Avoiding stereotypes in science

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Introduction

Who do you imagine when asked to describe a scientist?

Your first thought might have involved male white-haired 'mad' scientists in lab coats mixing coloured liquids. Perhaps you imagined Sheldon from the Big Bang Theory or Professor Millie from Biggleton – both of whom are described as very, very clever.

However, in reality, 'scientist' is far broader than the male, white-coat wearing stereotype pictured in popular culture, and not everyone who works in science is really clever.

Recent research has shown that young people are more likely to consider careers using science if their own self-image is similar to that of their image of a scientist. It's therefore important as science educators that we ensure that we challenge the stereotypes around science and scientists, and help children to see that a job in science is something that can be done by people like them.

Young children's views of scientists

If you ask children to write down six words to describe a scientist, then the picture that emerges is a more nuanced than one might expect. Along with the expected stereotypes, there is also 'hard-working', 'awesome', 'funny', 'careful' and even 'boy or girl'.

However, when we ask the children what jobs they would like to do when they grow up then the pattern that emerges is very gendered, even amongst STEM jobs. Girls tend to want to do biological and caring STEM jobs such as vet, nurse, doctor, and boys tend to want to do physical science jobs such as mechanic, astronaut, pilot, and engineer.

Children's career aspirations begin to develop from a very early age, and are shaped by their self-concept and by the society around them. From almost before they are born, children are treated differently depending on their gender and they are praised and sanctioned by their families, their peers and wider society for showing gender-appropriate or gender-inappropriate behaviour. This extends to jobs and roles, and although children might say that science jobs are for 'boys and girls', the type of science job they would like to do is moulded by what they see around them and how they are expected to behave.

Stereotypes of scientists in the primary science classroom

Many books and curriculum sources refer mainly to male scientists with few references to female scientists. In part, this is because the history of science has been predominantly written by men, with women's contributions going largely unrecognised and undocumented. If we only use these sources, children may come to think that being 'male' is an important characteristic for doing science.

The resources that we use in the classroom may be biased and show boys in a more active role (e.g. doing practical work), girls in a supporting role (e.g. writing or recording data), men in scientific careers and women in caring or teaching roles.

Additionally, the way that we talk about science and scientists may also reinforce stereotypes. For example, if we're discussing working scientifically, and the methods that scientists use in real life, do we use male pronouns? Or if we are talking about nurses in relation to the human body, do we use always female pronouns? Of course, there is a similar issue here whenever we talk about jobs in school – it's very easy to always use the same gendered pronoun or even job title (e.g. policeman, postman, dinner lady, waitress).

These inadvertent stereotypes in the primary science classroom can reinforce the messages that children receive from other sources, and discourage girls from physical sciences, and boys from biological sciences.

What can you do to address stereotypes?

It can be challenging to address stereotypes of scientists within the classroom because as teachers, we

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ourselves may unconsciously also hold some of those stereotypes. However, by making planning and putting processes and resources in place, we can provide children with a broader understanding of scientists, and other people who work in science.

1. Audit curriculum resources and displays

Knowing how science and scientists are portrayed in your curriculum resources is the first step. Parkin et al. (2017) suggest some useful questions to use to audit images and language in textbooks or other resources, and these are included in the table.

Look through the resources you use for each year group, keeping a tally-chart of the answers to these questions. You could do this individually as the science subject leader, or you could involve your colleagues to help them get to grips with stereotypes in science. You could also use these questions to help you choose new resources as well.

	Male	Female	Both
Images • How many images are of males, females, or show both genders together? • How many images show the male or female person in a positive light (e.g. eating healthily, helping someone of the opposite gender to do something, being fast etc) • How many images show the male or female person in a negative light (e.g. eating unhealthy food, being ill, being helped by someone of the opposite gender)			
Language • How many male or female pronouns are there? • How many male or female gendered words are there?			
Role models e.g. scientists, sports people, etc. • How many male and female role models are referred to?			

2. Include different scientists and jobs in the curriculum

As you approach your medium-term planning for science, you should now start to include a broader range of scientists and jobs in the teaching plans. The NUSTEM Primary Careers Tool can help you to identify different jobs that are linked to national curriculum topics in science (and also in maths). Incorporating living scientists and their work can also be used effectively as a prompts for scientific investigations in the classroom.

3. Talk about characteristics that are needed to be successful (STEM person of the Week)

We often talk about scientists in terms of what they do (or did). This can be difficult for children (especially as they get older) to empathise with because they often realise that what they are doing in science lessons isn't very like what the scientists do. However, if we shift the focus onto what characteristics scientists need to be successful then children can identify more with that. One possible set of characteristics to use are:

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

Of course, these are employability skills that are relevant for whatever job children choose.

NUSTEM's STEM Person of the Week is a resource that provides one way to introduce characteristics into science teaching using scientists and other people who work in STEM as role models. However, you can also include the characteristics by praising children for showing these characteristics during science lessons because they are the characteristics good scientists need.

References:

Parkin, C. L., & Mackenzie, S. (2017). Is there Gender Bias in Key Stage 3 Science Textbooks?: Content Analysis Using the Gender Bias 14 (GB14) Measurement Tool. Advanced Journal of Professional Practice, 1(1).

Links to NUSTEM resources:

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

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