

EARLY MATH MATTERS



A Read to Succeed Workshop
UNITED WAY OF GREATER NASHVILLE



References:

- <https://nrich.maths.org/10737>
- Sara Delano Moore, Ph.D., Director of Mathematics and Science, hand2mind.com
- Brian Mowry, Ph.D., Manager of Curriculum and Instruction, frogstreet.com

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- Find and register for the Read to Succeed Free Early Childhood Webinar Series at <https://www.eventbrite.com/o/united-way-of-greater-nashville-30218001622>
- Find RTS Webinar recordings at <https://www.unitedwaygreaternashville.org/rts-training/>



“The first five years have so much to do with how the next 80 turn out.” – Bill Gates

Math helps children make sense of their world through:

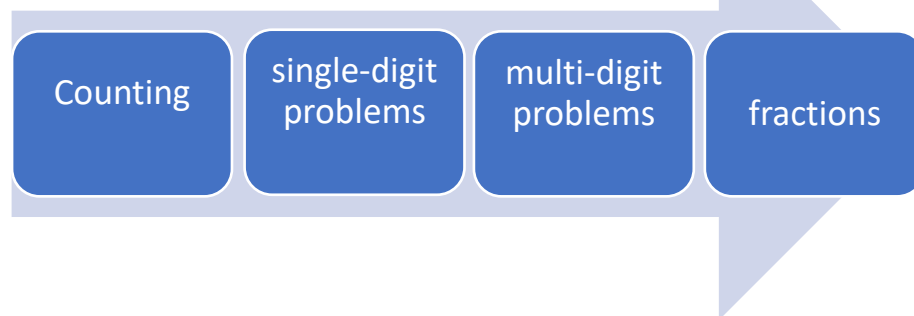
- Comparing quantities (who has more?)
- Finding patterns (what comes next?)
- Navigating in space (how can I get there from here safely?)

Which helps them solve real-world problems such as:

- Balancing a tall block building
- Sharing crackers fairly
- Not bumping into friends and chairs

Early math learning has a sizeable impact on a child’s future.

- **Early Math skills are built on for later skills**



- **The jobs of the future will be found in the STEAM fields (Science, Technology, Engineering, Art, and Math)**
 - Early exposure helps underrepresented populations find success (i.e. girls and students of color)
- **Early Math fluency is one of the biggest indicators of future literacy and school success**

But, studies show that 50% of ECE teachers don't teach math at all
Often, it's because we aren't comfortable with math ourselves.



Increasing our comfort with math helps us
guide our students to success.

Number Sense is an awareness or understanding of:

the
relationship
between
number and
quantity

number
symbols,
vocabulary,
and their
meaning

magnitude
and
comparisons
between
different
magnitudes

different
representa-
tions of a
number

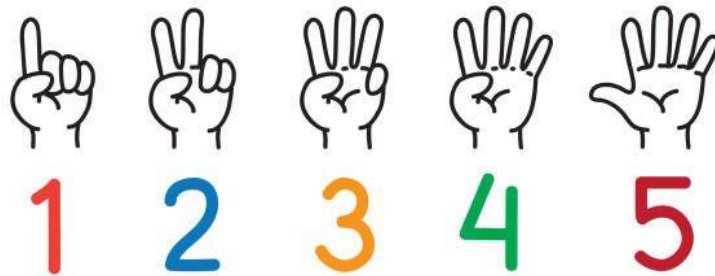
number
patterns
including
recognizing
missing
numbers

The ability to engage in systematic counting, including
notions of cardinality and ordinality

Competence with simple mathematical operations

Learning to Count includes:

