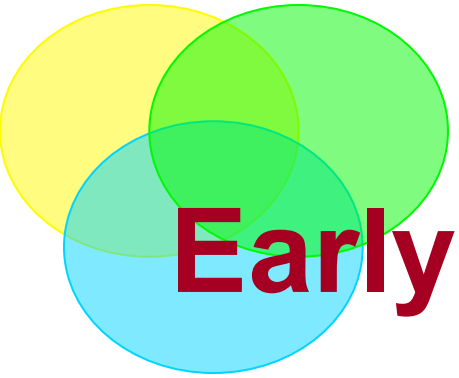
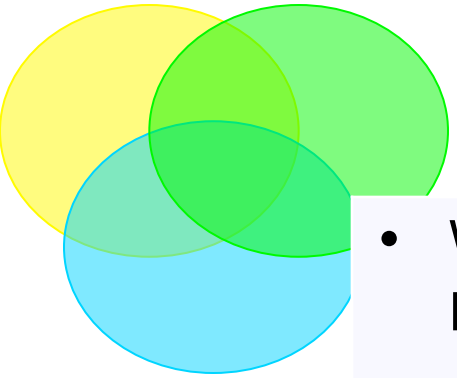


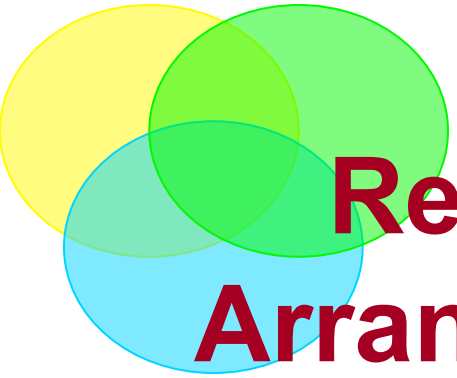
Early Mathematics Education

- Good morning, mathematicians

Reflecting on the Number Arrangements Research lesson

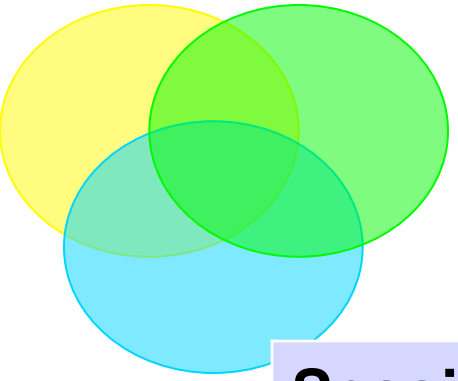


- What satisfied or delighted you when you did the Research Lesson, including how children responded, evidence of learning in their skill in observing, naming, and creating patterns?
- Comment on any "tailoring" or adapting the lesson you did to make the lesson more appropriate for your class ?
- Things you found challenging about doing the Napping House lesson, something you might do differently another time
- Comment on how you have become aware of opportunities to mathematize patterns in the daily life of the classroom



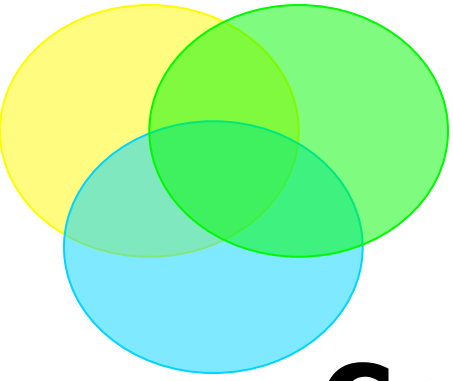
Reflecting on the Number Arrangements research lesson

- In small groups, review and then summarize the comments on one of the topics.
- Share out --Group discussion



Learning Lab 4

Session	Topic
1	Sets and Sorting
2	Patterns and Regularity
3	Numerosity and Number Sense
4	Counting

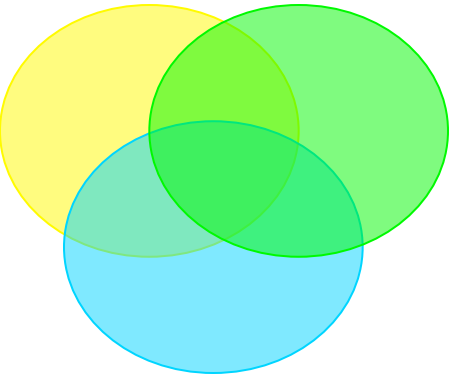


Let's Do Math

Counting large quantities

Work as a group to count the beads you have as quickly as possible!

