



OAKLAND SCHOOL VOLUNTEERS

ELEMENTARY MATH VOLUNTEER TRAINING

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I. Equity and OUSD's Vision for Math

A. OUSD's Vision for Math

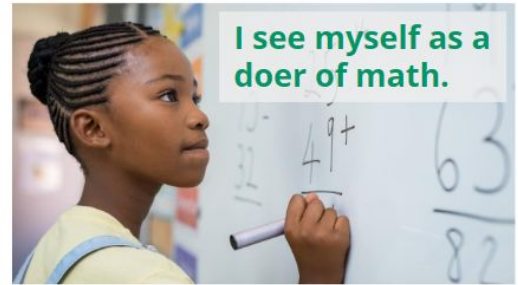
Through productive struggle, academic discourse, and performance tasks, OUSD students become problem solvers, collaborators, communicators, and owners of mathematics, to ensure college and career readiness.

B. Answer-Getting and Sense-Making

HOW DOES THIS VISION CONNECT TO ANSWER-GETTING AND SENSE-MAKING?

Developing math identity with our words

We say	Students think
I'm not good at math either.	Math is only for some people.
Math is hard.	I should be scared of math.
Just follow the steps I tell you.	Math isn't something that makes sense.
Show me your thinking in any way you like.	This is a safe space for me to be curious.
What do you think about my, or your friend's, thinking?	My ideas are valuable.
What tool or strategy do you think would work best?	I'm not a passive learner. I have agency.



II. Common Core State Standards

A. Preflection: What do you know and what do you want to learn?

WHAT DO YOU KNOW ABOUT THE COMMON CORE MATH STANDARDS?	WHAT DO YOU WANT TO LEARN?

B. Key Shifts in Mathematics

#1 FOCUS:

Rather than racing to cover many topics in a mile-wide, inch-deep curriculum, the standards ask math teachers to significantly narrow and deepen the way time and energy are spent in the classroom.

GRADE	FOCUS AREA
K-2	Addition and subtraction - concepts, skills, and problem solving; place value
3-5	Multiplication and division of whole numbers and fractions - concepts, skills, and problem solving

Resource: The full text of the standards are available [here](#). Not necessary to know for you to be a great tutor, but just in case you're curious about what students learn in each grade!

#2 COHERENCE:

Math is a coherent body of knowledge made up of interconnected concepts. Learning is carefully connected across grades so that students can build new understanding onto foundations built in previous years. Coherence is also built into the standards in how they reinforce a major topic in a grade by utilizing supporting, complementary topics. For example, instead of presenting the topic of data displays as an end in itself, the topic is used to support grade-level word problems in which students apply mathematical skills to solve problems.

Resource: [This website](#) lets you explore learning progressions from grade to grade.

#3 RIGOR:

Each standard calls for a specific approach based on where students are in the learning progression.

- **Conceptual Understanding:** Deeply understand mathematical concepts; see math as more than a set of mnemonics or procedures
- **Procedural Skill and Fluency:** Learn methods to calculate with speed and accuracy, including the standard algorithm
- **Application:** Apply math concepts in “real world” and problem solving situations

CONCEPTUAL UNDERSTANDING	PROCEDURAL SKILL AND FLUENCY	APPLICATION
<ul style="list-style-type: none"> → Understand → Reason → Explain → Interpret 	<ul style="list-style-type: none"> → Fluently → Read/Write → Evaluate 	<ul style="list-style-type: none"> → World Problems → Real World → Multi-step

Resource: [Graham Fletcher’s Progression Videos](#)

- These videos are an excellent crash course in how students learn topics from grade to grade in elementary school. Use them to get an idea of strategies and models that you can use with your students.

C. Video: Putting it all together

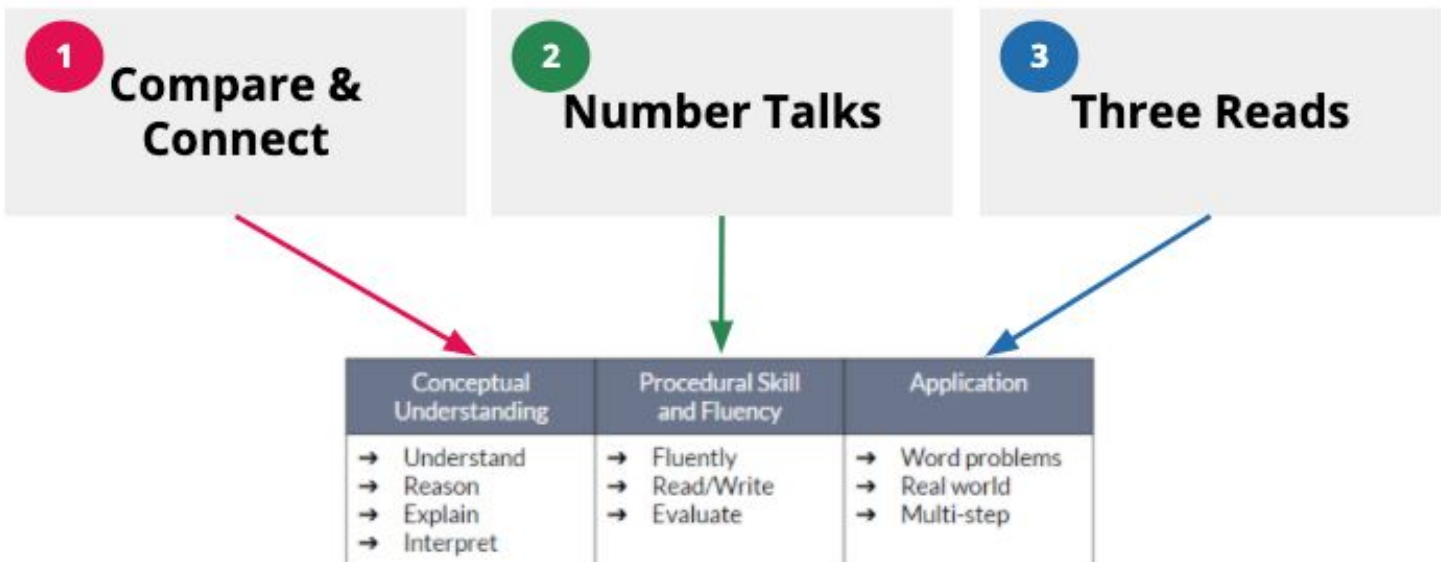
As you watch the video, take notes on where you see examples of Focus, Coherence, and Rigor.

