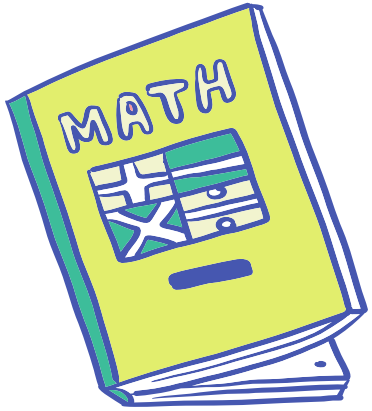
Welcome to Building Mathematical Minds in the Primary Grades

March 21, 2023

Our team



Gail Bedeau

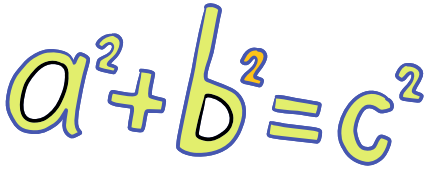
Early Reading Coach

Lisa O'Dell

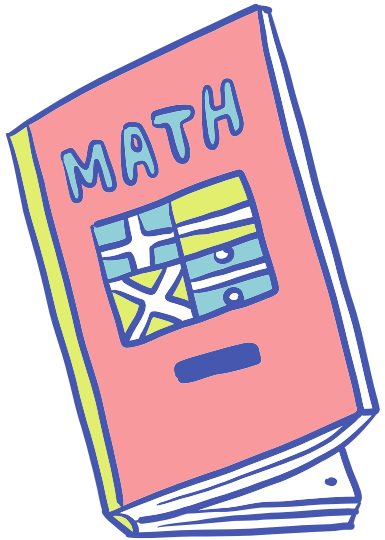
K-12 Learning Coach

"…is the goal of mathematics answer-getting or long-term mathematical understanding?"

Learning Goals

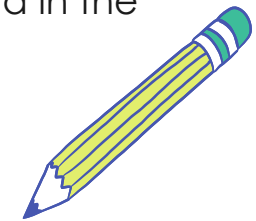


- To become familiar with the counting principles.
- To learn more ways to help your child make connections between what they are learning in school and everyday experiences at home and in the community
- Explore games that can be used at home to help young learners develop their numerical fluency and provide them with opportunities to practice their counting



Supporting your Child's Math Learning at home

Math is everywhere! We use it in the context of our lives on a daily basis. We learn math to help us solve real-world problems. As parents, you come with fountains of knowledge that you can leverage to help your child become a confident mathematician. You can help your children make connections between what they learn in school and everyday experiences at home and in the community.



You can:

- find ways to incorporate math at home (storytelling, cooking, counting, playing games, shopping)
- Play games that involve counting, and talk about strategy
- inspire a love of learning and better understanding of math by talking about how you use math
- Find examples of patterns in nature
- talk with your child about their math school work and share your own strategies for solving problems

Math Task

How would you solve 7+19 mentally

Why focus on mental math?

- ★ Mental math is an aspect of the Ontario mathematics curriculum from Grades 1-8.
- ★ Mental math strategies build on and extend students' understanding of number properties and relationships.
- ★ Fluency with numbers is a building block for learning more complex

Try this at home! Number Talks for Grades 1-3

Virtual Math Toolpage

Virtual Math Toolpage (Click on an image to access the resource)

Adobe Creative Cloud Express

GeoGebra

Tumble MATH

brainingcamp

Graspable Math

desmos

Knowledgehook

mPower

Flip

SCRATCH

tvo Mathify

TDSB MATHEMATICS FOR EDUCATORS

tdsb virtual library

TDSB MATHEMATICS FOR FAMILIES & CAREGIVERS

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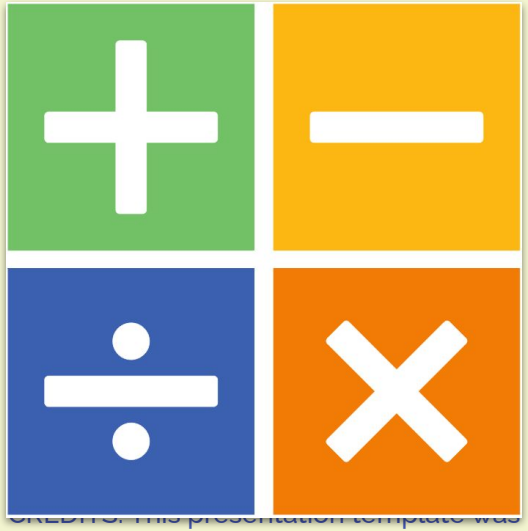
TDSB Math for Families & Caregivers



