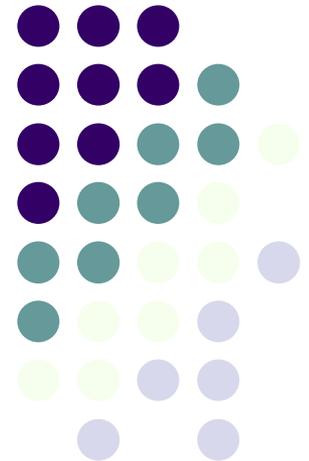


Tools for Promoting Gender Equity in Secondary Science and Math: Classroom Climate, Instructional Practices, and Curriculum

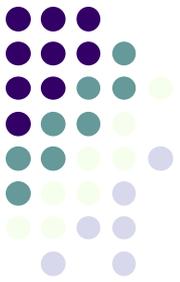
August 28, 2019

A Workshop for the Haverford School District

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Workshop Goals

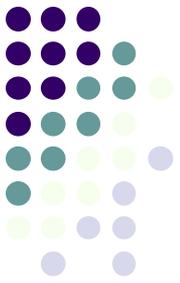


GOAL 1: Examine the social and school-based factors that lead to gender inequities in STEM in middle and high school

GOAL 2: Evaluate your current classroom climate, instructional practices, and curriculum with respect to gender equity

GOAL 3: Identify priorities to implement in your teaching this fall

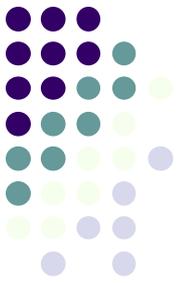
Agenda



GOAL 1: Examine the factors that lead to gender inequities in STEM in middle and high school.

1. *Welcome and Introductions*
2. *Activity:* Gender equity assessment
3. *Video & Discussion:* Watch video from PBS about girls in science
4. *Presentation:* Gender Inequities in STEM, Social Factors
5. *BREAK*

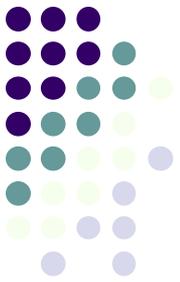
Agenda



GOAL 2: Evaluate your current classroom climate, instructional practices, and curriculum with respect to gender equity.

6. *Video & Discussion:* Watch video from the Teaching Channel
7. *Presentation:* Gender Inequities in STEM, Teacher Tools
8. *Activity:* Classroom Video Analysis

Agenda



GOAL 3: Identify priorities to implement in your teaching this fall.

9. Application: Reflect on current practice

10. Take Aways & Reflection



Welcome

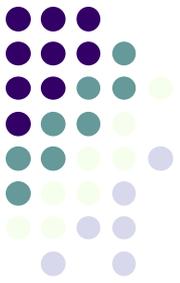
- How would you rate your current math/science classes in terms of gender equity?



Not equitable

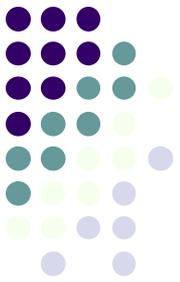
Very equitable

Welcome



Turn and Talk:

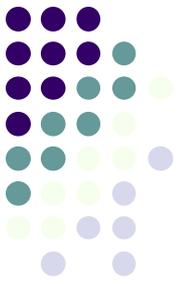
- What came to mind when you evaluated your classes in terms of gender equity?
- What do you hope to learn today?



GOAL 1: Examine the factors that lead to gender inequities in STEM in middle and high school.

Guiding Question: Why is gender equity important to consider in secondary STEM classes?

