4 participants Slide 20 – print 1 copy between 2 participants (or 1 each) Primary Careers Tool Analysis – print 1 copy per participant

Session 3: Employability characteristics and role models	Session powerpoint Copies of the STEM Person of the Week posters and postcards. You will need sufficient for each participant to have an example to take home. If possible, print out a complete set of postcards.

Presenter notes

This guide includes presenter notes for all three training sessions. It is recommended that presenters read through the notes in advance of the training, and also explore the further reading included with the slides.

Measuring Impact

Trainee teachers and their mentors can use the reflective activities to assess the impact of the training on their practice. In addition, the training, gap tasks and reflective activities, can be used to evidence the following teacher standards (2012):

Standard 5: Adapt teaching to respond to the strengths and needs of all pupils
- have a secure understanding of how a range of factors can inhibit pupils' ability to learn, and how best to overcome these
- demonstrate an awareness of the physical, social and intellectual development of children, and know how to adapt teaching to support pupils' education at different stages of development.

Standard 8: Fulfil wider professional responsibilities
- make a positive contribution to the wider life and ethos of the school
- take responsibility for improving teaching through appropriate professional development, responding to advice and feedback from colleagues.

Next steps for participants

At the end of the training sessions, participants will be able to include careers related learning in their ongoing curriculum planning and teaching. To enable this, the Primary Careers Tool is available on the NUSTEM website, as are further examples of STEM Person of the Week.
For participants who would like to explore the ideas further a reading list is provided at the end of each session presentation.

NELEP and NUSTEM

The CITE training materials have been developed by the North East Local Enterprise Partnership (NELEP) in collaboration with NUSTEM at Northumbria University.

NELEP is a public, private and education partnership that works with partners to grow the North East's economy through a Strategic Economic Plan. This acts as a blueprint for activities that need to take place to improve the region's economy.

NUSTEM is an outreach and research group based at Northumbria University. Their vision is for a vibrant and sustainable STEM sector which meets the needs of learners and employers, reflecting the diversity of wider society.

You can find out more about each organisation at our websites:
NELEP: https://www.northeastlep.co.uk/
NUSTEM: nustem.uk

Careers in Initial Teacher Education (CITE) Training

Session 1 – Careers Education and Unconscious bias

Presenter notes

Slide	Presenter notes	Participant activity
	Before the Session: Scissors – 1 pair between 2 participants (including scissors suitable for left-handed people) Session Powerpoint Slides 6, 7, 10 – print 1 copy for each group of 2 – 4 participants Slide 21 – print 1 copy between 2 participants Analysis Tools – print 1 copy per participant **After the Session:** Send copies of the presentation (as a pdf), copies of the Analysis and reflection tools. One week before the agreed date for completion of the gap task, email participants to remind them to submit the task and reflection.	
1&2	Introduce self and, depending on the group, ask them to introduce themselves.	Short introductions.
3	*This slide can be omitted if desired. If the CITE materials are being used as whole-school CPD then this slide should be amended to reflect the audience.* The aim of CITE is to support trainee teachers to include careers related learning in their teaching from the start of their career. The project consists three CPD sessions with associate gap task. *Additional info:*	

	Previously careers information, advice and guidance was focussed on students in secondary school. However, there is a growing understanding that children are starting to think about 'what they want to be' at a young age. Consequently, CITE aims to help teachers include careers related learning in primary teaching. The training, and activities, can be used to evidence the following teacher standards (2012) Standard 5: Adapt teaching to respond to the strengths and needs of all pupils • have a secure understanding of how a range of factors can inhibit pupils' ability to learn, and how best to overcome these. • demonstrate an awareness of the physical, social and intellectual development of children, and know how to adapt teaching to support pupils' education at different stages of development. Standard 8: Fulfil wider professional responsibilities • make a positive contribution to the wider life and ethos of the school • take responsibility for improving teaching through appropriate professional development, responding to advice and feedback from colleagues. *References and extra reading:* https://www.gov.uk/government/publications/teachers-standards https://www.educationandemployers.org/career-related-primary/	
4	*This slide can be omitted if desired or you should amend this slide to reflect the model of delivery that you are using.* Timeline of the training. This slide can be adapted depending on the context that the training sessions are being used in. The timeline given is for a model which takes place over a single year. Another possible model is for CITE to be included in a three year B.Ed course, in which case, there could be one session each year. Each session has an associated activity and reflective prompt for students to use as a 'gap task'. There is time at the beginning of session 2 and session 3 to allow students to share their reflections from the previous session and gap tasks.	

5	We start by looking at what jobs an imaginary class of thirty children might do for employment. This is an analysis of the current job market, NOT a prediction of the future job market. You can see that there would only be 7 children involved in STEM fields and 15 involved in non-STEM fields. Additional information: The data are taken from the Office for National Statistics Labour Force Survey 2016. The data for the UK were scaled to represent a class or 30 pupils – with data rounded up or down to the nearest half-child for presentation purposes. Those not in employment include those that are not actively looking for work – e.g. early retirement, caring for others, illness etc. References: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes	
6	*Hand out a copy of this slide for discussion – text is difficult to see on the screen.* This slide shows the breakdown of employment by gender. Participants should discuss the diagram. Ask: What do they notice? Are they surprised by this? If not, why? If there is time, or if this is a large group, spend some time taking feedback of key discussion points.	Small group discussion. If time, feedback discussion points.
7	*Hand out a copy of this slide for discussion* Having looked at the gender split in employment, this slide goes back in time a little bit to look at A-level entries. The diagram shows the percentage of A-level exam entries for 2019 split by gender. Again, participants should discuss the data. Ask: What do they notice? Are they surprised by this? If not, why? If there is time, or if this is a large group, spend a short time taking feedback of key discussion points.	Small group discussion. If time, feedback discussion points.

	Additional information: The data are taken from the JCQ A-level exam entries for 2019. Note that the absolute entry number for different subjects can be quite different. For example: there were more girls taking A-level Physics (8799 students) than took A-level French (5840 students), and more boys taking A-level Psychology (16500 students) than A-level Computing (9649 students) or A-level Further Mathematics (10380 students). Reference: https://www.jcq.org.uk/examination-results/a-levels/2019/main-results-tables	
8 - 11	We are going back in time again – this time to look at career aspirations for primary school children from NUSTEM research. Slide 8 NUSTEM have designed the STEM Career Knowledge and Aspirations tool (STEMKAT) which we have used to evaluate the effectiveness of the work that we do in primary schools over the longer term (Emembolu et al, 2020). STEMKAT presents a list of 30 jobs to children. The jobs represent all sectors of employment and different levels. They were chosen to ensure that there were jobs that most children would know (teacher, vet, fire fighter, shop assistant) as well as some that they might not know (lawyer, entrepreneur). Research participants were Year 3 and year 5 children from 6 North East primary schools (450 children). The children were given the list of jobs. They first sorted them into jobs they knew and jobs they didn't know. The jobs that they didn't know were removed from the list of jobs. They then sorted the remaining jobs they knew into jobs they'd 'like to do', jobs they 'would not like to do', and 'not sure'. Slide 9 shows the basic findings of the first data set that was collected in 2015. We will look at the fourth bullet point in more detail. Slide 10 *Hand out a copy of this slide for discussion*	

This slide shows the top 10 jobs chosen by boys and girls and the percentage of pupils that included that job in their 'would like to do' or 'not sure' categories.

