BetterLesson

BetterLesson Professional Learning Webinar

Math Language Routines

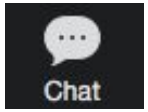
Session 1: Promoting Language Use in Math: Making Sense of Tasks

Ohio Department of Education & Workforce

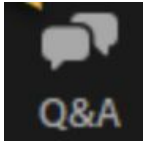
March 6th, 2024

Padraic O'Donnell & Megan Nagel

Welcome!



Share in the chat: Where are you joining us from today and what is your current role?



Have a question? If you have a question during the webinar, please use the Q&A tab to send your questions to the presenter. We will do our best to answer them in real time, if not we will be sure to address at the end!

Aligned & Tailored for Ohio ESC Partnership

Aligned

Our partnership is specifically designed to amplify the impact of other state-wide infrastructure and initiatives.

Our coaches will be familiar with key efforts, including:

- Materials Matter
- HQIM-related work streams with EdReports & Instruction Partners
- Ohio Standards for Math Practice

Tailored

Our team has worked with leadership from the ESC of Central Ohio, OESCA, and the Department of Education to tailor our workshop, coaching, and learning walk content to the unique needs of ESC Math Specialists

Our Webinar Series

Effective Math Teaching and Learning

Progression A: The 5 Practices for Orchestrating Productive Mathematical Discussions

A framework for planning and leveraging student ideas for deeper understanding.

Progression B: Mathematical Language Routines

A framework of principles and routines to promote language use in mathematics.

Promoting Language *and* Content Development

SUPPORT SENSE-MAKING:

Scaffold tasks & amplify language so students can make their own meaning.

OPTIMIZE OUTPUT:

Expand opportunities for students to describe their mathematical thinking to others orally, visually, & in writing.

CULTIVATE CONVERSATION:

Increase constructive mathematical conversations
(pairs, groups, & whole class).

MAXIMIZE META-AWARENESS:

Help students reflect on their own math ideas, reasoning & language.

Mathematical Language Routines (MLR's)

1: Stronger and Clearer Each Time

2: Collect and Display

3: Critique, Correct, and Clarify

4: Information Gap

5: Co-Craft Questions and Problems

6: Three Reads

7: Compare and Connect

8: Discussion Supports

Your Hosts

Padraic O'Donnell
Instructional Coach

Megan Nagel
Instructional Coach

Rebekah Lischwe
Instructional Coach
(Tech Support)

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ESC Association

Ohio Department of Education & Workforce

Let's Check In!

How familiar are you with the Math Language Routines?

I've never heard of them or I've heard a little bit

I'm aware of them, but need more explanation

I know what the Math Language Routines are

I try to use the Math Language Routines in my lessons

I can teach the Math Language Routines to others!

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Ohio Department of Education & Workforce

Our Series: Math Language Routines

Goal

Plan to use Mathematical Language Routines as practical ways to support language and math development simultaneously for all students.

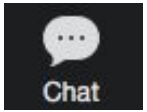
DEFINE	EXPLORE	BUILD	TRY, MEASURE, LEARN
Making Sense of Tasks	**Three Reads + Collect & Display**	**A Plan for Implementation**	

What are the Math Language Routines?

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

Understanding Language/Scale
Stanford Graduate School of Education

Share out!



Share in the chat:

What does amplify vs. simplify mean to you?

Describe an example of simplifying the use of language rather than promoting correct use of academic and/or mathematical language.

Promoting Language *and* Content Development

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Supporting Sense-Making Defined

"... learners of all levels can and should engage with grade-level content that is **appropriately scaffolded.** Students need multiple opportunities to talk about their mathematical thinking, negotiate meaning with others, and collaboratively solve problems with targeted guidance from the teacher. In addition, teachers can foster students' sense-making by **amplifying rather than simplifying**, or watering down, their own use of disciplinary language."

