

Engaging ALL Learners in Math Instruction



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Alt+Shift is an *Individuals with Disabilities Education Act* (IDEA) Grant Funded Initiative through the Michigan Department of Education, Office of Special Education



Who is in the room?

Categorial make-up:

- Mild - Moderate CI
- Severe CI - Severely Multiply Impaired (SXI)

Level:

- Elementary
- Middle
- High
- Transition



Session Goals

- 1) Highlight 3 communication strategies
- 2) Establish the purpose for teaching math to ALL students
- 3) Provide an overview of the Components of Number Sense (CONS)
- 4) Introduce the prototype for lesson construction (C-R-A)



Communication

Communication Strategy #1



Collaborate

Student Example #1



Communication Strategy #2



Provide a means for
communication
everywhere, all the time.

Jaden video (before)



Jaden video (after)



Communication Strategy #3



Stick with it.

Student Example #3



Communication Table Talk

What does communication look like in your setting?

What is going well?

What is an area for improvement?

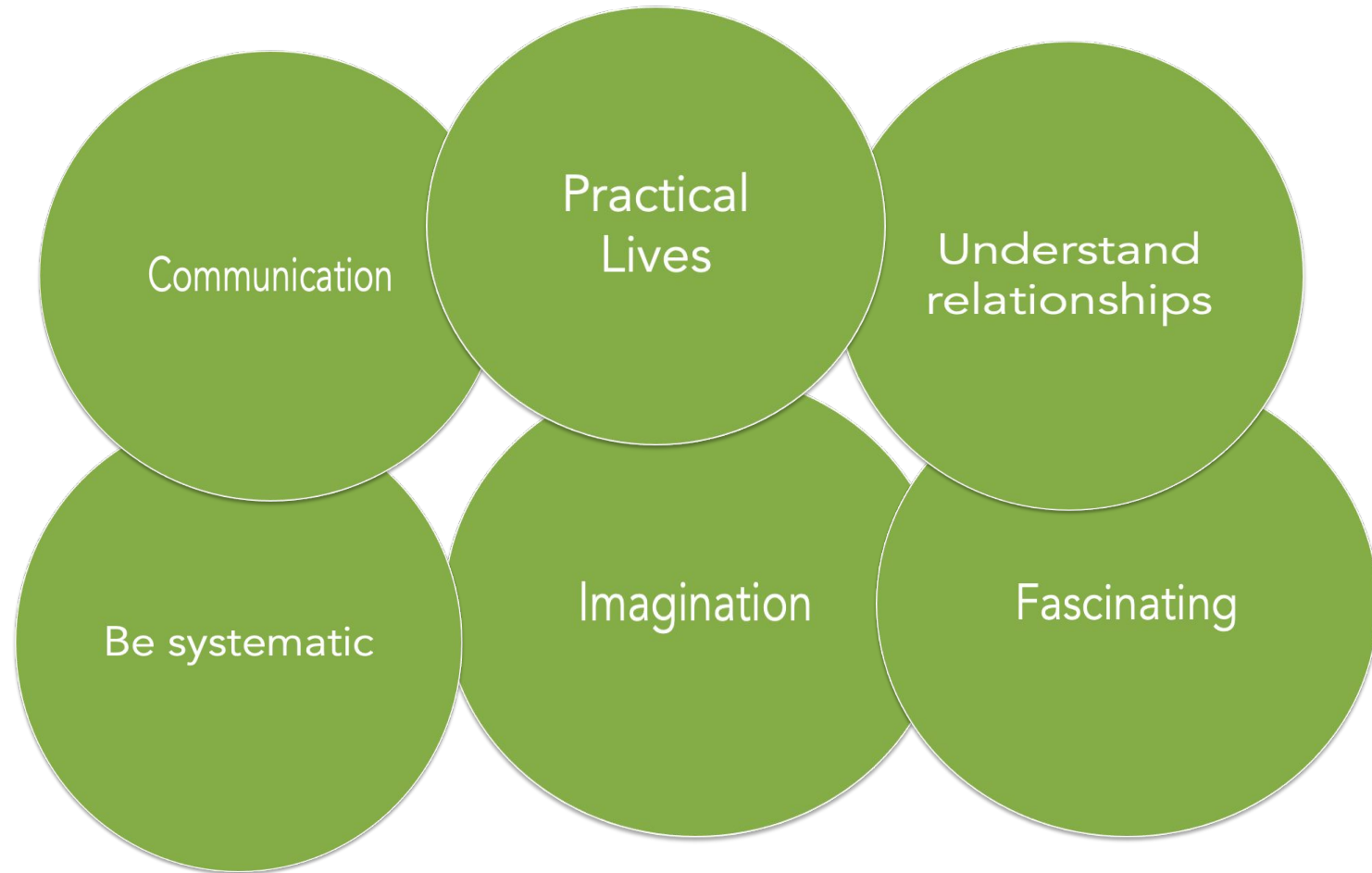


Evidence Informed Mathematics Instruction

Why Teach Math?

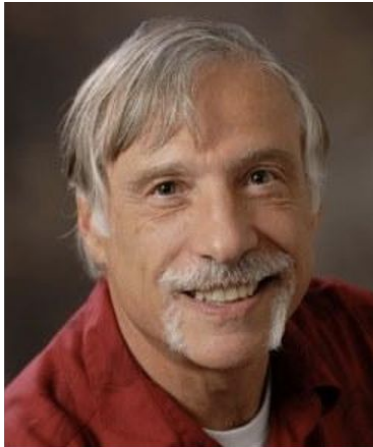
Math is important for everyone.

Why Teach Math?

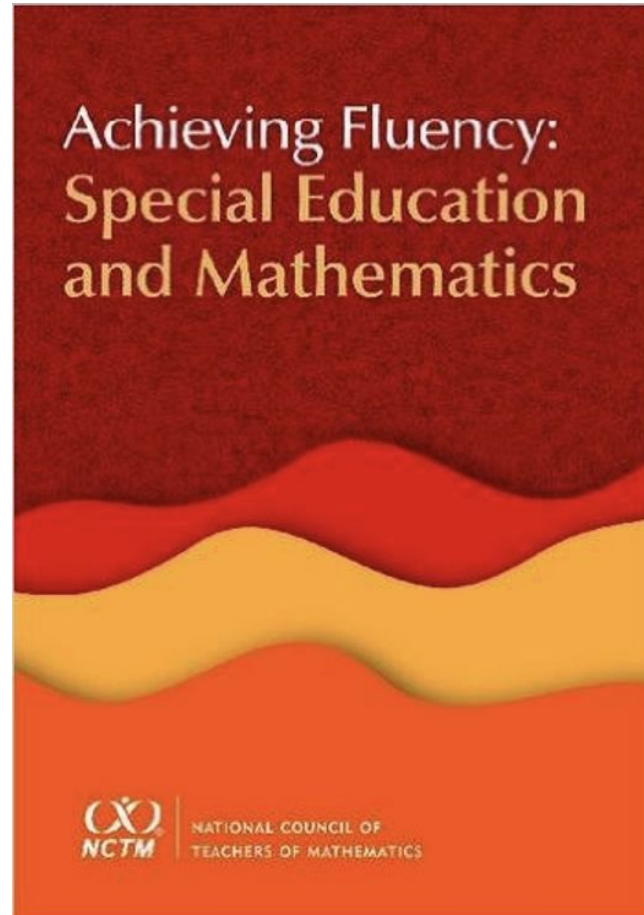


Staves 2001

Everyone Learns Math



Arthur J. Baroody
“Learning: A Framework”





- How do we make sense of **mathematics goals** for our classrooms?
- How do we **maintain rigor** for our students and maintain functional goals?
- How do we **teach a subject** that we may feel unprepared to teach?

EVERY STUDENT
CAN LEARN



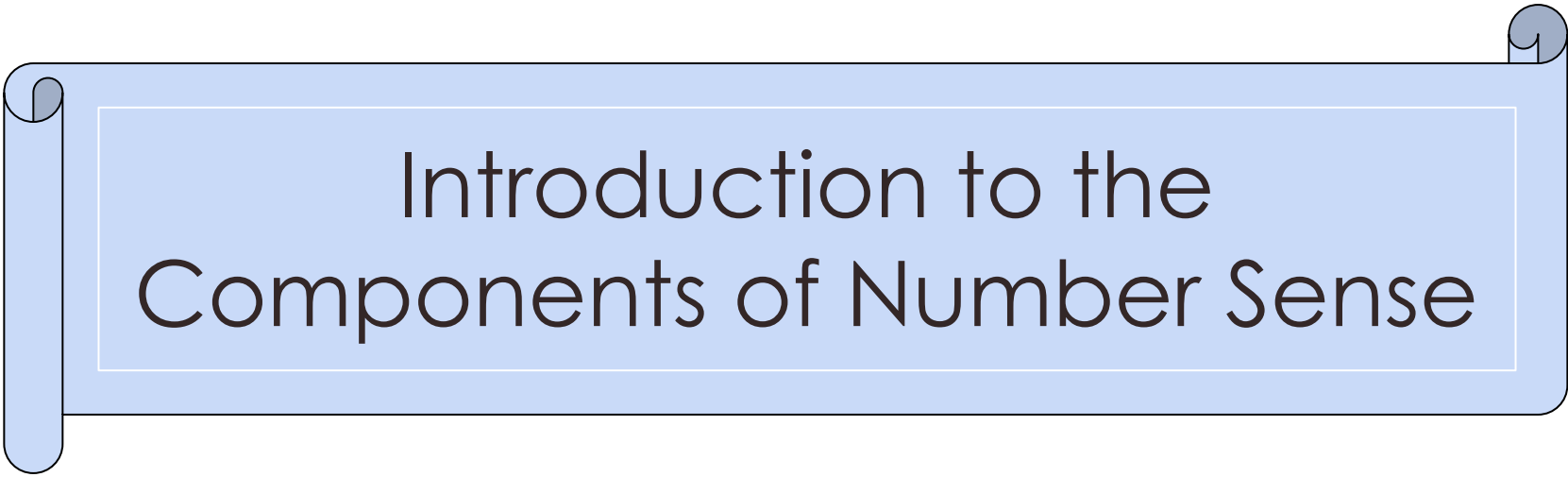
JUST NOT ON THE SAME DAY
OR IN THE SAME WAY



To Be Effective, You Must:

- Know your stuff,
- Know who you're stuffing,
- Know why you're stuffing,
- Stuff every minute of every lesson.