Participants should discuss the data.
Are there any patterns that they notice? Anything surprising.

Notes:
There are only two jobs that are common to both boys and girls: athlete and game tester.
The STEM jobs that girls are interested in are mainly healthcare related: vet, nurse, doctor (and game tester).
The STEM jobs that boys are interested in are physical science related: game tester, mechanic, pilot, astronaut, and engineer.

The full list of jobs was:

Actor/Actress	Detective	Farmer	*Mechanic*	*Surveyor*
Athlete	*Doctor*	*Game Tester*	*Nurse*	Teacher
Astronaut	*Engineer*	Hairdresser	*Pilot*	Tennis Player
Author	Entrepreneur	Judge	Politician	*Technician*
Banker	Estate Agent	Lawyer	Shopkeeper	*Vet*
Civil Servant	Firefighter	Librarian	Soldier	*Zoologist*

italicized jobs shows occupations classified as general STEM
jobs in bold show jobs classified as core STEM

Slide 11
This slide adds in the salary range for the jobs shown on slide 10. The data is taken from the national Careers Website job explorer.

Point out the difference in average salary for girls and for boys. Choices in primary school have potential long term consequences for future earning potential.

Slide 12
The research literature suggests that children and young people are move likely to aspire to a career if it matches their self-concept (Archer and DeWitt, 2013).

Small group discussion.

If time, feedback discussion points.

	In our society, science is seen as something that is done by 'clever people', and so children and young people who think of themselves as clever are more likely to aspire to a science career.	
	NUSTEM research found that girls are less likely to self-identify as *clever*, and more likely to self-identify as *kind*. (Padwick et al, 2016). This early self-identification has implications for children's future science participation, and goes someway to explain the gender split seen in the STEM jobs shown in the table on slides 10 and 11.	
	References Archer, L., & DeWitt, J., (2013). ASPIRES: Young people's science and career aspirations, age 10–14. Final project report. London: Department of Education and Professional Studies, King's College London. Emembolu, I., Padwick, A., Shimwell, J., Sanderson, J., Davenport, C., Strachan, R. (2020) Using action research to design and evaluate sustained and inclusive engagement to improve children's knowledge and perception of STEM careers. International Journal of Science Education, DOI: 10.1080/09500693.2020.1729442. Padwick, A., Dele-Ajayi, O., Davenport, C., Strachan R. (2016) Innovative methods for evaluating the science capital of young children. IEEE Frontiers in Education Conference. DOI: 10.1109/FIE.2016.7757680	
13	Ask the group to discuss the question on the slide: What might explain this disparity? Notes: Some ideas that might come up include Opportunities that children see around them. Girls might do roles that would fit in within childcare because they are aspiring to be a parent. TV and media influences (e.g. Peppa Pig has only female teachers). Models in society are already weighted. Culture playing a role. Peer pressure. Clarify ideas about broadening aspirations – there is nothing wrong with aspiring to parenthood or other caring role, but it is worth broadening the aspirations so that young people know what opportunities are available to them.	Small group discussion If time, feedback discussion points.

	At this point you might also receive answers which relate to inherent differences in preferences between genders. This will be addressed further in the next two slides, however, it is worth pointing out the different way in which children are treated from an early age, and how that might affect their preferences. The short video of an experiment from the BBC documentary 'No more boys and girls' which dressed children in 'opposite gender' clothes and asked adults to interact with them clearly shows that the ways that children were played with, and the toys there were offered, strongly depended on whether the adult thought they were a boy or a girl. https://www.youtube.com/watch?v=nWu44AqF0iI *Further reading* Cordelia Fine (2010) 'Delusions of Gender', ISBN: 978-1848311633 Gina Rippon (2020) 'The Gendered Brain', ISBN: 978-1784706814	
14&15	In the next two slides participants will start to unpick the reasons for some of the gender differences in career choices that we have looked at so far. There has been a tendency in society and in psychology to attribute observed differences in behaviour to EITHER genetic causes OR societal causes. It makes for simple stories. Slide 14 gives three possible explanations for the differences we've seen in previous slides. 1. The choice differences we see are due to genetic differences between genders This gives rise to the 'Men are from Mars, women are from Venus', or 'men can't multitask' type of idea. If this idea was correct, then there should be clear differences in brains that can be linked to the different behaviours. However, this is not the case. This article from the NY Times is a useful read https://www.nytimes.com/2018/12/03/opinion/male-female-brains-mosaic.html . If this explanation was correct, we would expect to see similar percentages of women in science research in different regions of the world as can be seen in the 2016 UNESCO data. • 48.2% for Central Asia • 45.1% for Latin America and the Caribbean • 41.5% for Arab States	

- 39.3% for Central and Eastern Europe
- 32.7% for North America and Western Europe
- 31.8% for Sub-Saharan Africa
- 23.9% for East Asia and the Pacific
- 18.5% for South and West Asia

(http://uis.unesco.org/sites/default/files/documents/fs55-women-in-science-2019-en.pdf)

2. There are personality differences between people that are due to genetics, and that influences their choices

Psychologists have long been interested in differences in personality. One popular model of personality traits is known as the Big Five. This model suggests that there are five key traits that form our personalities: Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism. Studies of identical and non-identical twins show that there are higher correlations between aspects of personality between identical twins than between non-identical twins – suggesting a genetic contribution to personality. However, these studies don't explain all of the differences between pairs of twins.

3. Children's attitudes and beliefs are shaped by the society that they grow up in.

A third possibility is that our attitudes and beliefs are socially constructed. We know how to behave as a girl, or as a British person because we have seen and been taught how to behave in this way. Think about queueing. This is an inherently British trait – we have been shown how to queue since we were very little (lining up in play group, being told to wait when getting on the bus etc). That behaviour is socially constructed: there isn't a genetic reason why we queue and people from other cultures don't. Similarly, we are 'taught' how to behave in gender appropriate ways from birth through praise and approbation of those around us, and the images that we see in society.

