Using Narrative to Engage Young Women in STEM

We will begin at 12:00pm pacific/3:00pm eastern
Presenters

• Penny Noyce, author of Magnificent Minds, Remarkable Minds
• Sonia Ellis, author of Talk to Me
• Beth McGinnis-Cavanaugh & Isabel Huff, Through My Window
NGCP Vision

The National Girls Collaborative Project (NGCP) brings together organizations that are committed to informing and encouraging girls to pursue careers in science, technology, engineering, and mathematics (STEM).
National Network of Collaborative Teams
NGCP Goals: Maximize Access to Shared Resources
NGCP Goals: Strengthening Capacity with Exemplary Practices
NGCP Goals: Gender Equity in STEM
Hertha Ayrton
(Phoebe Sara Marks)

England, 1854 - 1923
First woman electrical engineer
First to present a paper to IEE
Timeline 1854-1923

1854 | Birth of Phoebe Sarah Marks later Hertha Ayrton
1863 | Attends her Aunt Marion's school in London
1869 | Three women found Girton College at Cambridge
1870 | Starts work as a governess
1876 | Enters Girton College
1876 | George Eliot publishes Daniel Deronda
1883 | Invents a line-divider
1885 | Marries William Ayrton
1902 | Publishes book on electrical arcs
1903 | Wright Brothers' first powered flight at Kitty Hawk
1901 | Death of Queen Victoria
1906 | Wins Hughes medal from the Royal Society
1908 | William Ayrton dies
1910 | Suffragettes hold hunger strikes in prison
1914-1918 | World War I
1918 | Ayton invents an anti-gas fan
1918 | British women win the vote
1923 | Death of Hertha Ayrton
Street Lighting. City dwellers have never liked walking home in the dark. In urban Greece and Rome, lamps that burned vegetable oil provided some light. Roman slaves called lanternarii hung oil lamps outside the house or carried them through the streets to light their masters’ way.

By the 1500s, the main streets of London and Paris were illuminated. Laws required city residents to hang lanterns by their doorways and to keep lamps burning in windows that faced the street.

The earliest gas lamps, developed in the 1800s, used piped coal gas. Oil gas and kerosene came later. In 1875, the first electrical or arc lamps, called Yablochov candles after their inventor, provided a harsh, bright light. Gradually these arc lamps were replaced by incandescent lighting and then by today’s high intensity halide, or more recently, LED lamps.

Poison Gas in World War I. The French were the first to use a kind of tear gas against German attackers in Belgium. The Germans soon responded with the far more deadly chlorine gas. When a green cloud of chlorine gas released from cylinders in the German lines drifted across the French lines, soldiers began to choke. They died of suffocation as the gas reacted with moisture in their lungs to form hydrochloric acid. When the British began using chlorine gas too, the Germans responded with the far more deadly phosgene gas, which caused symptoms only after a latent period of hours or days.

By 1917, most Western soldiers had effective gas masks, but mustard gas, developed next, soaked into soldiers’ woolen uniforms and caused severe blistering all over the body. If it reached the eyes, it caused blindness, usually temporary. By that time, armies were shooting gas canisters to enemy lines in exploding shells. Still, if the wind changed, the gas sometimes drifted back over the lines of the sending army. The major purpose of gas attacks was to spread terror among enemy troops. Many army leaders felt, as one British general expressed it, that gas attacks were “a cowardly form of warfare” as well as one that offered neither side a clear advantage. After the war, the Geneva Protocol of 1925 outlawed the use of poison gas.
side to prevent it from slipping when placed in any position. The limb A of the rule is divided on both edges into eighths, quarters, half-inches, and inches, which are consecutively numbered so that any number of parts may be taken.

Mark's Space Dividers.

