Calendar Time

Discoveries in Number Sense through the CRA Model

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Purpose

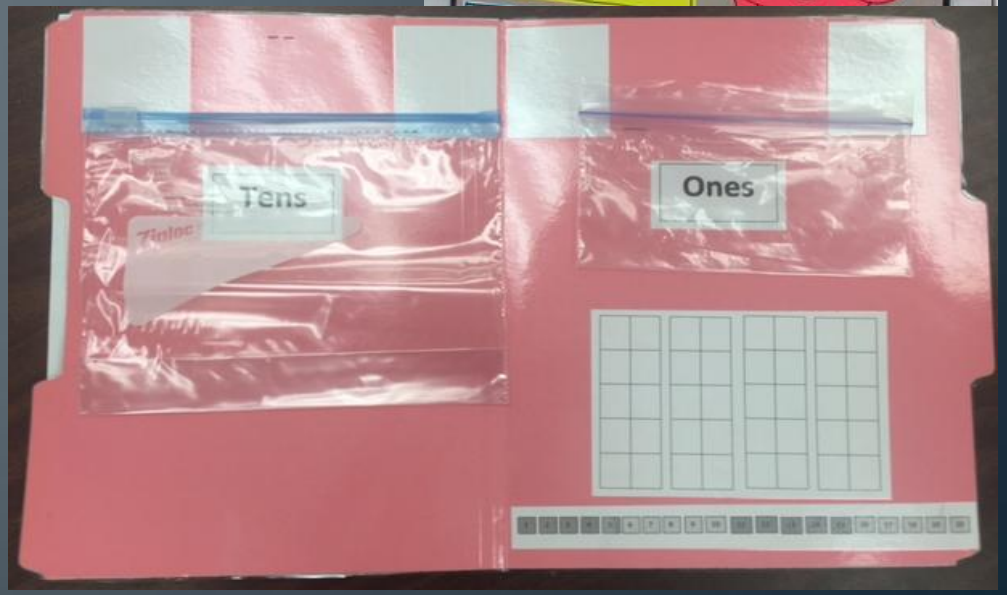
- To build an understanding of foundational early number concepts
- To build an understanding of the Concrete, Representational, Abstract sequence
- To practice calendar-based activities designed to support learning of early number concepts
- Raffle!!

Getting to Know Each Other

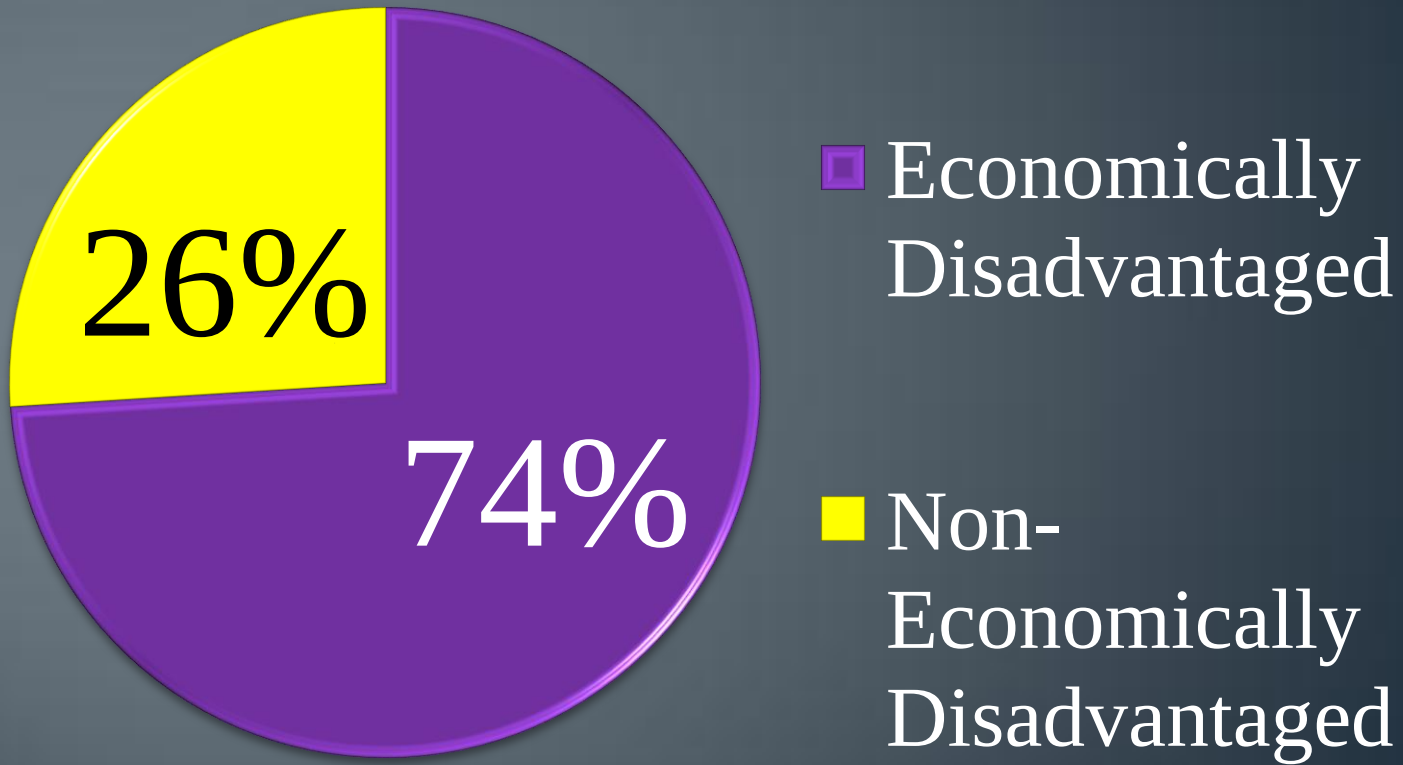
- What work do we do?
  - Classroom teacher
  - Instructional coach
  - Administrator
  - District personnel
- Is calendar time part of your math instruction?
- How mathematically meaningful is calendar time in your classroom? Why?