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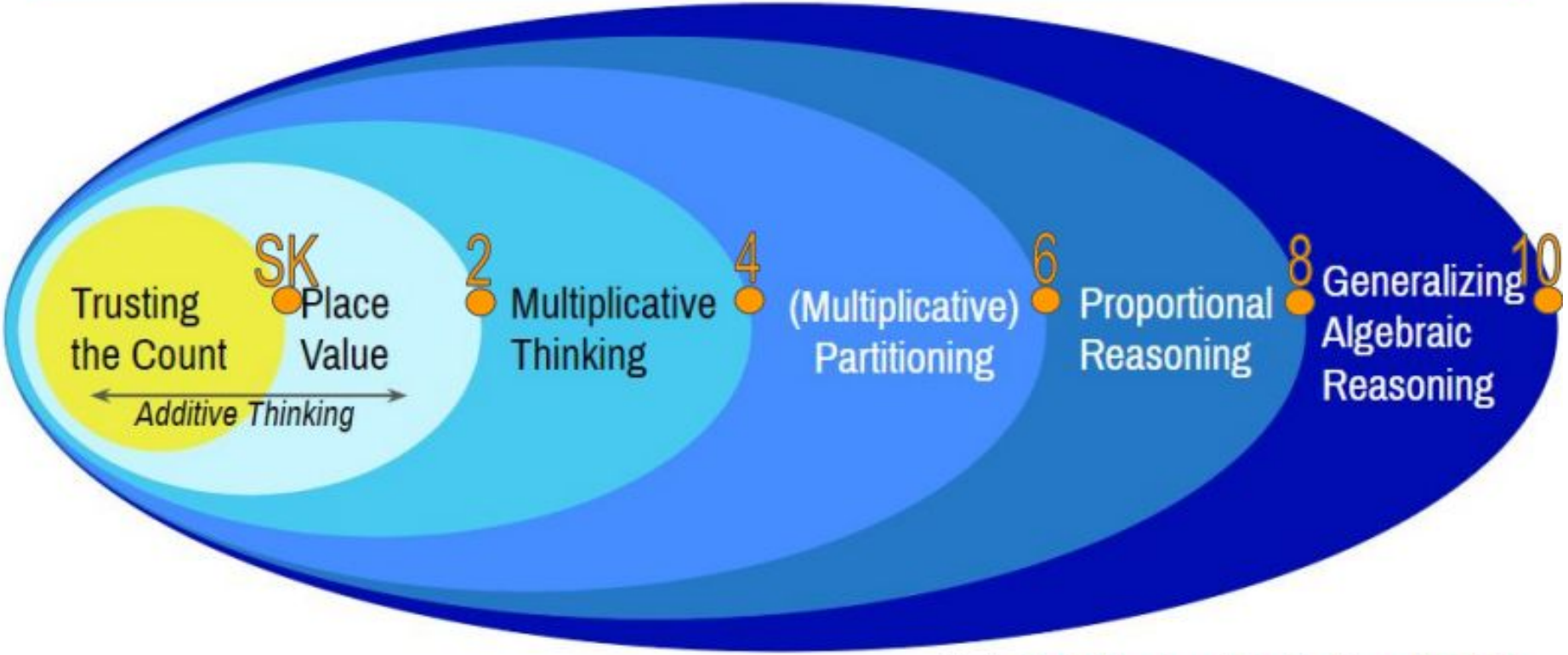
http://bit.ly/3mNgPCc

The Big Ideas of Number



Link: Chris Hurst and Derick Hurrell (2014)

