

Let's Give Them Something to Read, Write, and Talk About in Mathematics!



Latrenda Knighten

Lknighten@nctm.org

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**Counting
in Dog
Years**

COUNTING

IN

DOG YEARS

AND OTHER

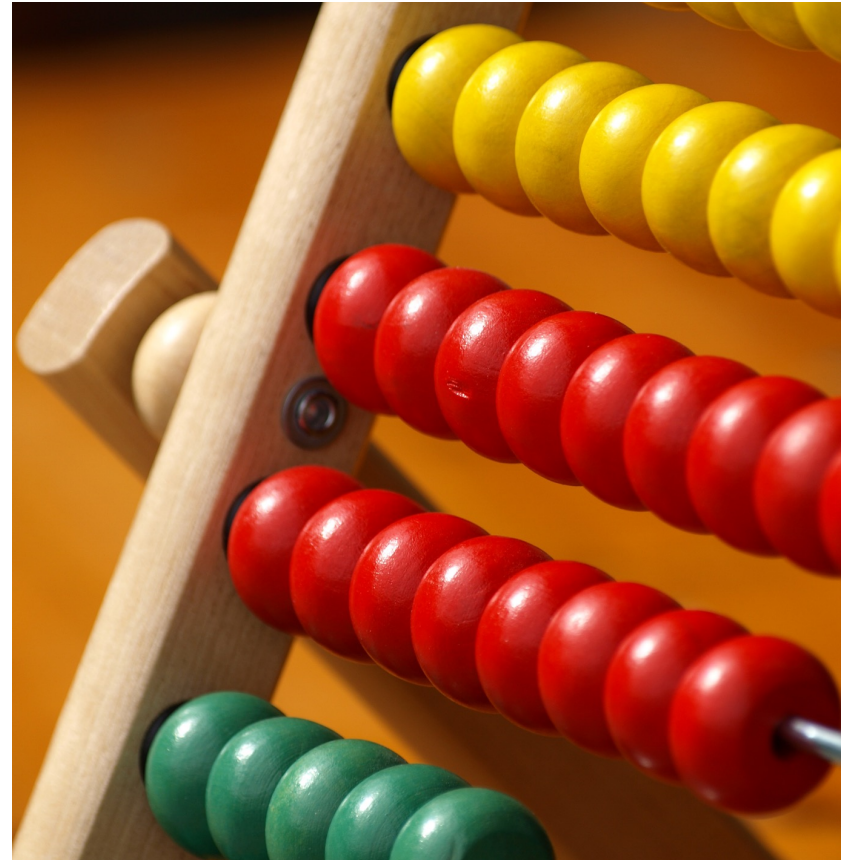
**SASSY
MATH POEMS**



A challenge faced by teachers across the country is identifying and using strategies to help students effectively communicate their mathematical thinking.

Goals for Today:

- Explore instructional strategies and activities that integrate literacy in the math classroom and promote problem solving, reasoning and critical-thinking skills in a student-centered classroom.
- Explore strategies and activities to help students connect mathematical concepts to the real world and engage in problem posing tasks that relate to real-life situations.
- Identify strategies for incorporating writing in the mathematics classroom that foster student confidence



Jasmine's Shopkins

Jasmine collects Shopkins. She has more than 45, but less than 75.

When she counts them by threes, she has none left over.

When she counts them by fives, she has two left over.

When she counts them by twos, she has none left over.

The number of Shopkins is more than half of 100. How many Shopkins does Jasmine have?

Show your thinking and reasoning.



Mathematical Bet Lines

“Bet Lines are key stopping points (text lines) where teachers ask students to dialogue about what they have just read and make predictions about the future.” (Soto-Hinman and Hetzel 2009, p. 95)

Mathematical Bet Lines is a discourse strategy that helps students understand story problems by revealing the task in stages and having learners adjust their predictions.”

“Supporting Sense Making with Mathematical Bet Lines” by Lara Dick, Tracy Foote White, Aaron Trocki, Paola Sztajn, Daniel Heck, and Kate Herrema, Teaching Children Mathematics Vol. 22, No. 9, May 2016.

