NOT THE SCIENCE TYPE

YOUR POTENTIAL IS EXPONENTIAL

3M AND GENEROUS FILMS PRESENT "NOT THE SCIENCE TYPE" DIRECTED BY JULIO PALACIO PRODUCED BY CHRISTINE ARENA EXECUTIVE PRODUCER ROBERT BRITTAIN

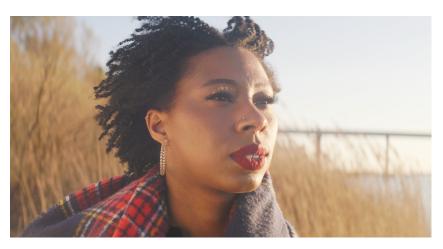GENEROUS FILMS EDITED BY JEFF JAY AND ALEX ZUSTRA CINEMATOGRAPHY BY WILLIAM ATHERTON 3M

~~Not~~ the Science Type: *Dr. Ciara Sivels*

Discussion Guide

Goal: Explore the experiences of underrepresented populations in STEM fields and learn more about chemical engineering.

Meet Dr. Ciara Sivels, a nuclear engineer who is passionate about teaching and mentoring the next generation of STEM leaders. As a high school junior, Ciara saw herself becoming a pastry chef. However, her chemistry teacher, Mr. Harrell, recognized Ciara's ability and interest and inspired her to connect cooking, chemistry and engineering. With her teacher's encouragement and mentorship, Ciara earned a Bachelor of Science in nuclear science and engineering at MIT.

Between her undergraduate and graduate degrees, Ciara spent time with Teach for America, which sparked her desire to pursue an academic career. In 2018, Ciara was the first Black woman to earn a Ph.D. in nuclear engineering from the top-rated University of Michigan. She was named an IF/THEN Ambassador in 2019 by the American Association for the Advancement of Science.

Ciara is now a nuclear engineer at Johns Hopkins' Applied Physics Lab where she studies how radiation affects materials. Ciara strives to help other young women to recognize that careers in STEM are not just possible but FUN!

"Not the Science Type" is a [docuseries](#) featuring four female scientists as they rise to prominence in fields ranging from biology to engineering, to science and technology-based applications and innovations, challenging stereotypes and confronting gender, racial, and age discrimination along the way. While each has taken a different path to pursuing scientific excellence, they are bound by the common experience of feeling outcast or "not the type" in traditionally homogenous scientific fields.
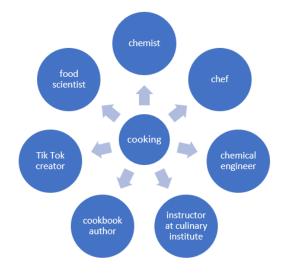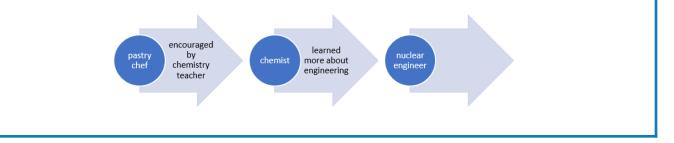
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Before the Video

- Engage students in a discussion surrounding their current thoughts about what they will pursue after high school and what factors have influenced those ideas.
- Possible prompts include:
  - Consider what you're passionate about.
  - Are you thinking of a way to pursue that passion after high school?
  - Who in your life has encouraged or discouraged you to pursue that passion?
  - What role do they play in your life now?
  - What are your current ideas about what you will do after high school?
  - Who or what has helped form those ideas?
  - Have your ideas changed over time? Why?
- Strategies include:
  - For either prompt: Think.Pair.Share or Stop & Jot.
  - For prompt #1, guide students in exploring how their passions may lead to future careers. Students begin with writing their passion in the center of the page and then drawing arrows outwards to possible careers.

  - For prompt #2, guide students in drawing a rough timeline showing how their ideas and dreams have changed over time and why. Who helped them dream of impossibilities?