To use the space dividers.—Suppose the space d to be is to be divided into any number of parts—say thirteen; taking the half-inch line A, hold the rule B
TORTURING WOMEN IN PRISON

VOTE AGAINST THE GOVERNMENT

National Girls Collaborative Project

Afterschool Alliance | Access STEM | Avanade Results Realized | American School Counselor Association | Google
Experiments with “ripplemark” in wave tanks, early 1900s
Could Hertha Ayrton’s gas-clearing fans have saved more soldiers from the effect of gas attacks?
The Call:

Novel written by Ayrton’s stepdaughter Edith Zangwill about a woman scientist whose life-saving invention is officially ignored during WWI.
Tumblehome Learning

Using story to excite kids about science and engineering

Diverse characters, science history, mystery and adventure
The Galactic Academy of Science
The Contaminated Case of the Cooking Contest
by Peter Wong and Penny Noyce

Food safety aboard a cruise ship
Canning, freezing, microwaves
Typhoid Mary and cholera
Incubating bacteria
Tracing an epidemic
Strong girl characters
Teacher/leader guides
Suggested activities
Who We Are

Sonia Ellis
Author, *Talk to Me*

Beth McGinnis-Cavanaugh
Through My Window

Isabel Huff
Through My Window
Common Themes

• Portray girls as heroes of their own stories
• Use intelligence, leadership, and strength to overcome obstacles
• Encourage a STEM identity
Evolution of *Talk to Me*

- Grounded in personal experience
- Inspired by the need for a different kind of engineer
- Based on Imaginative Education
Why Use Story?

- Stories provide context.
- Stories engage readers with extremes of reality, mystery, and heroes.
- Characters provide emotional relevance.
Sadina’s world is falling to pieces. Her mother is about to be arrested for a crime she didn’t commit. Her little sister, Maddie, is sinking into a world of silence. And her best friend Rio is turning into someone she doesn’t know.

Sadina fights the clock to clear her mother’s name, help her sister speak—and find out the truth about Rio.
The *Talk to Me* World
What Makes *Talk to Me* Different?
Sadina Reyes

LIKES
The band Polite Convention, basketball, strawberry syrup on pancakes, quesadillas

DISLIKES
Catalina, pickles (even more than Brussels sprouts)
Maddie Reyes

LIKES
Puppies, when my big sister Sadina reads to me and does the voices, gummy bears (especially the red ones)

DISLIKES
The color brown (it looks like mud), loud voices, watching the news (it’s so boring)
Catalina Davis

LIKES
Tiramisu (my fave), presents from my dad’s travels, my cat Penelope (she’s a superstar, like me)

DISLIKES
Losing at video games (which never happens because I rock at them!), not getting the attention I deserve
Paulie Reed

LIKES
Being four minutes older than my twin brother, airplanes—I am obsessed with them, Shakespeare (he’s the man)

DISLIKES
Things with sharp teeth
About *Talk to Me*

Lexile:  840
Chapters:  32
Pages:  144

Available in three formats:

- Free online eReader (throughmywindow.org)
- Free online audiobook
- For purchase in paperback
"… it was so captivating and relevant that I actually read it in one sitting. [It] impressed me on a variety of levels…There are many ways that the girls would be able to relate and make connections, which would not only be curriculum-based, but also socially and emotionally.

“Trust honesty fear responsibility all handled here in an engaging story about an intelligent teenage girl…Sadina's internal struggles…would easily lead into discussions about the choices teenagers and adults must make everyday and the outcome of those choices.”

“A strong main character who's relatable, especially in her relationships. A fantastic plot that kept [my daughter] glued to the ereader, in fact she found it very hard to put down…[she] asked me to buy a physical copy to read again and again.”
Using *Talk to Me*

- **Formal Classrooms**
  - “All school summer read”
  - Interdisciplinary: English and computer science
- **Afterschool Programs**
- **STEM Clubs, Robotics Programs, Book**
- **Novel Support**
  - Chapter plot summaries
  - Vocabulary words
  - Discussion and activity prompts
  - Connections to engineering
Through My Window

Multimedia learning environment

Talk to Me throughmywindow.org
  • e-reader (Spanish version coming soon!)
  • Captioned audiobook

Learning Adventures throughmywindow.org
  • Immersive, interactive—users become part of story!

Offline Enrichment Activities
  • Flexible, adaptable—educators choose what works!
  • Educator support site teamthroughmywindow.org
Contact Us!

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throughmywindow.org
teamthroughmywindow.org
Questions?
Stay Connected

• Tumblehome Learning
  http://tumblehomelearning.com/

• Through My Window
  http://teamthroughmywindow.org/

• National Girls Collaborative
  www.ngcproject.org