Activity: Gender Equity Assessment



[PollEv.com/limarcobu952](https://pollev.com/limarcobu952)

The Task:

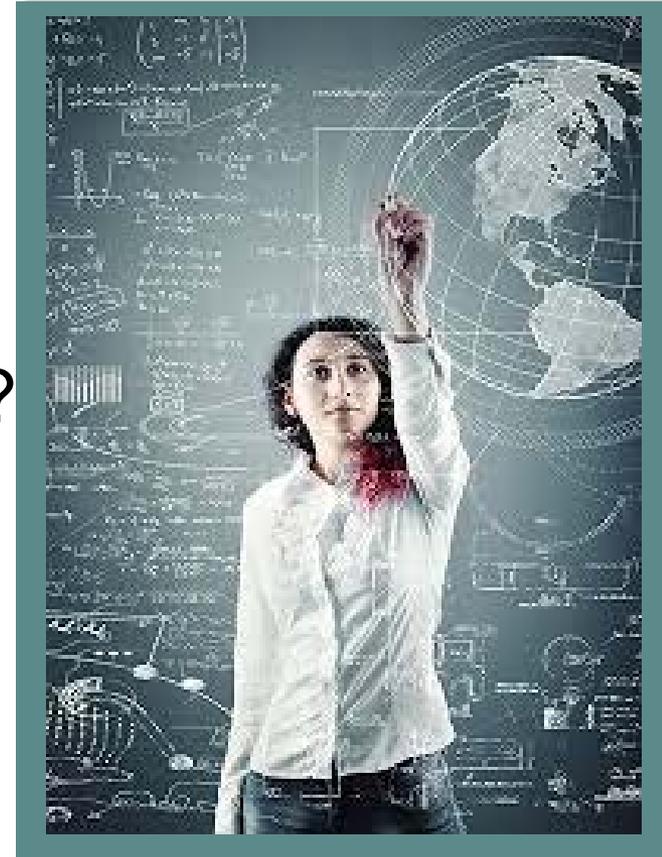
1. Respond to questions on the Gender Equity Assessment (responses will display in “real time”)
2. Discuss responses as tables/grade level teams

Activity: Gender Equity Assessment



Discussion Questions:

1. Were any questions challenging to answer? Which ones? Why?
2. What challenges around gender (in)equity have come up for you?
3. Did these questions make you think about the issue of gender equity in your classroom at all differently? How so?





Video and Discussion



The Task:

- Watch the PBS video about [Girls in Science](#)

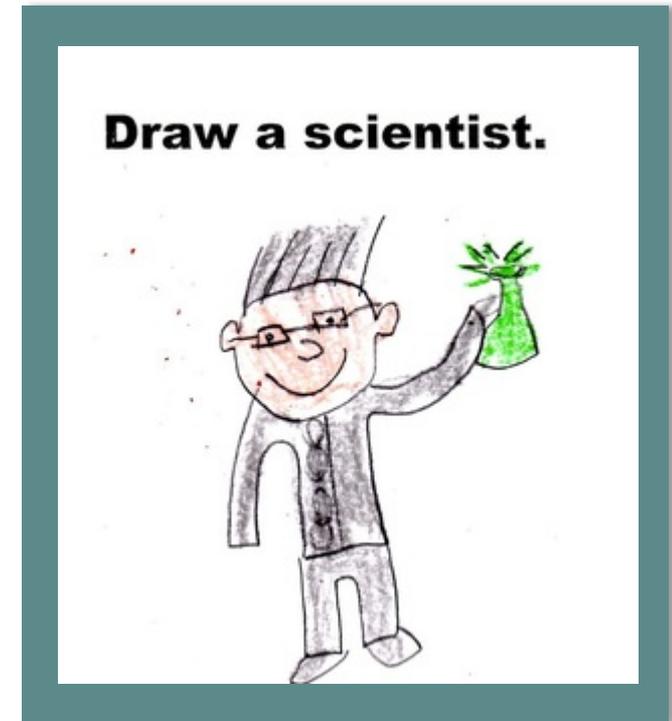
Discussion Questions:

1. What unique social pressures emerge for girls in STEM?
2. How do social pressures and biases impact female students?
3. What unique social pressures come up for your grade level? For your subject(s)?

Presentation: Gender Inequities in STEM, Social Factors



- Science is traditionally male, middle class, and white dominated. These stereotypes influence perceptions and girls' interests from a very young age.
- Research: Drawing a scientist ([Gugliemi, 2018](#))
 - 1960s – 70s, **99.4%** of children drew a male scientist.