Mathematical Language Routines (MLRs)

A 'math language routine' refers to a structured but adaptable format for amplifying, assessing, and developing students' language.

MLRs are designed to support a variety of language-focused skill growth: from reinforcing mathematical terminology to scaffolding conversations to providing opportunities for students to deepen their conceptual understanding by describing their work.

Mathematical Language Routines (MLRs)

Purpose of this routine is to foster students' meta-awareness as they identify, compare, and contrast different mathematical approaches and representations. This routine leverages the powerful mix of disciplinary representations available in mathematics as a resource for language development. In this routine, students make sense of mathematical strategies other than their own by relating and connecting other approaches to their own.

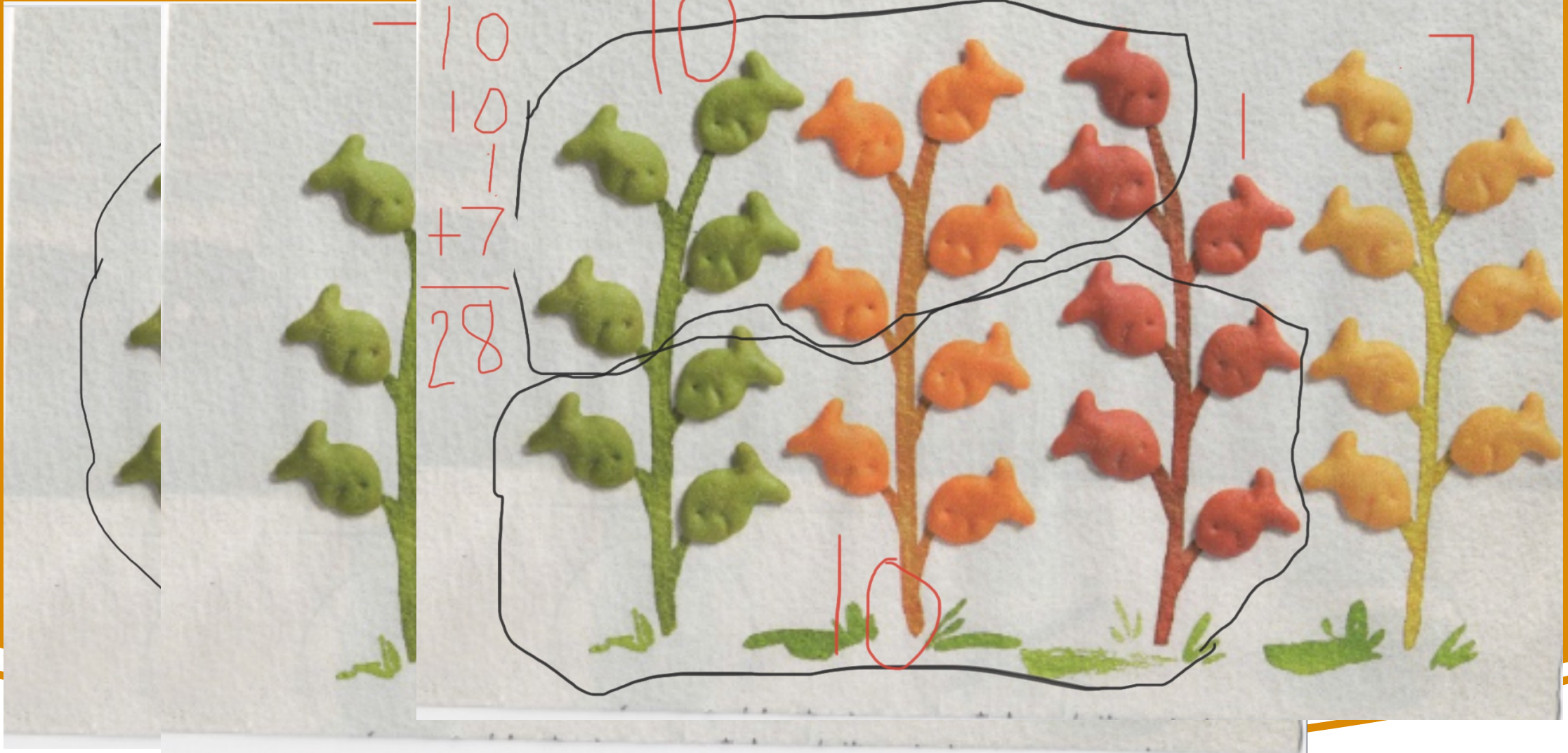
NUMBER TALK:
HOW MANY
GOLDFISH DO YOU
SEE? HOW DO YOU
SEE THEM?