Appoint an observer to time and record how you went about this task.



Let's Do Math

Unitizing quantities

Each of you will go home with 10 beads for each child in your classroom.

Does your group have enough beads for everyone?

How can you quickly collect your fair share?

Make sure you are remembering your process.

You can use the beads & piple cleaners or counting chips to have the children make NUMBER POWER TOOLS

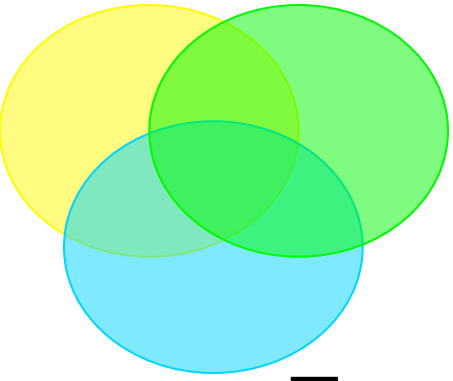
Let's Do Math

Create a poster

✓ Represent your results

✓ Report on the strategies you used (assigning different tasks, grouping, etc) & on decisions about counting by ones or by another unit.

✓Reflect on your understanding of counting

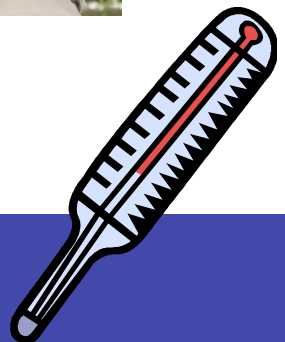


Let's Talk About It

Each table will study another table's poster and discuss how the approaches compare & how this activity might have affected your understanding of counting.

Be ready to report back to the whole group

Number is Complex!



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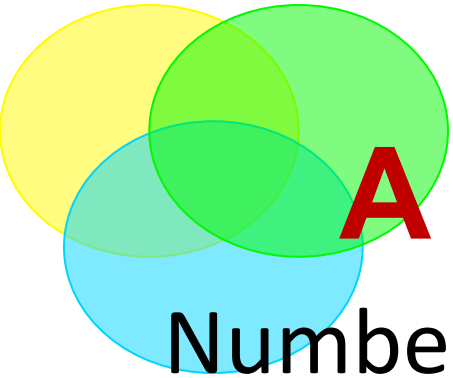
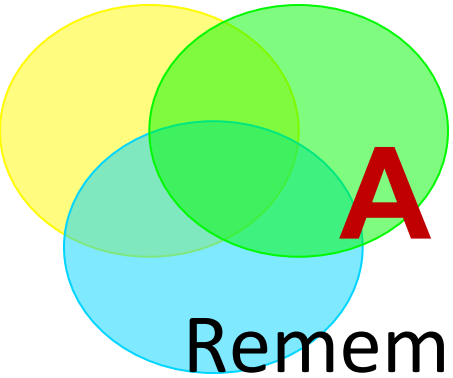


A Big Idea

Numbers are used in many ways, 2 of which are specifically mathematical.

Turn and talk about which 2 count:

1. to provide names for members of a group, such as a team (nominal)
2. to indicate amount (cardinal)
3. to specify position in a sequence (ordinal)
4. to act as shared reference points as in addresses (referential)



A Big Idea

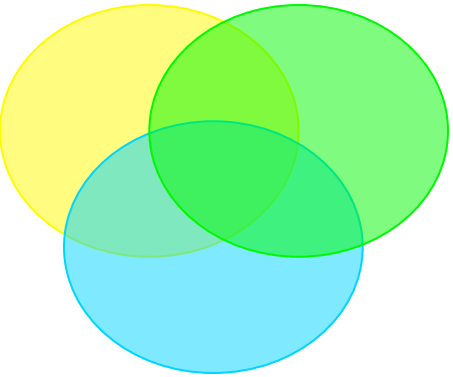
Remember this Big Idea about Number Sense?

- ***Quantity is an attribute of a set of objects and we use numbers to name specific quantities.***

What does this big idea suggest about:

Why we count

Why it is important that we always count something?



