Tackling Stereotypes and Developing Identification with STEM Careers

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About NUSTEM

NUSTEM's vision is of a vibrant and sustainable STEM sector which meets the needs of learners and employers, reflecting the diversity of wider society.



Theory of Change



Challenge 1: Children aspirations are not commonly aligned with STEM pathways



- Young children have high aspirations for their future, but mostly not for STEM
- Before the age of 8, children rule out certain careers as unacceptable based on their growing understanding of the world and their place in it.
- Primary children's career aspirations and motivations are gendered.

Findings on STEM Aspirations

What job would like to do when you are older? Why? List up to 3 jobs.

- 98% children held career aspirations
- 20 jobs accounted for 75% of the jobs named by the children
- Mapping to Standard Occupational Classification (SOC) 81% in highest categorisations of jobs in the SOC
- Mapping careers to STEM sectors Children have aspirations simultaneously for STEM and not STEM fields i.e. scientist and a dancer

Children's occupational aspirations diverge by gender at a young age



Children's occupational aspirations diverge by gender at a young age



The types of STEM jobs boys and girls aspire to is different

Jobs Group	Number	%	% from girls	% from boys
Core STEM	110	36	16	84
STEM Skilled Trades	12	4	17	83
Medical STEM	182	60	81	19

"My dad's an engineer. I want to do a lot of the more boy things because I like them. I like to do more like the building things"

Girl with Engineering Aspirations, aged 9

Motivations to work in different STEM sectors were similar irrespective of gender

- enjoy an aspect of it
- help others
- achieve goal
- job looks good
- success in it
- inspired by others
- other reason



Challenge 2: Many children and young people don't see STEM as being done by someone like them



How do young children describe scientists?



■ All ■ Males ■ Females

How do younger children (5-7) describe scientists?

What is a scientist like? What do you think they do? What do you think a scientist needs to be good at?

17% of children said they didn't know the term.

Undeveloped		Introductory		Stereotypical		Diversifying	
32 (13%)		54 (23%)		92 (39%)		60 (25%)	
Guesses	21	Powerful	33	Appearance	33	STEM jobs	24
Mirroring	11	Magic	21	Makes stuff	25	Finding out	10
				Experiments	11	Curriculum	10
				Clever	11	Work hard	8
				Explosions	8	Work environment	5
				Fixing stuff	4	Testing	3

What are the factors of influence on their early understandings of science occupations?

Key Influences on 5 – 7 Year Olds	Examples
Family: Siblings and Cousins	"My sister is a scientist. At home and after school she is. She makes models and mixes potions at a scientist desk. She is nine"
YouTube	"Well I've learned this stuff off a YouTuber. He was a scientist – I think this is what their thingy [called]. Erm, but sharks can live in salt water and fresh water."
Toys and Games	making volcanoes', 'making slime' and 'making potions', home science kits
Personal Experiences	Hobbies and interests, visitors to school, breaking their leg and having an operation

Young children did not commonly relate science learning in school with scientists or a broader spectrum of science-related jobs

Response: Attributes approach



STEM Person of the Week





This week's attributes:

Creative

Creative people make new things and have original ideas.

Self-motivated

Self-motivated people like to do things for themselves without being told how to do them.

Passionate

Passionate people have strong feelings about things that interest them.

Science & Technology

University

Attribute focus



Holly is a marine scientist who studies coral reefs. She is **passionate** about her work and enjoys the challenges of exploring coastlines. Holly is **creative** and **self-motivated** which allows her to come up with and test out new ideas about how the oceans and coastlines have changed.



The resource is designed to promote a counter-stereotypical view of the STEM profession through a series of 15 attributes.

Each week, there are 3 new attributes for the children to focus on.

In science lessons, and across other subjects, praise should be focused on children who display these attributes.

We want to show children that **they already have the skills that you need to be a scientist**.

The 15 Attributes

Observant	Open-minded	Committed	Collaborative	Curious
Creative	Imaginative	Patient	Organised	Self-motivated
Resilient	Communicator	Passionate	Logical	Hard-working

Breaking down stereotypes

The STEM Person of the Week role models and counter-stereotypical attributes provide a new understanding of the skills needed to be a scientist.

After the intervention, children use less stereotypes when describing scientists and more positive attributes.



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Website links to SPOTW

nustem

What We Do Resources & Reference News & Programmes About Q. 🕑 🕈



STEM PERSON OF THE WEEK

INTRODUCING STEM PERSON OF THE WEEK

Welcome to STEM Person of the Week – a STEM engagement activity that's been shown to reduce children's stereotypes of science and scientists by providing counter-stereotypical character attributes through a set of diverse STEM role models.

This resource aims to equip teachers with everything they need to effectively run this 5-week intervention in their school setting. The resource is simple to use and suitable for children in years 1 through 6. In fact, we recommend that you run STEM Person of the Week with your whole school; this way, children and teachers can share what they're learning beyond the classroom and into the playground and staff room.