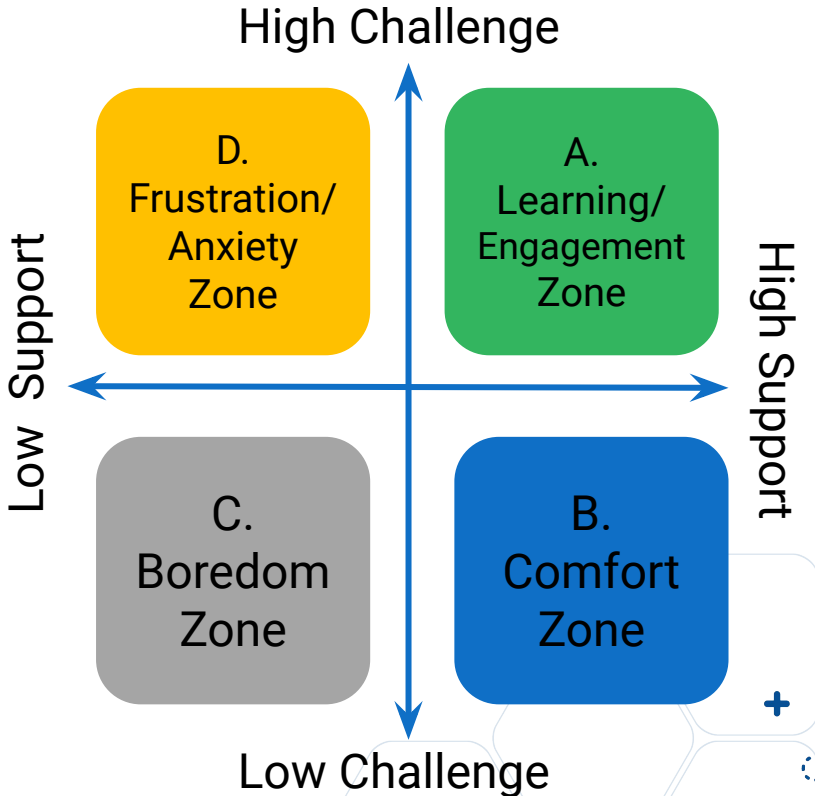
Understanding Language/SCALE

DEFINE

Balancing Challenge and Support

Scaffolding *Up* provides high levels of support for students accessing high-challenge content by

- Valuing students' resources for learning
- Developing a strong community of learners
- Engaging students in rigorous curriculum



Adapted from Mariani (1997)

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MLR 6

MLR 6: Three Reads

Purpose: To ensure that students know what they are being asked to do, create opportunities for students to reflect on the ways mathematical questions are presented, and equip students with tools used to negotiate meaning (Kelemanik, Lucenta & Creighton, 2016). This routine supports reading comprehension, **sense-making**, and meta-awareness of mathematical language.

It also supports negotiating information in a text with a partner in mathematical conversation.

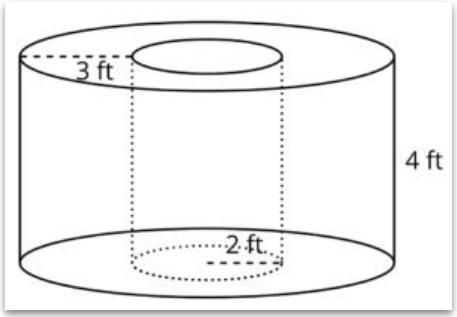
MLR 6

Chat

A Fishy Situation

Read 1: What is this situation about?

An aquarium manager drew a blueprint for a cylindrical fish tank. The tank has a vertical tube in the middle in which visitors can stand and view the fish.



The best average density for the species of fish that will go in the tank is 16 fish per 100 gallons of water. This provides enough room for the fish to swim while making sure that there are plenty of fish for people to see.

MLR 6

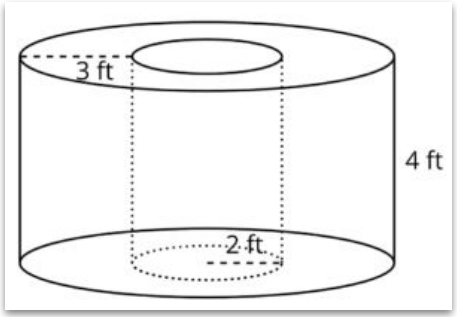
Chat

A Fishy Situation

Read 1: What is this situation about?