Traditional Calendar Time

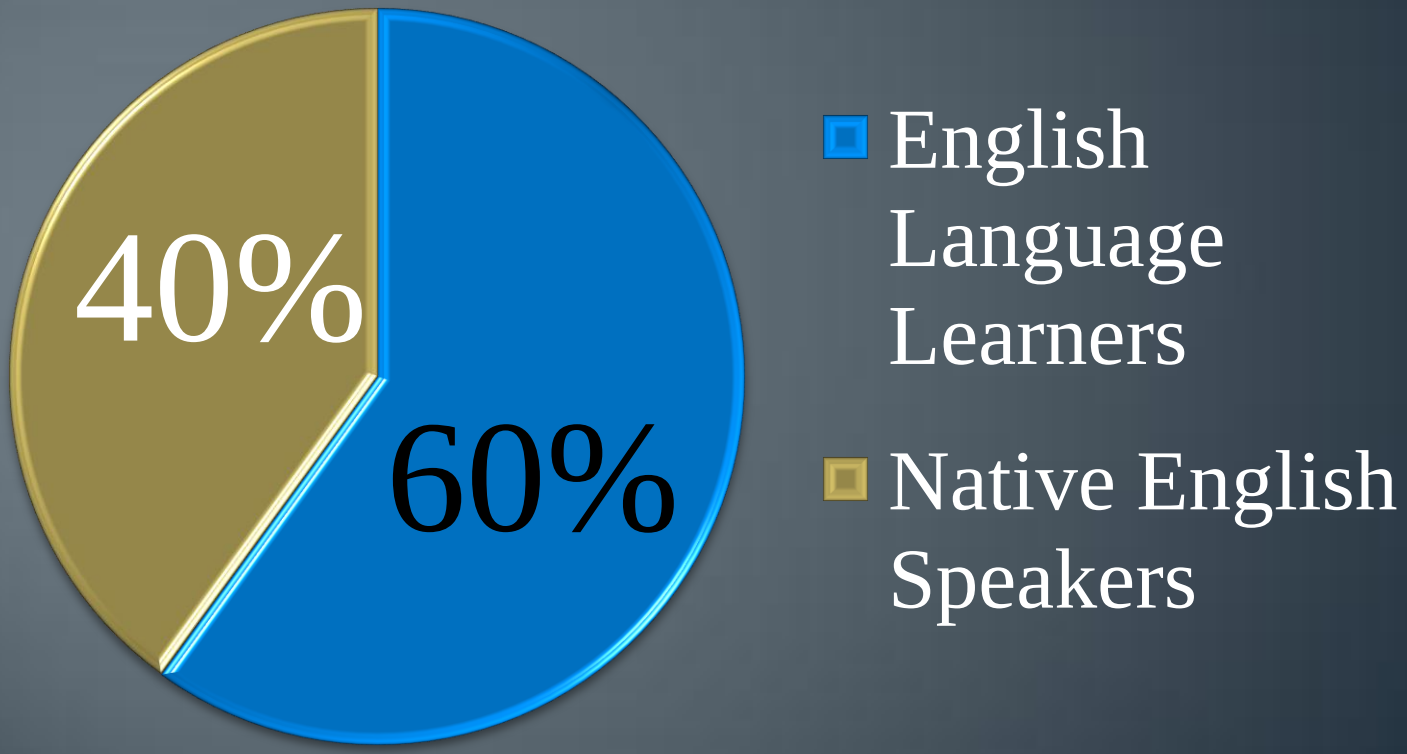
- In 2009, the National Research Council stated that, “using the calendar does not emphasize foundational mathematics”.