- How did you count the goldfish?
- Did anyone count the goldfish a different way?
- Did anyone know there were twenty-eight a different way?



NUMBER TALK:

HOW MANY GOLDFISH DO YOU SEE? HOW DO YOU SEE THEM?



MP3 Construct Viable Arguments and Critique the Reasoning of Others



Students should be able to talk about math, using mathematical language, to support or oppose the work of others.



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MLR6. Discussion supports

Debate Journal

Sam ran for 13 minutes. Dre ran for 9 minutes. Who ran longer?

Sam said they should add. Dre said they should subtract.

Who is correct?

Tell how you know with pictures, numbers, or words.

Writing in Mathematics

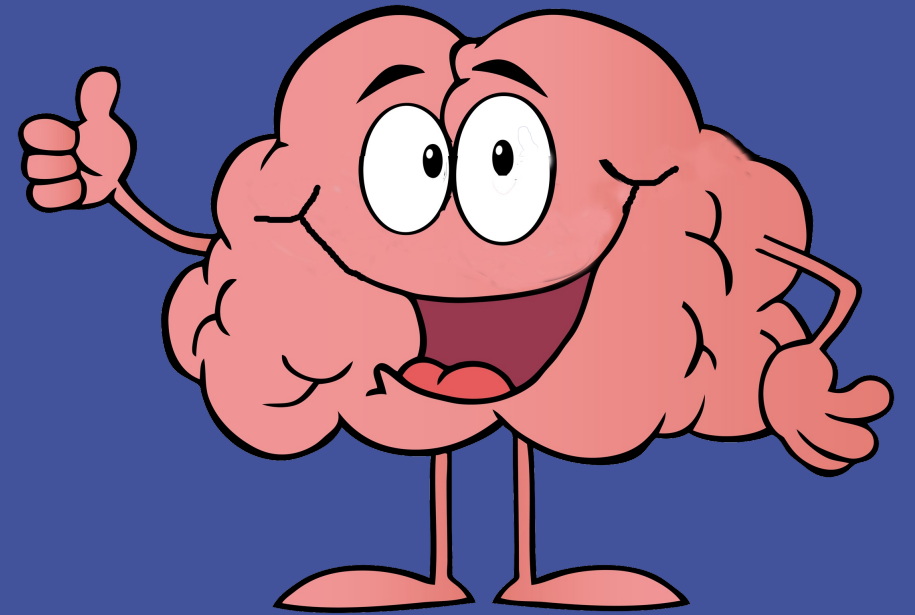
Learning mathematics is more than simply copying what the teacher does and repeating it.

