Connecting Mathematics and Science Through Literature and Storytelling

Related Resource List

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- Christine Anne Royce, NSTA Past President (18-19), Professor of Education/Science Education, Shippensburg University caroyce@aol.com; @caroyce
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The STEM Teacher Leadership Network's January webinar will be held on January 14th. NCTM is partnering with STEMTL Network for this event. The following list of resources support the topic and highlight points that are highlighted in the blog and will be on the webinar. Please note that many of these resources are available online or permission has been secured to share them while others may require membership to different associations or purchase of a resource.

Journal Articles

A Preschool Investigation: The Skyscraper Project
by Kelly K. McCormick and Guinevere Twitchell
This meaningful learning experience intrinsically invites problem solving and mathematical thinking that emerges during play. Teaching Children Mathematics Preschool Example

Biography as Mentor: Using Texts to Teach Science and Literacy through the NGSS and CCSS
by Donna Werderich, Pamela Farris, and Alice McGinty
This column provides ideas and techniques to enhance your science teaching. This month’s issue discusses using texts to teach science and literacy through the NGSS and CCSS. Science and Children

Flying Machines
by Emily Morgan, Karen Ansberry, and Susan Craig.
This column includes activities inspired by children’s literature. This month’s issue uses two fiction trade books to inspire students to design and test various flying machines. Science and Children

From the Tip of at Beak to the End of the Tail (Teaching Through Trade Books)
by Christine Anne Royce
Explore connections between the STEM fields with children’s picture books as you learn about Beauty the Bald Eagle who has a 3D printed beak and a dolphin with a prosthetic tail. Science and Children
Star Light Star Bright (Teaching Through Trade Books)
by Christine Anne Royce
This issue discusses how younger students can learn about patterns through constellations, which have set times at which they appear in the night sky. As students get older, they can consider starlight and begin to understand Henrietta Leavitt’s investigations to use the size and distance of stars from Earth. Science and Children

The Three Little Engineers
by Kari N. Jurgenson and Ashley R. Delaney
The Three Little Pigs launched a lesson in which kindergarten students were challenged with designing a house out of materials such as marshmallows and toothpicks that could withstand the Big Bad Wolf. Students engaged in the engineering design process and geometry standards while building and testing their models. Mathematics Teacher: Learning and Teaching PK-12

Engineering Example
Tinkering with Buoyancy
by Mi Yeon Lee
Teaching Children Mathematics (iSTEM column)

Goldilocks and Engineer
by Lukas J. Hefty
Teaching Children Mathematics (iSTEM column)

Using Trade Books and Biographies to Bring the Practices of Engineering to Life
by Julie K. Jackson and Michelle Forsythe
Information about using trade books and biographies as a strategy to engage students in understanding the engineering practices is presented in this article. Science and Children

Online Resources
Flatland: A Romance of Many Directions
Flatland: The Movie – Information about the movie made from the book.

How Reading Novels in Math Class Can Strengthen Student Engagement - by Kara Newhouse - a great article about using literature in the high school math classroom and includes a wonderful list for a math book club.

Math Book Magic by Kelly Darke: a blog whose purpose is to “search for and read magic math books” and to share this magic with “teachers, parents, and the mathematically curious.”

Math Through Stories - is an international research-based initiative, which sets out to explore various aspects of integrating stories and literacy in mathematics instruction.
Read Aloud Revival is a great podcast about children’s books and a place that promotes the value of reading out loud or oral stories. Here is their page on math read alouds. And here is their list of picture book biographies of mathematicians and scientists.

Sunil Singh - on his blog, his twitter feed, and through his books is continually exploring, theorizing about, and telling math stories, a true leader in this field.

Talking Math With Your Kids - a blog and set of resources by Christopher Danielson - his take on stories and math brings another exciting dimension to this conversation. Instead of a book itself being the story, imagine a book or a manipulative being the gateway to conversations that unfold like stories, that create new stories in the classroom or around the kitchen table.

Book Lists
Looking for books to integrate into your lessons? The following books are those that have been selected as Outstanding Science Trade Books or Best STEM Books which is a partnership between the National Science Teaching Association and Children's Book Council or Mathical Book Prize which is awarded by the Mathematical Sciences Research Institute in conjunction with the Children's Book Council and partnership with the National Council of Teachers of English and the National Council of Teachers of Mathematics.


OSTB 2014 List  BSB 2017 List  Mathical 2015
OSTB 2015 List  BSB 2018 List  Mathical 2016
OSTB 2016 List  BSB 2019 List  Mathical 2017
OSTB 2017 List  BSB 2020 List  Mathical 2018
OSTB 2018 List  BSB 2021 List  Mathical 2019
OSTB 2019 List  Mathical 2020
OSTB 2020 List  Mathical Honor Books
OSTB 2021 List  Mathical Hall of Fame

Additional Discussion Opportunities
Join the NCTM Mathematics, Literature, and Story Telling Community.
Open to members and non-members in the MyNCTM site.

Non-members: Create a free account - www.nctm.org/register/ and then click on the Find your
Books Read Aloud Online (with Permission)
The following resource is a list of books that have been read aloud online that may be useful for teachers.