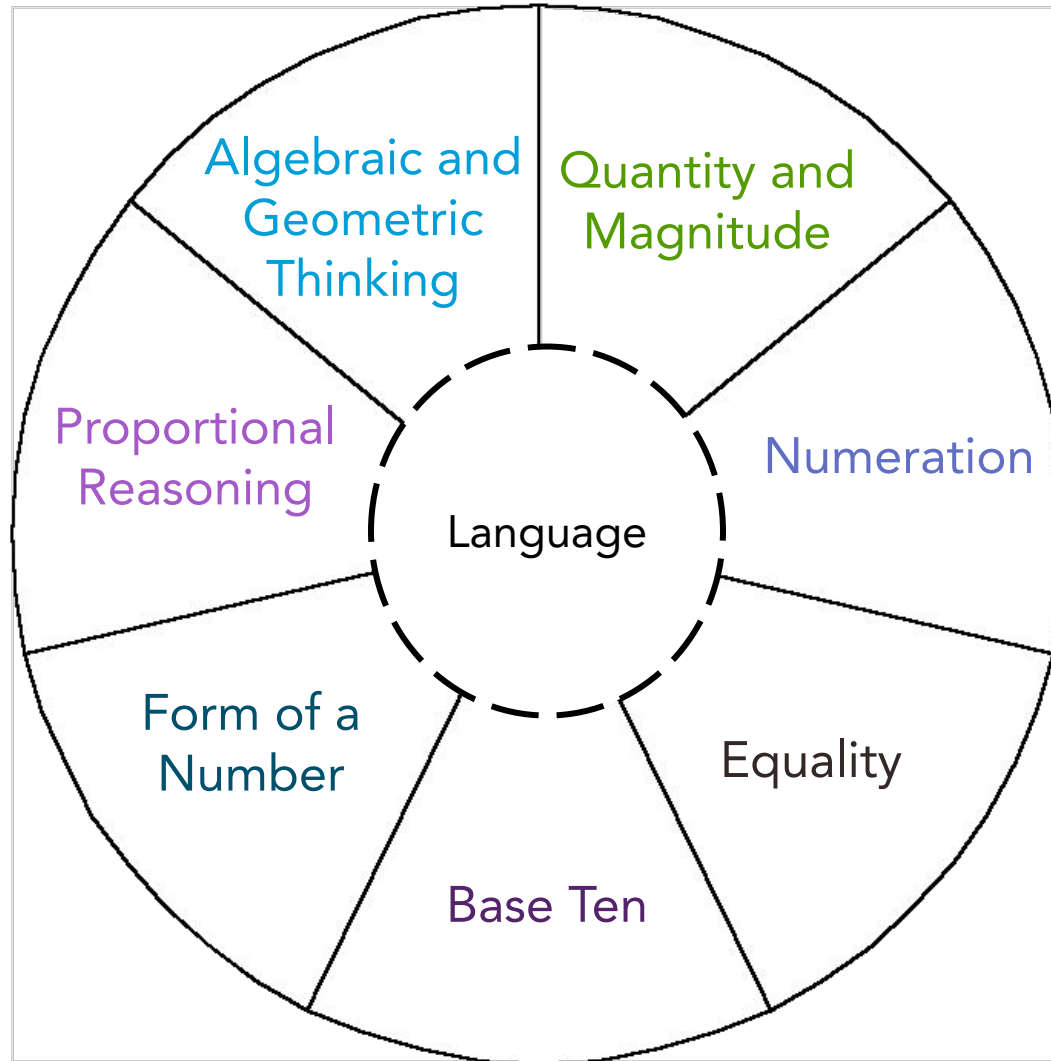




Introduction to the Components of Number Sense

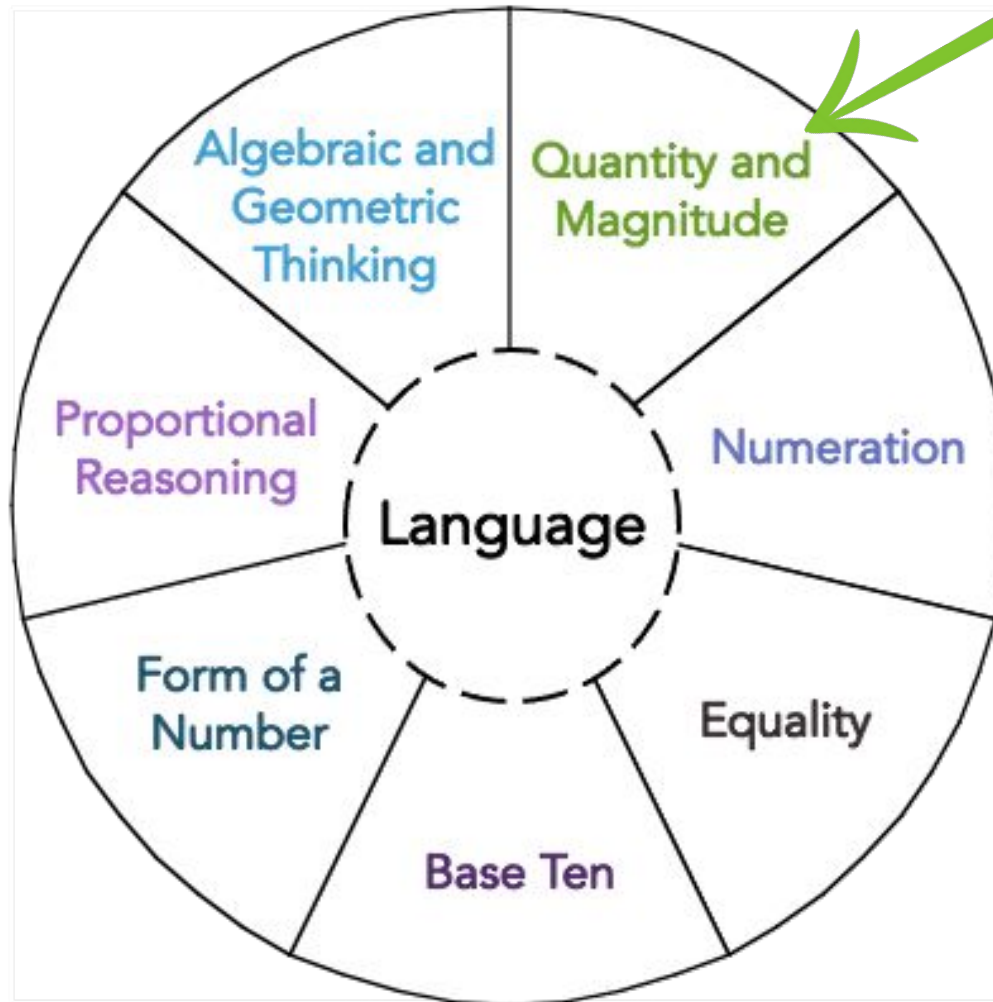
Number Sense

“Number sense is difficult to define but easy to recognize.”



