Girls Just Wanna Have Fun in STEM

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Time Frame 75-90 minutes

Essential Question(s)

How can promoting women in STEM shape science for the future?

Summary

In this session, participants will explore the research behind the decline of young women interested in STEM fields and analyze strategies and approaches to increasing their interest in STEM careers.

Learning Goals

- Explore personal and professional STEM career misconceptions.
- Analyze strategies and approaches to close the STEM gap in your schools and communities.

Attachments

- Closing the Gap—Girls Just Wanna Have Fun in STEM.docx
- Closing the Gap—Girls Just Wanna Have Fun in STEM.pdf
- Magnetic Statements Overview—Girls Just Wanna Have Fun in STEM.docx
- Magnetic Statements Overview—Girls Just Wanna Have Fun in STEM.pdf
- Magnetic Statements—Girls Just Wanna Have Fun in STEM.docx
- Magnetic Statements—Girls Just Wanna Have Fun in STEM.pdf
- Note Catcher—Girls Just Wanna Have Fun in STEM.docx
- Note Catcher—Girls Just Wanna Have Fun in STEM.pdf
- Session Slides—Girls Just Wanna Have Fun in STEM.pptx

Materials

- Session Slides (attached)
- Note Catcher handout (attached; one per participant; print front)
- Magnetic Statements posters (attached; one per session; print front only)
- Magnetic Statements Overview handout (attached; one per participant; print front only)
- Closing the Gap handout (attached; one per participant; print front/back)
- Chart paper

10 minutes

Engage

Customizing the Session

During the Explore portion of the session, participants are asked to move to a statement that repels them then move to a statement that attracts them, using the Magnetic Statements strategy. The statements are on slides 14-18 and 26-31 and on the attached **Magnetic Statements** posters, pages 1-5 and 6-11, respectively.

Use the expected size of your audience or the size of your room to determine how many Magnetic Statements to print. **Pages 1-5** of the Magnetic Statements posters and **slides 14-18** contain statements that are intended to be repelling, while **pages 6-11** of the attachment and **slides 26-31** are intended to be attractive.

Print the pages of the Magnetic Statements that you intend to use and hide the slides that you do not intend to use.

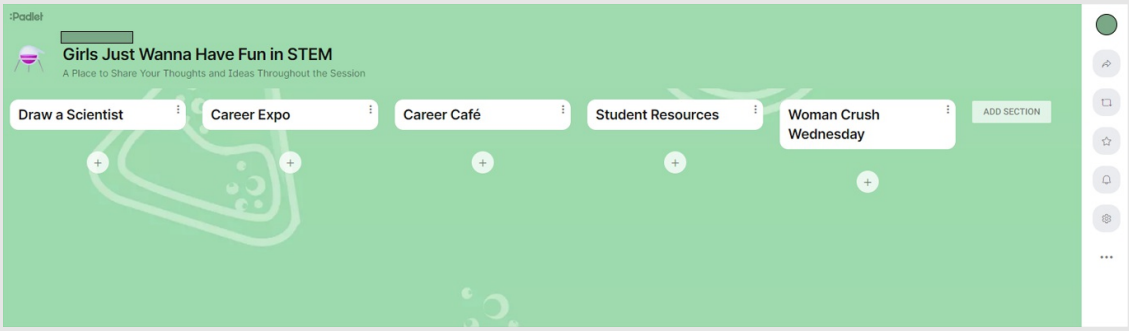
The **Magnetic Statements Overview** handout has all of the statements listed. Edit this document to reflect your choice of magnetic statements.

Facilitator's Note: Setting Up Before the Session

Prior to the session, set up the following:

Padlet:

1. Go to padlet.com and make a Padlet.
2. Once you have made all of your selections and set up your Padlet, like the one shown below, click the “Open share settings” arrow.
3. Click “Get QR code,” and either copy the image of the QR code or click “DOWNLOAD.”
4. Put your QR code on the **Note Catcher** handout and **slide 7**.