Read 2: What are the quantities in the situation? How are they related?

An aquarium manager drew a blueprint for a cylindrical fish tank. The tank has a vertical tube in the middle in which visitors can stand and view the fish.



The best average density for the species of fish that will go in the tank is 16 fish per 100 gallons of water. This provides enough room for the fish to swim while making sure that there are plenty of fish for people to see.

The aquarium has 275 fish available to put in the tank.

MLR 6

Chat

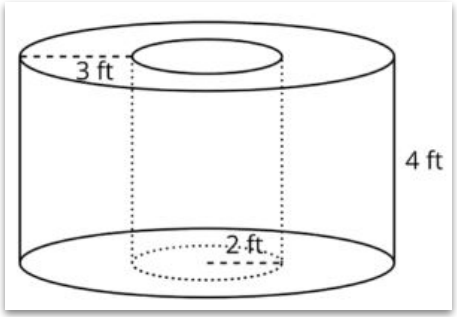
A Fishy Situation

Read 1: What is this situation about?

Read 2: What are the quantities in the situation? How are they related?

Read 3: What are some strategies we can use to answer the question?

An aquarium manager drew a blueprint for a cylindrical fish tank. The tank has a vertical tube in the middle in which visitors can stand and view the fish.



The best average density for the species of fish that will go in the tank is 16 fish per 100 gallons of water. This provides enough room for the fish to swim while making sure that there are plenty of fish for people to see.

The aquarium has 275 fish available to put in the tank. **Is this the right number of fish for the tank? If not, how many fish should be added or removed? Explain your reasoning.**

MLR 6

MLR 6 Three Reads

How it Happens

In this routine, students are supported in reading a mathematical text, situation, or word problem three times, each with a particular focus. **The intended question or main prompt is intentionally withheld until the third read so that students can concentrate on making sense of what is happening in the text before rushing to a solution or method.**

MLR 6

Variations on a Theme - Three Reads

Read 1: What is this situation about?

Read 2: What are the quantities in the situation?

- How are they related?
- What can we measure?

Read 3: What are some strategies we can use to answer the question?

What mathematical questions can we ask about the situation?

WHO READS:

Teacher Reading

Choral Reading

Partner Reading

HOW WE DISCUSS:

Whole Class Discussion

Turn and Talk/Think Pair Share

Write, then Share

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MLR 2

MLR 2: Collect & Display

Purpose: To capture students' oral words and phrases into a stable, collective reference. The intent of this routine is to **stabilize the fleeting language** that students use in order for their own output to be used as a reference in developing their mathematical language. The teacher listens for, and scribes, the language students use during partner, small group, or whole class discussions **using written words, diagrams and pictures**. This collected output can be organized, revoiced, or explicitly connected to other language i**n a display that all students can refer to, build on, or make connections with during future discussion or writing.** Throughout the course of a unit, teachers can reference the displayed language as a model, update and **revise the display as student language changes**, and make bridges between student language and new disciplinary language. This routine provides feedback for students in a way that increases sense-making while simultaneously supporting meta-awareness of language.

MLR 2

A Fishy Situation

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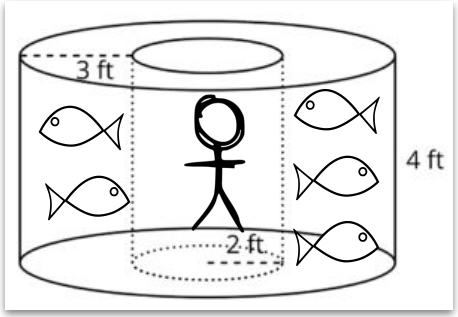

Volume of the whole cylinder
- Volume of the center cylinder
Volume of the outside cylinder

Volume of the outside cylinder
x 7.48 gallons of water / foot^3
# of gallons in the tank

$$\frac{16 \text{ fish}}{100 \text{ gallons}} = \frac{275 \text{ fish}}{? \text{ gallons}}$$