References and further reading:
https://www.psychologistworld.com/personality/five-factor-model-big-five-personality
Maltby, J., Day, L., Macaskill, A., (2017) Personality, Individual Differences and Intelligence. 4th Ed. ISBN: 978-1292090511. Especially Chapters 7 and 8.

15	Evidence suggests that the first explanation is wrong – there is no such thing as a male brain or a female brain – there are only human brains.

There is evidence that personality is influenced, in part, by genetics.

Much of psychology would now say that there is a strong interaction between nature and nurture – they can't be separated.

Our personalities and choices are influenced both by our genetics and by the society in which we grow up. There is also a growing awareness that the brain is 'plastic' for longer than once thought, and that our experiences can shape our brain even later in life. Thus, how we are treated, or what we do, can shape our brain.

Thus, the differences that we see in children's career and subject choices are likely to be due to the interplay of genetics (personality) and society.

References and further reading:
Article about some of the uses of brain plasticity in therapeutic circumstances.
https://www.wired.co.uk/article/game-your-brain | |
| 16 | The session now moves on to consider the network of influences that surround a child, both in the formal education, but also in the informal day-to-day life.
We are looking at who or what might influence children in their career aspirations, their exam choices and their career choices. | |
| 17&18 | Show slide 17 and ask participants to name as many influencers as possible

Slide 18 provides a range of different answers, with teachers and schools highlighted – because they are the two influencers that we are interested in for this project. | Small group discussion |

			If time, feedback discussion points.
19	Having looked at the problem of gendered career choices, we now begin talking about our (teachers) contribution to the problem. Emphasise that this is not about judging them as teachers or as people, but that there are consequences which arise because we have grown up within a society that proscribes a person's choices and actions depending on their gender.		
20&21	*Give a copy of slide 21, and a pair of scissors to pairs of participants.* This slide is used to illustrate how our brain can interpret information based on what we have experienced. Ask participants: Which square, A and B, is the lighter colour? Most participants say that square B is the lighter square. In fact, they are the same colour. Ask participants to carefully cut out square A and put in where square B is. They will 'see' that the square changes colour and becomes lighter as it moves from position A to position B. If they move it back to position A it will become darker again. This is an optical illusion which arises because we are interpreting the 2D image as if it was a 3D object. We have learnt that chess boards have squares of alternating colours, and that objects in shadow are brighter than they appear. Our experience (our bias) means that we interpret the diagram to see the two squares as being different shades of grey, even though they are identical.		Cutting out small shape and looking at the colour of the square.
22&23	This slide presents a riddle which relies on stereotypes. Participants (because we've been talking about gender) may give the answer 'mother' However, when out of this context, many people will provide other possible (but statistically less likely) answers such as 'step dad', 'new husband', 'gay dad'. Slide 23		Read and answer the riddle.

	We have an ingrained stereotype of a surgeon which is often male. And that colours our answer to the riddle. Ask participants to give other careers-related stereotypes that they can think of. The fact that careers related stereotypes come to mind easily shows how ingrained they are. There are also issues about language (e.g. fireman, binman, dinner lady/nanny) which shape our ideas. It is important to note that we hold the stereotypes whether we agree with them or not. Our quick, automatic response will often revert to these stereotypes, and it takes effort to think of the alternative.	Whole/Small group discussion
24	Myra Sadker and David Sadker spent 25 years looking at the experience of school for girls in America. They used a range of research methods, including direct observation of classroom practice. Some of their findings are shown on this slide. *References and further reading*: Sadker, D., Zittleman, K.R., 2009 Still Failing at Fairness: How Gender Bias Cheats Girls and Boys in School. ISBN: 978-1416552475	
25	This slide presents more recent research from 2016. The researchers worked in 6 schools across Sweden, and observed video recordings of 14 teachers and 195 pupils (85 boys and 110 girls). Their focus in this study was on the interactions between teachers and pupils. They looked at all interactions (general classroom instructions etc.) and interactions that were focussed specifically on science. The data from the study show that male and female teachers both interact more with boys than with girls, but that the difference is greater for male teachers. This applies regardless of whether all interactions were looked at, or just science specific interactions. Note that the difference was present for female teachers – they are showing gendered interactions because of the gendered nature of society. You might also want to discuss the different types of praise interactions that may be used with boys and girls and the effect of that on pupils: girls are praised for 'goodness', and boys praised for effort. (Dweck, 2006).	

	This can lead to girls thinking that their abilities are innate and unchangeable, and boys thinking that they can develop ability through effort and practice. *References and further reading* Dweck, C. (2012) Mindset. ISBN: 978-1780332000 Eliasson, N., Sorensen, H., Karlson, K.G., 2016. Teacher-student interaction in contemporary science classrooms: is participation still a question of gender? International Journal of Science Education, 38:10, 1655-1672. https://www.psychologytoday.com/us/blog/the-science-success/201101/the-trouble-bright-girls The power of words: How to give praise that motivates and empowers girls. https://www.amightygirl.com/blog?p=26248	
26 and 27	This slide provides suggestions of six different ways in which bias might affect children's education in primary. Print out the slides from UB Primary Bias Discussion Exercise and share with participants – the second slide in each case provides further points to support the main statement. 1. The pattern of classroom interactions can unintentionally reinforce messages of expected and accepted behaviours. • Boys are more likely to shout out and so get more time • Teacher punishes an entire class for the actions of a minority • Girls are often used as a behaviour management strategy. 2. Ideas about what children are 'good' at, and subsequently what paths are open to them are embedded at an early age. • The phrase 'typical boy writer' becomes an excuse for low achievement • Extra-curricular clubs conform to gender stereotypes • Children can be selected for extra-curricular activities based upon strengths and confidence 3. Many texts uphold traditional stereotypes. • Non-fiction texts often portray scientists as men in white lab coats, reinforcing the stereotype	Small group discussion of the five statements on the slide.

- Fiction texts: Heroes are usually male. Women and girls often need saving.

4. There is a surprising amount of sexist language and behaviour used in society and this can be picked up and imitated by young children.
- 'Don't be such a girl'.
- 'Man up'.
- 'Can I get two strong boys to help carry some books?'

5. Cultural change will only be achieved in all members of the school community are involved, including parents and carers.
- Text taken from a homework handout. 'Please find attached some tricky words, works we can't sound out. … the children will find it very useful to know these words by sight. Try making another set and play pairs, snap or hunt the tricky word around the house. Boys particularly like the latter because it's physical and competitive especially if you use a timer. See if you can spot tricky words when you're out and about or when you're reading books together.'