Components of Number Sense

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Quantity & Magnitude

- What is the difference?
 - Quantity-
 - Magnitude-

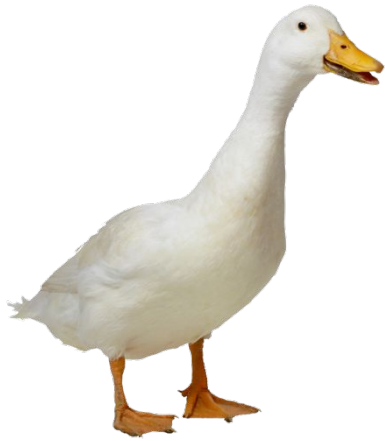
Quantity & Magnitude

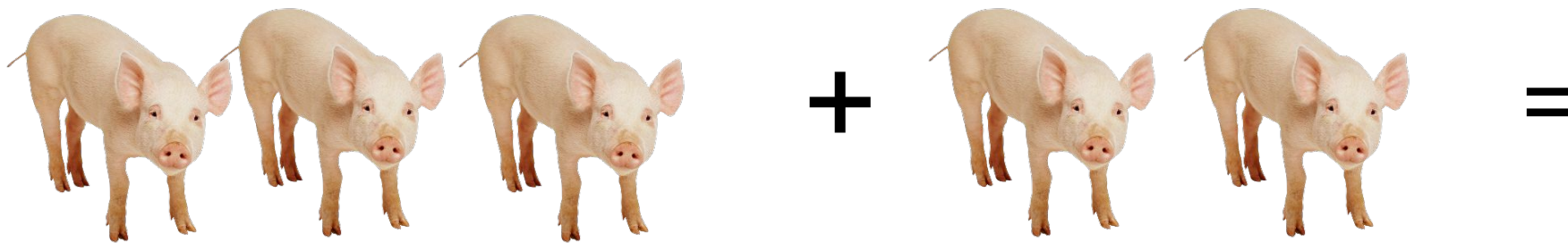
- What is the difference?
 - Quantity- the actual amount of something
 - Magnitude- relative size or amount as compared to something else

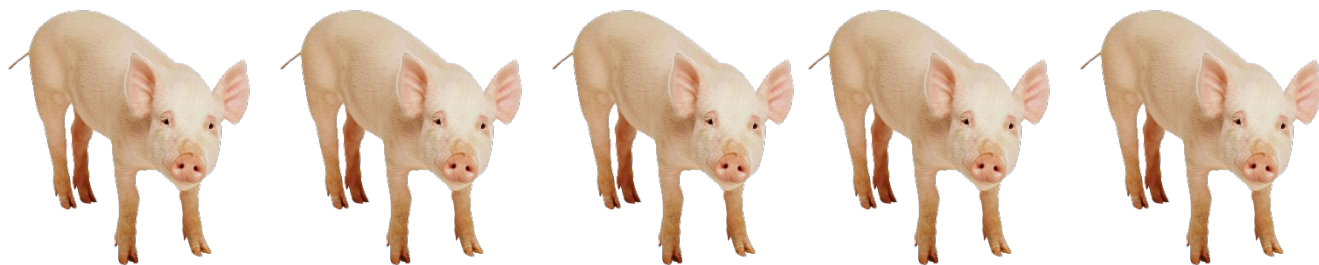
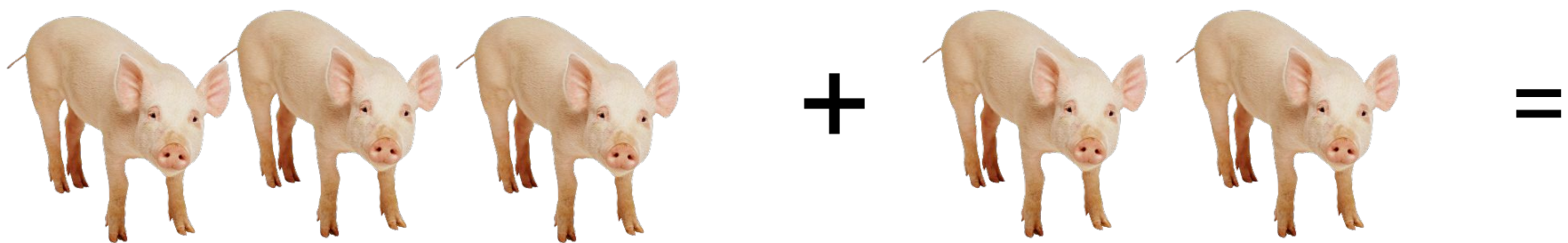
10
9
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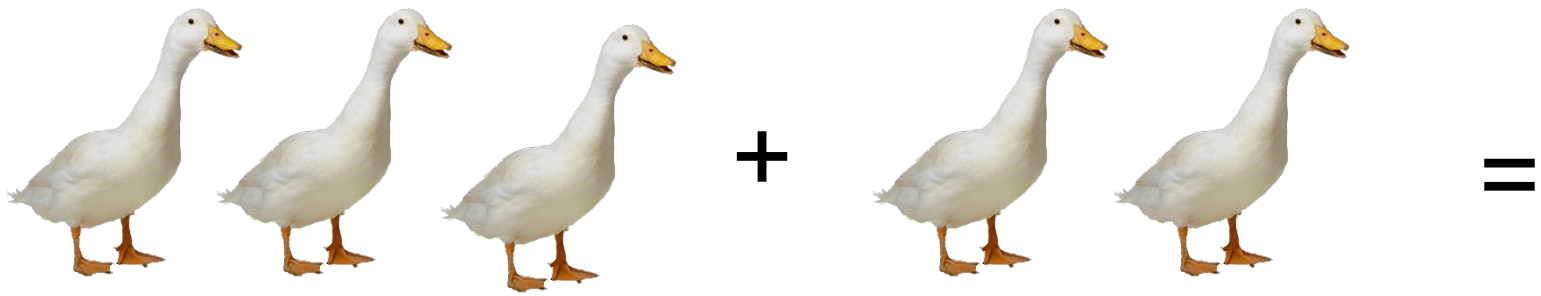
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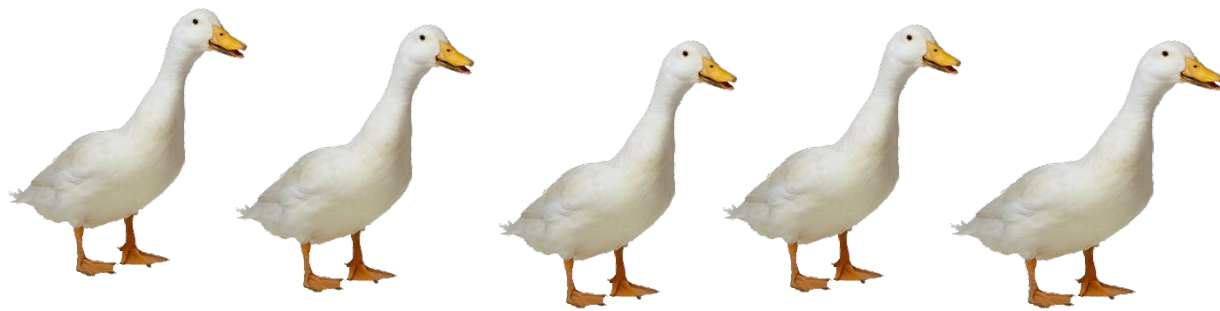
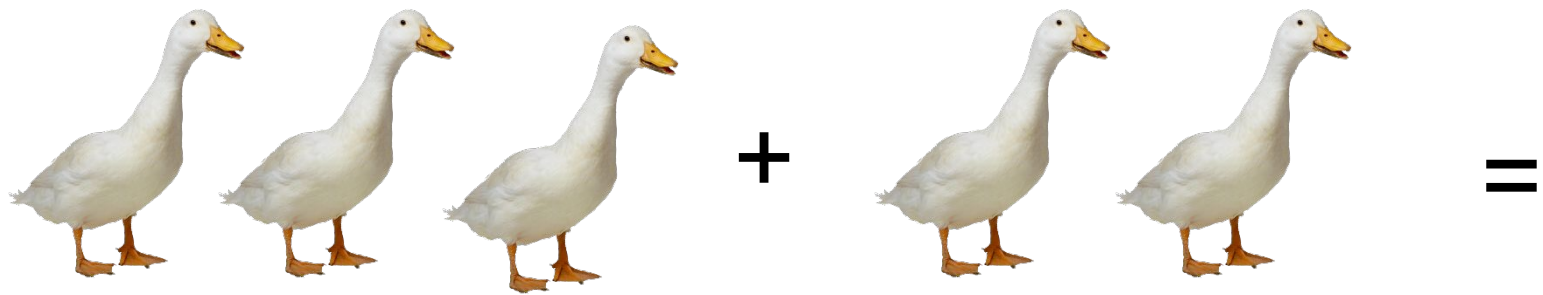
Thinking in terms of, and naming, units