Depending on the type of Padlet account you have, you may be able to use the “remake” feature. Click the following link, and click the remake button to make a copy of the original Padlet to your account: https://k20center.padlet.org/michelleike/girls-just-wanna-have-fun-in-stem-3astur7vy1lw0kjh

Posters for the Explore activity:

1. Print the **Magnetic Statements** posters.
2. Attach each magnetic statement to the top of a piece of chart paper (one statement per chart paper).
3. Hang the prepared chart papers around the room.

Begin the session by displaying **slide 2** from the attached **Session Slides** and welcoming participants as they enter. Draw participants' attention to the prompt on the slide.

Once participants are settled, welcome them to the session, and give each participant a copy of the **Note Catcher** handout. Let them know that they'll have time to wrap up work on the opening prompt after you share the session goals and objectives.

Move to **slide 3** to display the presentation title, "Girls Just Wanna Have Fun in STEM."

Welcome participants and introduce yourself and your background.

Show **slide 4**. Share the Essential Question: *How can promoting women in STEM shape science for the future?*

Share the Session Objectives on **slide 5.**

- Explore personal and professional STEM career misconceptions.
- Analyze strategies and approaches to close the STEM gap within your schools and communities.

Transition to **slide 6** and provide participants with an additional 1–2 minutes to complete their scientist drawings.

Facilitator's Note: Guiding the Activity

Participants should not need more than 5 minutes to draw their scientist. The details of the drawing are not what is important at this time. Use the Fist to Five strategy to have participants indicate if additional time is needed for uploading their picture.

Display **slide 7** and instruct participants to share their scientist drawings using the attached Padlet. Provide participants with instructions for how to share their drawings. If you are presenting remotely/virtually, make sure to share the link in the chat for those who are unable to access Padlet using the QR code.

Display the Padlet on the screen so that everyone can see what's being shared. Encourage participants to provide their thoughts or any details about how they created their scientists with the group.

Move to **slide 8** and direct participants' attention to the bottom of their Note Catcher handout. Share with them the S-I-T (Surprising, Interesting, and Troubling) strategy. Let participants know that they are encouraged to use that space to take notes as we go throughout the session.

Transition through slides **9-10** and share the related research.

- "One meta-analysis collection of 5 decades of Draw A Scientist Test (DAST) results showed out of 20,860 drawings, only 11% were women." - Cyril Ponnamperuma
- "Scientists are human–they're as biased as any other group. But they do have one great advantage in that science is a self-correcting process." - Cyril Ponnamperuma

20 minutes

Explore

Display **slide 11** and share the instructional strategy, Magnetic Statements, with your participants. Give each participant a copy of the attached **Magnetic Statements Overview** handout. Move to **slide 12** and provide your participants with five (5) minutes to read each of the statements around the room. Instruct them to choose the statement that most repels them.

Move to **slide 13** and instruct your participants to discuss the following with their groups and select a spokesperson:

- Why did you choose the statement?
- What is one way it can be reversed, solved, or fixed?
- What is something we can do?

Have them record any key information they discuss on the chart paper. There is a 5-minute timer on the slide. Provide your participants with more time if they need it.

Use **slides 14-18** to have a whole-group discussion about the research statements around the room.

- "According to the United States Department of Commerce, "Although women fill close to half of all jobs in the U.S. economy, they hold less than 25 percent of STEM jobs. This has been the case throughout the past decade, even as college-educated women have increased their share of the overall workforce."
- "Between 2008-2015, women earned 35.1% and 34.5% of undergraduate and Ph.D. STEM degrees, respectively."
- "Women are 30% less likely to be called to interview for a job than an equally qualified male counterpart."
- "Once hired, men are promoted at a 30% higher rate than women."
- "Women experience less sense of belonging, positive attitudes, and aspirations in STEM careers."

Display **slide 19** and have participants complete the other half of the activity by choosing the statement that they are most attracted to. Move to **slide 20** and provide the participants with five minutes to read each of the statements around the room. Instruct them to choose the statement that most attracts them.

Teacher's Note

This activity can be adjusted to meet time constraints by having participants complete one portion, such as the repelling or the attracting piece, rather than the entire Magnetic Statements strategy.

25 minutes

Explain

Facilitator's Note: Guiding the Activity

Depending on the needs of your participants, consider having them sit to watch the 7-minute video or remain in their groups.

