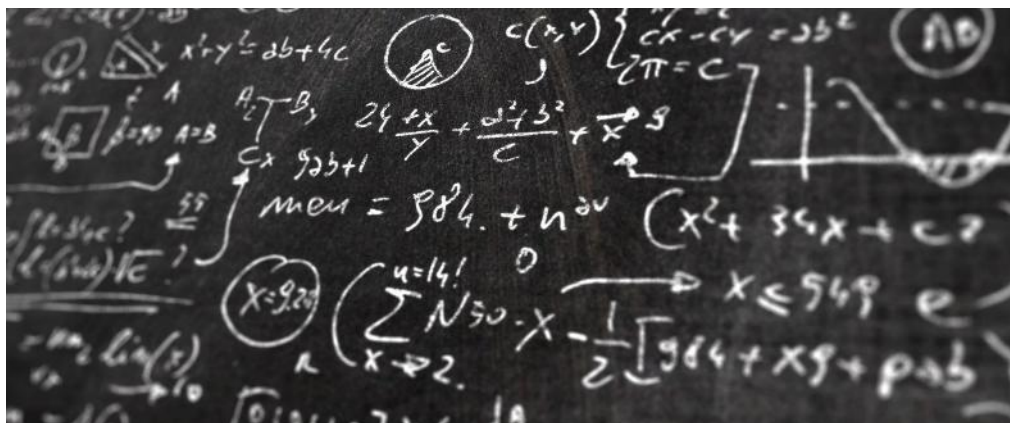


Supporting Math Skills in Early Childhood Education

Phuong H. Hoang



What one word would you use to describe your feelings about MATH?



<https://www.menti.com/alk1fjcxagsx>

Mathematical Mindset

embracing mistakes

process over product

promoting depth over speed

~~*"not math people"*~~

*seeing math as an open, creative,
and interconnected subject rather
than just rigid procedures*

growth mindset

Productive Struggle = Cognitive Growth

Objectives

- Identify key concepts and ways to foster mathematical thinking skills
- Implement ways to promote math skills throughout the daily routine
- Design curriculum to incorporate math concepts across all developmental domains



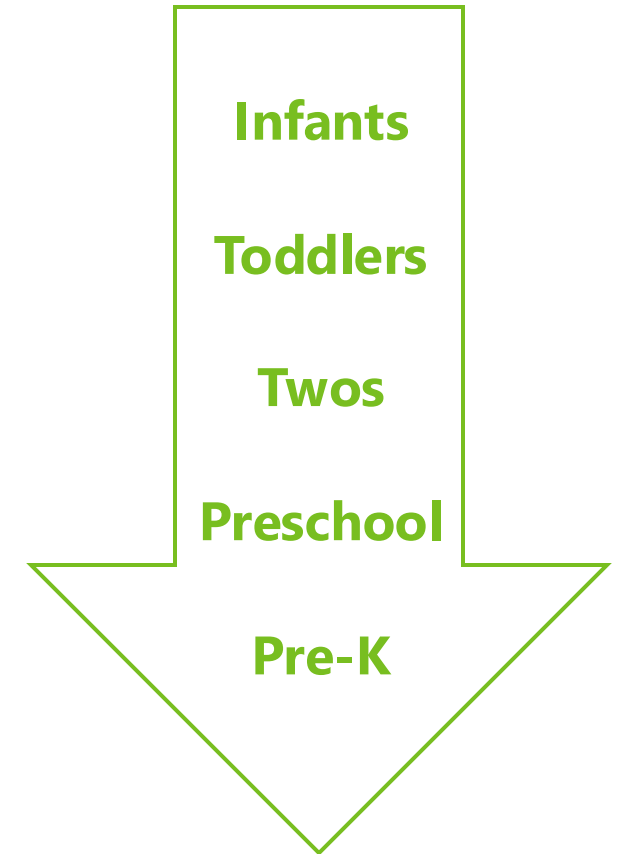
Early Learning Standards



- Matches, groups and classifies objects
- Demonstrates knowledge of numbers and counting
- Demonstrates knowledge of volume, height, weight and length
- Identifies and labels shapes
- Demonstrates understanding of positional words

