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
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 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.
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.
MLR2: Collect and Display

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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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.
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

I have two cages for my four lions – think about it!

Gabriel! Double the Lions...
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

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.
• 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 …

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### Sample Question Stems

**Questions to help students build confidence and rely on their own understanding.**
- How did you reach that conclusion?
- Does that make sense?
- Can you make a model to show that?
- Why is that true?

**Questions to help students learn to reason mathematically.**
- Is that true for all? Explain.
- Can you think of a counter example?
- How would you prove that?
- What assumptions are you making?

**Questions to ask to help students make connections among ideas and applications.**
- 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 ...?

**Questions to ask to help students collectively make sense of mathematics.**
- 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

**Questions to ask to encourage conjecturing.**
- 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?

**Questions to ask to promote problem solving.**
- 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?

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Joint Literacy and Math Conference

Joint Conference
June 17-19, 2024
New Orleans

NCTE National Council of Teachers of English

NCTM National Council of Teachers of Mathematics
Thank you

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Questions

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