Display **slide 22** and share the instructional strategy POMS (Point of Most Significance) with your participants.

Move to **slide 23** and share the "Girls Just Wanna Have Fun in STEM" video.

Embedded video
https://youtube.com/watch?v=hzVA1w4_WPk

Use **slide 24** to guide the discussion over their most significant point.

Move to **slide 25** and instruct the participants to go back to the Magnetic Statement posters and add any additional thoughts and ideas they gleaned from the video.

Use **slides 26-31** to have a whole-group discussion about the research statements around the room.

- "Women and girls need to see female role models in the workplace that look like them - over and over again." (Milgram, D., 2011)
- "They need to receive the message that women can work in STEM, be successful and fulfilled in their work life, while still have a personal life." (Milgram, D., 2011)
- "It is critical that biographies of female role models used in outreach materials emphasize not only the path these women took to arrive at their chosen careers, but also the joy they found in their work, as well as their personal interests and family stories." (Milgram, D., 2011)
- "A recent study found that female 9th and 10th grade students performed better in science when the images in their textbooks included counter-stereotypical images of female scientists." (Good, J. J., Woodzicka, J. A. & Wingfield, L. C., 2010)
- "Girls Who Code, an extracurricular program with a computer science focus for girls in programming, reports that interest reduces from 66% to merely 4% in girls between the ages of six to eighteen." (Ware, R. 2017)
- "By offering year-long clubs, after-school activities, and summer immersion programs, participants of Girls Who Code study computer science in college at "15 to 16 times the national average." (2019)

15 minutes

Extend

Display **slide 32**, direct your participants' attention to the back of their Note Catcher handout, and share the instructional strategy, Identity Chart. Instruct them to consider all of the information they have explored through the first part of this session and, using the top part of their identity chart, write down any tactics or ideas that they can take back to their school to help close the gender gap.

Transition through **slides 33-34** and share that K20 is working to close the gap through many of its career exploration practices and ask them to brainstorm some ways they can work to close the gap at their school.

Display **slide 35** and pass out the attached **Closing the Gap** handout. Instruct participants to use the QR codes on the slide and spend approximately 10 minutes exploring some of the resources available to them through the K20 Center.

Move to **slide 36** and have your participants revisit their identity charts. Instruct them to add any additional information, tactics, and/or ideas that the exploration of the K20 Center's resources have sparked.

Direct participants' attention back to Padlet. Have them add takeaways for the four groups: Career Expo, Career Café, Student Resources, and Woman Crush Wednesday. If time allows, ask for a few participants to share aloud with the whole group. Remind participants that what they have written is for them to take back to their school or classroom.

5 minutes

Evaluate

Move to **slide 37** and direct participants' attention to the bottom of the front of their Note Catcher handout. Remind them of the S-I-T (Surprising, Interesting, and Troubling) strategy that was shared at the start of the session. Provide them with a few minutes to complete this. Once you notice that they have completed the activity, have them share some of the things they found surprising, interesting, and troubling with their table group.

Research Rationale

Research continuously shows that career exploration can be affected by an individual's beliefs, including a connection between high school students' beliefs regarding their capability of completing career decision tasks and their overall career exploration (Chiesa et al., 2016; Rogers & Creed, 2011). Further research shows that for Science, Technology, Engineering, and Math (STEM) subject areas there is a decline in girls' interest when they reach adolescence (Hyllegard et al., 2017). This is due to a lack of environments which promote collaborative learning, hands-on experiences, creativity, practical applications, and stereotype threats (Cooper & Heaverlo, 2013). Given that girls will develop an interest in STEM careers in proportion to their enjoyment of STEM classes and activities, it is important to identify specific skills that will help to encourage their passion in STEM subject areas (Sadler et al., 2012). Furthermore, research shows that teenagers engaging in multiple opportunities to speak with professionals through career talks statistically earn higher salaries in adulthood (Kashefpakdel & Percy, 2017). If students' beliefs prevent them from deeper career exploration, they are less likely to have a variety of career opportunities in adulthood. To dispel misconceptions about careers and ensure sustainability, GEAR UP programs can implement programs and activities that provide accurate and diverse representations.

Resources

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