A Big Idea about Counting

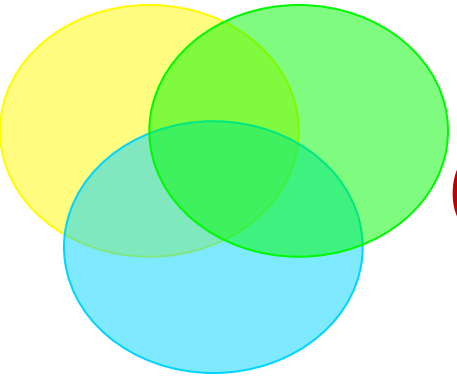
- **Counting allows us to name "how many" in a set.**

In math talk—counting allows us to **determine & expresses cardinality.**

Video Analysis

- *Sesame Street*

- Turn to a partner & talk about how Sesame Street characters understand cardinality



Cardinality Rules for Counting

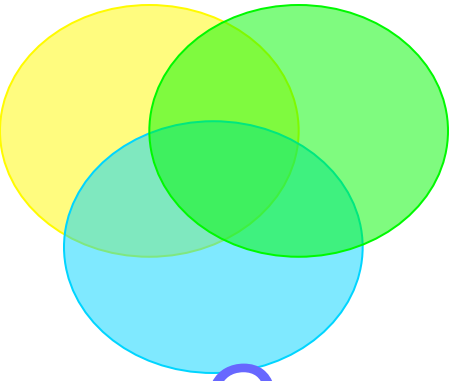
Very young children benefit for a lifetime when important adults are always careful to:

- **Count Something!!** **Not just say number words**
- **Express Cardinality to name the set.**

How many sheep? **1,2,3,4,5- That makes 5 sheep.**

(Or a Sussex shepherd might say:

***yan,tan, tethera, pethera, pimp* sheep).**

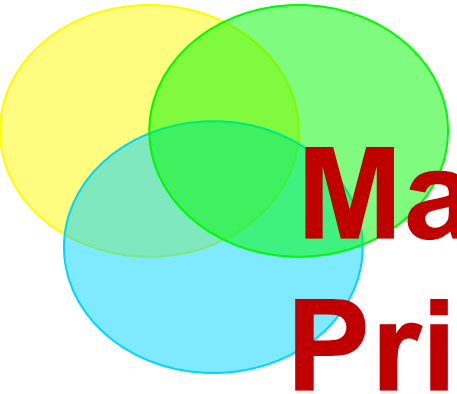


A Big Idea:

Counting has rules that apply to any collection.

1. Stable-order
2. One-to-one correspondance
3. Order-irrelevance
4. Cardinality

R. Gelman and C.R. Gallistel, (1978)



Making Sense of the 4 Principles of Counting

Talk at your table:

How did each of the

4 principles of counting

Apply in the strategies you used when counting the beads ?

The Stable-Order Principle

- **Definition**: Counting words have to be said in the same order every time.
- **Skills that show mastery**
  - Mastery of the number name sequence
  - Can count up and later can count down from an assigned number

The Stable-Order Principle

- **Tricky Bits:**
- The counting sequence reflects a ***verbal linguistic pattern*** as well as a number pattern—except for the tricky teens in English and some other languages (but not in Shepherd!!)

Focus on the child:

Counting Teens and 20s with Child 14 –what supports does Brandon (an ELL) use to accomplish his task?

One-to-One Correspondence

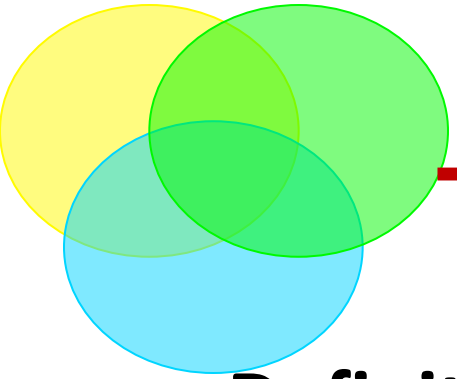
- ***Definition:*** Each item in a collection must be counted once and only once.
- ***Tricky Bits :*** Saying the number sequence doesn't match the pointing.
- **Skills that show mastery**
  - One number is named for each object pointed at.
  - When items are counted in groups, appropriate skip counting can be used.

The Order-Irrelevance Principle

- **Definition**: No matter what order the items in a collection are counted, the result is the same
- **Skills that show mastery**
  - Uses a system to keep counted from uncounted objects (pushes objects to the side or lines up
  - May group to take advantage of skip counting or subitizing.

The Order-Irrelevance Principle

- **Tricky Bits:**
  - Which treasure stash is easier to count –why?