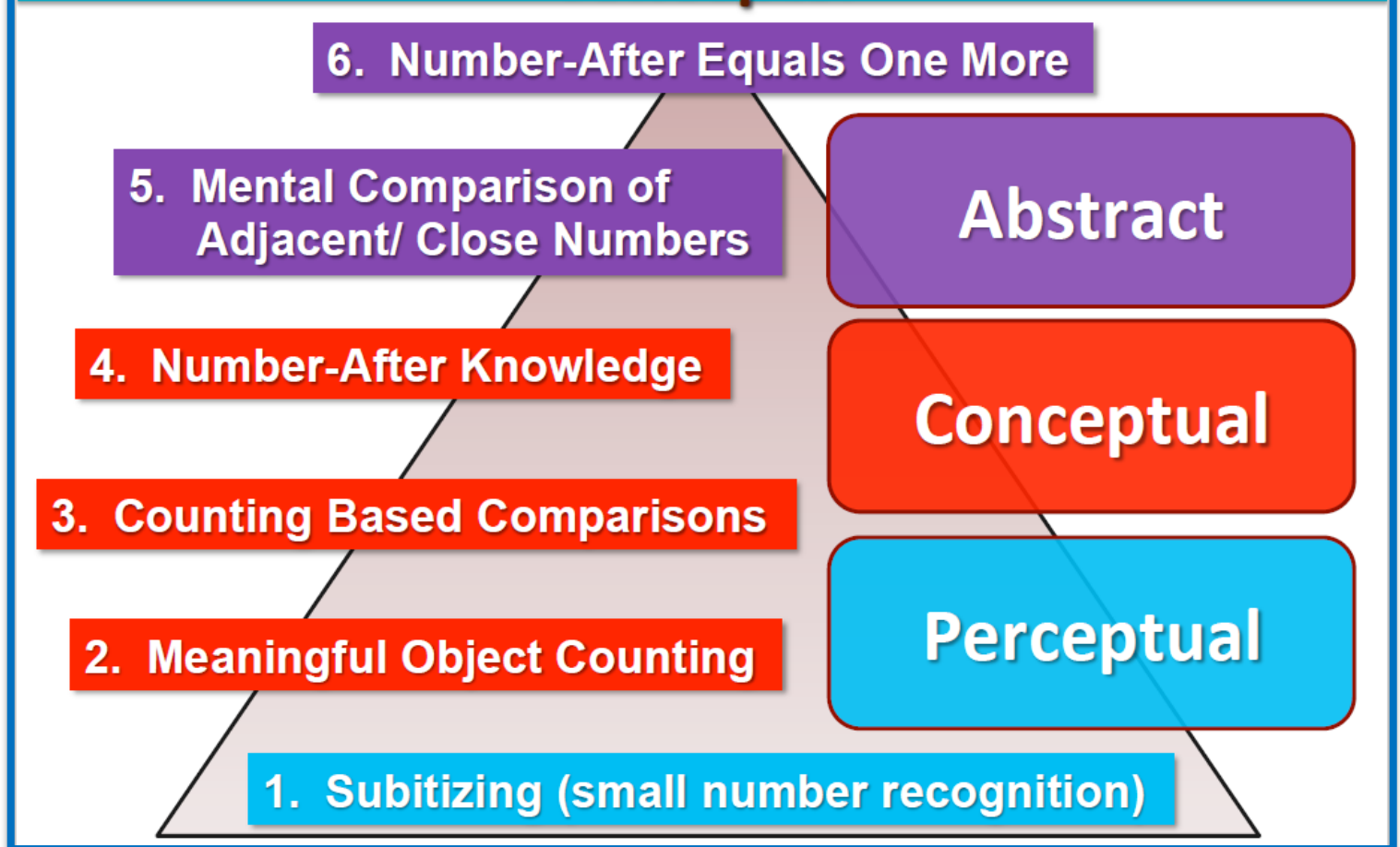
- Learning the number words
 - Number patterns in English can be different from those in other languages (thirty vs. twenty-ten)
- Learning the number words in order (**this is fluency**)
 - This is not a race, we're building fluency (just like with the alphabet)
- Identifying the symbol and matching it to the word
- Understanding cardinality:
 - the quantity represented by the number word and symbol (**this is comprehension**)



Number of the Week Activities can be very enriching and help with number comprehension. Activities can include:

- Create a number of the week display
- Use number books, number songs, and number rhymes
- Tactile numbers for tracing (i.e. sandpaper)
- Writing numbers in a medium (i.e. sand)
- “How many different ways can we make this number?”
- “Where can we find this number?”

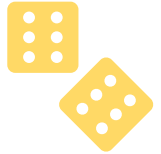
Developmental progression of number concepts:



Children learn:

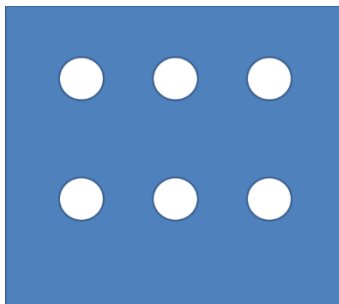
1. the “Perceptual” skills first
2. then the “Conceptual” skills
3. finally, the “Abstract” skills

Subitizing is knowing the amount of something without having to count it individually.

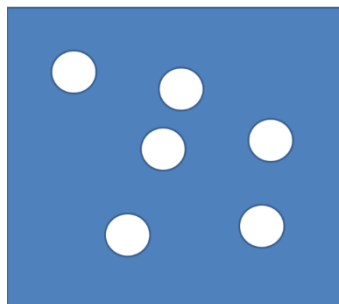


- Subitizing matters because:
 - It is the basis for working on basic formulas
 - It makes math more efficient
- Activities can include using manipulatives or even stickers in different amounts and arrangements for practice.
 - Arrangement matters:

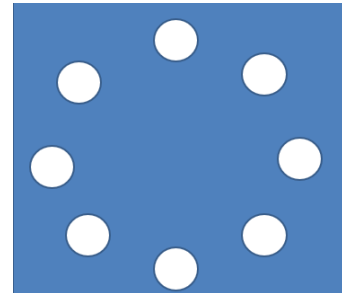
lines are easiest



groups are harder



circles are hardest



Meaningful Object Counting

- This is one-to-one correspondence
- It allows us to know how many objects are in a group (cardinality)
- Hints:
 - Touching the object is important in the beginning
 - Point out the last number is the total quantity