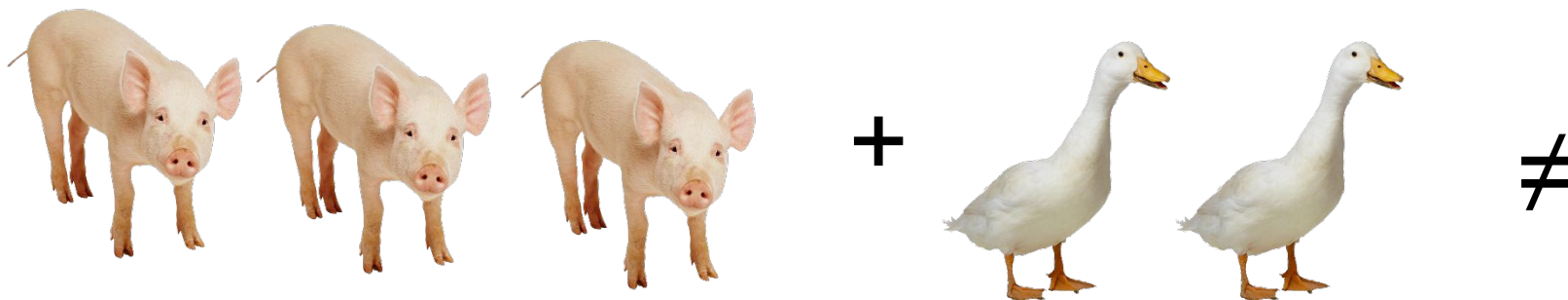


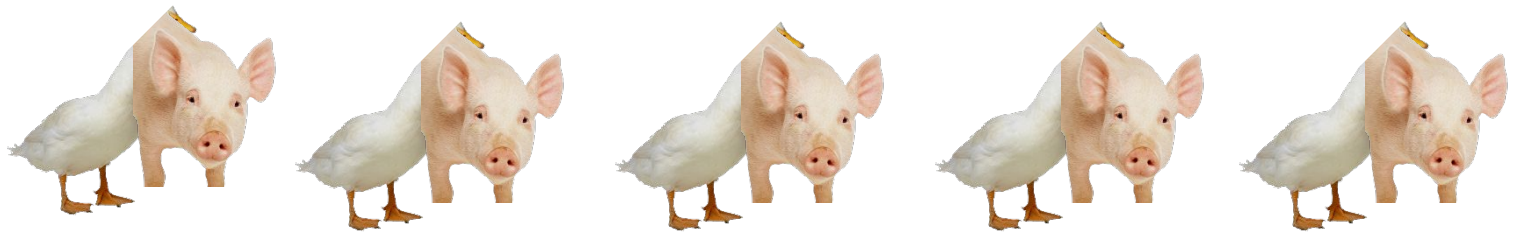
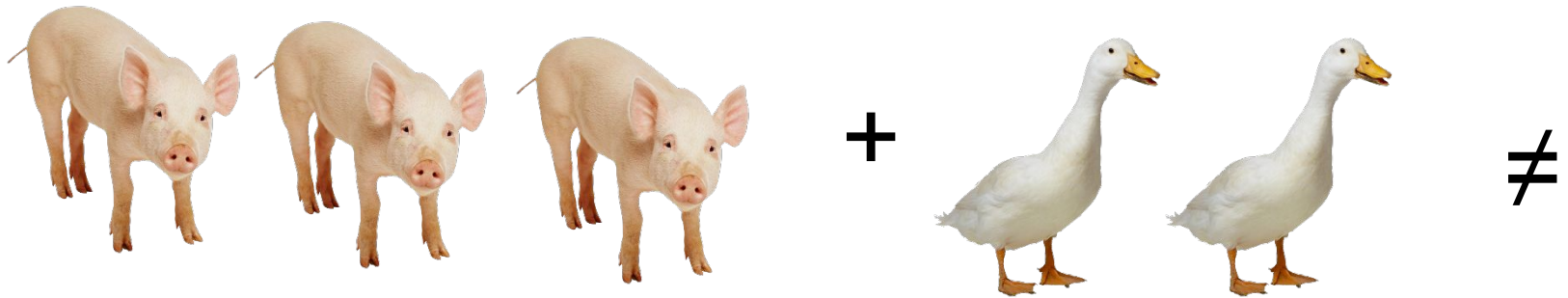












Piducks?

Common unit or denomination



3 pigs

2 ducks

5 animals

Uncommon units

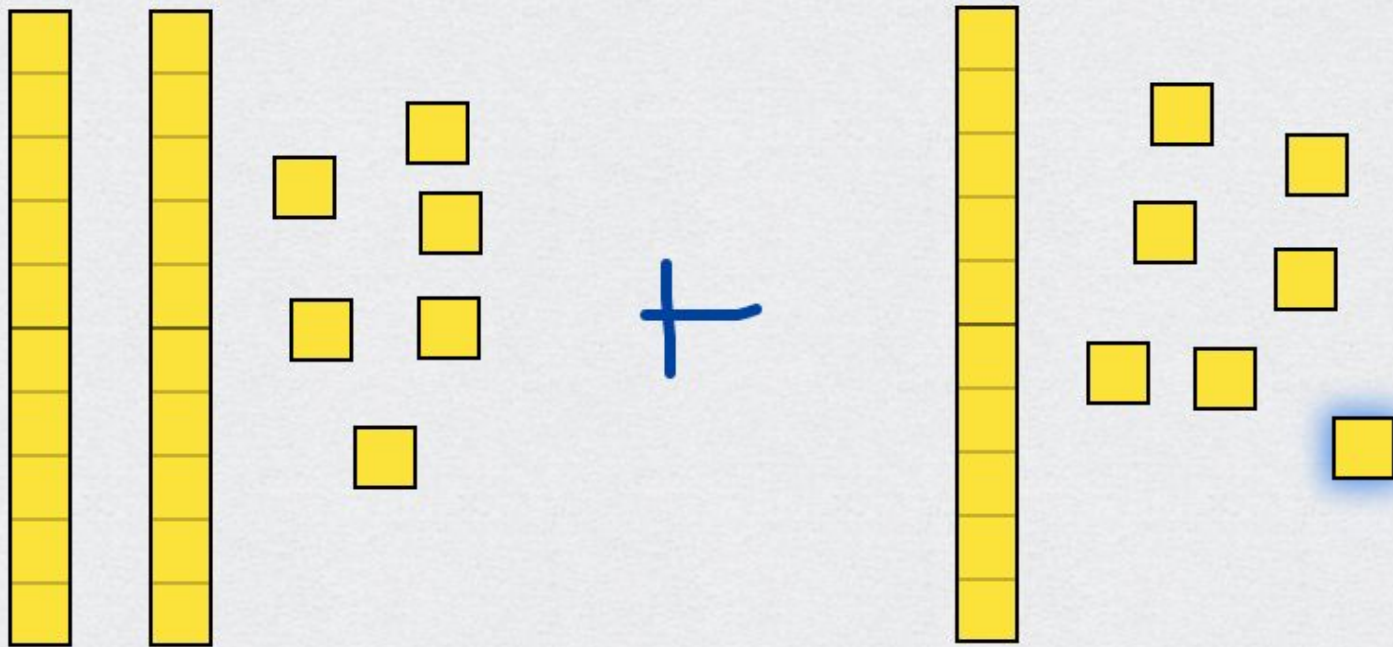
- You cannot add quantities that describe different nouns (ex. - pigs and ducks).
- You must convert quantities to the same unit or find a unit they share.

A vertical toolbar on the left side of the screen containing various drawing and editing tools. From top to bottom, the tools are: a cluster of yellow squares, four vertical columns of yellow squares, a 10x10 grid of yellow squares, a ruler, a white eraser with the number '2', a red marker, a blue pen, a grey eraser with the word 'ERASE', and a white eraser with the word 'ERASE'.

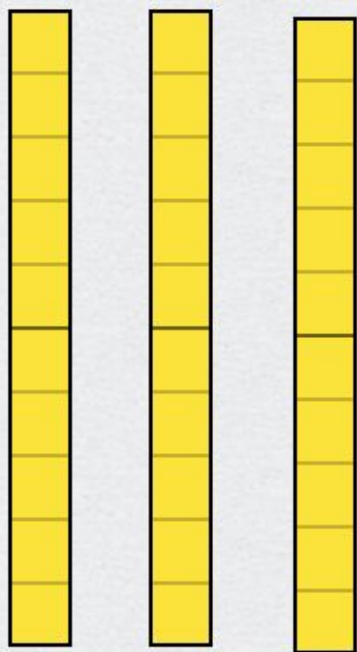


A horizontal toolbar at the bottom of the screen with various navigation and editing icons. From left to right, the icons are: a circular arrow (refresh), a square with left and right arrows, a square with left and right arrows and a double arrow, three colored circles (green, blue, red), a double arrow with a vertical line, a trash can, and an information icon (i).

$$26 + 17$$

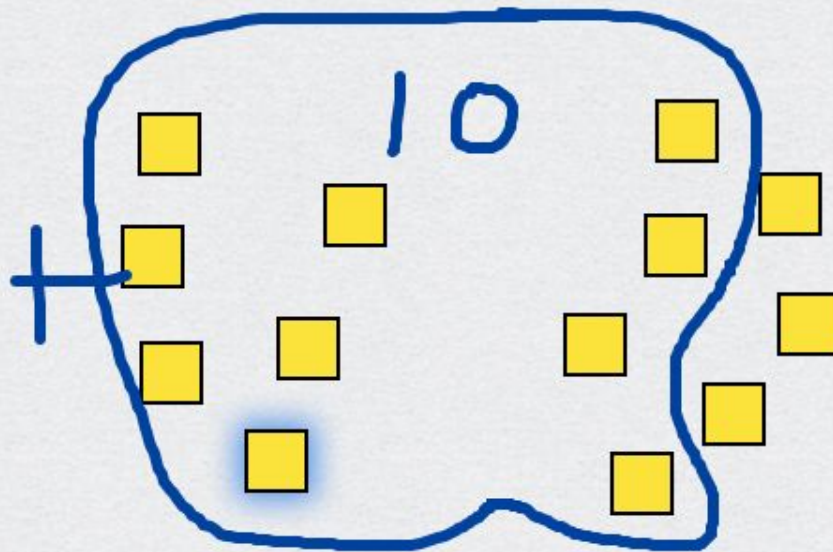
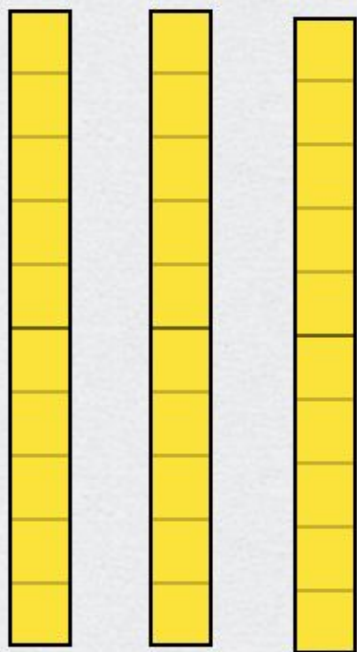


A vertical toolbar on the left side of the screen. From top to bottom, it contains: a cluster of yellow squares; four vertical yellow bars of different heights; a yellow grid; a ruler; and a blue square icon with the number '2' and a pencil icon. Below the '2' icon is a small downward-pointing triangle.