The Cardinality Principle

- **Definition**: The last number word produced names the numerosity of the set.
- **Skills that show mastery**
  - When asked, “How many altogether?” names the last number without counting
  - Can count out to create a set of given quantity, “give me 5”

Cardinality—Rational Counting

- **Tricky Bits:**

Children who have a strong understanding of cardinality and "rational counting" use "counting on" rather than "counting all"

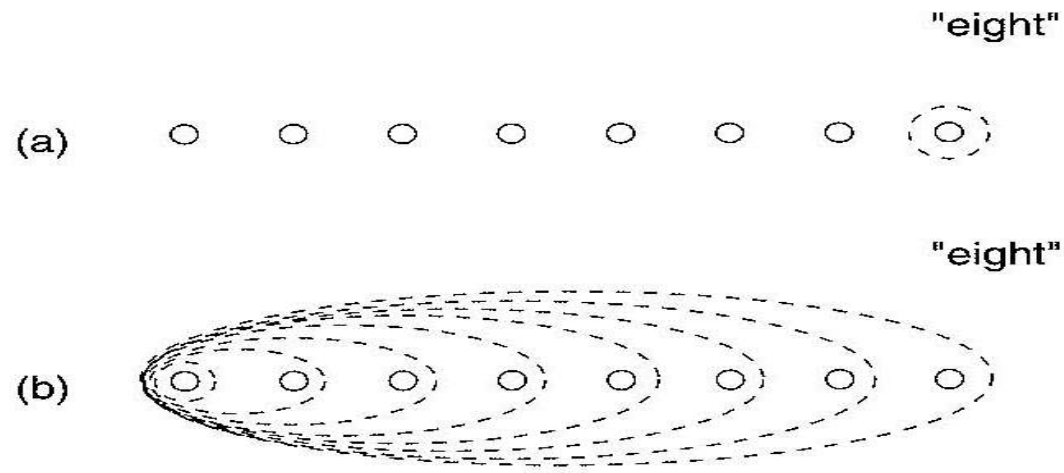
What Learning Looks like:

What's the difference between what Child 7 and Child 18 do?

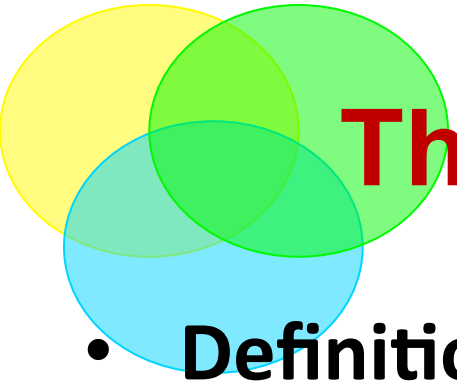
Hierarchical Inclusion

Each number names a quantity one greater than the number before it, and therefore includes all the quantities named by earlier numbers.

Figure 1.2. The (a) absence and (b) presence of hierarchical inclusion in a child's mind.



(Kamii,C. 2004.)



The Abstraction Principle

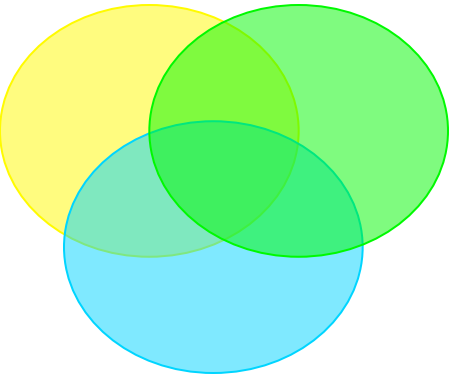
- **Definition**: Counting can be applied to any set, including non-physical entities.
- **Skills that show Mastery**
  - Count physical objects such as chairs, jelly beans as well as non-physical items such as minds in a room, ideas.
  - When given a story problem, can model the count using manipulatives and drawings.

Big Ideas and Key Skills in Counting

Big Ideas	Key Skills
• Numbers are used in many ways, 2 of which are mathematical	• Identify different functions of number
• Counting has rules that apply to any collection	• Naming • Tagging • Uses a system to expedite accurate counting • Expresses Cardinality

Developmental Trajectory

Age	Stage
• 2-3	• **Chanter and reciter** (to 5 ,then to 10 +) correctly chants the number words
• 3-4	• **Corresponder:** Can keep 1 to 1 correspondence (up to 5, then to 10)
• 3-5	• **Counter**—first for 1-5 then more; counts meaningfully, can express cardinality
• 4-6	• **Producer:** Counts out a designated number of objects (1st- 2-5; later, to 10 +
• 5-6	• **Fluent rational counter/producer** –can count/ produce up to 30; give next number; count back from 10



Try and Apply

Research Lesson

Movement Counts

How might this work in <u>your</u> classroom?

Reflecting on today's learning

What might you say about the series or Early Math ?

Let us know if you are interested in continuing with new topics in next year.