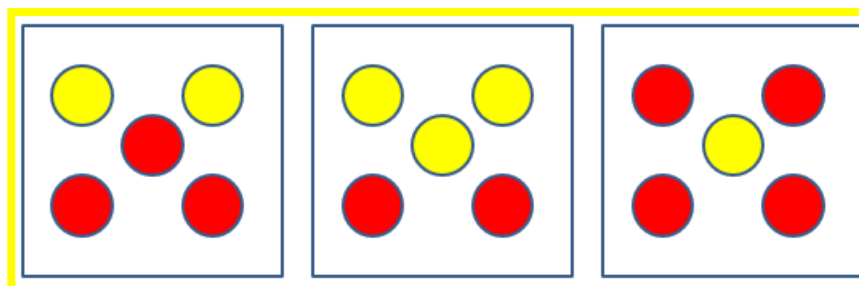
Counting-Based Comparison

- This involves knowing, which is more than, less than or the same as (equal)



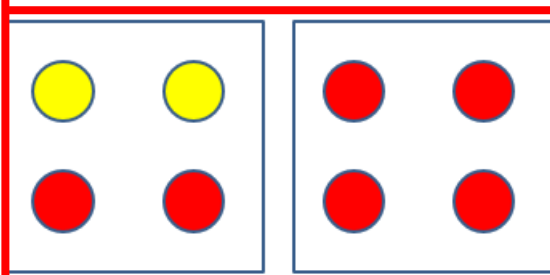
Composing and Decomposing

- Part of counting-based comparisons is learning all the different ways we can make a number



Using the same pattern, students can see it's 5 every time, even though it's different amounts of red and yellow

You can introduce the concept of "zero" by using only 1 color. It's still 4, even without the yellow.

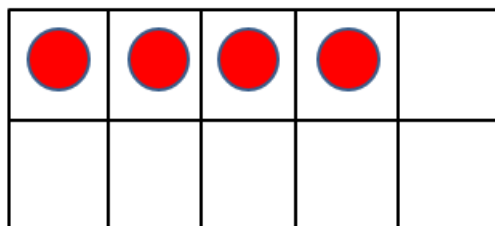
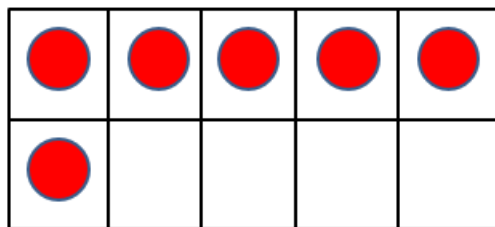


A Note on Ten Frames

- Using a ten-frame helps practice with subitizing as well as counting on by keeping counters organized.
 - With very young children, you can use a 5 frame
- Work with students so they don't fill it in randomly, make 5, then make 5 more. This shows that 5 is the first anchor number and then 10 is the anchor for our whole base-10 system.

Comparison of Adjacent and Close Numbers

Using ten frames to introduce comparisons shows the numbers in relation to the 5 benchmark.



Six is more than four.

$$6 > 4$$

Four is less than six.

$$4 < 6$$

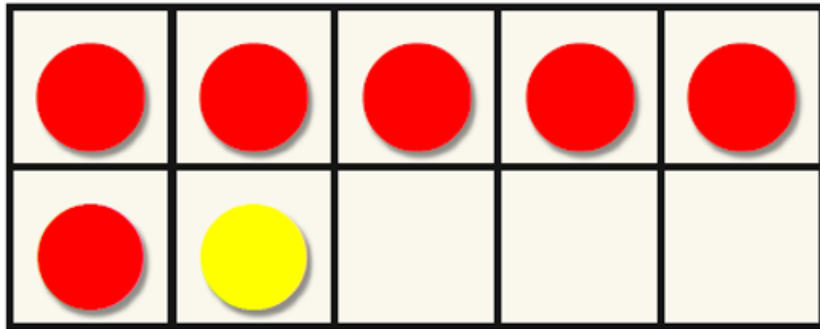


Tips:

- Always ask, “How do you know?”
- Switch up asking, “Which is more?” with “Which is less?”

The Number After Equals One More

- This skill can be taught with composing and decomposing



- The difference between “Counting All” and “Counting On”
 - Counting All – counting every object
 - Touching each counter in turn, “1, 2, 3, 4, 5, 6, and 7.”
 - Counting On – Start from a number and count from there.
 - Say “I see 5 red on top, 1 red on the bottom, and 1 yellow.” Touching the last two counters, “That’s 5, 6, and then 7.”
 - We want to start moving children to counting on for better math efficiency. However, this skill may not be mastered until early elementary.

“Creativity is the secret sauce to science, technology, engineering, and math.” – Ainissa Ramirez

Play is at the heart of all early learning

- Allowing children to play with these skills with loose parts, natural objects, and loved toys is the best way to engage children in wanting to learn.



Intentional, Responsive Teaching: *A Continuum Of Distributed Practice*

I Do/ You Watch	I Do/ You Participate	We All Do Together	I Watch/ You Do
Modeling Mathematical Thinking  Honing Your Skills			
• Taking Attendance • Read-Aloud  	• Class Survey/ Graph • Number Talk 	• Math Games • <i>Investigation/ Project Work</i> 	• Self-Selected Learning Centers • Journaling  

Notes: