Math Through Stories: Using Literature to Spark Hands-On Math Investigations in Grades 3-5

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How do we create simple investigations?



What are the benefits of blending math and literature instruction?

- Gets students talking
- Connects math to their lives
- Nurtures problem solving
- Read aloud provides a shared experience, so contributes to equitable math practice
- Revisits comprehension skills
- Sets a context for writing tasks
- Brings energy to math class
- Promotes math joy

"After reading or listening to a good story, we can't resist talking about it. We want to share our thinking and hear the thinking of others. Collaboration and reflection are critical ways that students make sense of math."

Sue O'Connell Math by the Book

Books Highlighted in the Session					
Title	Author	Possible Math Link	EXAMPLES		
Dragons Love Tacos	Adam Rubin	Multiplying a single-digit number by a multiple of ten	The dragons had 4 trays of 20 tacos. How many tacos did they have? • Show me a model of 4 groups of 20 tacos. • What would 4 × 20 be? • Record the equation. • $4 \times 20 = 80$ • $What would 4 \times 20 be?• What do you notice?• Why is this happening?• Predict 7 × 20 =• Model it. Were you correct?• What is the rule? Why does it work?$		
Wangari's Trees of Peace	Jeanette Winter	Multi-digit multiplication	Investigate: Planting Trees But the women wanted to plantichs of seedlings in each row. From Tiles to Drawings One day the women planted 6 rows of 24 seedlings. How many seedlings did they plant that day? I am not sure we have enough square tiles. Is there another way we could model this without actually using square tiles? I am of sure we have enough square tiles. Is there another way we could model this without actually using square tiles?		
Born and Bred in the Great Depression	Jonah Winter	Dividing a unit fraction by a whole number	Create a model to show the way $\frac{1}{4}$ baf of bread might be shared by 4 people. How much of the whole lad would each person get? What division equation shows what you did? Explain. Record the data. • What do you notice? • On the quotients make sense? Why or who rat? • Could you find the denominator without drawing the mode? How? • Predict if there had only been $\frac{1}{2}$ log of bread for them to shore, how much of whole log would each person get? • Draw a model to see if you were right. • Gray a divide unit fractions by whole numbers without using a model? How?		
The Raft	Jim LaMarche	Finding the area of a rectangle	Investigate: Exploring Area • Students use one-inch color tiles to create rectangular rafts of different sizes. • Students record the data and look for patterns to find the rule. • Imply in looks • Media in looks • Imply in looks <td< td=""></td<>		
Bean Thirteen	Matthew McElligott	Understanding Prime and Composite Numbers	Sharing Beans Exploring Prime and Composite • Could they have fairly shared 24 beans? Student pairs pick a number (230) and create a poster to show the area models and find the factor pairs for that number. • Is there more than one way? Student pairs pick a number (230) and create a poster to show the area models and find the factor pairs for that number. • Is there more than one way? Student pairs pick a number (230) and create a poster to show the area models and find the factor pairs for that number. • Is there more than one way? Student pairs pick a number (230) and create a poster to show the area models and find the factor pairs for that number. • Is there more than one way? Student pairs pick a number (240) and create a poster to show the area models and find the factor pairs for that number. • Is there more than one way? Student pairs pick a number (240) and create a poster to show the area models and find the factor pairs for that number. • Is there more than one way? Student pairs pick a number (240) and create a poster to show the area models and find the factor pairs for that number. • Is there more than one way? Student pairs pick a number (240) and create a poster to show the area models and find the factor pairs for that number. • Is there more than one way? Student pairs pick a number (240) and create a poster to show the area models and find the factor pairs for that number. • Is there more than one way? Student pairs pick a number (240) and create a poster to show the		
Enemy Pie	Derek Munson	Adding and subtracting fractions with like denominators	InvestigateDad cut the enemy pie in sixths. Show itDad cut the enemy pie in sixths. Show itwith your pattern blocks.Dad ate 2 sixths of the pie and leremy ate one sixthof the pie. How many sixths did they eat?2 sixths + 1 sixth =Mathematicians don't write out the words like we did. Turn and share how a mathematician would $\frac{2}{6} + \frac{1}{6} = \frac{3}{6}$ $\frac{2}{6} + \frac{1}{6} = \frac{3}{6}$ Pose more problems.		
The Crayon Man: The True Story of the Invention of Crayola Crayons	Natascha Biebow	Exploring the concept of volume	Investigate: A Box of Crayons Once a product is created, it has to be packaged for sale. How did they package crayons? Is it important that the box is just the right size? Why or why not? How did they know how big to make the box? How big is a crayon? Box templates are filled with centimeter cubes to find the volume. What if we put 16 crayons in the box in 2 Jyeers? 07 24 in 3 layers? What is the volume?		