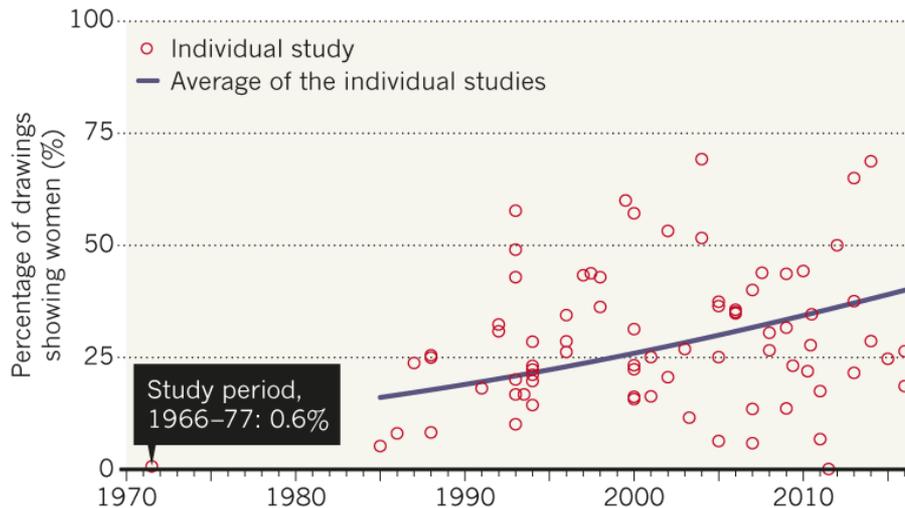


Presentation: Gender Inequities in STEM, Social Factors



SKETCHING SCIENTISTS

When asked to draw a scientist, US children today are much more likely than those in the 1970s to doodle a picture of a woman, according to an analysis of five decades' worth of studies.



©nature

- 1985 – 2016, **72%** of children drew a male scientist
- From the 1980s onwards, an average of **30% of girls** and **83% of boys aged 6** sketched male scientists.
- But by **age 16**, **75% of girls** and **98% of boys** drew male scientists.

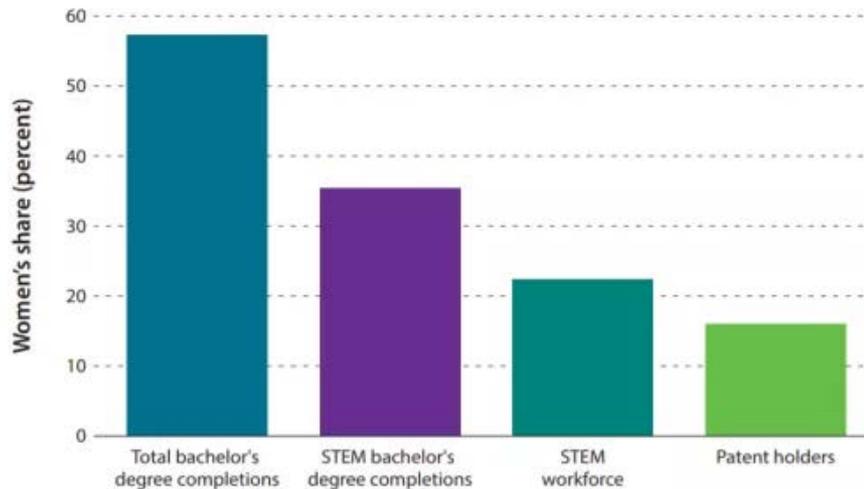
Presentation: Gender Inequities in STEM, Social Factors



- *WHY?* Power structures in society, science, and in the *classroom* can discourage students from pursuing their natural curiosities and interests as they progress through school.

FIGURE 9.