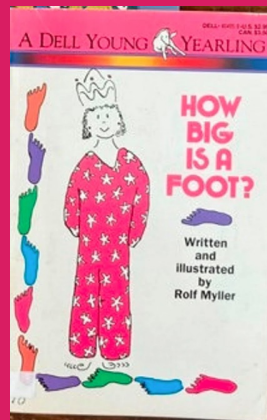
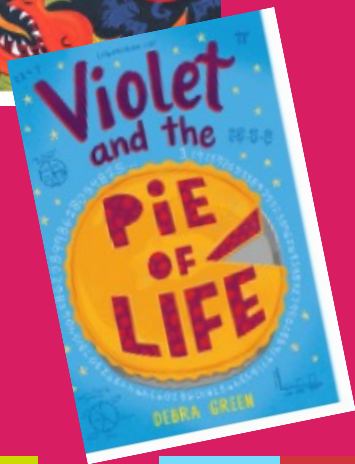
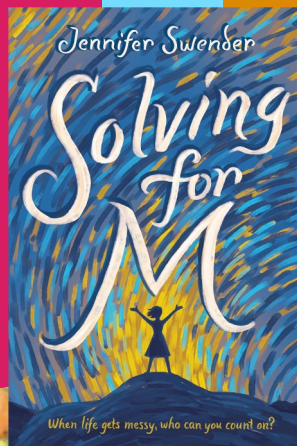
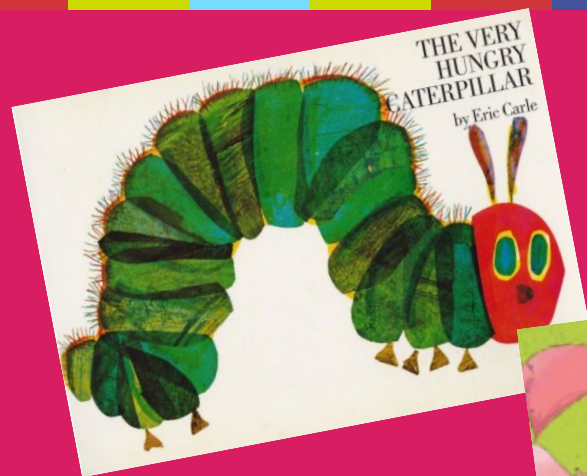
Students must learn mathematics in many different ways.

Writing provides the time for students to think and reflect, to make meaning about what they are learning. By writing, students begin to make an idea or concept their own.

Integrating writing into mathematics lessons allows teachers to focus on teaching for understanding while helping students see the connections between reading, writing, and mathematics.

Writing allows the brain time to reflect on learning. Thinking time is necessary to process learning. It is more valuable to students than memorization. When thinking about the concept or idea the student can go back to the way they created meaning during writing.





Using children's literature is a non-threatening strategy for getting students to write about mathematics topics.



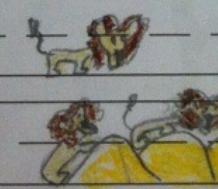
Double the Ducks by Stuart J. Murphy




Double Stories

Double the Ducks - Double Stories

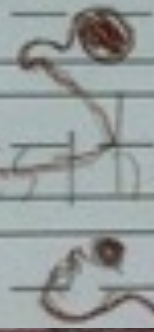
Double
I have
five sacks
feed my
three
need four
my lions
to the zoo
back
ten sacks
and eight



Double
I have
five sacks
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need four
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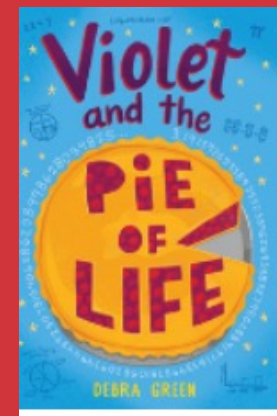
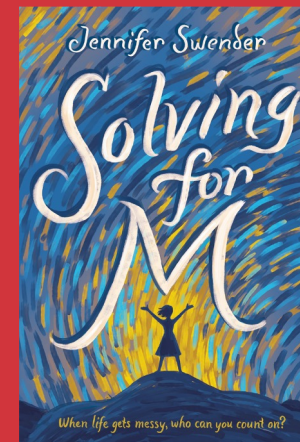


Gabriel Double the Lions
I have two lions. I feed
them two bags of food. I
have two cages for my
lions. I ^{brought} my lions to the
zoo. Each one ^{brought} a
front back. Now I need
four bags of food. Now I
need four cages for
my lions. Think about
which one has the longest tail



Using Literature in Mathematics

- Launching for problem solving and problem posing
- Can contextualize and support connections
- Making predictions-noticings & wonderings
 - Activate prior knowledge-Lens of experiences
- Creativity & Imagination
- Critique and make sense of our world
 - *Catalyzing Change*, NCTM 2018, 2020
- Vocabulary-dual meaning words-symbols
- Enrich classroom discourse
- Supports reasoning and sense-making



Willkerson, Fetterly, & Wood (2015). Problem Posing and Problem Solving: Using YA Literature to Develop Mathematical Understandings and Make Mathematical Connections” in *Young Adult Nonfiction: Gateway to the Common Core* edited by Hayn, Kaplan, Nolen, & Olvey, Rowan & Littlefield.