6. Teaching materials and displays can reinforce gender stereotypes.
- Images used in displays often conform to gender stereotypes.
- Presentations and resources can include stereotypes and stereotypical language.

Note that this discussion may provide challenging for participants and will need to be handled carefully. They can also be directed towards additional information as appropriate.

Slide 27 provides some additional prompts for consideration about language in the classroom.

The phrase 'OK guys, pens down' is often the most controversial example of a gendered statement that might be heard in the classroom. Participants might feel that 'guys' has become a non-gendered term. However, as with many 'generic' terms, the default is male – consider who you would draw or describe if you were drawing a group of males. As teachers, it is worth considering if there are other terms that could be used to ensure that both boys and girls are included.

North East Ambition

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nustem

	This blog post describes one company's attempt to think about gender inclusive language to replace 'hey guys'. https://www.hotjar.com/blog/gender-inclusive-language-workplace/ UNESCO produced guidelines on gender-neutral language in 1999. Although old, the principles still hold and you can download a copy from here. If you want to find out more searching for 'gender-neutral language' will provide many examples from different professions and organisations.	
28	This slide contains some initial strategies that could be used to start to tackle the issue of unconscious bias in classrooms. Further detailed ideas can be found in materials produced by Improving Gender Balance Scotland: https://www.iop.org/education/teacher/support/girls_physics/resources/file_69612.pdf	
29	This slide contains a brief summary of the session so far.	
30 - 31	This slide introduces the 'gap task' and the three tools that were created to support participants to think about bias and gender in primary schools. Participants should choose one (or more) of the Tools and use it to examine gender and careers in their placement school. They could also use the exercise as a prompt for discussion with their school based mentor about unconscious bias in the school context. Tool 1: Classroom Interactions Analysis Tool This tool allows students to look closely at the classroom interactions that take place during their observations of teaching. Emphasise that *Tool 1 should only be used with **permission** of the teacher being observed*. In order to reduce observation effects, it is also suggested that participants ask permission, and then wait a little while so that the teacher behaviour is not affected. Tool 2: Literature Analysis Tool This tool allows students to look at the main and supporting character in a children's story book, and how they are described.	Share each tools and give participants time to look at them. Discuss possible uses.

	Tool 3: Display Content Analysis Tool. This tool allows students to look at displays around the school and examine careers content that may be included. It is important to note that these tools are not intended to be an assessment of the school, but opportunities for the participants to think reflectively about gender and careers.	
32	To support the participants to reflect on the CPD and their learning, each tool has reflective prompts on the back. These are intended to guide thinking about the issues they have explored using the tool. The reflective prompts are common to all three tools. You may wish to ask participants to complete the activity within a set period of time, and return their completed forms to you. Alternatively, you may wish to ask them to bring the completed forms to the next training sessions	Discuss reflective activity.
33	Ensure that participants know what their next steps are, and have thought about which tool they would like to use. It is helpful to agree a date by which they will have completed the gap task and the reflection, and ask them to email their reflections to you. This increases the likelihood that they will think about the activity more deeply, and the reflections can then be included in their standards file (if students). Participants may wish to complete the documents by hand, or electronically. You should send copies of the tools electronically to them after the session. If the date for training session #2 is known, include it in this slide.	
34	Include your contact details.	
35&36	References and further reading.	

Careers in Initial Teacher Education (CITE) Training

Session 2 – Career aspirations in primary schools

Presenter notes

Slide	Presenter notes	Participant activity
	Before the session: Arrange with the venue for access to the internet for participants (e.g. iPads or smartphones). Ask participants to bring the results of their gap task to the session (completed analysis tool and reflection). Print out and cut up the 'Top aspirations cards'. You will need 1 set between 2 or 3 participants. Print out the 'Top aspirations sorting activity' sheet. You will need 1 per 2 or 3 participants. Print out copies of slide 16. You will need 1 copy between 3 or 4 participants. Print out copies of slide 20. You will need 1 copy between 2 participants (or 1 each) Print out copies of the 'Primary Careers Tool Analysis'. You will need 1 copy for each participant. **After the session:** Send copies of the presentation (as a pdf), the Template presentation, and the 'Primary Careers Tool Analysis Tool' to participants.	
1&2	Introduce self and, depending on the group, ask them to introduce themselves. Looking at the evidence for putting more careers in primary teaching, and also a simple tool to include careers in the curriculum.	Short introductions.
3	*This slide can be omitted if desired. If the CITE materials are being used as whole-school CPD then this slide should be amended to reflect the audience.*	

	The aim of CITE is to support trainee teachers to include careers related learning in their teaching from the start of their career. The project consists three CPD sessions with associated gap tasks. *Additional info:* Previously careers information, advice and guidance was focussed on students in secondary school. However, there is a growing understanding that children are starting to think about 'what they want to be' at a young age. Consequently, CITE aims to help teachers include careers related learning in primary teaching. The training, and activities, can be used to evidence the following teacher standards (2012) Standard 5: Adapt teaching to respond to the strengths and needs of all pupils • have a secure understanding of how a range of factors can inhibit pupils' ability to learn, and how best to overcome these • demonstrate an awareness of the physical, social and intellectual development of children, and know how to adapt teaching to support pupils' education at different stages of development. Standard 8: Fulfil wider professional responsibilities • make a positive contribution to the wider life and ethos of the school • take responsibility for improving teaching through appropriate professional development, responding to advice and feedback from colleagues. *References and extra reading:* https://www.gov.uk/government/publications/teachers-standards https://www.educationandemployers.org/career-related-primary/	
4	*This slide can be omitted if desired or you should amend this slide to reflect the model of delivery that you are using.* Timeline of the project. This slide can be adapted depending on the context that the training sessions are being used in. The timeline given is for a model which takes place over a single year.	