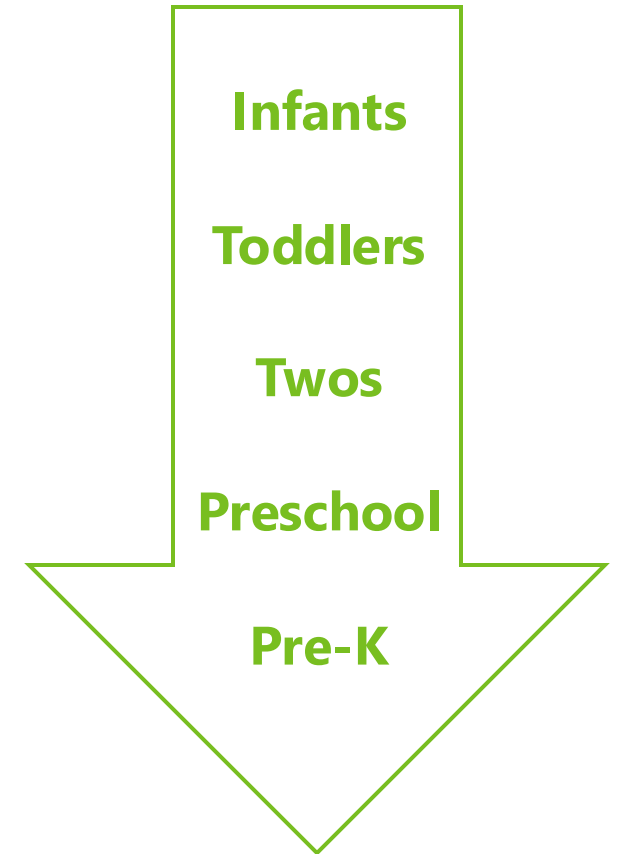
Matches, Groups, and Classifies Objects

- Interacts differently with familiar and unfamiliar people and objects
- Recognizes similarities and differences, including familiar and unfamiliar people, objects and routines and begins to match one
- Matches one object with a group of similar objects
- Groups objects on the basis of a single characteristic (e.g., color, size or shape)
- Groups objects according to a common characteristic, regroups them according to a different characteristic and explains the grouping rules

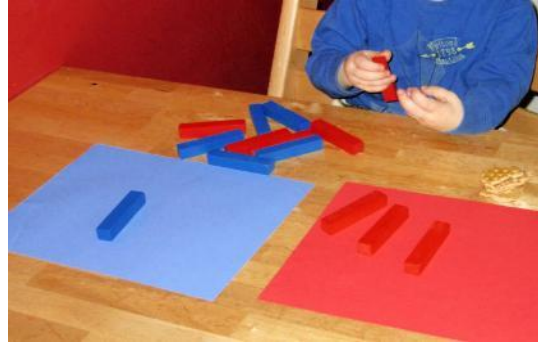


Patterns

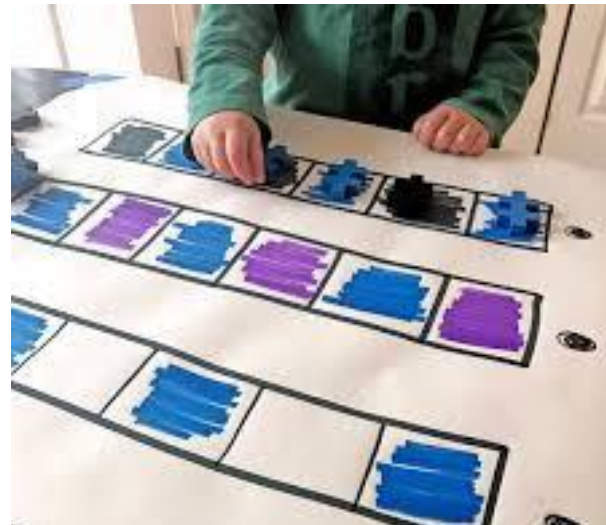
- Develops awareness of repeating sequences in everyday routines
- Notices and anticipates simple repeating sequences
- Follows and participates in simple repeating sequences
- Copies simple patterns
- Creates and extends simple repeating patterns