Counting Principles

Relationships

Order Irrelevance

Stable Order

Unitizing

Quantity

Counting

Abstraction

Cardinality

Operational Sense

Representation

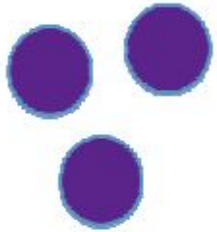
One-to-One Correspondence

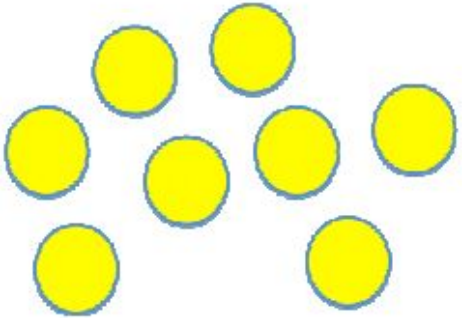
Movement as Magnitude

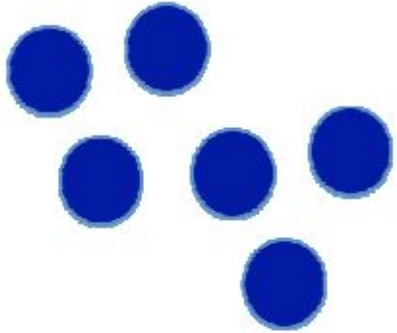
Conservation

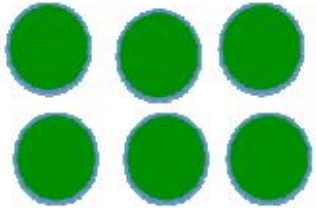
Try This

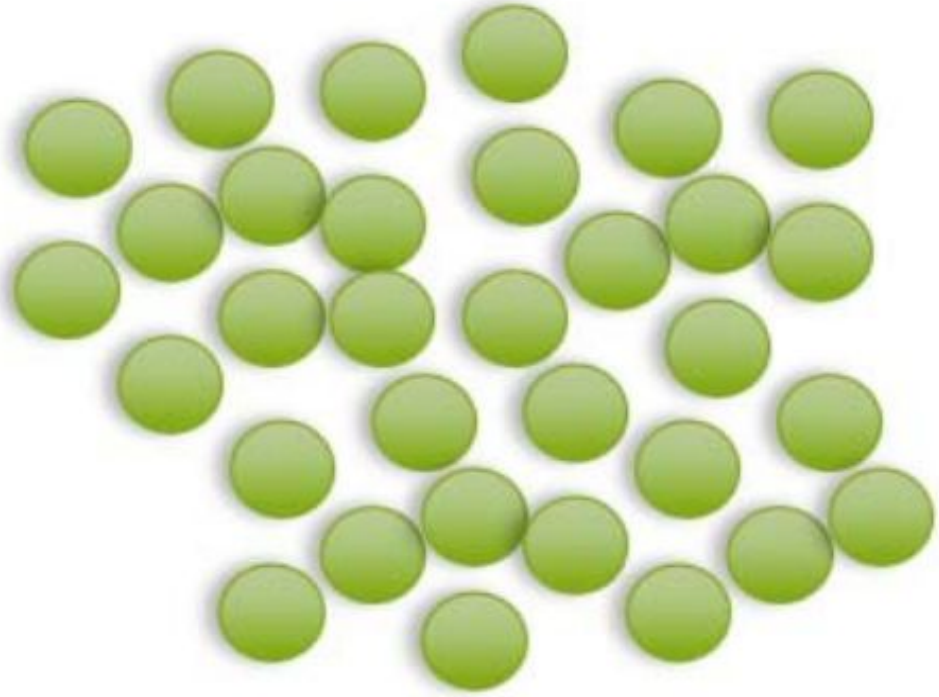
How many are in each group? How did you know?











Stable Order Principle

1, 2, 3, 4, 5, 6...

not

1, 3, 2, 4, 6, 5...