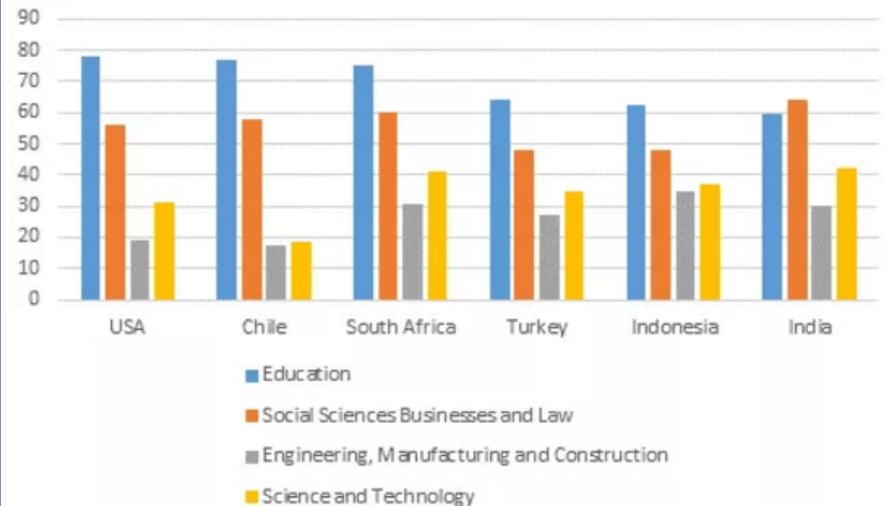
Share of Women, by Selected STEM and Innovation Measures



Source: Current Population Survey 2016; NCES 2016; National Women's Business Council 2012; Nobelprize.org 2017.

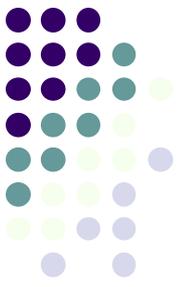
From: www.brookings.edu

Figure 1: Percentage of female graduates from tertiary degrees in selected subjects (2014)



Source: Source: World Bank Education Statistics based on UNESCO Institute for Statistics

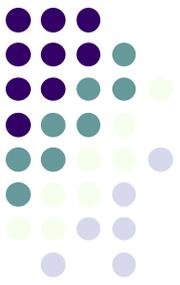
Presentation: Gender Inequities in STEM, Social Factors



- Social factors, not ability:
 - misconceptions about abilities
 - gendered play
 - gendered hobbies
 - femininity vs. “geek”



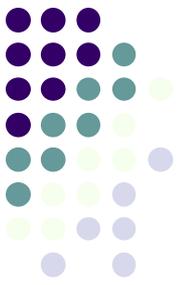
Presentation: Gender Inequities in STEM, Social Factors



- ***For teachers:*** attention to power dynamics in society and the classroom that lead to gender inequities in STEM



Presentation: Gender Inequities in STEM, Social Factors



- *What is science?*

“De-settle expectations” regarding the very “forms of knowledge, experience, and meaning making” with which students participate in science,” (Bang, Warren, Rosebery, & Medin, 2013, p. 304).

- *What impacts student interest?*

“Interest matters, but so do the ways in such interests are forged within sociopolitical histories where issues of power, privilege, and location deeply shape opportunities to learn and become,” (Birmingham et al., 2017, p. 820)

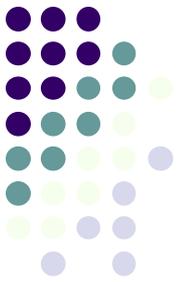


BREAK

- *Challenge:* Can you name these female scientists? What is their claim to fame?
- Marie Curie
- Jane Goodall
- Mae Jemison
- Ada Lovelace
- Rosalind Franklin
- Rachel Carson

MARIE &
JANE &
MAE &
ADA &
ROSILAND &
RACHEL

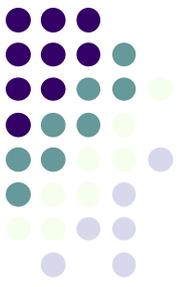
#WOMENINSCIENCE



GOAL 2: Evaluate your current classroom climate, instructional practices, and curriculum with respect to gender equity.

Guiding Question: What can we do to support and encourage female engagement and interest in STEM?

