



# BetterLesson Professional Learning Webinar

Developing Mathematical Fluency



**Ohio Educational Service Center**

Date: June 26th, 2024

Lisa Fik

## Ways to Engage with Us Today



**Chat Box**

**Share your thoughts!  
Make sure the chat box says Send to 'Everyone'.**



**Q & A**

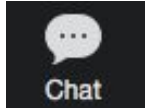
**Use the Q&A button to add your questions.**



**Handout**

**Click on the links shared in the chat.  
Slides will be shared with the recording.**

# Welcome!



Welcome!

Share in the chat:

- Where are you joining us from today?
- What is your current role?

# Your Hosts



**Annika Moore**

Math Consultant  
DEW



**Lisa Fik**

BetterLesson  
Instructional Coach

# 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:

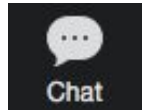
- Materials Matter
- HQIM-related work streams with EdReports & Instruction Partners
- Ohio Standards for Math Practice



## 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

# Welcome!



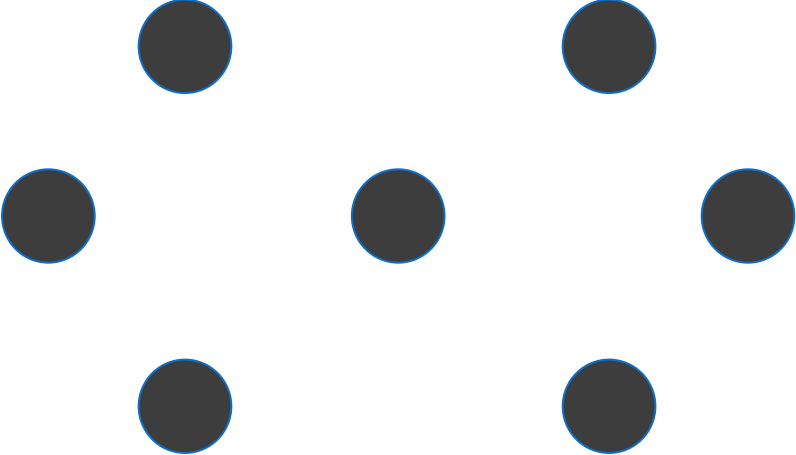
On the next slide, you will see a series of dots. How many?

## Purpose of a Dot Talk

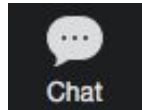
- the creativity in math
- the visual nature of math
- the many different ways people see math



# Welcome!



# Welcome!



How many dots did you see?

Describe how in the chat.

## Purpose of a Dot Talk

- the creativity in math
- the visual nature of math
- the many different ways people see math





# Our Series: Elements of Student-Centered Math Instruction



## Goal

Examine the importance of providing grade-level, high-quality instruction while being responsive to students' diverse backgrounds and experiences

DEFINE

Components of fluency.

EXPLORE

Experience a fluency strategy.

BUILD

A strategy into your practice.

TRY, MEASURE, LEARN

# Our Webinar Series: Elements of Student-Centered Math Instruction

1

Creating Positive Learning Experiences in Math

2

Developing Mathematical Fluency

3

Using Visual Representation to Support Math Reasoning

4

Developing Multiple and Varied Checks for Conceptual Understanding

# Qualities of a Powerful Math Classroom



## The Content

Students have opportunities to experience coherent and meaningful disciplinary ideas.



## Cognitive Demand

Students engage in productive struggle, grappling with challenging problems.



## Equitable Access to Content

Classroom structures invite and support active engagement of all students.



## Agency, Authority, Identity

Students provided opportunities to contribute to discussions and build on others' ideas.



## Formative Assessment

Instruction “meets students where they are” and gives them opportunities to deepen understanding.



# Define

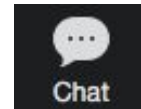
## Components of Fluency

# Becoming Fluent

## Have you had to learn a new language?

Think about the experience and what it means to become fluent in a language.

Drop some words or phrases in the chat.