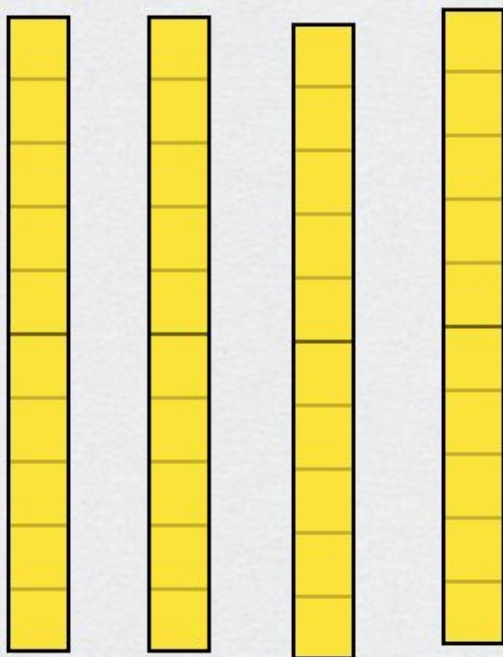


A horizontal toolbar at the bottom of the screen. From left to right, it contains: a circular arrow icon (undo); a square with left and right arrows (move); a square with left and right arrows and a zoom-in icon (zoom); three colored circles (yellow, green, red) (color); a circular arrow icon (refresh); a trash can icon (delete); and an information icon (help).

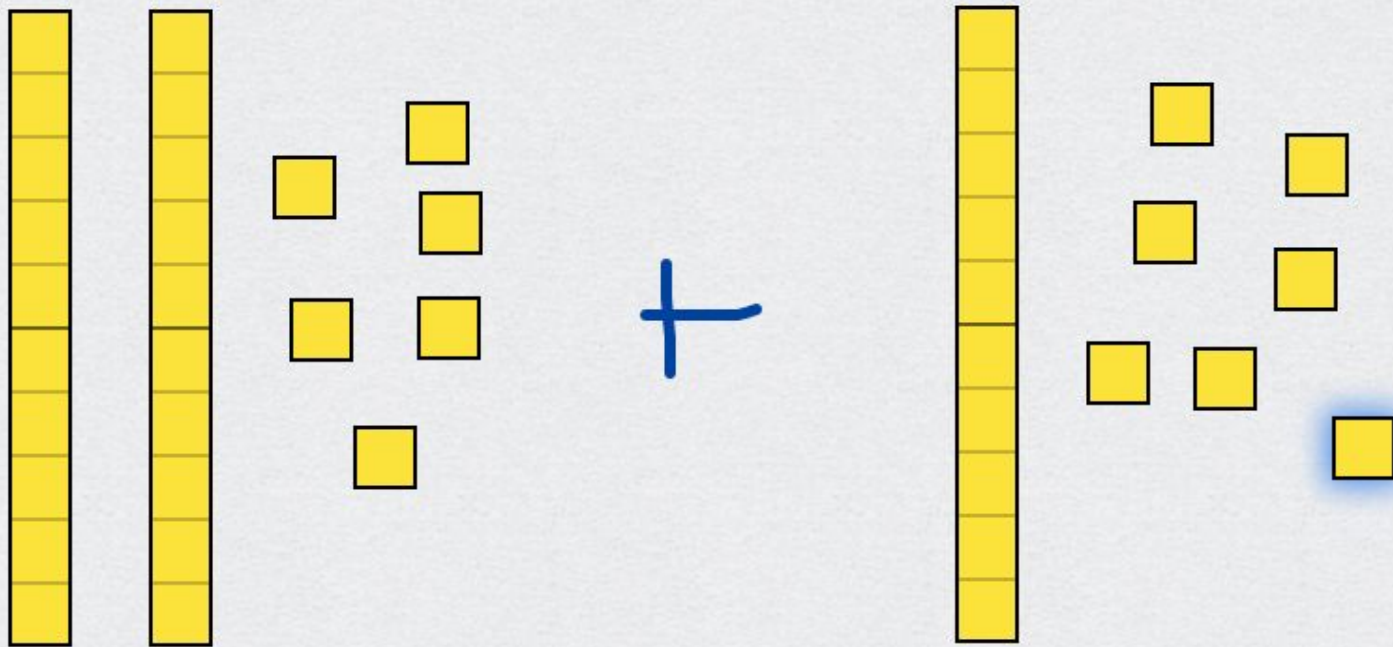
$$26 + 17$$



$$26 + 17 = 43$$



$$26 + 17$$



$$\frac{1}{2} + \frac{1}{2}$$

$$\frac{1}{5} + \frac{1}{5} + \frac{1}{5}$$

$$\frac{1}{2} + \frac{1}{5}$$

$$\frac{1}{2} + \frac{1}{5}$$

$$\frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10}$$

$$x + x^2 + 2x + 1 + x^2 + 2$$

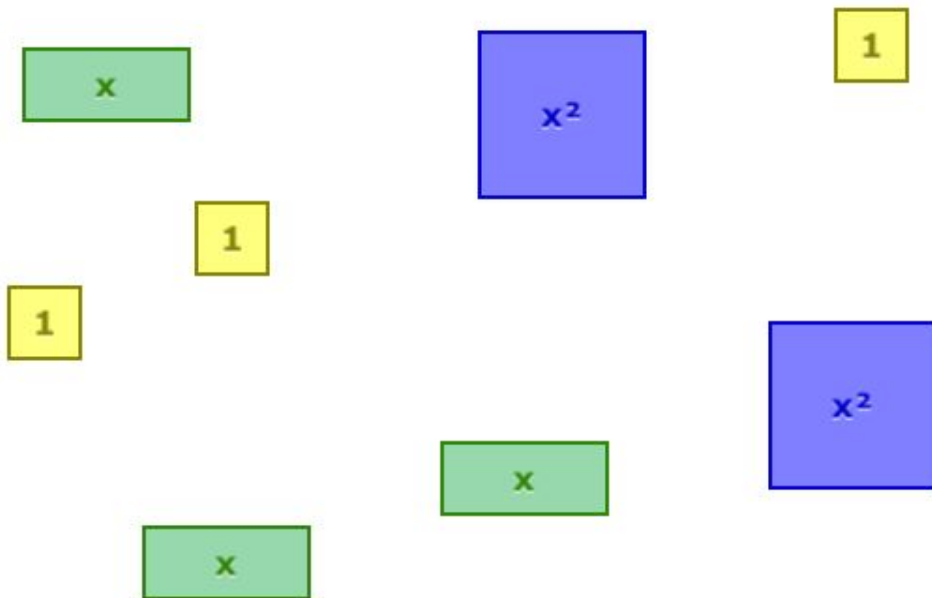
Unit Tiles



x Tiles

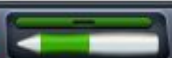


x² Tiles



More Apps

Clear All



Basic



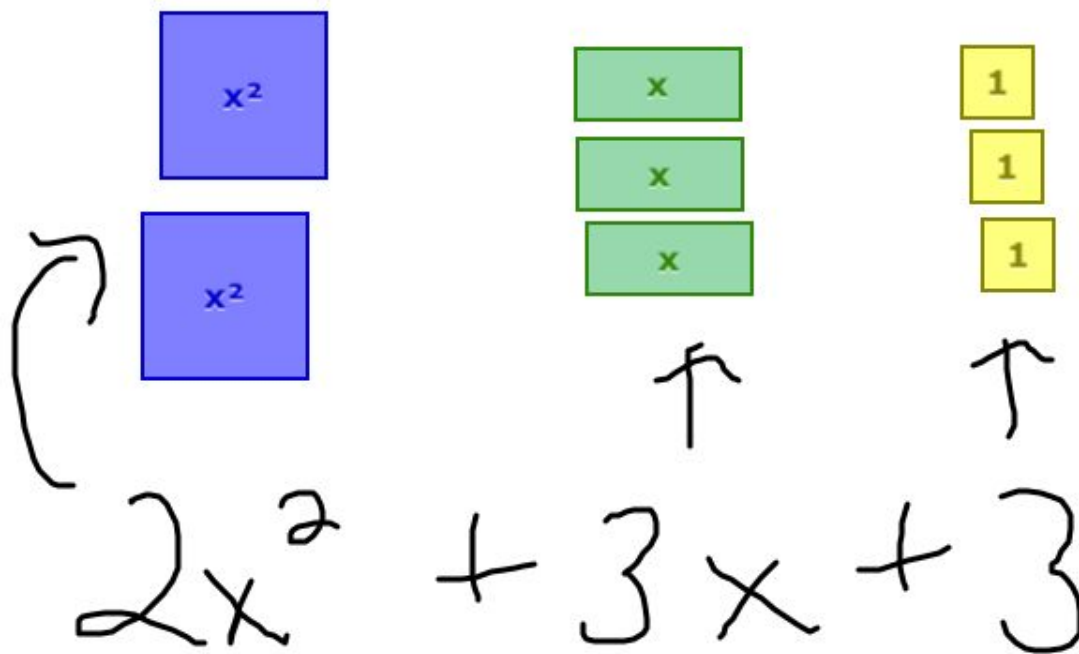
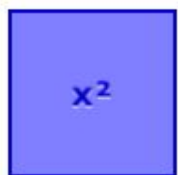
Unit Tiles



