# Bias in science lesson

## Years 7 and 8

Students are often unaware of biases that operate in society and the ways in which these biases can limit the contributions of diverse Australians. In this lesson they have an opportunity to explore the ways women have been written out of science history, and to take action to highlight the importance of diversity in STEM.

Curriculum alignment

### Science

### [AC9S8H02](https://v9.australiancurriculum.edu.au/search?TTN=q%3DAC9S8H02&on=AC&AC=q%3DAC9S8H02%26pageOffset%3D0) – investigate how cultural perspectives and world views influence the development of scientific knowledge

## Learning hook

1. Ask students to work in pairs and write down as many scientists as they can in 60 seconds.
2. Ask them to go through their list and highlight all the women.
3. With another colour, ask them to highlight the scientists from non-Western backgrounds.
4. Collect the class data from the lists anonymously, either by using an app or having students put their heads on the desk and hold up paper numbers or fingers.
5. Together, examine the data. What trends do students see? What questions does this provoke for them?

Girls in focus: Some students may feel they have ‘underperformed’ if they are unable to identify scientists from a variety of gender or cultural backgrounds. It’s a good idea for students to work in pairs for this activity, and very important to ensure students appreciate that their perceptions are often the result of broader social forces.

## Learning input

Explain to students that cultural perspectives and worldviews which preference particular genders or over others impact the way scientific knowledge is developed, as they can privilege the contributions of some scientists over others.

As a class, watch this [Ted Talk](https://www.youtube.com/watch?v=acQG6pZX1AI) by Kylie Walker to learn more about the visibility of women scientists and hear about the Superstars of STEM program.

Explain that an extreme example of bias against women in science is ‘the Matilda Effect’, where the bias against acknowledging achievements of women scientists means their work is attributed to their male colleagues. The phrase was coined in 1993 by Margaret Rossiter, an academic historian, and named after the women’s rights advocate Matilda Joslyn Gage.

Learn more about Margaret Rossiter’s work and the forgotten women of science by accessing the articles linked in the resources section.

## Learning construction

#### **Part A – the impact of bias**

1. Explain to students that gender bias can occur against people who identify as any type of gender, and that this is just one type of bias which can prevent people from fully participating in science.
2. Ask students to think of any times when they have felt ‘locked out’ of something related to STEM they wanted to pursue. What caused this? Was it a stated rule or requirement, an issue related to geography or access or perhaps a feeling or belief?
3. Students can write a personal reflection explaining their experience and the impact of bias in their own lives.

#### **Part B –  what shapes who gets to do science?**

1. Students can select a science topic that relates to a current area of study, interest or a personal passion.
2. Before they begin creating their video, students should plan their content and how they are going to ensure effective and engaging communication. Students can use the template (see below).
3. Students should be encouraged to share their videos and seek feedback from others as part of their review process.

#### **Part C – celebrating diversity in STEM**

One way to continue to improve equity in STEM fields is to celebrate and share diverse STEM practitioners.

Ask students to create a poster that celebrates the contributions of a little-known scientist. It could be someone the students know personally, someone who has inspired them or someone who is of a gender, cultural, racial or social background of the student’s choice.

Their poster should include the scientist’s name, area of focus and explain their contributions to STEM. It should engage high school students and encourage them to learn more about diverse practitioners.

For inspiration, students can explore the following poster resources:

* [The GiST women in STEM careers posters](https://www.thegist.edu.au/students/women-in-stem/poster-series/)
* [Nevertheless STEM Role Models Posters](https://medium.com/nevertheless-podcast/stem-role-models-posters-2404424b37dd)
* [STEM Trading Cards](https://www.stemtradingcards.org/series-1-cards)

In addition to the poster, students should explain why they chose this STEM practitioner and what they believe are some of the challenges this person may have faced in their career.

Girls in focus: Research has shown that projects which involve researching and presenting historic and contemporary women in STEM can be intrinsically motivating and informative. Engaging in personally meaningful projects supports students’ engagement with STEM.

Resources
Video: [TedxMelbourne (2019) The old man in a lab coat – smashing stereotypes in science](https://www.youtube.com/watch?v=acQG6pZX1AI)

Article: [Unheralded women scientists finally getting their due](https://www.smithsonianmag.com/science-nature/unheralded-women-scientists-finally-getting-their-due-180973082/)

Poster: [STEM role models posters](https://medium.com/nevertheless-podcast/stem-role-models-posters-2404424b37dd)

Article: [The Matilda effect](https://medium.com/s/the-matilda-effect)

Posters: [The GiST women in STEM careers posters](https://www.thegist.edu.au/students/women-in-stem/poster-series/)

[STEM trading cards](https://www.stemtradingcards.org/series-1-cards)