FOCUS	COHERENCE	RIGOR

III. 3 Tutoring Strategies That Promote Sense-Making

A. Overview and Resource Links

These are **universal strategies**:
beneficial to all, **essential** for multilingual learners.



Resource: [Nix the Tricks](#)

- Some of the ways we learned to do math might not actually promote sense-making. This guide shows some common “tricks” that obscure mathematical meaning.

Resource: [Math Language Routines](#)

- Created by researchers at Stanford, these routines are currently the gold standard for helping multilingual learners process and develop language in math. *Compare & Connect* and *Three Reads* are two of the eight routines in this work.

Resource: [Illustrative Math Tasks](#)

- If the teacher you’re working with asks you to find tasks to do with students, this website is a great source to use! Each task outlines questions for you to ask and potential things students might say. Many of the tasks on the next pages are from Illustrative Math.

B. Hands-on Practice in Small Groups

#1 COMPARE & CONNECT

- 1 Give student(s) a task that can be solved in more than one way.
- 2 Have the student tell you similarities and differences between their approach and another student's, or yours.
- 3 Ask follow-up questions about the math.
 - "Where is the 10 in each approach?"
 - "Why does this approach involve multiplication, and this one doesn't?"
 - "What might make this approach easier to understand?"

→ **USEFUL TIP:** Students learning math move on a progression from **concrete** (objects), to **pictorial** (visuals), to **abstract** (numbers and symbols). Use this strategy to show them what the next stage looks like.

Compare & Connect: Pairs practice

2-3
minutes
each!

First person: Kindergarten

Bobbie Bear has a box of red and blue buttons. She takes 4 buttons out of the box. How many of each color button might she have?

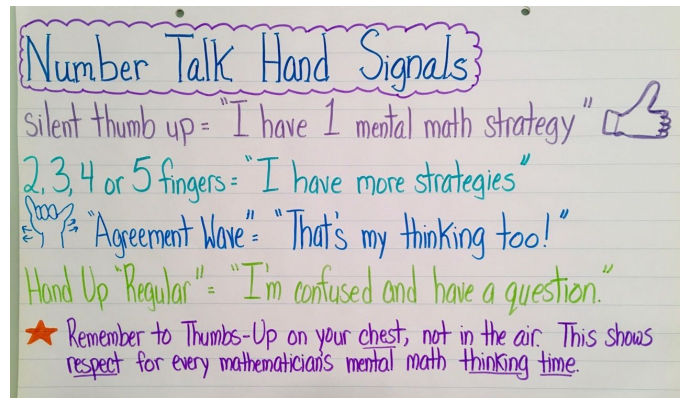
Second person: Grade 4

Which fraction is greater?

$$\frac{3}{5} \quad \underline{\quad} \quad \frac{4}{10}$$

#2 NUMBER TALK

- 1 Give student(s) a computation task to solve **mentally**. Give wait time!
- 2 All students say their answers at the same time.
- 3 Ask the student(s) one at a time to explain their steps. Act as a scribe for them. Don't shape or correct their thinking yet.
- 4 If working with more than one student, invite them to question each other about their strategies and ask each other for clarification. If working 1:1, you may do this yourself.



Number Talks: Pairs practice

**First person:
Grade 1**

What is $48 + 9$?

**Second person:
Grade 2**

What is $702 - 499$?

**2-3
minutes
each!**

#3 THREE READS

Show students a task with the question covered.

- 1 Students read the situation with the goal of comprehending the text (describe the situation without using numbers). **“What is this situation about?”**
- 2 Students read the situation with the goal of analyzing the language used to present the mathematical structure. **“What are the important information and amounts?”**
- 3 Students read the situation in order to brainstorm possible mathematical solution methods. **“What are all the questions we could ask?”**
- 4 Reveal and solve!

Three Reads: Pairs practice

2-3
minutes
each!

First person: Grade 5

Two fifths of the students in the fifth grade want to be in the band. Three tenths of the students in the fifth grade want to play in the orchestra.

What fraction of the students in the fifth grade want to be in one of the two musical groups?

Second person: Grade 1

Ali had 9 marbles. Maria had 5 marbles.

How many more marbles did Ali have than Maria?

IV. Questions & Reflections

WHAT ARE YOUR MAIN TAKEAWAYS FROM THIS TRAINING?	WHAT QUESTIONS ARE UNANSWERED? WHAT ARE YOU HOPING TO LEARN MORE ABOUT?