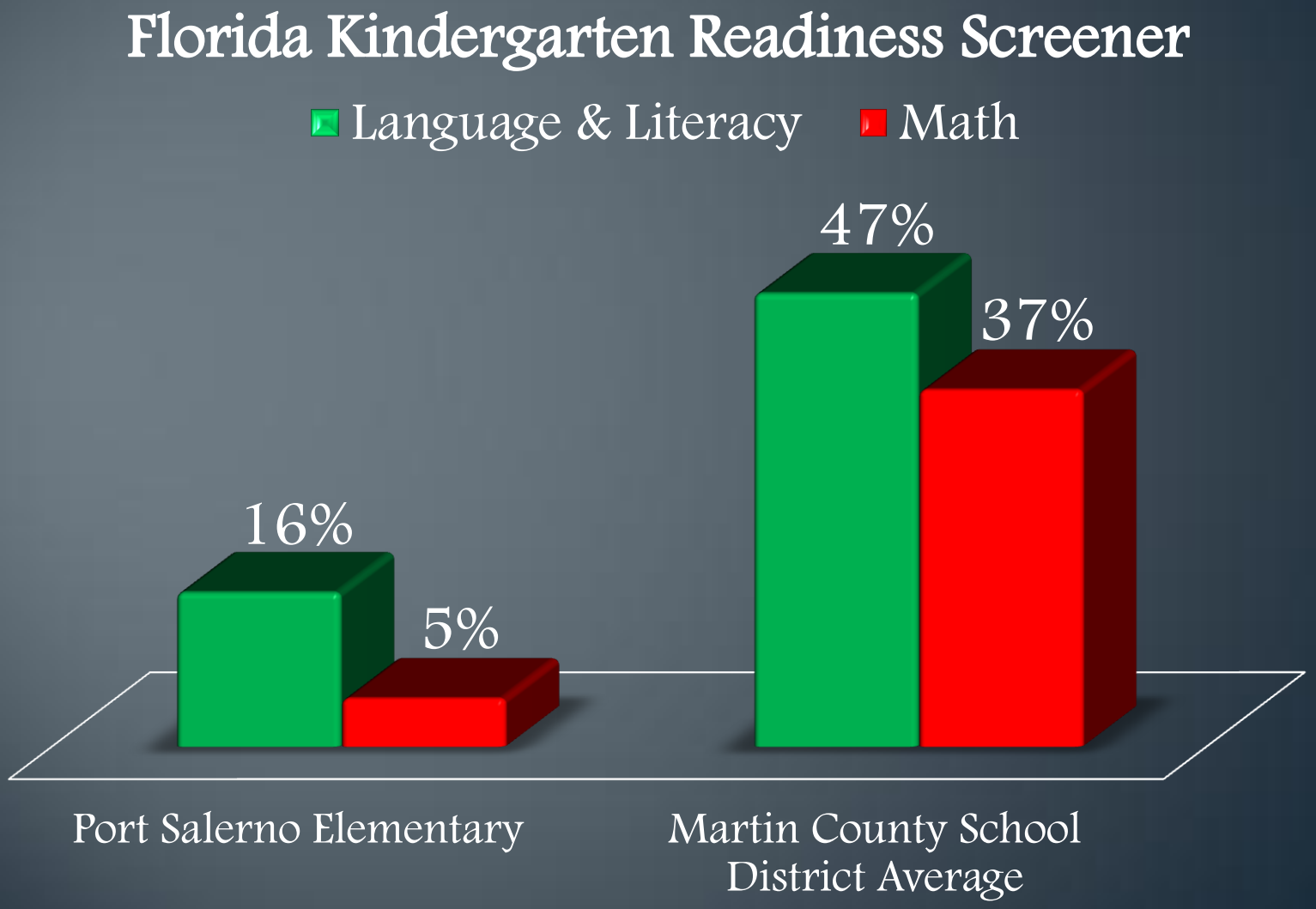
Economic Background



Language Background



School Readiness



Kid Snippets: "Math Class" (Imagined by Kids)

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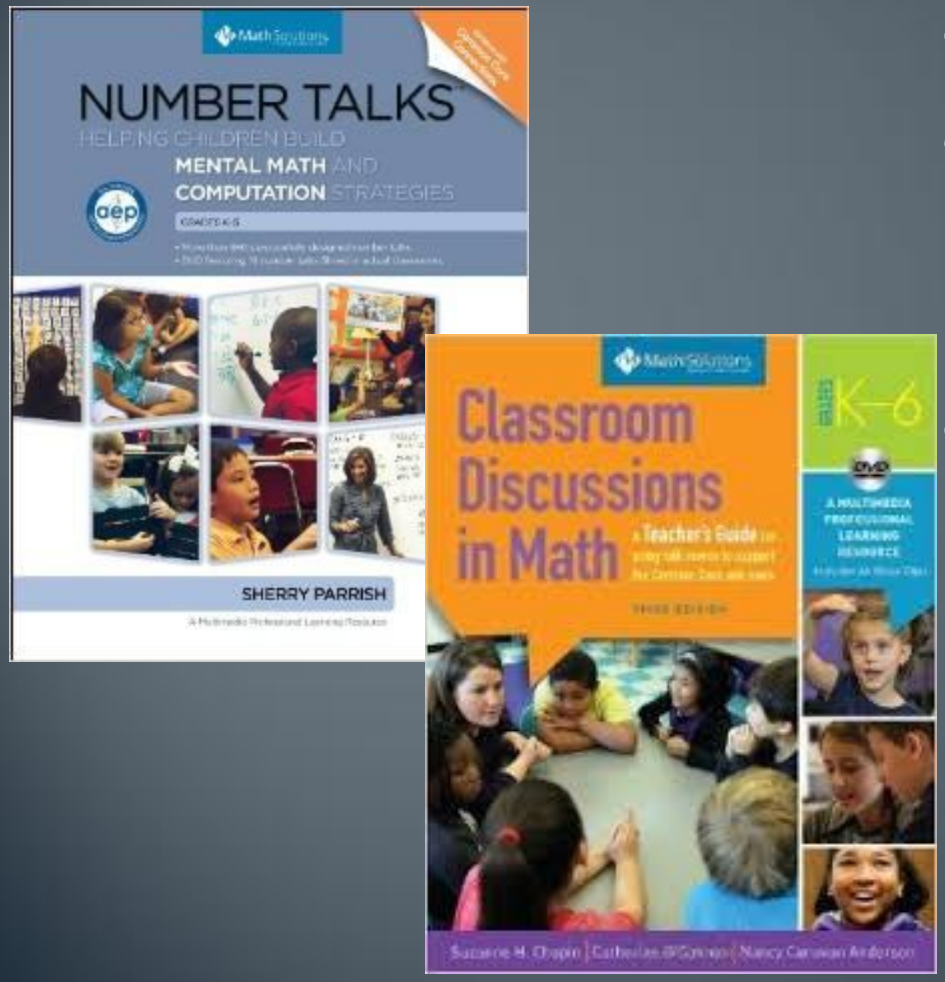
Math Conversations



- Student-driven
- Rich and meaningful conversations about numbers
- Build language

The Math in Calendar Time

- Foundational Mathematics Content in Number for Early Learners
- According to the National Research Council's Committee on Early Childhood Mathematics, there are three core areas of foundational mathematics content in number for early learners.
  - Number
  - Relations
  - Operations