Video

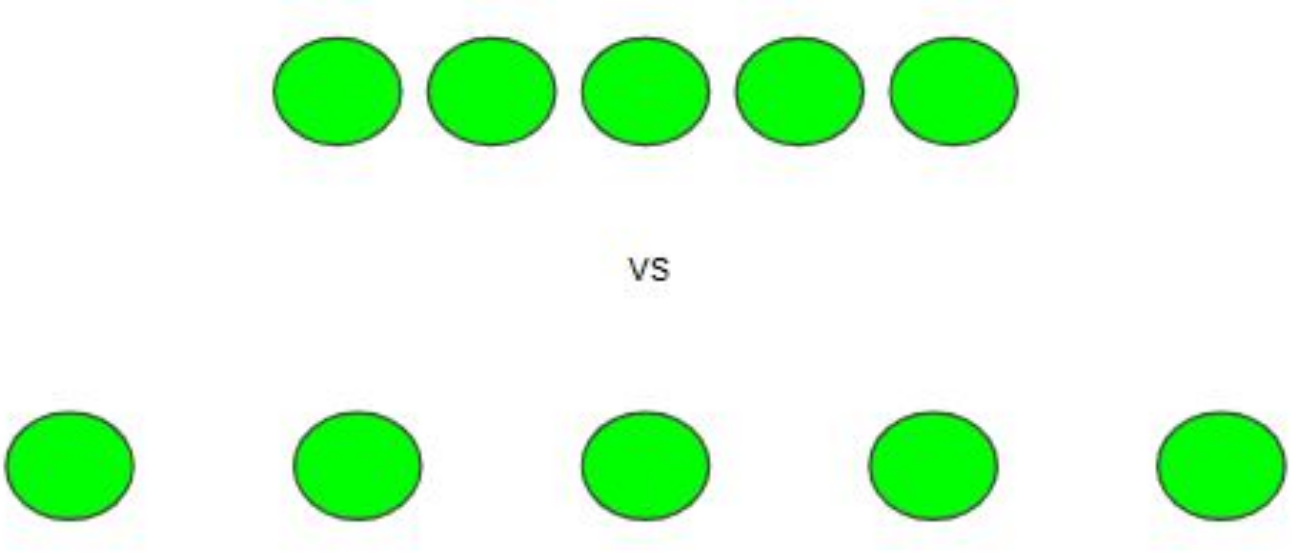
Cardinality Principle

Video

When a student understands cardinality, they understand that the last number used to count a group of objects tells **how many** are in the group. There is a connection between that landing number and quantity. There is now a purpose to counting!

Conservation Principle

video



As students experience counting at various stages, they begin to develop an understanding that the number of objects remains the same, even when those objects are moved, spread out, rearranged, or some are hidden.

One to One Correspondence Principle

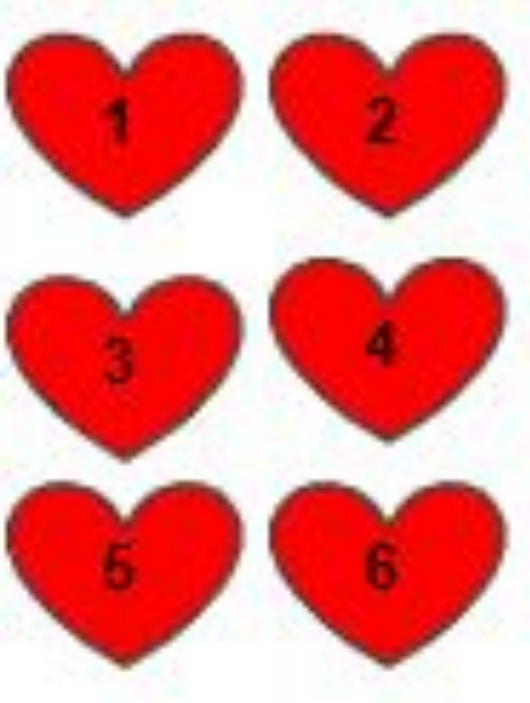
Video

1:1 correspondence is one of the earliest skills students will work towards when learning to count. Learners have achieved 1:1 correspondence when they can:

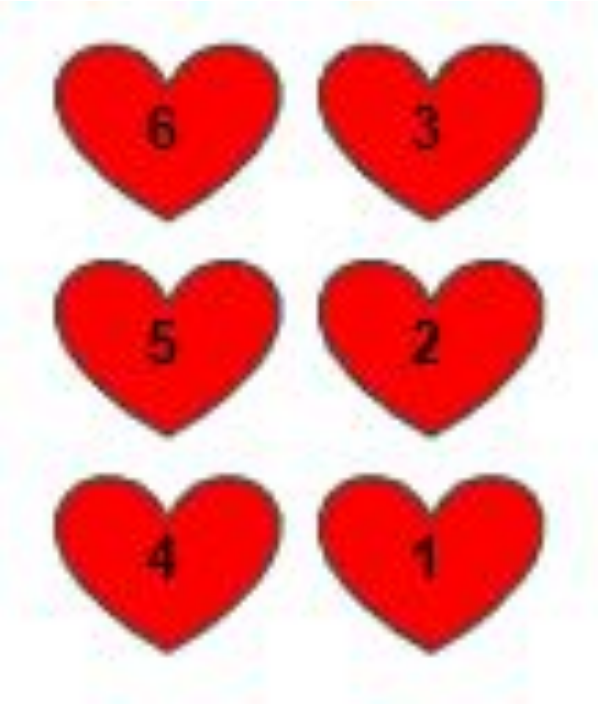
- Count one object at a time
- Keep track of objects while counting
- Counts each object only once
- Understands that it doesn't matter in which order objects are counted