Here you'll find:

- Links to the resources which you can download and print
- · Aims, background and research
- Guidance for teachers who want to deliver in their school



Marine Scientis

Holly is a marine scientist who specialises in coral reefs. She

is passionate about her work and enjoys the challenges of exploring coastlines. Holly is creative and self-motivated

which allows her to come up with, and test out, new ideas about how the oceans and coastlines have developed.

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self-motivated

Other careers resources

We've more careers-linked materials for primary and secondary:

Free careers resource

https://nustem.uk/stem-person-of-the-week/

Resource 2: Primary Careers Tool



44 States of Matter



Embedding Careers in Teaching

The Primary Careers Tool

					Topic Areas					
Topic Areas	Sports Scientist	Zoologist	Vet	Surgeon		Colour Technologist	Mechatronic Engineer	Robotic Technician	Automotive Engineer	
Animals, including humans	Sports scientists require the ability to analyse	Zoologists study the anatomy, behaviour,	Veterinary physiotherapists work	A surgeon cuts the human body to remove diseased	> Algebra	A colour technologist uses	Mechatronic engineers	Robotic technicians work	Automotive engineers are	
③ Earth and Space	physical and classification, evoluti	physical and class Read more > Read	classification, evolution Read more >	alongside veterinary surgeons	tissue or organs, Read more >		technology of colour	mechanical engineering	professionals,	designing
♀ Electricity			Read more >	nore >	 Geometry – Properties of Shapes 	Read more >	Read more >	Kead more >	Read more >	
🖓 Everyday Materials	Ornithologist	Nurse	Marine Biologist	Herpetology Veterinarian		Civil Engineer Civil engineers are	Structural Engineer Structural engineers are	Astronomer Astronomers are a type of	Satellite Communications	
≍ Evolution & Inheritance	of zoologist who study ornithology	regarded as a caring profession but the	of the creatures that live in the	Herpetology veterinarians specialise in the care of	Number	responsible for the	focused on all aspects	scientist that study objects	Engineer Satellite communications	
➡ Forces	Read more >	Read more >	Read more >	reptiles Read more >	I Ratio and Proportion	Read more >	Read more >	Read more >	engineers work with the satellite systems	
n Forces & Magnets					,≪ Statistics				Read more >	
🔅 Light	A herpetologist is a	Animal Technologist Animal technologists work				Astronaut	Crystallographer	Robotics Engineer	Taxidermist	
🕸 Living Things & Their Habitats	zoologist who studies reptiles and amphibians,	in research and development				Astronauts are trained by	Crystallographers study	A robotics engineer is	A taxidermist stuffs and	
Plants	Kead more >	Read more >				such as NASA	structures. They	robots and robotic	to be displayed	
Rocks						Kead more >	Read more >	Kead more >	kead more >	
:ġ: Seasonal Changes						Geologist	Surgeon			
¶≎ Sound						understand the history of	body to remove diseased			
${}^{b}_{b}{}^{b}$ States of Matter						our planet so they Read more >	tissue or organs, Read more >			

https://nustem.uk/primarycareers

https://nustem.uk/primarycareersmaths



 Upper Key Stage 2
 work to understand, predict and measure aspects such as the strength, stability and how rigid buildings are. They also work to develop new designs or modify the designs of buildings or structures which are to be constructed and are responsible for choosing the appropriate materials, such as concrete, steel, timber and masonry, to meet design specification.

 Three attributes
 Attributes: observant, committed, tenacious

 Image search link
 • Google Image Search link

Job title matched to the National Curriculum science topic.

STEM Career: Geologist

Age-appropriate explanation about the career.

Counter-stereotypical image that helps develop understanding of the career.

Dr Kate Winter, Polar Geologist

Geologists work to understand the history of our planet so they can predict how events and processes of the past might influence the future. Geologists seek to understand the processes of landslides, earthquakes, floods, and volcanic eruptions well enough to avoid building important structures where they might be damaged. They prepare maps of areas that have flooded in the past in order to prepare maps of areas that might be flooded in the future.

Discussion question to allow the class to think about the career in greater depth. Attributes: observant, curious and creative

Could you be a geologist?

Three attributes of a person in this STEM career that the children might share.

Image use and e-safety

- Each career contains a link to an image search
- The link is for a counter-stereotypical image search

e.g "structural engineer AND female", "nurse AND male".

 Always follow good e-safety practices: you should never do a live image search in front of a class as you have no control over the results that could be displayed

Improving Diversity and Number of Young People choosing STEM careers



Start working with families and children **from a young age.**



Use attributes of people working in STEM to help children to see what they have in common with them.



Show parents and carers the **different** routes into STEM careers.



Support teachers to include careers in their subject lessons. Showcase local opportunities.



Ensure that **company culture is inclusive of staff from different backgrounds.** Make STEM sectors good places to work.

Any questions?

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References & Links

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- Primary Careers Tool <u>https://nustem.uk/primarycareers/</u>
- STEM Person of the Week <u>https://nustem.uk/stem-person-of-the-week/</u>