	Another possible model is for CITE to be included in a three year B.Ed course, in which case, there could be one session each year. Each session has an associated activity and reflective prompt for students to use as a 'gap task'. There is time at the beginning of session 2 and session 3 to allow students to share their reflections from the previous session and gap tasks.	
5	The next few slides are a recap of the previous session to remind participants of the previous ideas, and also allow them to share the actions and reflections from their gap task. This riddle was presented in the previous session. It acts as a summary of the session. In groups participants should discuss the answer of the riddle and talk about the focus of the previous training and what they remember about it. Depending on group you may need to prompt with a summary of the material in the session. For participants that did not attend the first session, you may wish to share a copy of the training materials for them to look at the session in more detail.	Small group discussion. Feedback if time allows.
6	This slide provides a short summary of the narrative used in the previous session. Talk through the findings, adding in detail as appropriate from the feedback from slide 5.	
7	This slide contains some initial strategies that could be used to start to tackle the issue of unconscious bias in classrooms. (From previous session) Further detailed ideas can be found in materials produced by Improving Gender Balance Scotland: https://education.gov.scot/improvement/learning-resources/improving-gender-balance-3-18/ This includes an Action Guide for ELC practitioners and for primary schools.	
8	**Feedback from using the tools.**	Whole group discussion

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	Ask each participant to say which analysis tool they used, describe what they observed and give their reflections about the activity. Where the Classroom Interaction Analysis Tool was used, ask participants to keep their feedback anonymous and constructive. Possible Findings: Examples of good practice (e.g. half-boys and half-girls on a display) Photographs of boys doing active things and girls doing passive things on display Displays not including people. Display examples of 'good work' favouring one group of children over another. Story books being gendered Tendency for certain groups of children to seek attention from the teacher during classroom interactions.	
9	Ask participants to think back to the youngest age they can remember what they wanted to be when they were growing up and share with the group. Share back. [Interestingly, anecdotal evidence from previous NUSTEM CPD sessions about careers suggests that a lot of teachers (particularly primary school teachers) wanted to be teachers when they were little.] Ask: What was driving that choice? Possible responses: Family, enjoyment, being good at the subject, no real reason.	small group / whole group discussion
10	The next section of the session looks at research carried out by NUSTEM. NUSTEM collected career related aspirations from children in four primary schools in North East as part of a project funded by STFC. 300 children were asked 'What would you like to be when you grow up?" This is the same question that participants have just discussed.	

11 - 12	This slide contains the top ten jobs that the boys and girls gave as their answers – twenty in all.

Give out the 'Career Aspirations' cards so that there is one set of cards between two or three participants.

Ask participants to sort the jobs into two groups: the top ten aspirations for girls and the top ten aspirations for boys.

Slide 12 shows the result of this sorting activity (and included the shared jobs as a separate group for clarity).

Discuss results with participants. Ask if they were surprised by any of the aspiration choices by the children. | Sorting cards into groups.

Discussion |
| 13 | Before the session: Print out the handout 'Career Aspirations sorting' so that there is the same number as sets of cards.
Ask participants to put the 10 careers into order showing the most popular to least popular in the top 10 for girls and boys. Encourage participants to justify their ordering.

Note: This activity can take a while, so you may choose to ask participants to put just the top three cards for boys and girls in order. Alternatively, you can put combine the activities on slide 11 and 13 together, and ask participants to sort and rank at the same time. | Card sorting |
| 14 | This slide shows the top ten career aspirations for boys from the NUSTEM research project.

There may be some discussion about the ordering of the jobs. | |
| 15 | This slide shows the top ten career aspirations for girls from the NUSTEM research project.

There may be some discussion about the ordering of the jobs.
(e.g. surprise that doctor is higher up the list than nurse for girls) | |

16	This slide presents the data from slides 14 and 15 in more detail. Print out a copy of the slide and ask participants to discuss the data: Is there something that surprises them, or that they notice. Possible comments: Jobs are still aspirational. Limited range of jobs which are mostly traditional and roles that children will have come across in their life up to that point (if we ignore Youtuber). Footballer dominates the male aspirations (and therefore all aspirations). Creative, artistic and sporting aspirations make up a large proportion of the answers (27% over all, 38% for males, 19% for females).	Small group discussion
17	Graphs side by side to show how popular footballer is for boys – you can hide this slide if you want.	
18	This slide summarises some of the other findings from the NUSTEM research into job aspirations, which pick up on some of the possible observations from slide 16. In all, there were 81 different types of roles that children aspired to but the top 20 jobs accounted for 75% of those roles, and those top 20 were all fairly traditional jobs. This is perhaps unsurprising because these will be the jobs that children will have come across in their lives (and in stories/media) up to that point. However, as we've seen before in the CITE training, the aspirations were gendered and fell into stereotypical roles (mostly). Boys gave a broader range of STEM aspirations (28 mentioned) than girls (17 mentioned).	
19	As well as thinking about what job aspirations children have, it is also work looking at the reasons they give for choosing those jobs.	

	These data are taken from the NUSTEM research presented earlier. As well as asking children their job aspirations, they were also asked why they wanted to do the job(s) that they had identified. Their answers were then analysed and grouped into a range of categories/themes. NUSTEM found that across all of the jobs children gave a number of reasons for their choices. The broad categories were 'Enjoy an aspect of the job', 'achieved success in it', 'job looks good', 'achieve personal goal', 'to help others', 'inspired by' and 'other'. In each category there were a range of answers: • 'enjoy an aspect of the job' answers given included 'like animals', 'like topic', 'like hobby' • 'Achieved success in it' answers given included 'do it already' or 'good at it' • 'achieve personal goal' answers included 'learn/be better', 'money/fame/respect', 'travel/explore', to be healthy', 'make me happy' • 'to help others' included 'make people happy', 'make people look good', 'inspire others' • 'inspired by' answers included 'like family member', 'inspired by an experience' This slide gives the percentage of reasons given in each category. *Further Reading* Padwick, A., Davenport, C., Strachan, R., Shimwell, J., Horan, M. (2020 in preparation) Tackling the digital and engineering skills shortage: Understanding young people and their career aspirations.	
20	This slide presents a model of how children's career aspirations are formed during their childhood, and why they might have the job aspirations that we see in the NUSTEM research. These different phases affect how children think about careers (or 'what they want to do when they grow up'). Although the phases are linked to specific ages of children, children develop at different rates, and so the boundary of the individual phases are not as clear-cut as the diagram might suggest. In early childhood (cognitive growth phase), children begin to classify people on obvious characteristics or behaviour. At the beginning of the phase children will often report wanting to be characters from stories (e.g. unicorns), inanimate objects (fire truck) or animals (tiger). However, as they get older they	Give a copy of the slide to participants.

begin to realise that these are not possibilities and stop being named as answers to the question of what they want to be.

From an early age children are very attuned to the different behaviour and roles for girls/women and boys/men that they see in society around them. Participants may be familiar with nursery and reception children acting as 'gender police' and telling each other what they can (or cannot) do as a result of whether they are a boy or a girl. This is also seen in their occupational aspirations, and children begin to turn away from some roles or jobs. (Which can be seen in the data from NUSTEM research on previous slides).

Children and young people then undergo a progressive elimination of possible roles which narrows the range of acceptable jobs that they might be interested in. Some of this narrowing is due to perceived status and difficulty of jobs.

Finally, young people enter the compromise phase. At this point they recognise that there are a range of steps and barriers to getting a job and that they may not achieve their desired goal (footballer, doctor), and start to look at other acceptable and more available choices.