Science & Engineering Practices: Video Introduction



- [Video](#) produced by the Teaching Channel

Discussion Questions:

1. What stood out to you about the video?
2. What challenges have come up in your classes/disciplines?
3. What can teachers do to equally support all genders?

Presentation: Gender Inequities in STEM, Teacher Tools



1. CLASSROOM CLIMATE

- *Systemic and longitudinal connections* – activities that promote curiosity and exploration, open-ended questions, interdisciplinary thinking
- *Self-efficacy* – support student feelings of confidence and competence in science.
 - Highlight diverse role models and mentors
 - Offer a diversity of different types of activities for learning about and showing science knowledge

Presentation: Gender Inequities in STEM, Teacher Tools



2. INSTRUCTIONAL PRACTICES

- Student-centered, active learning tasks
- Open-ended, inquiry-based real-world problems
- Collaborative work monitored for equitable participation across genders
- Group discussions

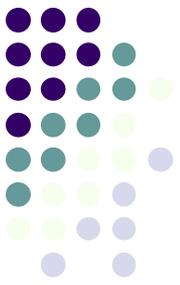
Presentation: Gender Inequities in STEM, Teacher Tools



3. CURRICULUM

- Content that is relevant to students in relation to their personal interests and career aspirations
- Intentionally challenging gender stereotypes by highlighting female scientists

Activity: Classroom Video Analysis



Discussion Questions:

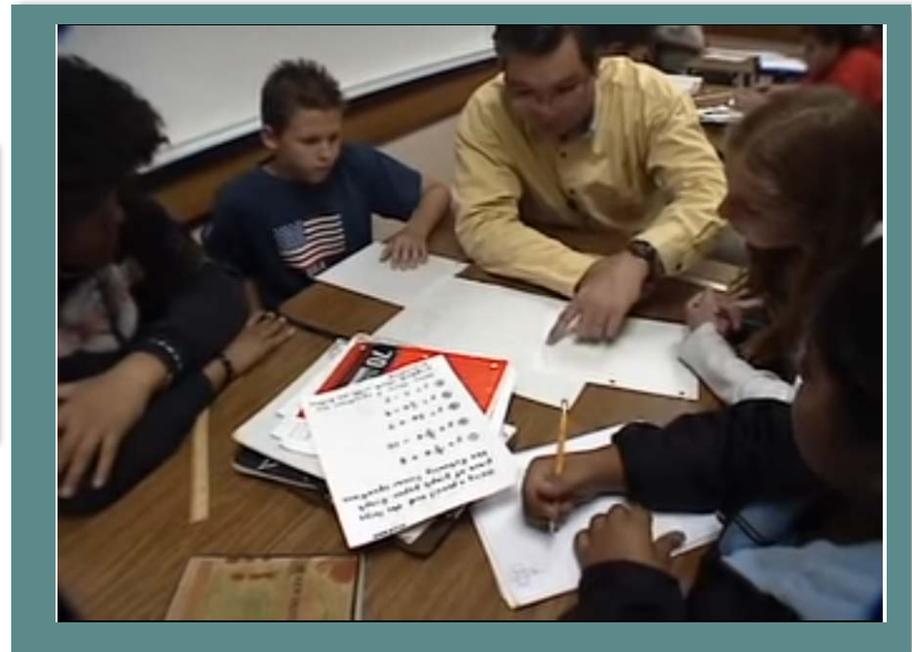
- In what ways did this lesson promote gender equity (climate, instruction)?
- What feedback would you give this teacher?

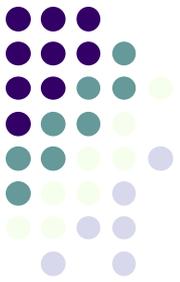
After watching the video, what feedback would you give to this teacher?

START:

STOP:

CONTINUE:

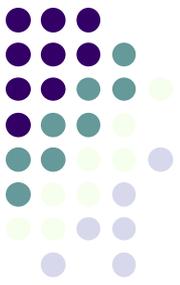




GOAL 3: Identify priorities to implement in your teaching this fall.