Sorting

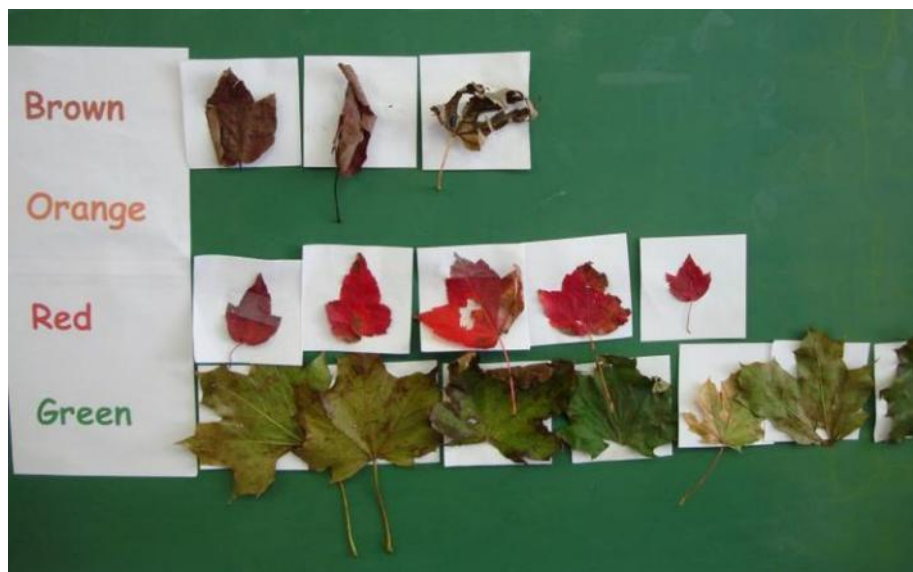
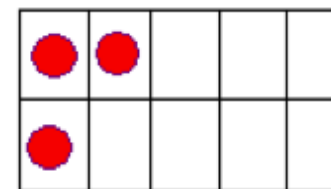
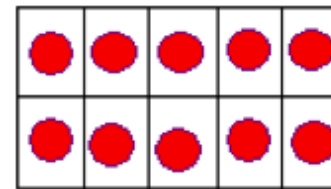
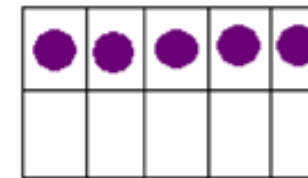
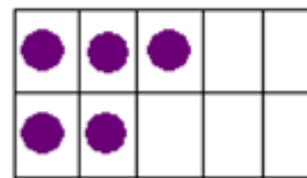
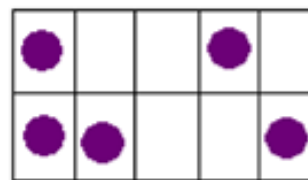
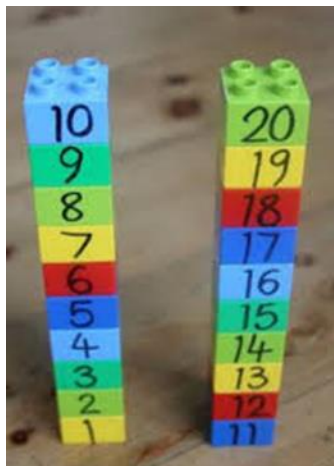


Patterns



Data

How do we organize, represent, and share information?



Series: [Focus on the Lesson](#)

Shoe Graph

This is a [Video](#) December 17, 2014 • For grade levels [Kindergarten Pre-K](#) • Tagged [Books](#), [English Language Learner](#), [Featured](#), [Graphing](#), [Seasonal](#), [Shoes](#)



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Duration: 08:55

Early Math Collaborative

The Collaborative works to improve math instruction for young children in three ways:

- Professional development
- Research
- Dissemination

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<http://earlymath.erikson.edu/shoe-graph-3-5-year-old-childrens-education-programs-and-activities/>

Demonstrates Knowledge of Numbers and Counting

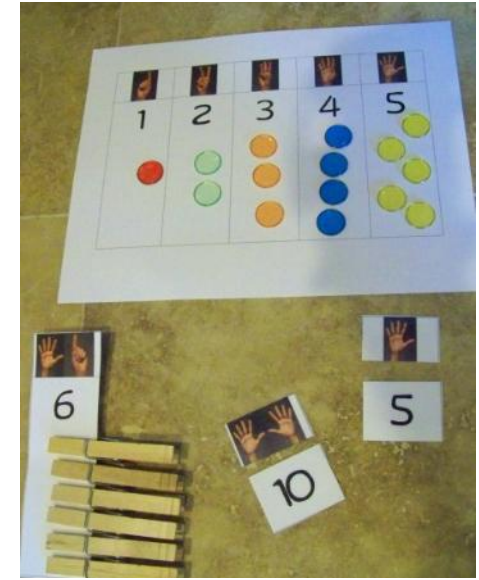
- Begins to develop an awareness of quantity
- Shows awareness of the concepts of one, two and more; recites numbers in random order
- Begins to rote count to 10 but may not be accurate consistently
- Counts to 10 by rote; accurately assigns number names to quantities up to 5 (one-to-one correspondence); recognizes a few numerals and connects each to a quantity
- Counts to 20 by ones