Why is this model helpful for primary schools?
The narrowing of job choices starts from a very early age. Rather than wait until children are older and making subject choices, it is better to help them 'keep their options open' from an earlier age. Primary schools can tackle stereotypes, and show a broader range of possible jobs (and a broad range of people doing them) so that children have more acceptable alternatives by the time they reach secondary school and GCSE choices (and beyond).

Further reading:
Gutman, L. and Akerman, R., 2008. *Determinants of aspirations [wider benefits of learning research report no. 27]*. Centre for Research on the Wider Benefits of Learning, Institute of Education, University of London. https://discovery.ucl.ac.uk/id/eprint/1541614/1/Gutman2008Determinants.pdf

	Howard, K. A. S., & Walsh, M. E. (2011). Children's Conceptions of Career Choice and Attainment: Model Development. Journal of Career Development, 38(3), 256–271. https://doi.org/10.1177/0894845310365851 Gottfredson, L. S. (2005). Applying Gottfredson's Theory of Circumscription and Compromise in Career Guidance and Counseling. In S. D. Brown & R. W. Lent (Eds.), Career development and counseling: Putting theory and research to work (p. 71–100). John Wiley & Sons Inc (available at http://www1.udel.edu/educ/gottfredson/reprints/2004theory.pdf)	
21	This quote is from the charity 'Education and Employers'. Assure participants that as primary teachers they are not being expected to (nor should they) provide careers advice to children. Including careers is about broadening the range – helping children to find out about more jobs done by people around them, and that they could do. It also allows teachers to address stereotypes that children have about different jobs. *Further reading* https://www.educationandemployers.org/wp-content/uploads/2020/01/Disconnected-Career-aspirations-and-jobs-in-the-UK-1.pdf	Discuss quote if time allows
22 - 23	One of the challenges for primary teachers about including careers in the curriculum, particularly STEM careers, is that they may not be aware of the range of careers that are available. NUSTEM created the Primary Careers tool to help primary school teacher to easily find information about different roles linked to science and maths topics in the national curriculum. The Primary Careers tool is a database of over 100 different STEM jobs which can be sorted by national curriculum topic. Each job has a short description and a link to a (counter-stereotypical) image search. Participants should now open the primary careers tool – they can choose either the science version (https://nustem.uk/primarycareers) or the maths version (https://nustem.uk/primarycareersmaths). Slide 23 is a screenshot from the science PCT	Feedback and discussion

24	This slide provides an outline what careers page on the PCT looks like. Each page follows the same structure. There is a short description of the job in language which should be suitable for Upper Key stage 2. There are three attributes that someone who works in that field would find useful. Finally there is a counter stereotypical careers link.	
25	First ask participants to explore the databases Ask if they notice anything about the image search – discuss the importance of using a range of images/role models Next ask participants to choose a lesson/topic that they have taught recently and have a look at the jobs linked to that topic. How could they have included the job in their lesson(s)?	Look at the Primary Careers Tool using internet enabled device (about 15 minutes)
26	This slide explores an important e-safety point. The image searches in the PCT are set up to provide counter-stereotypical images e.g. 'structural engineer AND female' or 'nurse AND male'. Emphasise that participants should never do a live search in front of a class, particularly an image search. Including the 'AND female' term can produce search results which can be inappropriate for sharing with children.	
27	The PCT is used to create a slide which can be used as a starter or plenary in science or maths lessons. Why attributes? The intention is to show children what they already have in common with people who have a career in STEM. Many of the attributes are employability skills, or 'soft' skills. They are attributes and attitudes that will help children regardless of job. Why ask 'Could you be a ….?' Originally asked 'Do you want to be a ….?' However, this is a closed question and as we have seen in the data given earlier, even young children have ideas about what sort of job they want. SO if you ask them 'do you want to be a…' then the answer is likely to be 'no'.	

		However, 'Could you be....?' is a much more open question. Children might look at the picture and see something that appeals (e.g. I like climbing and this picture has mountains in it so maybe I could do that'), or that they have the characteristic (e.g. I'm very creative') that the person in the picture has.	
		Further reading: Kashefpakdel, E., et. al. (2018), 'How are schools developing real employability skills?' available at: https://www.educationandemployers.org/wp-content/uploads/2018/11/Joint-Dialogue-FINAL-REPORT-2019.pdf	
28		Inclusion of careers into classroom teaching provides a clear opportunity to contextualise children's learning which can benefit their understanding of underlying concepts. *Further reading:* Michael Giamellaro (2014) Primary Contextualization of Science Learning through Immersion in Content-Rich Settings, International Journal of Science Education, 36:17, 2848-2871, DOI: 10.1080/09500693.2014.937787	
29		This slide sets the next 'gap task'. Give each participant a copy of 'Primary Careers Tool Analysis Tool' Participants will use the Primary Careers Tool (for either maths or science) to include a career context in one of their lessons. They will be provided (electronically) with a powerpoint template that they can amend to include the appropriate career. However, they can also use their own format if they would like to do so. At this point, participants could spend some time planning, either in small groups or individually.	Planning gap task / small group discussion.
30		This slide outlines the next steps for participants. It is helpful to agree a date by which they will have completed the gap task and the reflection, and ask them to email their reflections to you. This increases the likelihood that they will think about the activity more deeply, and the reflections can then be included in their standards file (if students).	

31	This slide provides links to the resources that participants will need.	
32	Add your contact details to this slide	
33-34	References and further reading from this session.	

Careers in Initial Teacher Education (CITE) Training

Session 3 – Employability characteristics and role models

Presenter notes

Slide	Presenter notes	Participant activity
	Before the session: Ask participants to bring the results of their gap task to the session (completed reflection on the use of the Primary Careers Tool) Print out examples of the STEM Person of the Week posters and postcards. You will need sufficient for each participant to have an example to take home. If possible, print out a complete set of postcards. **After the session:** Send copies of the presentation (as a pdf), the poster and postcards, and the reflection tool to participants. Agree a date when they will have completed the reflection from the task and send it to you by email. Send a reminder email a week before this date.	
1&2	This is the third session of the CITE training. It focuses on the use of employability characteristics and how they can be used to help children to identify as someone who could work in STEM. Introduce yourself and, depending on the group, ask them to introduce themselves.	
3	*This slide can be omitted if desired. If the CITE materials are being used as whole-school CPD then this slide should be amended to reflect the audience.*	

