How gender inclusive are your science education activities?

Questions to consider!

THE INDIVIDUAL LEARNERS

When students engage in science education activities in class, they already have individual, well-established gender identities. This means they might already feel that science is for certain kinds of learners, and not for others. You can help counteract this feeling by thinking about your science activities in the following ways:

What scientific interests do learners have?

Does your activity allow for several different lines of inquiry that correspond to different ways of being interested in the subject?	*For example, an activity may have a technological line of inquiry, a socio-scientific line, and an ethical line.*
Does your activity give equal consideration to specific details of the activity and the bigger picture?	*For example, some learners may be interested in the broad uses of science, but others may be interested in the technological details of science.*

What previous experiences do learners have with science?

Do you avoid presenting learners with strongly gendered activities that may contribute to the internalisation of ‘female’ or ‘male’ identities?	*Provide learners with science activities that include its various aspects, for example interpreting and discussing data, having diverging points of view, arguing one’s perspective, reaching agreement (or not), etc.*
Does your activity include the diversity of science as much as possible?	*Science is often considered as one ‘scientific method’. But every instance of doing science has its own individual line of inquiry that you can model your activity on.*

What experience does the learner have in the classroom?

Have you considered that learners may have experienced gender exclusion previously, in the classroom?	*For example, if independent behaviour has been rewarded in some learners, but not others, this may affect learners’ willingness to participate in the education activity.*
Do you encourage all learners to participate equally, and set high expectations for all learners?	*For example, some learners may hesitate while others may speak before they think. It is important for educators to encompass these differences.*

How does learner’s sense of self or identity relate to activity?

Can your activity encompass a variety of different ways of engaging?	*For example, some learners might be more comfortable with plenary discussions, others with group work.*

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THE INTERACTIONS BETWEEN STUDENTS

It is important to consider how the interactions between your students may create and reproduce inequality. These ways may include ‘othering’ (for instance, having lower expectations for certain learners because of their gender) or students taking/giving a subordinate role in order to be a part of that group (for example, as the ‘secretary’ of a group). Consider the following questions...

Does your activity or lesson require different capabilities in a balanced way?

Does your activity or lesson have a balanced approach to participants’ learning preferences? Does your activity include thinking tasks, motor skill tasks, and value-related tasks?

For example, carrying out an experiment might require primarily motor skills while assessing the ethical implications of a scientific finding might require primarily the ability to assess value arguments.

What kind of interaction does your activity or lesson require?

Does your activity or lesson involve a variety of different interaction forms?

For example, think about including individual work, group work, and dyad interactions.

Do the different roles of the students in your activity or lesson have equal status, or do the roles rotate between participants (to counteract instances of ‘othering’ or subordination)?

For example, if the activity requires students to take on experimenter, managerial, or secretarial tasks, ensure that learners take turns carrying out these tasks.

What scientific role models do students encounter?

Do you yourself serve as a scientific role model?

Teachers are often role models for students; thus, you should consider how to take an inclusive approach to science in your interactions with the students. It is important to reflect the full diversity of science when you discuss it, and not to just discuss its difficult, challenging, or individualistic aspects.

Does your activity or lesson involve encounters with scientists (or images or videos)? If so, remember that girls and boys are most inspired by role models they feel similar to. Otherwise, the standards set by the other person become a contrast that girls and boys may react against.

Scientists are often conceived of and portrayed in stereotypical ways. It is important to present the learners with a variety of personalities, genders, and career pathways, not just ‘nerds’ or ‘star scientists’. Remember, women can be role models for boys, and men can be role models for girls.

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AT THE LEVEL OF YOUR SCHOOL

Schools may build gender meanings into their practices, and these may become institutional logics that are difficult or impossible for you, as an individual teacher, to change. However, if you are aware of the potential gendering effects of these practices, you can counteract or work around them. Consider the following questions...

How does your school's core aim shape your activity?

Does your school have a stated core aim, and does this core aim shape the science education activities you carry out?	*For example, a mission statement of 'Developing independent, high-performing students' may set the scene for particular ways of doing science that may exclude some kinds of learners.*
Have you considered how best to align the school's stated aim with your activity's opportunities for gender inclusion?	*For example, are there ways to interpret the stated aim of 'independence' (see above example) in activities that include a greater diversity of learners?*

How does your school approach science, and how is this reflected in your pedagogy?

Have you considered how your institution's approach to science appeals to different learners in different ways?	*For example, a hands-on, project-oriented pedagogical approach may appeal to extrovert personalities who enjoy experimentation and risk-taking, whereas a more textbook and study-based approach may appeal to more introvert personalities who thrive by observing and reflecting.*

Does your school focus on specific scientific disciplines, and are they represented in specific ways in the institution?

Have you considered how to take a balanced approach to the scientific disciplines in your activity?	*For example, it is easy to classify physics as 'hard' and biology as 'soft'; yet all scientific disciplines have built-in dualisms such as hard vs. soft. Science education activities that encompass these dualisms, rather than embracing one extreme, are inclusive to a broader range of learners.*
Does your activity ensure that the variety of ways of conducting scientific research are represented in the activity?	*For example, biology requires both descriptive activities (drawing or classifying) and experimental activities (laboratory testing).*

What kind of engagement is supported by the classroom or lab?

How does the physical learning environment support the planned activities?	*For example, does the setup of desks allow for group work? Does the lab space and equipment allow for participation by more than one learner? Are there areas dedicated to hands-on activity and areas dedicated to quieter tasks?*

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AT THE LEVEL OF YOUR CULTURE AND SOCIETY

Gender identity is shaped and influenced by the culture and society which institutions, educators, and learners are immersed in. These conditions are difficult or even impossible for you to change, but by being aware of them, you may help offset or counteract their effects. Consider these questions...

Is there a public interest aspect to your activity? If so, how does this interest set the scene for your activity?

If you carry out an education activity that takes a point of departure in public representations (e.g. to spark interest in your activity), you should consider how to support multiple ways of participating in the activity beyond those publicly recognized.

For example, do you use well-known public figures or television programmes to create the background for your activity? And is so, are you aware of possible inclusion and exclusion effects of this background?

What are the stakeholders' interests and how does that interact with the activity?

Have you considered how gender is implicitly or explicitly conceived and discussed by stakeholders (ministries, politicians, interest groups etc.) and the potential effects of this on your education activity?

For example, the EU campaign Science: It's a girl thing! reflects a certain view of gender and science – do such views affect your science education activities indirectly?

Or, does the national science curriculum define science in ways that tend to include some kinds of students but not others?

What are the cultural constraints for the activity?

Have you considered what is included in the definition of 'science' in your national context, and what is excluded? You should consider whether employing a broader conception of 'science' in your activity could support the inclusion of a broader range of learners.

For example, in Italy, a background in the classical languages is considered to be a valid qualification for studying physics. This is in contrast to Denmark, where physics students are required to have a background in math. The consequence of this is that many more girls enter the physics study programme in Italy than in Denmark.