Math Journals

- Allow students to record their math work and thinking.
- Can be used to record solutions to math problems, strategies, and thought processes used to arrive at the solution.
- Provide students with an avenue to organize, clarify, and reflect on their thinking in mathematics.
- Can be used by the teacher as a formative assessment tool to inform classroom instruction.
- In addition to learning how to “do” math, students must also learn how to articulate what they’re learning in math. Recording one’s thinking and receiving specific, instructional feedback from the teacher can help students achieve this goal.

Response Journals

- Allow teachers to actively engage students in writing about mathematics
- Allow students to articulate their mathematical thinking and promote greater understanding of concepts
- Allow students to approach problem solving from multiple entry points and express their thinking in diverse ways
- Allow students to model with mathematics
- Provide the teacher with valuable information that can be used to inform instruction

Next Steps

Add to Your Professional Toolkit



Sample Sentence Stems

I agree with

because ...

This is what I think

...

I have a different
perspective because

...

I made a connection
with what

_____ said ...

When I thought
about the question,
I remembered ...

I chose this method
because ...

©Rawding and Wills (2012), November 2015
issue of Teaching Children Mathematics

bit.ly/KnightenMay9

Sample Question Stems

<p>Questions to help students build confidence and rely on their own understanding.</p> <ul style="list-style-type: none"> • How did you reach that conclusion? • Does that make sense? • Can you make a model to show that? • Why is that true? 	<p>Questions to help students learn to reason mathematically.</p> <ul style="list-style-type: none"> • Is that true for all? Explain. • Can you think of a counter example? • How would you prove that? • What assumptions are you making? 	<p>Questions to ask to help students make connections among ideas and applications.</p> <ul style="list-style-type: none"> • What concepts that we have learned before were useful in solving this problem? • What uses of mathematics did you find in the newspaper last night? • Can you give me an example of ...? • How does this relate to ...?
<p>Questions to ask to help students collectively make sense of mathematics.</p> <ul style="list-style-type: none"> • What do you think about what _____ said? • Do you agree? Why or why not? • Does anyone have the same answer but a different way to explain it? • Can you convince the rest of us that your answer makes sense? • _____ can you explain to us 	<p>Questions to ask to encourage conjecturing.</p> <ul style="list-style-type: none"> • What would happen if _____? • Do you see a pattern? Can you explain the pattern? • What are some possibilities here? • Can you predict the next one? What about the last one? • What decision do you think he/she should make? 	<p>Questions to ask to promote problem solving.</p> <ul style="list-style-type: none"> • What do you need to find out? • What information do you have? • Can you do this mentally? • Will a calculator help? • What tools will you need? • What do you think the answer or result will be? • What strategies are you going to use?

Joint Literacy and Math Conference



National Council of
Teachers of English®

**JOINT CONFERENCE
JUNE 17-19, 2024
NEW ORLEANS**

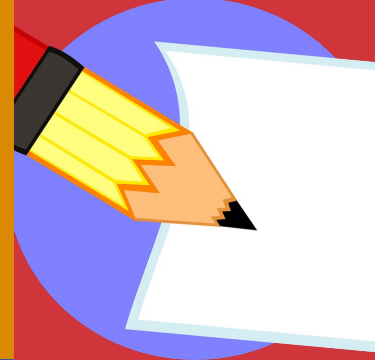


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Thank you

Latrenda Knighten

Lknighten@nctm.org





Questions

Latrenda Knighten
Lknighten@nctm.org

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