Guiding Question: What changes will we implement to promote gender equity through classroom climate, instructional practices, and/or the curriculum this fall?

Application: Reflect on Current Practice



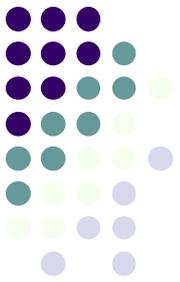
The Task:

- Working as a table, reflect on gender equity in your classes for your grade level/subject area for classroom climate, instructional practice, and/or curriculum.

Discussion Questions:

1. What are your strengths?
2. What is 1 area you could improve in each category?
3. How can you (as a grade level/department) do to make a change? How will you monitor this change?

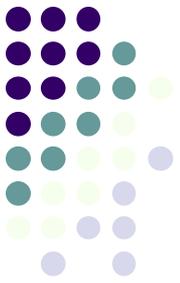
Workshop Take Aways



GOAL 1: Examine the social and school-based factors that lead to gender inequities in STEM in middle and high school

GOAL 2: Evaluate your current classroom climate, instructional practices, and curriculum with respect to gender equity

GOAL 3: Identify priorities to implement in your teaching this fall



Reflection

- How would you rate your current math/science classes in terms of gender equity?



Not equitable

Very equitable



Reflection

- How confident do you currently feel about working towards gender equity in your class?



Not confident

Very confident

For more information:



Marco-Bujosa, Gender Equity in Science and Math PD 8-28-19

STRATEGIES TO IMPROVE CLASSROOM CLIMATE, INSTRUCTIONAL PRACTICES, AND CURRICULUM

Steps to take as a teacher to challenge gender biases in STEM classes:

- Increase awareness of the way gender arises in your classroom and in instruction.
- Expand schemas for yourself and students about who does STEM.
- Be intentional in your instruction and interactions with students to encourage girls and challenge any stereotypes or biases that arise.
- Speak up to advocate for girls in your school and community (and give girls an opportunity to speak for themselves)

Ideas for improving gender equity in your classroom.

1. If you find more male scientists and mathematicians featured in the textbook you use, do your own research and add more notable women to the mix.
2. Use wait/think time deliberately. Instead of calling on the first or second hand, choose the fourth, fifth, or sixth.
3. Be aware of the number of female students you call on. Be incredibly proactive in making sure that all students (regardless of gender, ethnicity, language, or learning ability) are equitably included in discussions and participation.
4. Call out sexist notions or terminology in texts used in the classroom—for example, a textbook, magazine article, poem, research report, or blog post. You can also highlight any gender stereotypical language used by students in the classroom and use it to invite broader discussion.
5. Videotape your classes and review your interactions with students. You could also invite a colleague to watch you teach and note which students are being asked questions, and what type of questions.
6. Design a lesson or unit of study based on exploring issues of gender, self-image, and equality in STEM with your students.
7. Design a community/family event to engage families in encouraging girls

Select resources for teachers:

- 4000 Years of Women in Science, <http://www.astr.ua.edu/4000ws/>
- Association for Women in Science, <https://www.awis.org/>
- Campbell, P. & Storo, J. (1994). Making It Happen: Pizza Parties, Chemistry Goddesses & Other Strategies that Work for Girls and Others." <http://www.campbell-kibler.com/Pizza.pdf>
- Girls Incorporated, <https://girlsinc.org/impact-categories/girls-in-stem/>
- Girlstart, <https://girlstart.org/our-programs-for-educators/>
- Girls Who Code, <https://girlswhocode.com/women-in-tech-lessonplans/>
- National Girls Collaborative Project, <https://nagcproject.org/engineering-girls-in-stem>
- Women in Engineering Proactive Network, <https://www.wepan.org/>

Adapted from: <https://www.edutopia.org/blog/gender-equity-classroom-rebecca-alber> and Goodk, R. (2005). Promoting gender equity in the science classroom. WEEA Equity Resource Center.

Questions: Email

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Slides and handouts: Website

<http://lisamarcobujosa.weebly.com/>