MLR 2

A Fishy Situation

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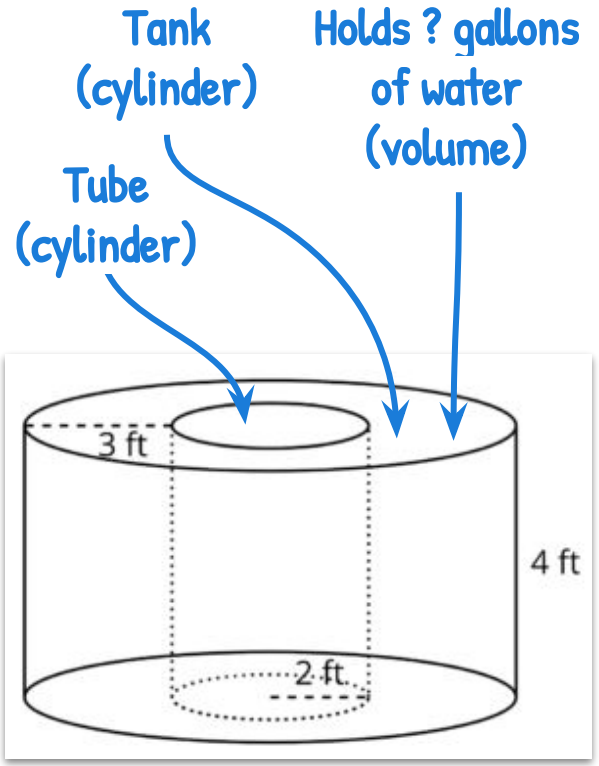


MLR 2

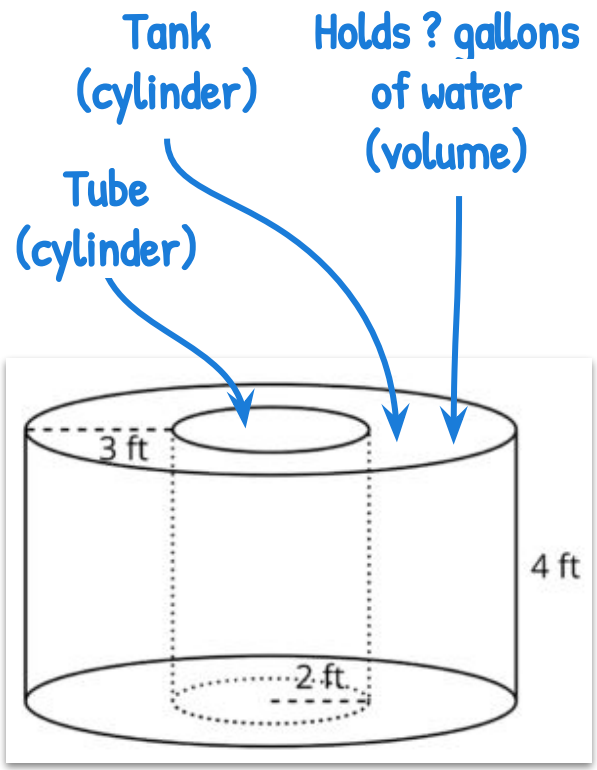
A Fishy Situation

"What do we need to know?"

"How might we find the volume of the tank?"

"How might we find the amount of water held by the tank?"

"How might we determine if the tank holds enough water for the fish we have?"



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MLR 2

Variations on a Theme - Collect & Display

COLLECT:

Teacher circulates and listens to student talk during **partner, small group, or whole class discussion**