x Tiles



x² Tiles

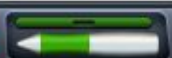


$$2x^2 + 3x + 3$$



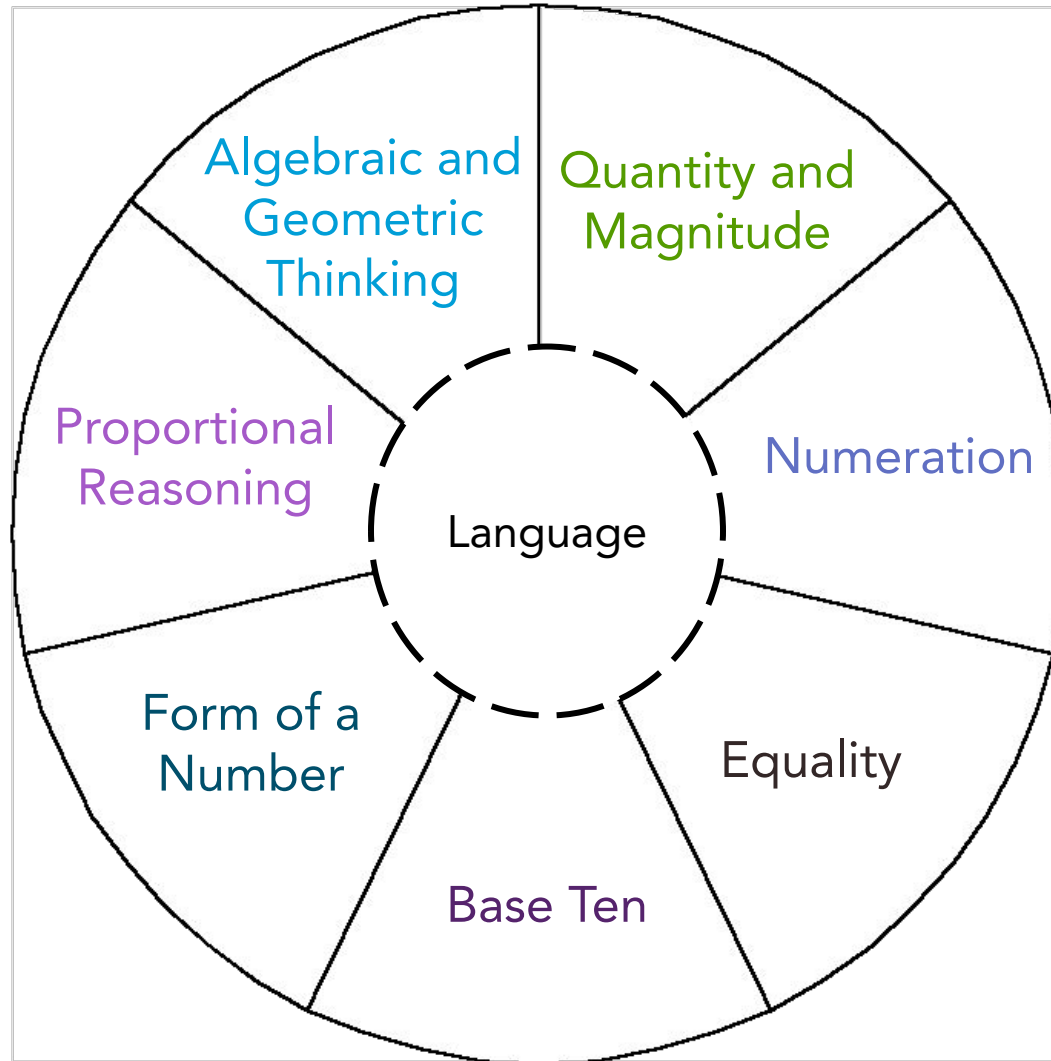
More Apps

Clear All



Basic





Components of Number Sense

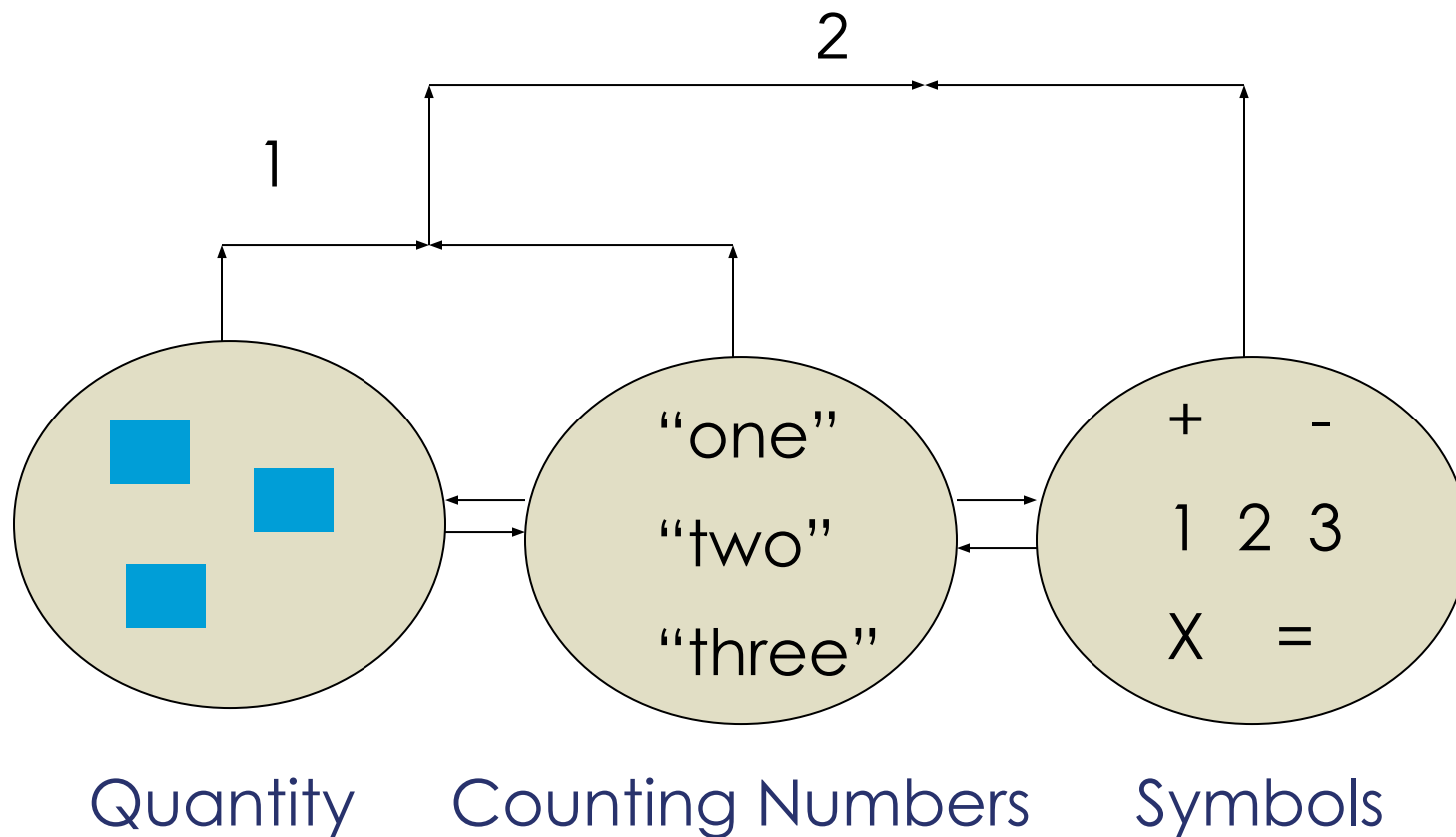
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Prototype for Lesson Construction