National Council of Teachers of Mathematics: https://www.nctm.org/


- Problem of the Week – Flatland-Soldiers
- Flatland The Movie Information
- NCTM’s Catalyzing Change Series: Early Childhood & Elementary, Middle School, High School
- NCTM’s Principles to Actions: Ensuring Mathematical Success for ALL
- Deepening Student’s Mathematical Understanding with Children’s Literature, 2018 Understanding-with-Children-s-Literature/
- Exploring Math through Literature PK-8, 2017, Digital Resource,

National Science Teaching Association https://www.nsta.org
- Pairing Literacy and Science to Effectively Teach Argumentation (Blog)
- Venn Diagram of Practices in Science, Math, and ELA
- What Makes a Good STEM Trade Book (Blog)

Recommended or Referenced Books
1. 1789 Marc Aronson and Susan Campbell Bartoletti (Editors)
2. A Computer Called Katherine by Suzanne Slade
3. Beauty and the Beak by Deborah Lee Rose and Jane Veltkamp
4. Cao Chong Weighs an Elephant by Songju Ma Daemicke and Christina Wald
5. Counting on Katherine by Helaine Becker
6. Dirt Cheap by Mark Hoffmann
7. Emmy Noether: The Most Important Mathematician You’ve Never Heard by Helaine Becker
8. Exemplary Evidence: Scientists and Their Data by Jessica Fries-Gaither
9. Flatland by Edwin A. Abbott
10. Goldilocks and The Three Bears
11. HERSTORY: 50 Women and Girls Who Shook Up the World by Katheirne Halligan
12. Hidden Figures--multiple reading levels
13. If...A Mind-Bending New Way of Looking at Big Ideas and Numbers by David J. Smith
15. Katherine Johnson by Ebony Joy Wilkins
16. Look Up Henrietta Leavitt Pioneering Woman Astronomer by Robert Burleigh
17. Maryam’s Magic: The Story of Mathematician Maryam Mirzakhani by Megan Reid
18. Maryam Mirzakhani by M. M. Eboch (grades 1-4)
20. Notable Notebooks: Scientists and Their Writings by Jessica Fries-Gaither
21. Nothing Stopped Sophie: The Story of the Unshakable Mathematician Sophie Germain by Cheryl Bardoe and Barbara McClintock
22. Numbers in Motion: Sophie Kovalevski, Queen of Mathematics by Laurie Wallmark
23. On a Beam of Light: A Story of Albert Einstein by Jennifer Berne
24. Our World is Relative by Julia Sooy
25. Ride the Wind: Airborne Journeys of Animals and Plants by Seymour Simon
26. Seven Golden Rings: A Tale of Music and Math by Rajani LaRocca, Archana Sreenivasan (Illustrator)
27. Solving for M by Jenifer Swender
28. The Boy Who Dreamed of Infinity by Amy Alzanauer
29. The Boy Who Loved Math: The Improbable Life of Paul Erdos by Deborah Kelligman
30. The Girl with a Mind for Math: The Story of Raye Montague by Julia Finley Mosca
31. The Noisy Paintbox: The Colors and Sounds of Kandinsky’s Abstract Art by Barb Rosenstock and Mary Grandpre
32. The Polio Pioneer by Lida Marshall
33. The Three Little Pigs
34. Violet the Pilot by Steve Breen
35. Who Sank the Boat? by Pamela Allen
36. Wood, Wire, Wings: Emma Lilian Toddy invents an Airplane by Kirstin Larson
37. Work it, Girls: Blast off into space like Mae Jemison by Caroline Moss

Online Resources for Particular Books
The Boy Who Dreamed of Infinity
- Author Resources

1789 (with the essay “Pi, Vega, and the Battle of Belgrade”
- Author Resources

Cao Chong Weighs an Elephant
- Pan Balance Shapes
•  Pan Balance Numbers
•  Pan Balance Expressions
•  Didax Virtual Balance
•  Cao Chong Weighs an Elephant Storybook Guide

Nothing Stopped Sophie: The Story of Unshakable Mathematician Sophie Germain
•  Jamboard
•  Nothing Stopped Sophie Storybook Guide

Solving for M
•  Principles to Action
•  PEMDAS
•  TCM 13 Rules that Expire
•  MTMS 12 Rules that Expire
•  MT Circumventing Rules that Expire

Additional Resources
•  Illuminations: Mathematics and Children’s Literature
  Goldilocks, An Engineer?
•  Exploring Volume Activity from the April 2018 iSTEM Column in the NCTM Teaching Children Mathematics journal
•  Teaching Mathematics through Multicultural Literature
•  If You Give a Mathematician a Book
•  Teaching Measurement with Literature
•  Wondrous Tales of Measurement
•  Measuring Penny
•  Posing Problems from Children’s Literature
•  Building the Mathematics and Literature Connection through Children’s Responses
•  Promoting Mathematical Discourse through Children’s Literature
•  Black Mathematicians List from Dr. Kristopher Childs
•  LitLinks: What Makes a Good STEM Book?
•  Science and STEM Investigates Books
•  Celebrate Science Blog