Van de Walle, 2013

Concrete, Representational, and Abstract

- Based on Bruner's reasoning theory
  - **C**oncrete-using manipulatives
  - **R**epresentational-using drawings or pictures
  - **A**bstract-using numerals or mentally solving problems

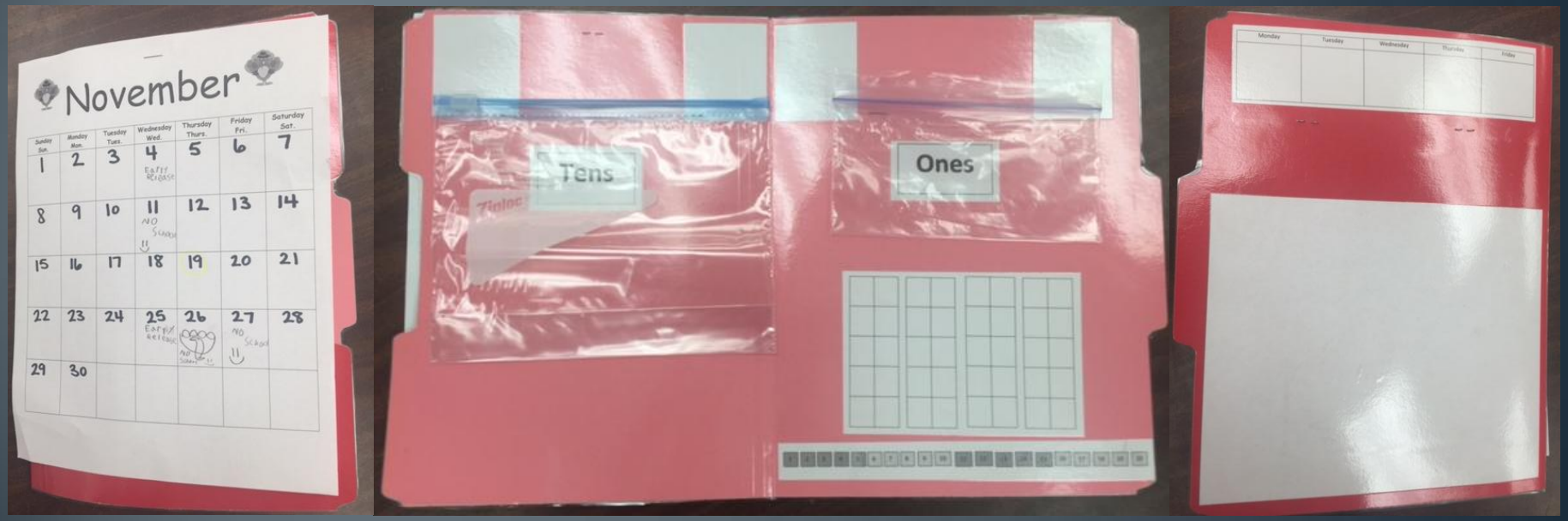
Van de Walle, 2013

Number: Quantity, Counting, and Knowing How Many

- Verbal counting
  - Standard list of counting words in order
  - One-to-one correspondence between counting sequence and objects
- Cardinality
  - Last word count identifies the amount in the set
- Ordinality
  - Each number is one more than the previous number; the new quantity is embedded in the previous
- Concept of Zero
  - Count of zero indicates nothing in set
- Counting on and counting back
  - Counting forward and back within the number sequence from any given number

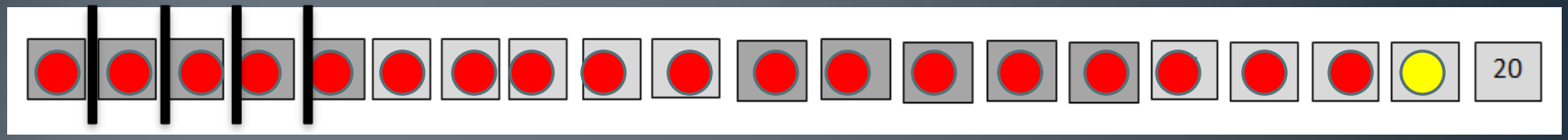
Van de Walle, 2013

A Student Calendar



Number: Activities to Build Understanding in the Concrete, Representational, and Abstract