“PRE-K EXIT EXPECTATIONS”

- Counts to 20 by ones
- Tells what number comes next in the counting sequence when given a number between 1 and 9
- Recognizes and names the written numerals 1–10
- Counts 10–20 objects accurately, using one number name for each object
- Understands that the last number named tells the number of objects counted and that the number of objects is the same regardless of their arrangement or the order in which they were counted
- Counts to answer “How many?” questions about 10–20 objects
- Correctly associates a numeral with a group of as many as 10 counted objects

Numbers & Counting



Demonstrates Knowledge of Volume, Height, Weight and Length

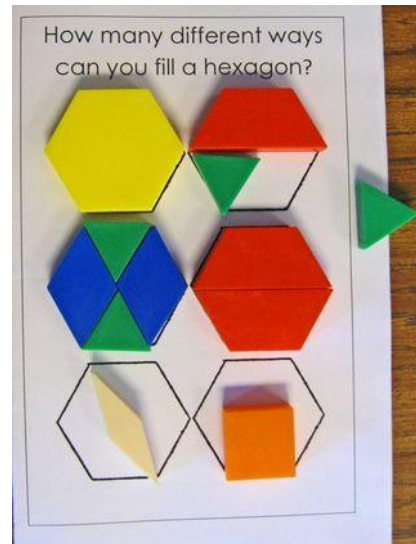
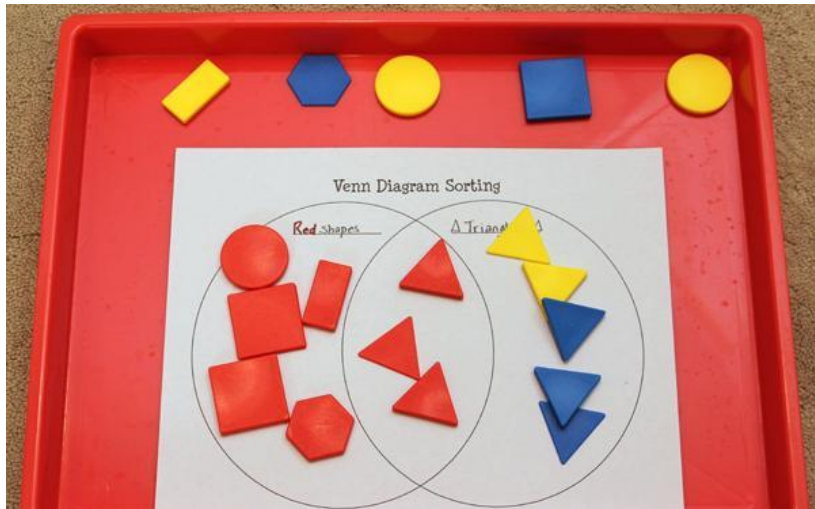
- Emerging
- Explores objects of different shapes and sizes and demonstrates awareness of how objects differ by properties (size, weight, height, etc.)
- Makes simple comparisons, noticing similarities and differences between measurable properties of objects (e.g., length, width, height)
- Understands reasons for measuring and the purpose of measuring tools; uses standard and nonstandard tools and some measurement words; begins to order a few objects according to height and length
- Describes everyday objects in terms of measurable attributes, such as length, height, weight or volume (capacity), using appropriate basic vocabulary (e.g., short, long, tall, heavy, light, big, small, wide, narrow)
- Knows and correctly uses a few ordinal numbers
- Knows the usual sequence of basic daily events

Identifies and Labels Shapes

- Interacts with objects in the immediate environment
- Explores objects of different shapes
- Matches one shape with the same shape
- Names a few basic two-dimensional shapes
- Correctly names basic two-dimensional shapes (squares, circles, triangles, rectangles), regardless of their orientations or size
- Describes basic two- and three-dimensional shapes
- Builds objects of basic shapes (ball/sphere, square box/cube, tube/cylinder) by using various materials such as craft sticks, blocks, pipe cleaners, clay and so on