# Mathematical Fluency

The ability for students to compute **flexibly, accurately, and efficiently** to transfer procedures to different problems and contexts; to build or modify procedures from other procedures; and to recognize when one strategy or procedure is more appropriate to apply than another.

NCTM 2014, 2020; National  
Research Council 2001, 2005,  
2012; Star 2005

# What are the components of fluency in mathematics?

- Flexibility
- Accuracy
- Efficiency in computation

# The Goal of Fluency

- **Flexibility:** Students have conceptual understanding of how they arrived at a fact & can choose from a variety of strategies.
- **Accuracy:** By using the strategy appropriately, students arrive at the correct answer.
- **Efficiency:** Students are able to choose a strategy and implement it without struggling.

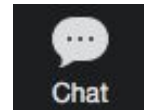
**Example: A student who can mentally calculate 99-47 by thinking about 100-48**

**Example: A student who can mentally multiply  $25 \times 12$  by thinking of it as  $(20+5) \times 12$**



# Reflect

- What **fluency strategies** have you traditionally used in math class?
- What **challenges and successes** are you facing in terms of supporting your students?





# Define

## Fluency Strategies

# Actions to Ensure Students Develop Fluency

Conceptual understanding must precede and coincide with instruction on procedures.

Procedural fluency requires having a repertoire of strategies.

Basic facts should be taught using number relationships and reasoning strategies, not memorization.

Assessing must attend to fluency components and the learner. Assessments often assess accuracy, neglecting efficiency and flexibility.

**Which of these are your biggest challenge when it comes to supporting students with procedural fluency?**



# Productive or Unproductive Practice

Not encouraging every student –including those who already know their facts– to learn reasoning strategies

**Unproductive**

Utilizing Peer Teaching

**Productive**

Telling a strategy rather than providing explicit strategy instruction

**Unproductive**

Pressing for speed

**Unproductive**

Encourage Meaningful Learning

**Productive**

Using only fact families to teach subtraction facts.

**Unproductive**

## Reflect and Connect

Reflect on 1 unproductive strategy mentioned.

How can you redesign your teaching approach to foster a deeper understanding of basic math facts among your students?



# Considerations for Fluency



## Conceptual Connections

Conceptual understanding must precede and coincide with instruction on procedures.



## Multiple Strategies

Procedural fluency requires having a repertoire of strategies.



## Reasoning and Relationships

Basic facts should be taught using number relationships and reasoning strategies, not memorization.



## Efficiency and Flexibility

Assessing must attend to fluency components and the learner.

# Pillars of Building Fluency



Model for students multiple solution strategies.



Establish connections between new topics and previous topics.



Build procedural understanding through conceptual understanding.



# Explore

## Experience a Strategy



# Concrete-Representational-Abstract

## CONCRETE

The **DOING** stage  
using concrete objects  
to model problems.

## REPRESENTATIONAL

The **SEEING** stage  
where representations  
or pictures model  
problems.

## ABSTRACT

The **SYMBOLIC** stage  
using abstract  
symbols to model  
problems.

# Concrete-Representational-Abstract

## CONCRETE

Manipulatives such as  
counters, pattern  
blocks, base ten  
blocks

## REPRESENTATIONAL

Drawing pictures,  
circles, tallies.

## ABSTRACT

Numbers, notations,  
math symbols to  
represent an  
algorithm.