During the Video

- Stop at key points to allow students to reflect on the experiences of underrepresented populations in STEM education.
- **Pause at 2.21**. While in high school, Ciara's parents sat her down and said, "You're not like the other people in your class [...] People may make assumptions about you based on the way you look [...] As a minority, you're going to have to work harder."
  - **Stop & Jot.** Do people make assumptions about you? Why? Do you feel it affects how hard you have to work? Explain.
- **Pause after 6:15:** "Why did it take so long?" [for the first Black woman to graduate with a Ph.D. in nuclear engineering from the University of Michigan.]
  - **Think.Pair.Share.** What are some reasons you think it took until 2019 for the first African American woman to be awarded a PhD in this field from this University? Have you seen other inspiring "firsts" recently? What qualities are needed by someone who is a "first"?
- **Pause after 7:00** when Ciara discusses social media as one way to break down barriers regarding issues of access and exposure in small towns, rural community and minority communities.
  - **Lead a class discussion**: Thinking of our community, do we have any issues of access and exposure? Are there opportunities you feel you're missing out on? In addition to social media, what are some other ways to break down these barriers? What communities do you rely on to support your passions?

After the Video

- Guide students in continuing to reflect on the experiences of underrepresented populations.
- **Reflect.** At the beginning of the video, Ciara's Mom told her to, "Represent," when Ciara was presented with an academic award in high school. What did she mean? In what ways did Ciara "represent?" Do you feel a responsibility to ever "represent?" Why or why not?

Go Further!

- Learn more about Ciara's academic journey, including what supports were helpful in college and graduate school:
  - All About Nuclear Engineering: What it's Really Like to be a Nuclear Engineer | Curiosity Camp https://www.youtube.com/watch?v=AW6DJ9YWI04
  - Sivel's is Gold https://www.stemisthenewblack.com/new-blog/2018/11/7/sivels-is-gold
  - Ciara in the #IfThenSheCan exhibit https://ifthenexhibit.org/ambassador/B-10/
- Explore another recent "first" - Black women were inducted into the National Inventors Hall of Fame for the first time in 2021

https://www.cnn.com/2021/09/28/us/inventors-hall-of-fame-first-black-women-scn-cec/index.html

- Learn more about STEM Is The New Black, an organization that seeks to introduce and expose minority students from underrepresented communities to STEM opportunities and careers: https://www.stemisthenewblack.com
- Check out five unusual things that chemical engineers do: https://www.wemadeit.ca/share-able/5-weird-things/

Activity

Engage students in a chemical engineering challenge such as making a glowing, bouncing egg: https://www.kiwico.com/diy/stem/crazy-chemistry/glowing-bouncy-egg

Careers

- Ciara's teacher helped her recognize she could combine her love for baking and chemistry into a career. What are your passions? Describe your dream career in a few words … and get suggestions from the Nepris Career Explorer! https://www.nepris.com/app/career-explorer
- Share information with your students about the Society of Women Engineers community for girls under age 18: SWENext https://swe.org/k-12-outreach/swenext-clubs/ and WEMADEIT, a Canadian collaborative partnership by people who believe there should be more young women in engineering: https://www.wemadeit.ca/
- Explore engineering careers through the National Society of Black Engineers https://careers.nsbe.org/career-insights/

Meet…

Meet other engineers like Dr. Sivels at the IF/THEN Collection:

- **J'Tia Hart**: *Nuclear Engineer* https://ifthenexhibit.org/ambassador/A-25/
- **Afua Bruce**: *Computer Engineer* https://ifthenexhibit.org/ambassador/B-24/
- **Sydney Hamilton**: *Aerospace Engineer* https://ifthenexhibit.org/ambassador/B-01/
- **Erika Anderson**: *Reliability Engineer* https://ifthenexhibit.org/ambassador/T-04/

IF/THEN®, an initiative of Lyda Hill Philanthropies, was founded to increase diversity and representation of women in science, technology, engineering, and math (STEM) by empowering current innovators and inspiring the next generation of pioneers. One hundred twenty-five AAAS IF/THEN® Ambassadors were selected and supported to serve as high-profile role models for middle school girls from 2019 through 2021. They have pursued careers in a wide range of STEM disciplines including neuroscience, immunology, machine learning, mathematics, and many more. Learn more about the unique stories of these women innovators at the IF/THEN Collection.

![IF/THEN Collection logo]