	The aim of CITE is to support trainee teachers to include careers related learning in their teaching from the start of their career. The project consists three CPD sessions with associated gap tasks.	
	Additional info: Previously careers information, advice and guidance was focussed on students in secondary school. However, there is a growing understanding that children are starting to think about 'what they want to be' at a young age. Consequently, CITE aims to help teachers include careers related learning in primary teaching.	
	The training, and activities, can be used to evidence the following teacher standards (2012) Standard 5: Adapt teaching to respond to the strengths and needs of all pupils	
	• have a secure understanding of how a range of factors can inhibit pupils' ability to learn, and how best to overcome these • demonstrate an awareness of the physical, social and intellectual development of children, and know how to adapt teaching to support pupils' education at different stages of development. Standard 8: Fulfil wider professional responsibilities • make a positive contribution to the wider life and ethos of the school • take responsibility for improving teaching through appropriate professional development, responding to advice and feedback from colleagues.	
	References and extra reading: https://www.gov.uk/government/publications/teachers-standards https://www.educationandemployers.org/career-related-primary/	
4	*This slide can be omitted if desired or you should amend this slide to reflect the model of delivery that you are using.*	
	Timeline of the project. This slide can be adapted depending on the context that the training sessions are being used in. The timeline given is for a model which takes place over a single year. Another possible model is for CITE to be included in a three year B.Ed course, in which case, there could be one session each year.	

	Each session has an associated activity and reflective prompt for students to use as a 'gap task'. There is time at the beginning of session 2 and session 3 to allow students to share their reflections from the previous session and gap tasks.	
5 - 6	The next few slides are a recap of the previous session to remind participants of the previous ideas, and also allow them to share the actions and reflections from their gap task. Slide 6 shows the findings from NUSTEM research into the career choices of girls and boys aged 8 – 11 years old. Can see a very clear difference in boys and girls career choices. Session 1 looked at why these differences might arise.	
7	In Session 2 we looked at how we could contextualise children's learning using careers. The quote is taken from this paper: Michael Giamellaro (2014) Primary Contextualization of Science Learning through Immersion in Content-Rich Settings, International Journal of Science Education, 36:17, 2848-2871, DOI: 10.1080/09500693.2014.937787	
8	Primary careers tool The gap task from the previous CITE session was for participants to use the Primary Careers Tool. **Feedback and reflections from participants** At this point, participants should share how they used the PCT, and what sort of conversations that they had with their pupils as a result.	Small group discussion. If time, feedback discussion points.
9	Employability characteristics Finding different ways to describe people at work.	

	The main part of the session is looking at how we can describe people who work in STEM. In session 2 we discussed using counter-stereotypical images when talking about different STEM careers. We're now going to have a look at some of the stereotypes that children (and adults) have about people working in STEM.	
10	What six words would you use to describe a scientist?

Ask participants to write down six words they would use to describe a scientist. They should then compare and discuss their words in small groups.

If time, or if this is a large group, spend a short time taking feedback of key discussion points.

Possible discussion points:
Lots of stereotypical words used.
Writing down objects, rather than words to describe someone. | Small group discussion.

If time, feedback discussion points. |
| 11 | This slide shows a screen shot of an image search for 'scientist'.
You can see that there is quite a diverse picture in terms of gender and ethnicity

However, all of the scientists are wearing lab coats, and quite a few are looking at test-tubes of liquid.
This is not representative of what scientists do, but does give an insight into the stereotypical images people are looking at. | |
| 12 | When do these stereotypes of scientists begin? How can we find out what children think about scientists? | |
| 13 | One way to find out what children think is to use the 'Draw a scientist test'. This research tool was first used by Chambers in the mid-sixties.
The Draw A Scientist test (DAST) is a long established test to explore stereotypes of scientists, and it was developed in 1981 by David Chambers. Children (and adults) are simply asked to draw a scientist. DAST has the advantage that it is an easy test to administer. | |

	However, a number of methodological issues with DAST have been raised: • It relies on drawing ability, • In some drawings the gender of the scientist is not clear, leading to possible bias in the coding, • Forces a single stereotype – but children may have more than one conception of a scientist (as seen when asked to draw a second scientist in Maoldomhnaigh & Hunt, 1988) However, this hasn't stopped the test (and variants of it) being used regularly. Further Reading: D. Chambers (1983) 'Stereotypic Images of the Scientist: The Draw-A-Scientist Test', Science Education 67(2) 255-265. https://onlinelibrary.wiley.com/doi/abs/10.1002/sce.3730670213 S. Losh et al. (2008) 'Some methodological issues with "Draw a Scientist Tests" among Young Children. International Journal of Science Education 30(6) 773 – 792. https://www.tandfonline.com/doi/abs/10.1080/09500690701250452 M Ó Maoldomhnaigh & Á Hunt (1988) 'Some Factors Affecting the Image of the Scientist Drawn by Older Primary School Pupils', Research in Science & Technological Education, 6:2, 159-166, https://www.tandfonline.com/doi/abs/10.1080/0263514880060206	
14	At NUSTEM we wanted to explore possible, more nuanced, views of scientists. We used the 'six word' text to evaluate the effect of different interventions on children's conceptions of scientists. We asked children to 'Write down six words to describe a scientist'. This is the same activity that participants did for slide 10. Children from year 1 to year 6 in one North East school took part in the activity, although in the final research project (described in more detail later in the presentation) there were only 123 pupils included in the data analysis. Intelligence – teaching pupils that it's not about an innate intelligence. Find something you enjoyed and worked really hard at it.	Small group discussion.

15	The headline results are presented on this slide. Nearly half of the words were categorised as stereotypes e.g. brainbox, frizzy hair, lab coat, explosion. Of the stereotype words, 60% referred to some form of (often high) intelligence. Girls were more likely to use positive sentiments (e.g. friendly, kind) to describe boys. Very few gendered words were used (e.g. boy, girl). Ask participants to discuss the findings. Was there anything that surprised them?	Small group discussion
16	What are the actual characteristics that are useful to be successful in science and STEM careers? Ask participants to (briefly) discuss and suggest characteristics that people need to be successful in a STEM job. You could write them down on flipchart paper if you wanted.	
17	Using previous reports (see further reading), and discussions with colleagues who work in STEM, NUSTEM have created a list of 16 employability characteristics (or STEM attributes). We shared the list with primary schools' science coordinators to make sure that they were happy with using the words with primary aged children. We also created simple definitions of each characteristic which can be found at https://nustem.uk/resource/stem-attributes/ These employability characteristics include a wide variety of skills that are useful for being good at life generally. They are also skills that children will already have. This provides a bridge between how children think of themselves and how they see people who work in STEM. Note that we deliberately chose NOT to include intelligence. We understand that academic achievement is important in science, but don't want it to be a barrier to children who are interested but may feel as though they are not clever enough – not everyone who works in a STEM job is as clever as Einstein!	