Order Irrelevance Principle

Video

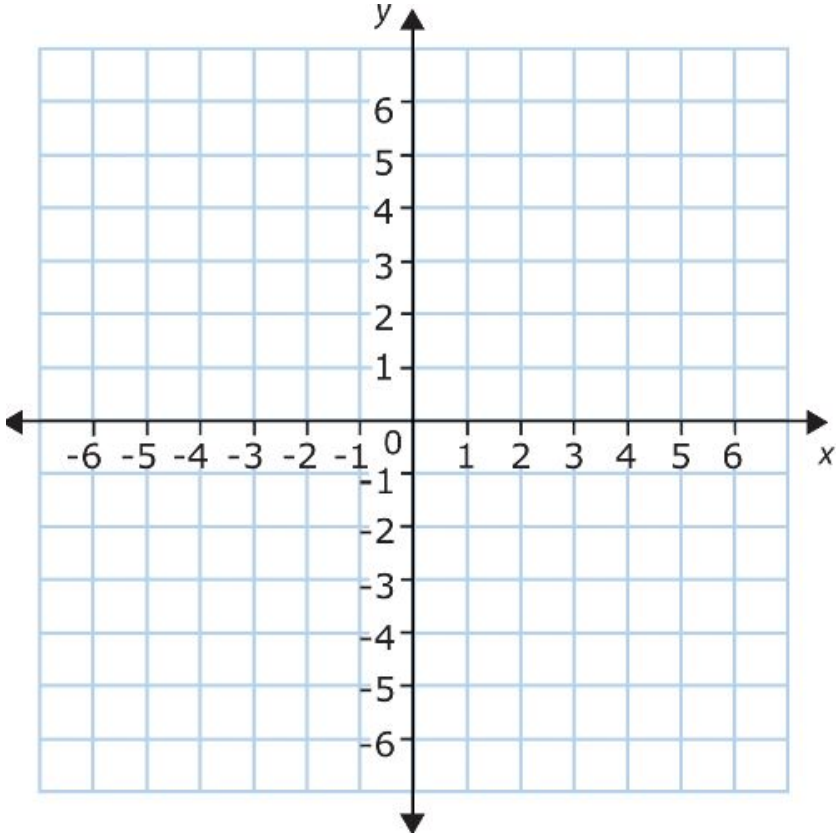


6 in this group



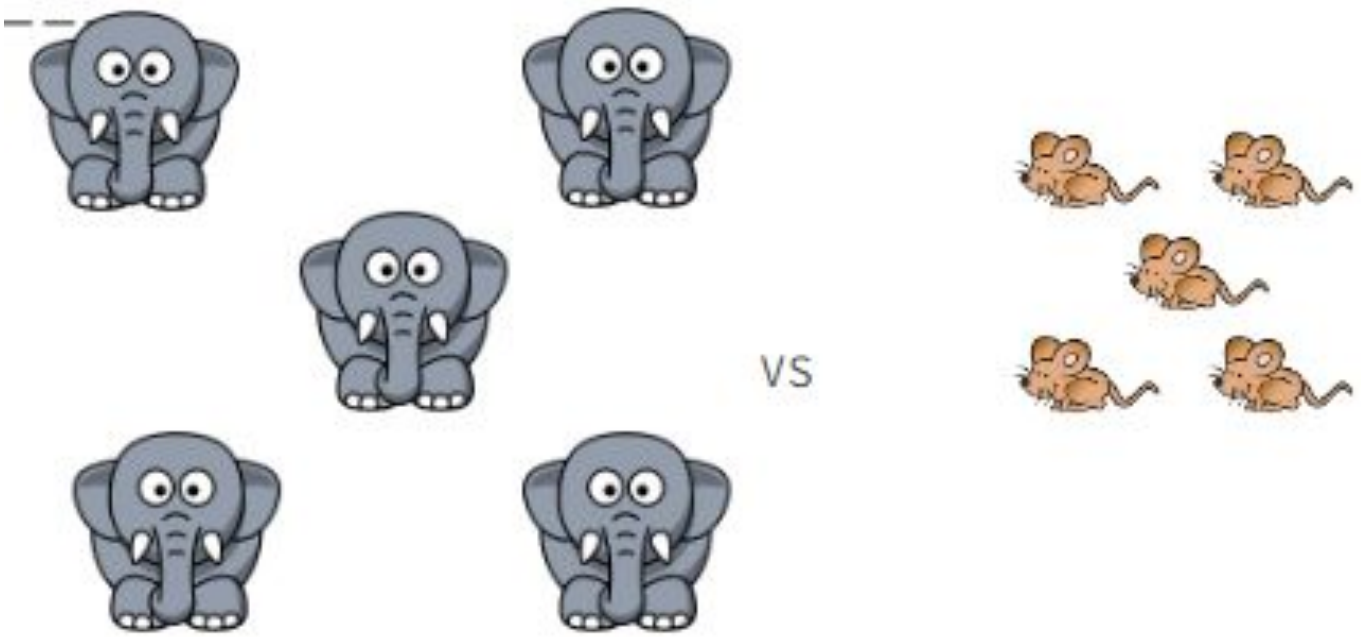
6 in this group

Movements of Magnitude Principle



Video

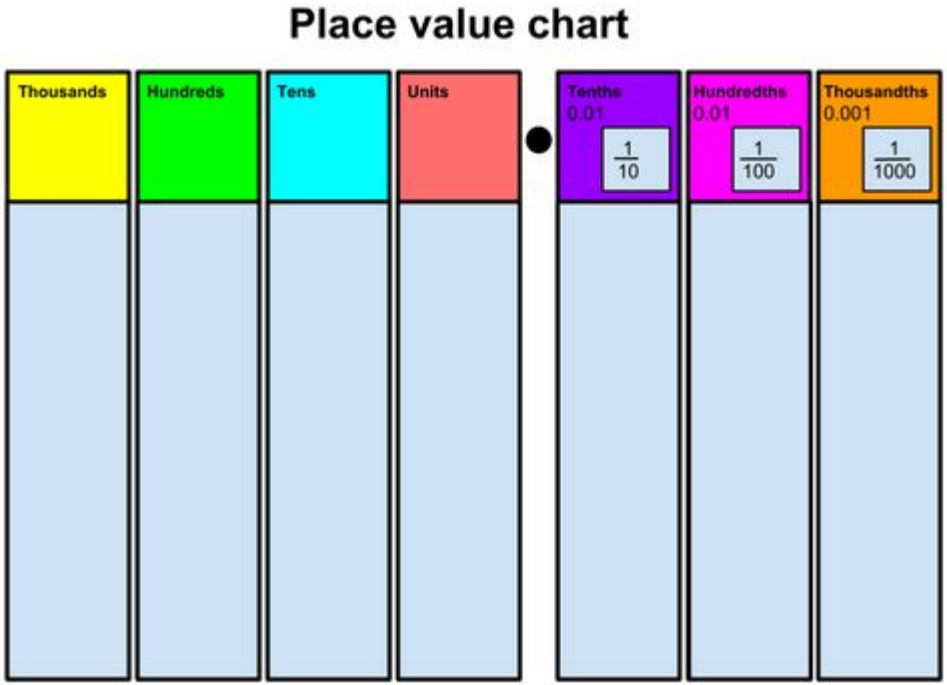
Abstraction Principle



Video

Unitizing Principle

Video



Unitizing is a huge jump for young learners. They are able to count single objects accurately. They know that one means one object. Two means two objects. Now they have to ;see that "one" can mean multiple objects as in "one group of ten". In order to count in groups, students need to see a group of objects as one unit.

