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Citation: Davenport, Carol and Padwick, Annie (2021) Inclusive teaching in science: Changing culture and practice. Primary Science (166). pp. 29-30. ISSN 0269-2465

Published by: Association for Science Education

URL: <https://www.ase.org.uk/resources/primary-science/i...>
<<https://www.ase.org.uk/resources/primary-science/issue-166/inclusive-teaching-in-science-changing-culture-and-practice>>

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Inclusive teaching in science: changing culture and practice

Carol Davenport and Annie Padwick consider how we can make science teaching inclusive for all the children in our classrooms

Young children are naturally curious about the world around them. They want to know why things are the way they are and how things work. For many children, this natural curiosity translates, as they get older, into an interest and enjoyment of science. In a recent survey of over 240 primary school children between the ages of 8 and 11, NUSTEM found that 75% of children said that they liked science and 63% said that they were good at science. However, when we looked at the data by gender, we did see a difference in enjoyment between girls and boys, with 71% of girls and 79% of boys saying that they liked science. Earlier NUSTEM surveys of children from primary and secondary schools showed that enjoyment of science overall decreases as children get older, but with a steeper decline for girls.

What can we do?

How can we help all pupils continue to enjoy, and study, science as they progress through school? The Institute of Physics has been thinking about this in relation to physics in secondary schools for many years. Their research showed that school culture had a strong effect on the uptake of physics at A-level, with girls at girls-only schools being more than 2.5 times more likely to study physics as girls in coeducational schools (Institute of Physics, 2012). Building on this research, the Institute of Physics then developed an 'Improving Gender Balance' project, which looked at how whole-school changes could affect the uptake of A-level physics (Institute of Physics, 2017). One of the key recommendations of that project was '*Train teachers to understand unconscious bias and how the experiences of boys and girls*

may differ because of it. Have physics teachers adopt more inclusive teaching practices, which can have a big impact on progression rates' (p. 5).

The article on unconscious bias in the last edition of *Primary Science* (Davenport, 2020) explains more about unconscious bias, but you might ask how inclusive physics teaching can be translated into primary science teaching. In a pilot that built on the Institute of Physics project, Education Scotland developed action guides and classroom resources aimed at addressing gender imbalances from ages 3 to 18 (available from the Education Scotland website – see *Weblinks*).

Tips for Teachers

One very useful Institute of Physics resource is *10 Tips for Teachers* on inclusive teaching (see Figure 1 and *Weblinks*). This takes the recommendations for physics teachers

Key words: ■ Inclusion ■ Gender

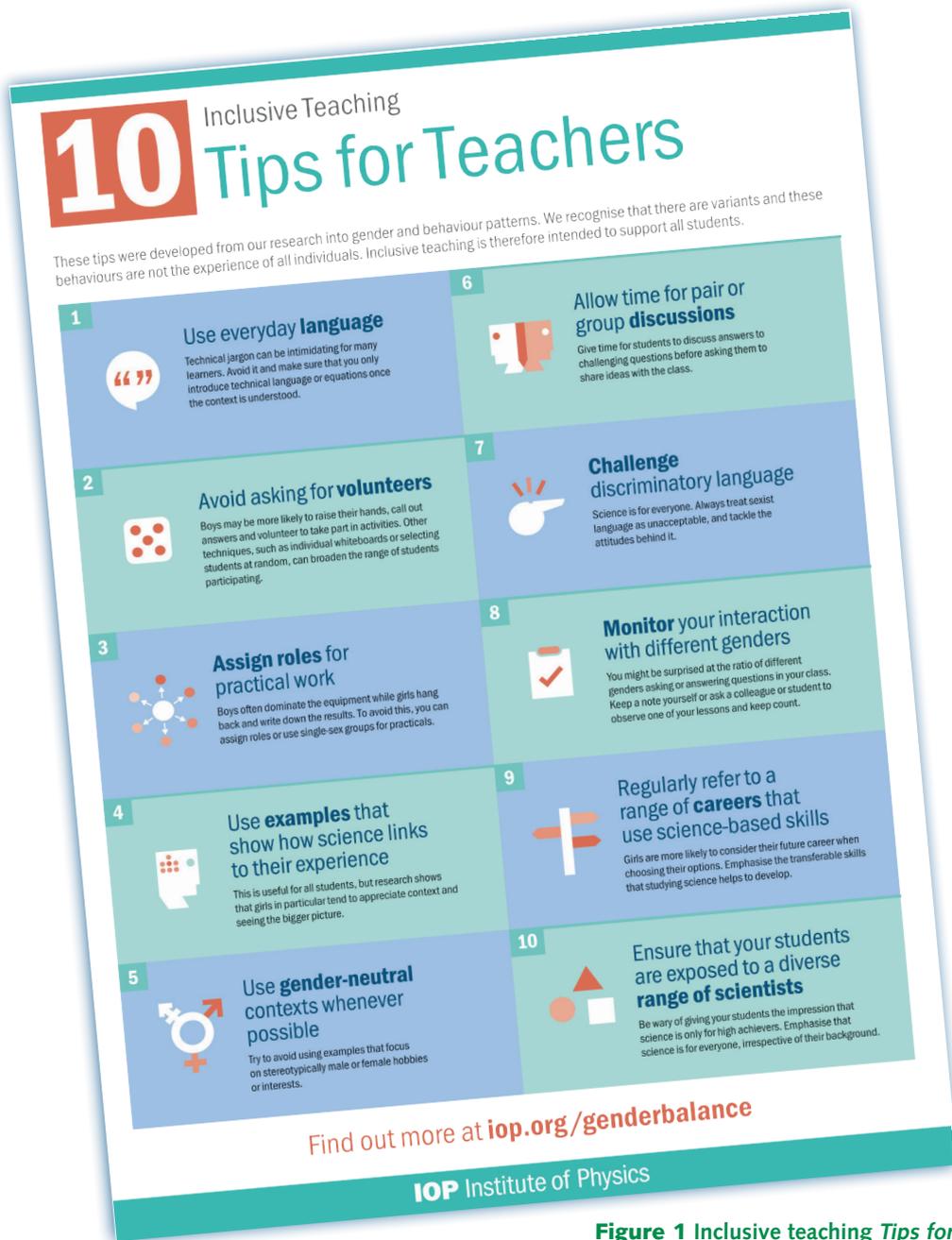


Figure 1 Inclusive teaching Tips for Teachers from the Institute of Physics

References and further reading

Davenport, C. (2020) Unconscious bias and primary schools. *Primary Science*, 165, 7–8.
 Davenport, C. and Shimwell, J. (2019) Careers advice and changing stereotypes in the primary classroom. *Primary Science*, 157, 29–30
 Institute of Physics (2012) It's different for girls: the influence of schools. Available at: www.iop.org/sites/default/files/2019-04/its-different-for-girls.pdf
 Institute of Physics (2017) Improving Gender Balance: reflections on the impact of interventions in schools. Available at: www.iop.org/sites/default/files/2019-07/IGB-reflections-intervention.pdf
 NUSTEM (2019) *NUSTEM's 5 year impact study: primary schools*. Available at: <https://nustem.uk/about/research/impactstudyprimary>

Weblinks

Education Scotland, *Improving gender balance and equalities 3–18*: <https://education.gov.scot/improvement/learning-resources/improving-gender-balance-3-18>
 Institute of Physics, *10 Tips for Teachers*: <https://education.gov.scot/media/gr2g25ob/updatedtop-ten-tips-science.pdf>
 NUSTEM *Primary Careers Tool*: <https://nustem.uk/primarycareers>

and develops them for all teachers of science at all levels. Some of the tips are re-statements of good (primary) teaching practices (e.g. challenging discriminatory language, avoiding asking for volunteers and allowing time for pair or group discussions). Similarly, many primary teachers will use interesting and relevant examples to link science topics to children's everyday lived experience. Unconsciously, teachers may assume that they need to talk about football to interest the boys or animals to interest the girls. However, there is a lot of variation among children's interests, so it is better to use non-gendered examples to ensure that all children feel included.

Some of the other tips may not be things that you have previously considered. For example, when children are doing practical work, rather than letting them choose whether they are 'doing' or 'recording', you could assign roles to them so that everyone gets a chance to develop these important science skills.

The final two tips recommend showing children the range of careers, and people, who work in STEM to allow them to see that these jobs can be done by people like them. The NUSTEM *Primary Careers Tool* provides an excellent way to find careers linked to primary science topics (see *Weblinks* and Davenport and Shimwell, 2019).

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