	Further reading: Lucas, B., Hanson, J., & Claxton, G. (2014). Thinking Like an Engineer - Implications for the Education System. Retrieved from http://www.raeng.org.uk/thinkinglikeanengineer MacDonald, A. (2014). "Not for people like me?" Under-represented groups in science, technology and engineering, (November 2014), 1–32. Retrieved from https://www.wisecampaign.org.uk/uploads/wise/files/not_for_people_like_me.pdf SCORE (2013) "Guidelines for the content of Key Stage 4 qualifications". Retrieved from http://score-education.org/media/12525/ks4%20guidelines%20final%20version.pdf	
18	Changing Stereotypes: Scientist of the Week. To explore whether it was possible to influence the stereotypes of scientists that children have, NUSTEM created a 5-week research project called Scientist of the Week. (Note that after the initial pilot of the project, the role models were extended to a range of different STEM roles, and so the project is now called 'STEM Person of the Week'. This slide provides the basic outline of the original project. Five scientists were chosen that represented a range of different backgrounds, ages and sciences. At the start of each week a new scientist was introduced to the children in the classroom, and across the school. Each scientist had 3 attributes that related to their role. The schools were given a poster of each scientist to put up in every classroom, and an A6 postcard of each scientist for every child. During lessons the teacher then looked out for pupils showing those attributes and praised them for that, rather than for attainment. At the end of the week, the children could take their postcards home to explain to their families what they had been doing in lessons.	

| 19 | This shows a sample of the new STEM Person of the Week cards that have been created for the CITE project.

Each contains a picture of the STEM person, a short description of what they does that incorporates the attributes. On the reverse of the postcard is a short definition of the three attributes.

For CITE there are 2 sets of cards – each of which includes five different people from North East companies.

There are also additional sets of STEM Person of the Week available on the NUSTEM website: https://nustem.uk/stem-person-of-the-week/ | |
|---|---|---|
| 20 | This slide provides a short overview of the research method used.

Before the start of the project, all the children in the school were asked to complete the 'six words' test.
At the end of the five weeks, the children were asked again to describe a scientist using 6 words.
This was repeated after 1 month and 1 year.
To look at the change, we matched children who had been present at each of the data collection points (which removed year 6 from the analysis because they had moved school at the 1 year follow up). This gave a total of 118 children.
Some data were also removed from the analysis due to irregularities in the data collection (e.g. in one class all the children gave almost identical words). | |
| 21 | This slide shows the different categories that were used to code the words that the pupils wrote down at each data collection.

Descriptions and examples of the types of words used in each category:

Category	Description	Indicative examples
Stereotypes and Intelligence	General and Intelligence based stereotypical words	White coat; curly hair; explosions Brain box; genius; smarty pants

Positive attributes	Words that described positive qualities that were not the Target Attributes	Fascinated; energetic; accurate
Target attributes	The 15 attributes used in the SotW resources	
Positive sentiments	Words that described feelings of positivity towards science	Tremendous; nice; life-saving
Negative sentiments	Words that were non-stereotypical and negative	Stupid; bossy; annoying
Science Words	Words that described things that scientists might know about	Plants; fingerprints; nature
Science Jobs	Careers	Chemist; engineer; scientist
Miscellaneous	Any word not deemed to fit in categories 1-8	Ravenclaw; pink

| 22 - 24 | These slides present some of the findings of the data analysis for the changes in the use of stereotypes. The blue bars show the percentage use of the words before the intervention, the red bar shows the percentage use 1 week after the intervention, the green bar shows the percentage use 1 month after the intervention, and the final purple bar shows the use of stereotype words 1 year after the intervention. The data presented in the slides are for 118 children who were present for all four data collection points. The oldest children in year 6 were not included in the analysis because they had left the school when the one year data collection took place.

 Slide 22 shows the change in the use of All stereotypes. There is a significant decrease even after 1 year. We then separated out the different types of stereotypes to show general stereotypes and intelligence stereotypes | |

	Slide 23 shows the change in the use of general stereotypes, and again there is a significant decrease after 1 year. **Slide 24** shows the change in the use of Intelligence stereotypes. Although there is an initial decrease, the use of this type of stereotype increases over the year, and one year after the intervention there is effectively no difference between the percentage use of intelligence stereotypes. Ask participants to discuss the findings shown by the graphs. **Possible discussion points:** Wider societal influences reinforcing the view of scientists as clever. Large reduction in general stereotypes – so fewer ideas about 'white coats' and 'potions'. Surprising that the effect lasts for a year. *Further Reading:* J. Shimwell et al. 'Scientist of the Week: the long-term effects of a medium-term, teacher-led STEM intervention to reduce stereotypical views of scientists in young children'. In preparation.	Small group discussion. If time, feedback to larger group.
25	This slide gives some of the implications of the research project, which may have been mentioned in the previous discussion.	
26 - 28	These slides introduce the resources for the STEM Person of the Week resource sets developed for the CITE project. Slide 26 summarises how the resource can be used in classrooms. An important aspect of the project is for teachers to link the attributes shown by the STEM people with the attributes that the children themselves already have. This helps to emphasise that the children may already have the attributes that they need to work in STEM. Slide 27 shows the front of the poster and postcard. The back of the postcard contains simple definitions of the attributes for the STEM Person on the card.	

	Slide 28 outlines the resources that are provided for participants: • A3 poster to print and display in the classroom • Powerpoint presentation slide (and additional guidance) to introduce the STEM Person to the class at the start of the week. • (Optional) A6 postcards to print out so children can refer to them during the week, and then take them home at the end of the week.	
29	Participants should now spend some time discussing how they will use the STEM Person of the Week in their teaching. Depending on the placement (or school), participants may choose only to use one of the STEM Person of the Week Cards. However, they may be able to include more than one if they are on a longer placement. You could discuss possible options, and then ask them to discuss. Participants may have other ways that they wish to use the resources, and that is fine. Possible options: Choose one person whose job could link to a topic that is being taught in science or maths. Use the resources as part of PSHE activities or an assembly to help children think about their own attributes. Plan to use one STEM person of the Week each week for five weeks.	Small group discussion.
30	Give participants some time to complete the planning sheet for the gap task. They should try to be as specific as possible about how they will use the STEM Person of the Week activity.	
31	This slide outlines the next steps for the participants. It is helpful to agree a date by which they will have completed the gap task and the reflection, and ask them to email their reflections to you. This increases the likelihood that they will think about the activity more deeply, and the reflections can then be included in their standards file (if students).	

| 32 | Include your contact details on this slide. | |
| 33-34 | References and further reading for participants | |