Shapes



Demonstrates Understanding of Positional Words

- Notices and responds to how objects, people or own body move through space
- Follows directions that include gestures to place objects in, on, under, up or down
- Follows verbal directions to place or find objects in, on, under, up or down
- Follows directions to place objects or body besides, between or next to
- Correctly names basic two-dimensional shapes (squares, circles, triangles, rectangles), regardless of their orientations or size
- Describes basic two- and three-dimensional shapes
- Builds objects of basic shapes (ball/sphere, square box/cube, tube/cylinder) by using various materials such as craft sticks, blocks, pipe cleaners, clay and so on
- Identifies the relative position of objects, using appropriate terms such as above, below, in front of, behind, over, under

Series: [Focus on the Lesson](#)

Walk with Rosie

This is a [Video](#) June 20, 2014 • For grade levels Kindergarten Pre-K • Tagged [Books](#), [English Language Learner](#), [Featured](#), [Home](#), [Mapping](#), [Play](#)

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Duration: 07:55

Students explore spatial relationships by describing and traversing an obstacle course, then making a map of it.

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- Professional development
- Research
- Dissemination

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What best describes your professional role?

—

<http://earlymath.erikson.edu/walk-with-rosie-math-gameeducation/>

Early Childhood Math Programs for Professionals

Empowering Math-Confident Educators & Math-Strong Kids

The Erikson Institute Early Math Collaborative is transforming the understanding, teaching and learning of early mathematics from the ground up.

[Explore our Idea Library ▾](#)

<https://www.erikson.edu/early-math-collaborative/>



Sets ▾

Sets are basic to children's thinking and learning. They are also basic to our number system. We often fail to appreciate how much of young children's lives—and above all their play—involves thinking about and working with sets of things.



Operations ▾

When children focus on what happens when we join two sets together or separate a set into parts, they learn about how quantities change. When they have lots of experience comparing amounts, they become familiar with thinking about differences between sets.



Data Analysis ▾

Data analysis can be very simple, like making a list of items and writing how many you have of each in parentheses, or creating and talking about a bar graph whose bars are higher for snowy than rainy days in the month of January.



Number Sense ▾

Number sense is the ability to understand the quantity of a set and the name associated with that quantity. The transition from an innate, informal number knowledge to a conventional understanding of number sense is a major cognitive development.



Pattern ▾

Pattern is less a topic of mathematics than a defining quality of mathematics itself. Mathematics "makes sense" because its patterns allow us to generalize our understanding from one situation to another.



Spatial Relationships ▾

Children between the ages of 3 and 6 are more than ready to develop their skills at expressing directions from different locations and understanding relative positions. With Big Ideas learning early mathematics includes learning about spatial relationships.



Counting ▾

Counting is a part of young children's daily life. They love to count everything from the stairs they climb to the crackers they eat. But what is counting? Counting seems very simple, but it is really quite complex.



Measurement ▾

Measurement is any process that produces a quantitative description of an attribute, such as length, circumference, weight, temperature, volume, or number. Measurement is an essentially mathematical procedure that we apply in many different contexts.



Shape ▾

Everything in the material world has shape. In mathematics, the focus is very much on regular shapes, such as the two-dimensional circle, triangle, and rectangle and the three-dimensional solids known as spheres and polyhedrons.

Erikson Institute Early Math Collaborative

<https://www.erikson.edu/early-math-collaborative/>

NAEYC

<https://www.naeyc.org/resources/topics/math>

District of Columbia Early Learning Standards (DC ELS)

<https://osse.dc.gov/publication/district-columbia-early-learning-standards-dc-els>

National Council of Teachers of Mathematics (NCTM)

<https://www.nctm.org/classroomresources/>

Zero to Three

<https://www.zerotothree.org/resource/help-your-child-develop-early-math-skills/>

Institute of Education Sciences (IES)

<https://ies.ed.gov/ncee/wwc/practiceguide/18>



Wrap-Up

How will you:

- Foster mathematical thinking skills?
- Promote math skills throughout the day?
- Design curriculum to incorporate math concepts across all developmental domains?



Thank you!

Phuong H. Hoang
phuonghahoang@gmail.com

MATHEMATICS
is not about
numbers, equations,
computations, or
algorithms:
it is about
UNDERSTANDING.

William Paul Thurston