Counting with number paths



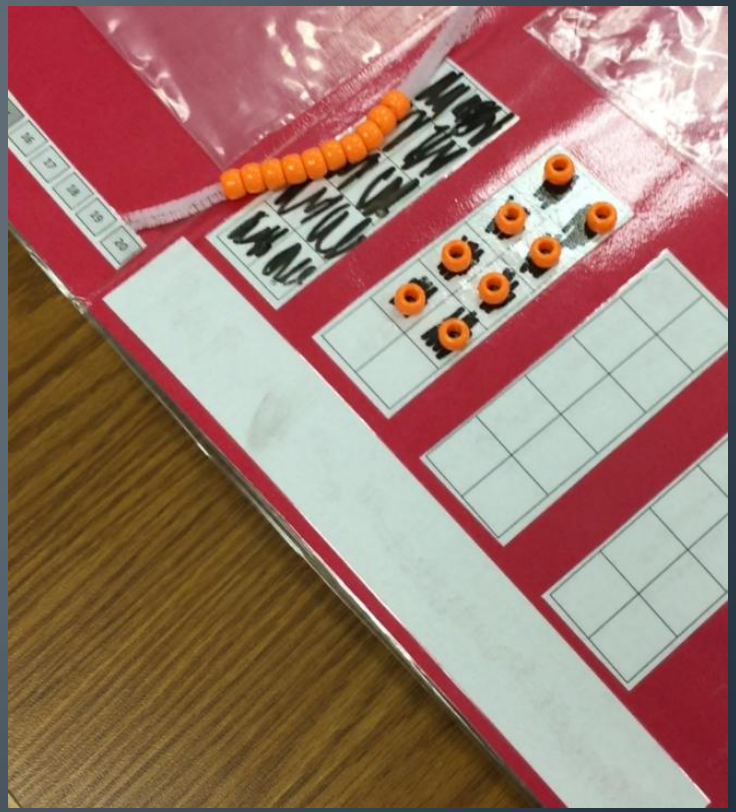
Counting with number lines

- We already have 18 beads because yesterday was November 18th.
- If I gave you one more bead, how many beads would you have?

Number: Activities to Build Understanding in the Concrete, Representational, and Abstract

Building a ten

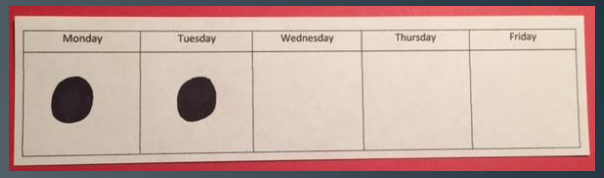
- Make the number 18 on your ten frames.
- How did you make 18?

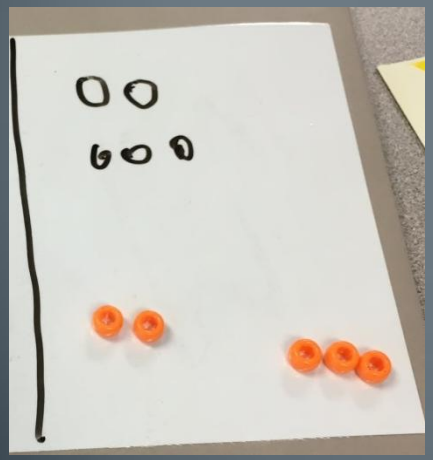


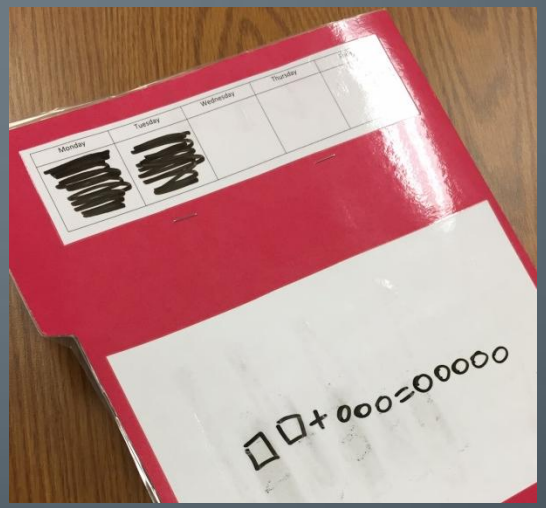
Number & Relations: Activities to Build Understanding in the Concrete, Representational, and Abstract