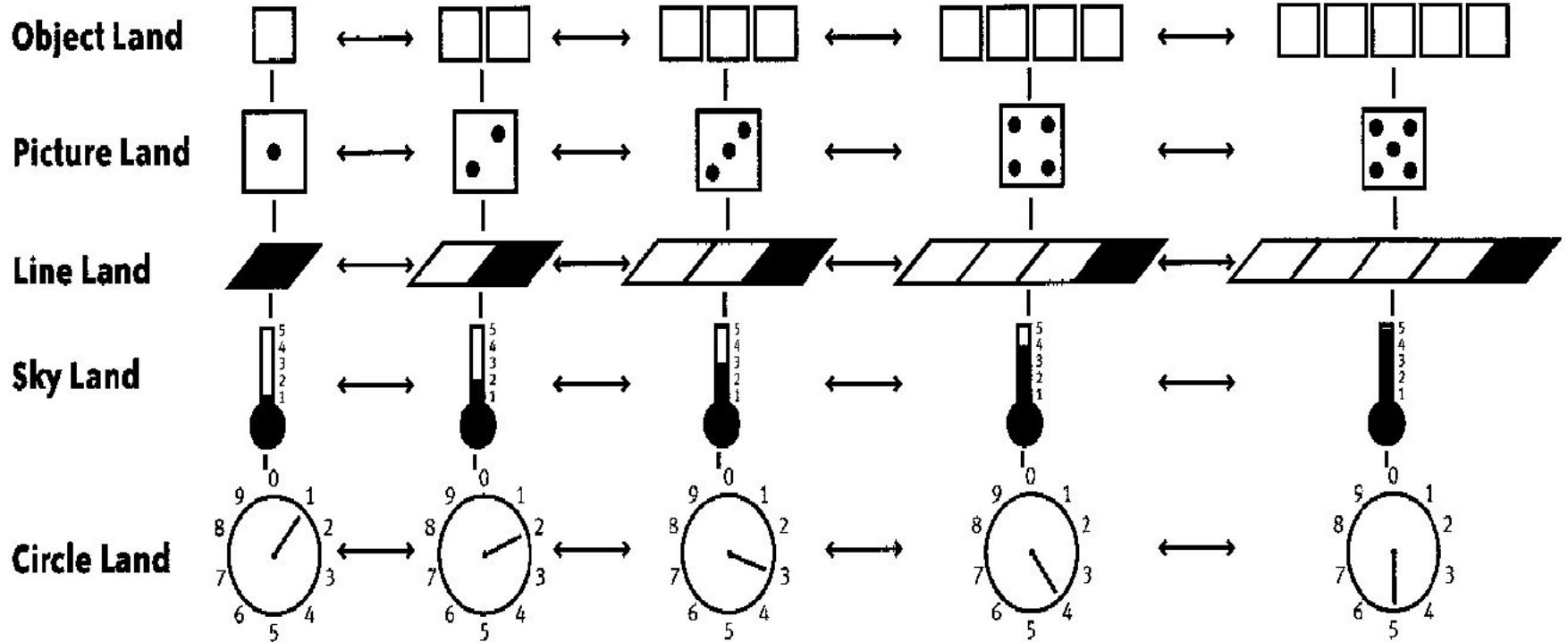
Sharon Griffin

Core Image of Mathematics



Number Lines

Representation for Numbers in Different Lands



How does this interconnectedness develop?



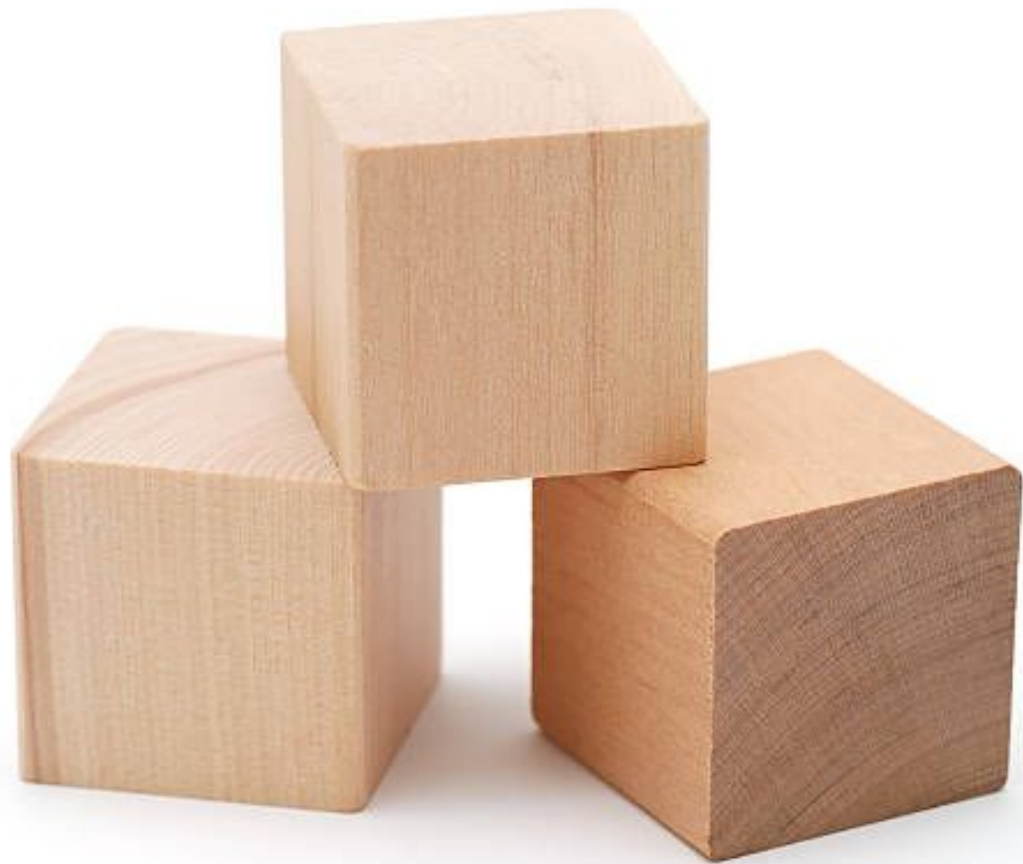
What is this?

Cat



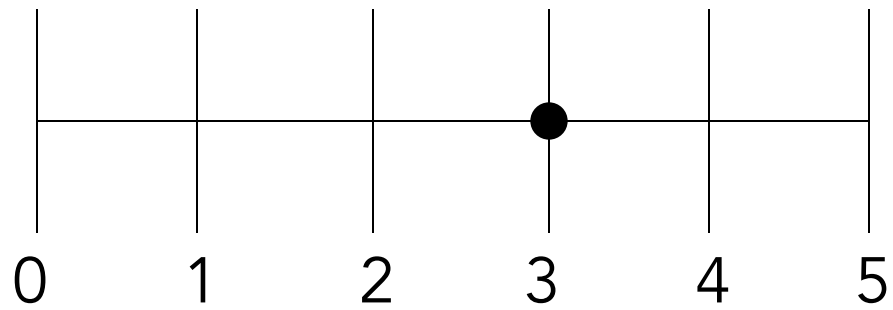
What is this?