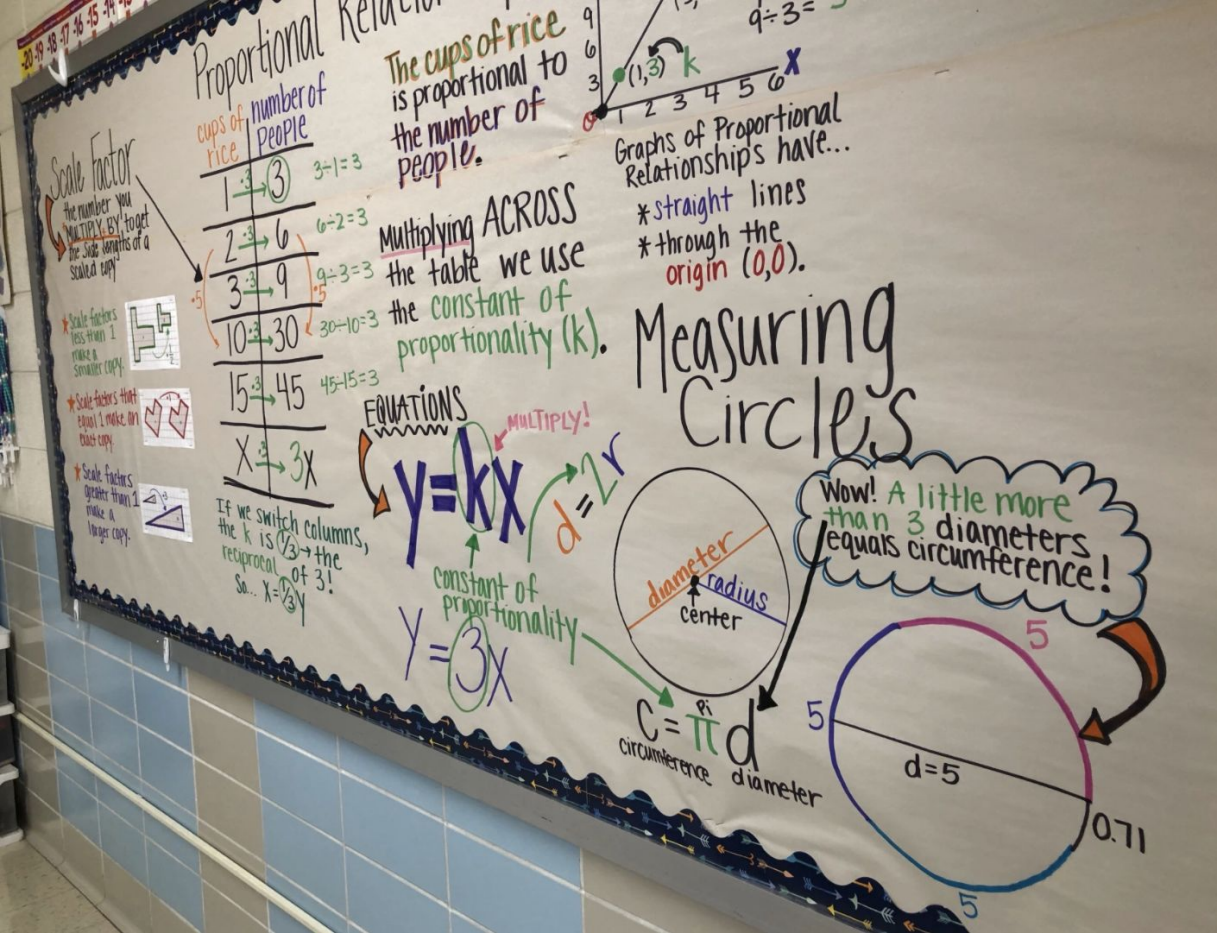
Jot down words / phrases / drawings / writings students produce that can be connected to lesson goals

Encourage students to revise / update / add connections

DISPLAY:

Display language on a clipboard, poster, board, or screen for whole class to use as a reference throughout the lesson / unit

Show connections between student ideas and new vocabulary & highlights examples of students using math language functions (beyond just vocabulary words)



Working, Growing Anchor Chart

Teacher Morgan Stipe dedicates a whole wall to maintaining a running display of key terms, visuals & connections.

Build

How can we make this work actionable?

Let's Explore: Strategy Choice Board

Choose any of the sections below and explore the related BL resources & strategies.

MLR Deep Dive:

Three Reads

MLR Deep Dive:

Collect & Display

A Similar Strategy:

Notice and Wonder

MLR Planning Guide:

A Collect & Display Example

Q & A

What questions do you have about our conversation today?

We value your feedback!

Your input is important to us, please take a moment to complete our survey using the link in the chat.

Thank you!

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ESC ASSOCIATION

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