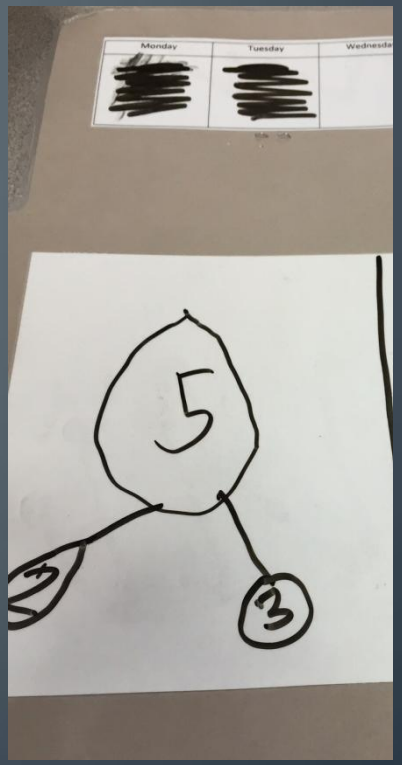
Fluency through five

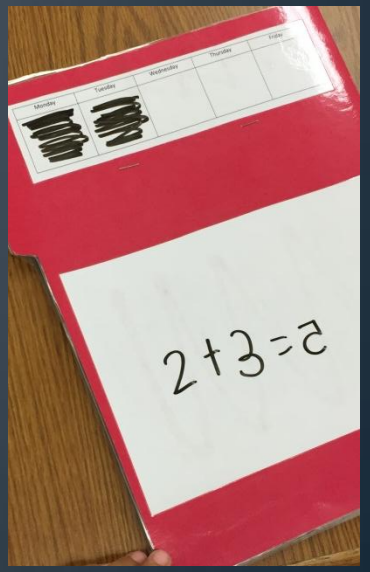
- How many do you have colored in?
- How many more do you need to make 5?









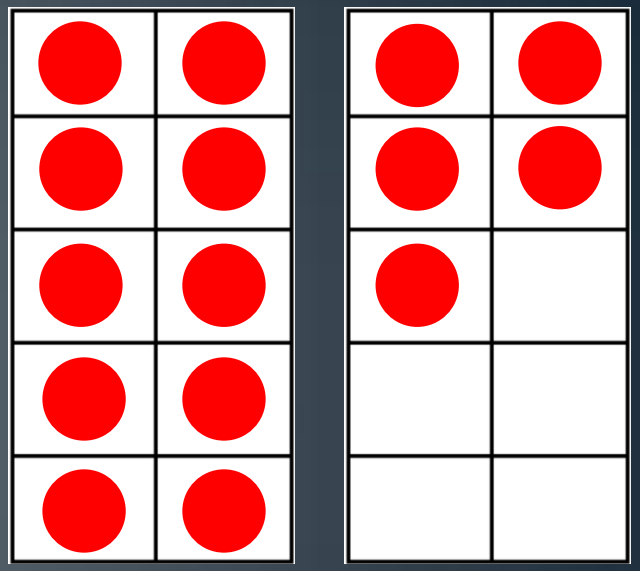


Relations:
Building Relationships Between Numbers 1 Through 10, and 10 Through 20

- 4 types of number relationships that children can and should develop
  - **One and two more, one and two less**
  - **Anchors, or "benchmarks" of 5 and 10**
  - **Part-part-whole relationships**
  - Spatial Relationships
- Pre-place-value concepts with numbers 10-20

Van de Walle, 2013

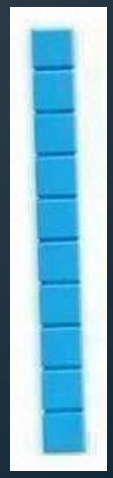
Relations: Activities to Build Understanding in the Concrete, Representational, and Abstract



Building a ten

- Make 15 using your tens frames and beads.
- How many more do you need to make another 10?
- How did you figure that out?

Make a ten using your pipe cleaners and beads.



Operations:
Developing Meaning with Addition and Subtraction

- Teaching students to see mathematical situations in their day-to-day life using calendar.