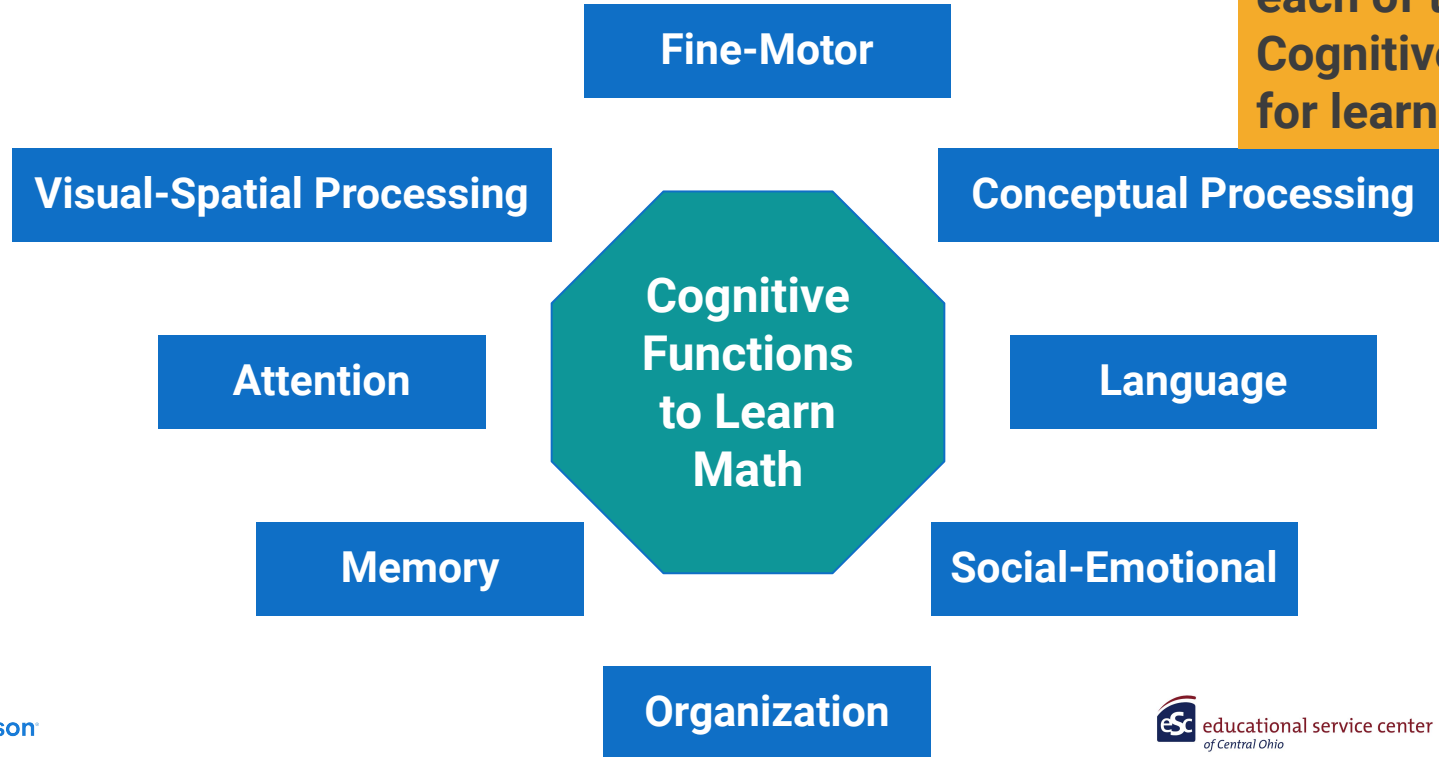
## Your Turn!

1. Choose an Ohio Critical Area of Focus Standard.
2. Think of how you build opportunities for students to move from Concrete → Representational → Abstract.



# Considering Cognitive Functions

How might the CRA strategy support each of the Cognitive Functions for learning math?



## Things to Remember About CRA...



May be implemented at all grade levels individually, in small groups, or for the entire class.



Explicit instruction that involves the use of manipulatives is needed.



Intervention for math instruction that research suggests can enhance performance.

**Academic  
Safety**

**Necessary  
Conditions**

**Effective  
Facilitation**

**Quality  
Tasks**

# Reflect

Take a moment to reflect, then share your thoughts on this question:

**Why do mathematics?**



Chat



# Build

How can we make this work actionable?



## Time to Plan



5 minutes

- Use the Strategy Planning Guide to work out specific steps for using one of the strategies we explored or from the Choice Board.

# Let's Explore: Strategy Choice Board

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

**Number Talks**

**[BL Strategy](#)**

**Worked Examples**

**[BL Strategy](#)**

**Visual  
Representations**

**[BL Strategy](#)**

## 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!