Number Progression

1, 2, 3...

Pre-counting

- Counting with some correspondence
- Comparing quantity by size
- Perceptual subitizing up to 4

Early Counting

- Cardinality (meaningful counting)
- Representing an amount by ones
- Matching to compare
- Counting with one to one correspondence
- Representing an amount by ones

Flexible Counting

- Counting unseen objects
- Counting on and counting back
- Conceptual subitizing
- Counting to compare
- Counting by 2s and 5s

Number Composition

- Composition and decomposition
- Conceptual subitizing with 5s and 10s
- Unitizes by 10s with a model
- Unitizes by 10s and 1s
- Using number relationships to compare and solve problems

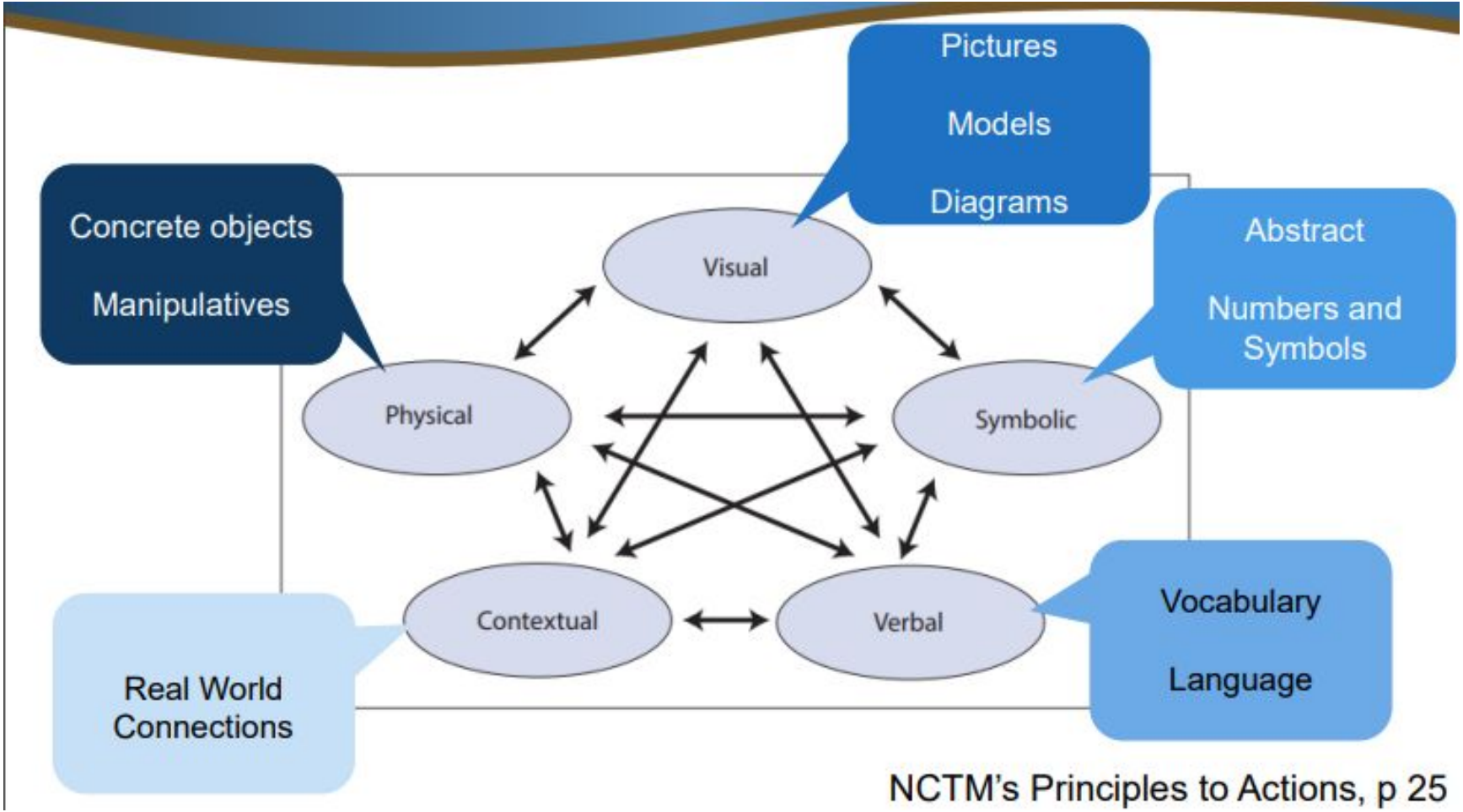
Base Ten

- Multiplicative place value
- Uses integrative base ten understanding.
- Applies base ten understanding to compare or solve problems

Source: Ogap Additive Framework

How might you represent this amount

Mathematical Thinking



NCTM's Principles to Actions, p 25

What does this look like?

Lisa has six gummy bears in her lunch bag.

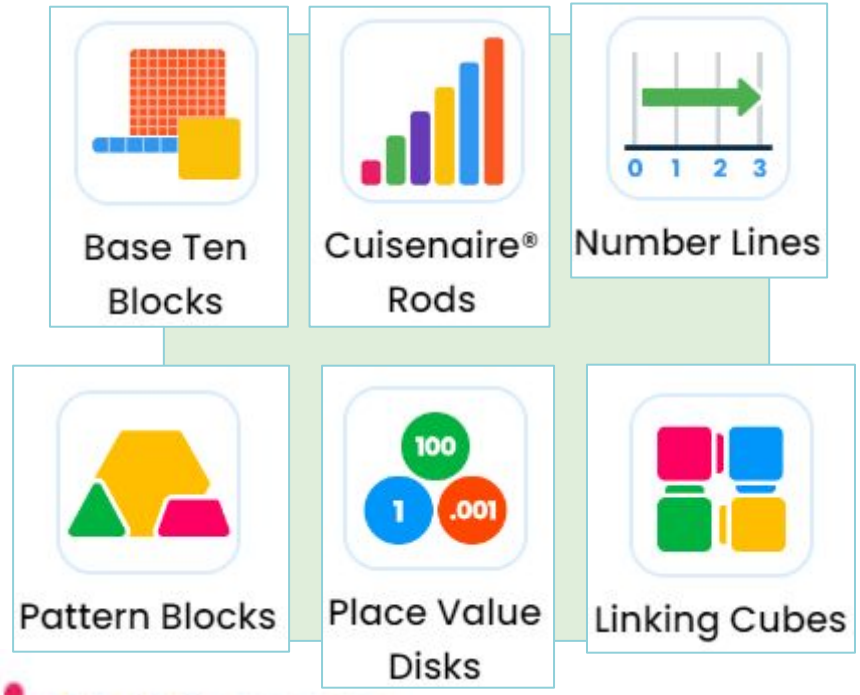
6

There are 6 tables in the classroom. How many students can sit at each table?

Low Tech vs. High Tech Options (Early years/Primary)

Low-Tech- Found items from your home

High-Tech



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Math materials in play

Spectrum of Play

Free Guided Structured

Exploration of Mathematical Concepts

Mathematics in an inquiry stance

- How do the children reveal their knowledge and thinking about quantity relationships?
- What does the way they use materials/manipulatives reveal about their mathematical thinking?
- How do they think about measurement and about the ways we use it in various familiar contexts? How do they reveal their thinking about measurement?
- What do they think about what makes a pattern?
- What do they think about *why* we collect data (e.g., to inform us, to help us make decisions about something)? What are their ideas about *how to collect data* (e.g., taking surveys)?
- How do they reveal their thinking about shapes and spatial relationships?

Mathematics is not about numbers, equations, computations or algorithms: it is about understanding.

~ William Paul Thurston~