3





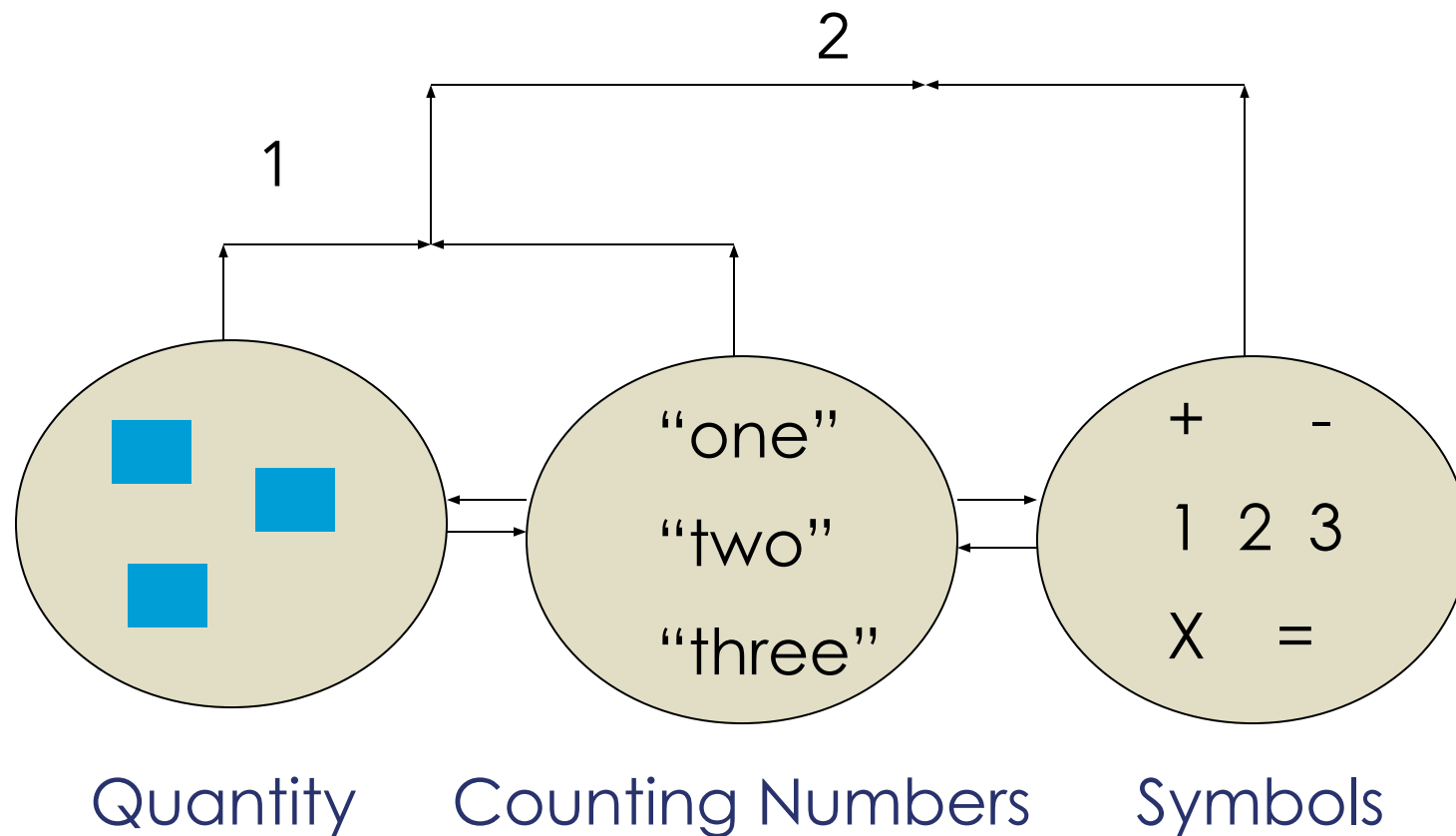




Clap, Clap, Clap

Sharon Griffin

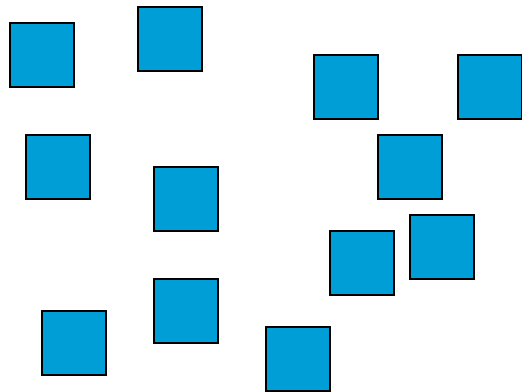
Core Image of Mathematics



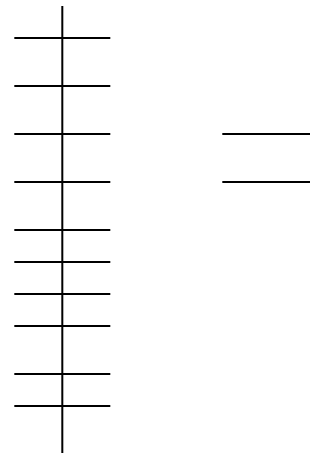
C-R-A Cecil Mercer

- The student moves through stages.
- The teacher has the responsibility to explicitly and directly instruct students through these stages.
- Make connections for the students!

Concrete



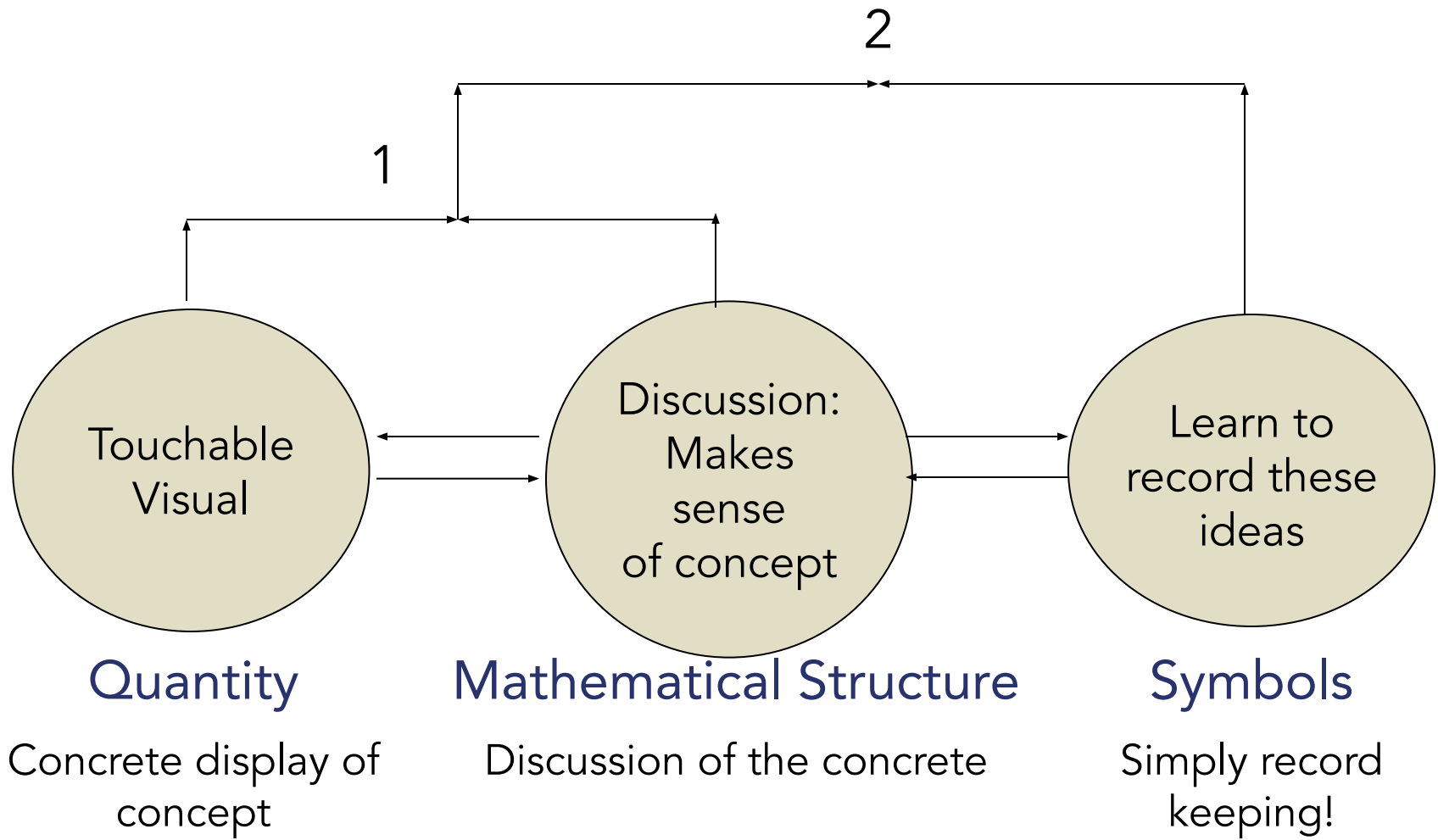
Representational



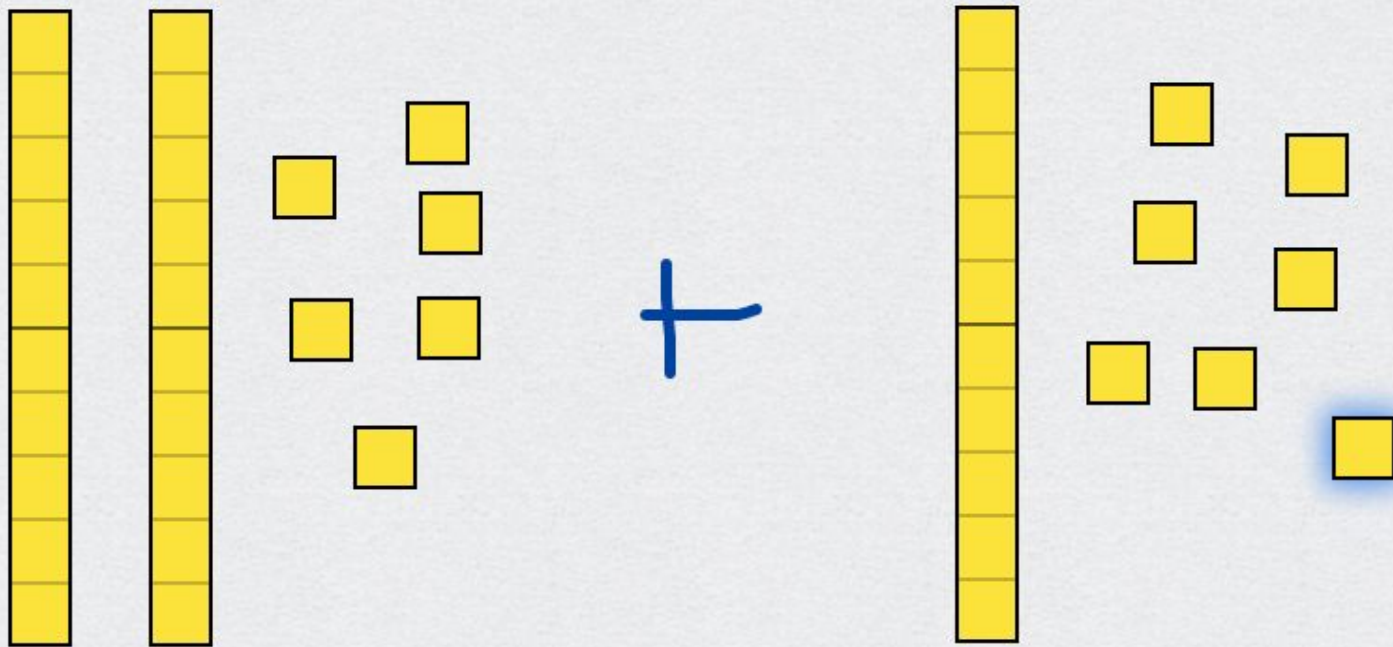
Abstract

$$7 + 5 = 12$$

Prototype for Lesson Construction



$$26 + 17$$



What do you wish your math education had done for you?

What do you hope to do for your students' math education?



IT IS NOT WHAT
IS POURED INTO
THE STUDENT,
BUT WHAT
IS PLANTED,
THAT COUNTS.

– E.P. BERTIN

WE ARE
TEACHERS

Questions



Thank You

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