Gender Equity in STEM Education - Teacher Guide

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Setting the Stage

Students will research different groups that support women in STEM and compare this to an increase in human rights and a decrease in Climate Change throughout the globe. Students will discover that there is a correlation between an increase in women in STEM fields, a decrease in climate change, and an increase in human rights globally and locally.

Lesson Overview

In this lesson, students will discuss and learn about two phenomena: First, students will learn about programs and people that have dedicated their time to making the STEM field a more equitable place for all genders. Second, students will discuss how this idea of gender equity in STEM education will stabilize/decrease climate change, and increase human rights globally.

Instructional Overview	
Grade Level	High School
Instructional Time	50 minutes
Driving Question	What might happen to climate change if more genders were represented in STEM?
Standards	NGSS standards for HS science included, see the “Standards” section at the end of this lesson for details.
Concepts	• An increase of women in STEM will increase women’s empowerment globally while also having a positive impact on climate change.
Outcomes	• Students will be able to identify and explain the relationship between an increase in women in STEM and the decrease in climate change.
Materials	❏ Google Slides

	❏ Worksheet ❏ Presentation Sheet
Material Preparation	❏ Print worksheet and presentation sheet, one per student ❏ Give students access to google slides
DEI/human rights connections	• This lesson will provide an understanding of how empowering women in the STEM fields will lead to a decrease in Climate Change.

Lesson Flow

Activity 1: Introduction to the lesson.

- (5 minutes) Focus question: What might happen to climate change if more genders were represented in STEM?
    - Have students hypothesize the answer and talk to students around them
- (5 minutes) Background information
    - Teacher will run through the first 3 slides of the presentation while students think about questions and work in groups to propose some ideas.
    - In the google slide notes (located just below the slides) are possible answers to each question which can be used to introduce new ideas/concepts. If the teacher has time, discuss each question.

Activity 2: Small group work

- (10 minutes) Form small groups and research different organizations
    - Students will form groups of 4-5 and will be assigned one of the 9 programs/inspirational people to present on (see slides)..
    - Students then fill out the worksheet with the background information they have found based off of the recommended sites embedded in the slides.
    - Students will then add this information onto their designated slide (sides 6-14 on the presentation).

Engage: Students google and learn about groups and organizations that encourage women to go into STEM and the effects on the environment and community around them. While they are learning about the group/organization, the students fill out the Gender Equity in STEM Worksheet (see link in Materials).

Explore: Students will spend time working on obtaining knowledge from internet

research and the suggested websites (linked on the google slides) to prepare to share this knowledge with the rest of the class.

Activity 3: Class presentations

- (20 minutes) Students form new groups and present to one another their findings
    - Students will split up into new groups, one person from each group in the new group (i.e 9 students per new group).
    - Students spend 30 seconds to 1 minute presenting their information in the new group. Next, they will spend 30 seconds to 1 minute answering questions from their peers.
    - Students listening to the presentations will fill out the presentation note sheet and write down questions to ask.

Explain: Students will make a presentation discussing an organization that supports women in STEM and how this has affected the community around the women. They will present this to their peers in small groups.

Concluding discussion

- (10 minutes) Class discussion
    - Talk about the common findings within each organization about how more women in STEM can help decrease Climate Change.
    - Provide room for students to ask or write down questions that can be later discussed or answered. Not all questions they ask need to be answerable, it is best if they are asking questions that lead to more discussions and do not have a concrete answer. This is excellent practice for phenomenon-based knowledge.

Evaluate: Informal assessments include participation in the presentation, effort on the worksheet, and effort on the presentation note sheet.

Standards:

https://www.nextgenscience.org/topic-arrangement/hsinterdependent-relationships-ecosystems

Evidence Outcome from NGSS:
HS-LS2-7: Design, evaluate and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

Disciplinary Core Idea:

HS-LS2-7: Ecosystem dynamics, functioning and resilience & Biodiversity and humans & Developing possible solutions.
HS-LS4-6: Adaptation & Biodiversity and humans & Developing possible solutions.

Science Practice:
HS-LS2-7: Construct explanations and design solutions

Cross Cutting Concept:
HS-LS2-7: Stability and change
HS-LS4-6: Cause and effect

Useful resources:

UNESCO International Symposium and policy forum. cracking the code: Girls' education in STEM. UNESCO. (2018, January 30). from https://en.unesco.org/unesco-international-symposium-and-policy-forum-cracking-code-girls-education-stem

UNICEF. (2020, October). *Reimagining girls education through science 2020 - UNICEF*. Reimagining Girls' Education Through STEM. from https://www.unicef.org/media/84046/file/Reimagining-girls-education-through-stem-2020.pdf

Imafidon, A.-M. (2022, February 15). *Girls do science too...* Stemettes ®. Retrieved April 10, 2022, from https://stemettes.org/

Akhtar, S., Chen, Y., Imran, M., & Ahmad, S. (2021, April 17). *Environmental education and women ... - journals.sagepub.com*. SAGE Open. from https://journals.sagepub.com/doi/abs/10.1177/21582440211009469

Hughes, C. (2017, September 13). *How women's Rights Drive Economic Development*. The Borgen Project. from https://borgenproject.org/womens-rights-drives-economic-development/

Armstrong, L., & Adamson, G. (2021, July 2). *The role of gender in peer-group perceptions of climate scientists' media statements*. Public understanding of science (Bristol, England). from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8488648/

Hill, C., Corbett, C., & St. Rose, A. (2010). *Why so few? women in science, technology, engineering, and mathematics.*American Association of University Women. from https://eric.ed.gov/?id=ED509653

Young, C. (2021, February 11). *Calling all girl scientists: Climate change needs you*. OECD Education and Skills Today. from https://oecdedutoday.com/girl-women-scientists-climate-change-green-jobs/

Trumper, R. (2010, December). *How do learners in developed and developing countries relate to environmental issues?* Science Education International. from https://files.eric.ed.gov/fulltext/EJ907042.pdf

Tucker, S., Schooleman, G., Torres, A., Gasca, A., Silver, M., & Heskett, C., (May 3, 2022) *Women & Environment. Chapter 6: Gender Equity in Science Education*. Global Restoration and Degradation, CU Boulder. From https://docs.google.com/document/d/12c4XdiKwjsSvoe4OtmV2LW4kf6s6KrmN6yVqtf-tPEs

Find more curriculum here:
https://cires.colorado.edu/outreach/programs/right-here-right-now-global-climate-summit