How to Solve a Problem	Ashima Shiraishi	Perseverance; plotting points on a coordinate grid	
Can I Be Your Dog?	Troy Cummings	Finding Perimeter	A Special Place to Play Mitzi decided to fence in a play yard forArfy. She has 18 yards of fencing and wants to use it all. How might she design a rectangular play yard forArfy? Work with a team to create a play yard using 18 craft sticks. Work with a team to create a play yard using 18 craft sticks. Work with a team to create a play yard using 18 craft sticks. Work with a team to create a play yard using 18 craft sticks. Work with a team to create a play yard using 18 craft sticks. Work with a team to create a play yard using 18 craft sticks. Work with a team to create a play yard using 18 craft sticks. Work with a team to create a play yard using 18 craft sticks. Work with a team to create a play yard using 18 craft sticks. Work with a team to create a play yard using 18 craft sticks. Work with a team to create a play yard using the team to create a play yard on grid work? How do you know thee designs would work? What do you notice? This what mathematices. What do you notice?
Harlem Grown	Tony Hillery	Finding Perimeter	Calculating the length of wood needed to make flower bed frames.

Math + Literature Resources

For more on Heinemann's *Math by the Book* series and to download sample lessons and a K-5 literature list: <u>www.MathbytheBook.com</u>

Some websites to search for literature to use in your math lessons:

- <u>https://www.mathsthroughstories.org/</u>
- <u>https://www.colorincolorado.org/books-authors/books-kids</u>
- https://diversebooks.org/resources-old/where-to-find-diverse-books/
- <u>https://earlymath.erikson.edu/the-best-childrens-books-for-early-math-learning/</u>

Padlet of K-2 Children's Literature Related to Math Skills/Concepts

https://padlet.com/sueoc46/j3uevoy154m1fuhb

Padlet of Grades 3-5 Children's Literature Related to Math Skills/Concepts https://padlet.com/sueoc46/who7w8089bm6r6k2

Padlet of K-5 Culturally Diverse Children's Literature with Math Connections https://padlet.com/georginarivera123/2ygfo12jusaomm7s

Follow Sue on Blue Sky @sueoconnellmath.bsky.social

Join Sue's Facebook group at https://www.facebook.com/groups/MathinPractice

Explore Sue's resources, along with links to additional math tools and resources on her website: <u>https://www.qualityteacherdevelopment.com/</u>

Teacher Resource Materials by Sue O'Connell

Math by the Book (Heinemann) (<u>www.mathbythebook.com</u>)

This series explores the teaching of math concepts through children's literature. Lessons, word problems, discussion questions, differentiation ideas, and practice tasks are all included to teach grade-specific skills and concepts through the story context. There is a book for each grade level K-5, including a wealth of online resources, and each book includes ideas for twenty skills taught during that year.

Navigating Numeracy Learning Progression Centers (Hand2Mind)

(www.hand2mind.com/navigating-numeracy)

Navigating Numeracy center kits (Hand2Mind) provide everything you need for grade-specific, hands-on, and interactive practice opportunities that guide your K-5 students toward a deep understanding of numbers. Each kit contains 45 repeatable centers that span the skills you teach across the school year. The tasks are engaging and focus on the critical number skills that are a priority in our math standards. Each kit contains a teacher's guide, student task cards, game boards, spinners, game cards, and manipulatives so students can explore the skills through hands-on tasks.

Math in Practice (Heinemann) (<u>www.mathinpractice.com</u>)

This series is filled with lesson ideas, instructional strategies, practice tasks, and many online printable resources to make teaching K-5 math more meaningful and more fun. There is a book for each grade level K-5 that contains a wealth of grade-specific activities, as well as a *Guide for Teachers* filled with instructional strategies and an *Administrator's Guide*. Visit the website or <u>www.mathinpractice</u> to view the materials.

Putting the Practices into Action - Implementing the Common Core Standards for Mathematical Practice K-8 (Heinemann) with John SanGiovanni (www.heinemann.com)

The Standards for Math Practice are the heart and soul of the Common Core State Standards. This book explains each standard in teacher-friendly terms and highlights practical activities to make the standards come alive in classrooms. It contains PLC study group questions and online resources.

Mastering the Basic Math Facts for Addition and Subtraction Mastering the Basic Math Facts for Multiplication and Division

(Heinemann) with John SanGiovanni (<u>www.heinemann.com</u>)

Through investigations, discussions, visual models, children's literature, and hands-on explorations, students explore the math operations, and through engaging, interactive practice achieve fluency with basic facts. Online resources are filled with customizable activities, templates, recording sheets, and teacher tools to simplify your planning and preparation. Over 450 pages of reproducible forms are included in English and Spanish translation.