- Proper sequencing to support students full grasp of the meaning of operations is very important: Result unknown problems are the easiest, progressing to change unknown problems and then to start unknown problems

Van de Walle, et. al 2014 & Carpenter, et.al., 1999

Operations: Activities to Build Meaning in the Concrete, Representational, and Abstract

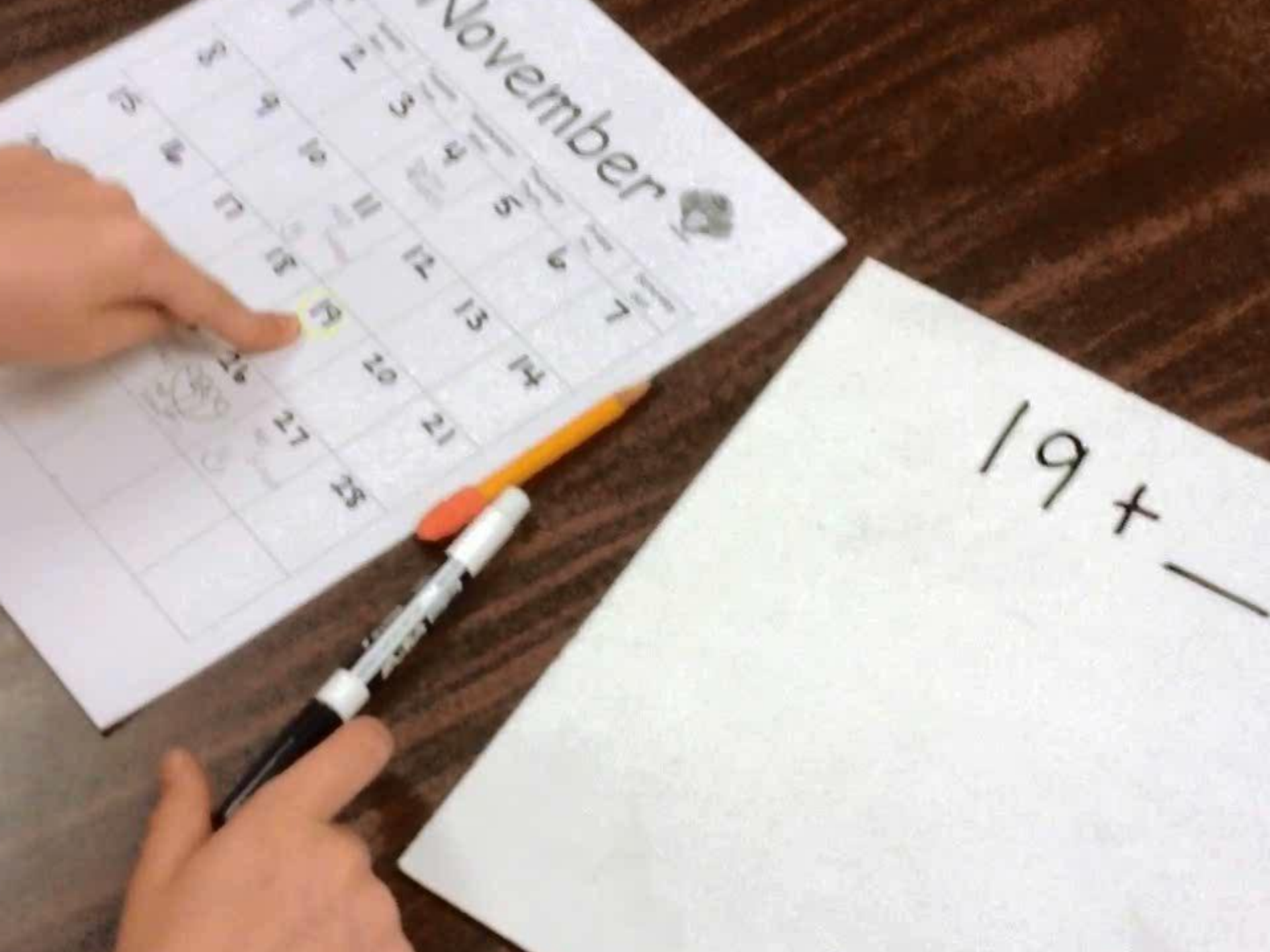
Story problems about the calendar

- Join Change Unknown:

Today is November 19th, we know that Thanksgiving is on November 26th. How many days do we have until Thanksgiving?

19 + __ =26

How would you solve this problem?


November
19 + _

Operations: Activities to Build Meaning in the Concrete, Representational, and Abstract

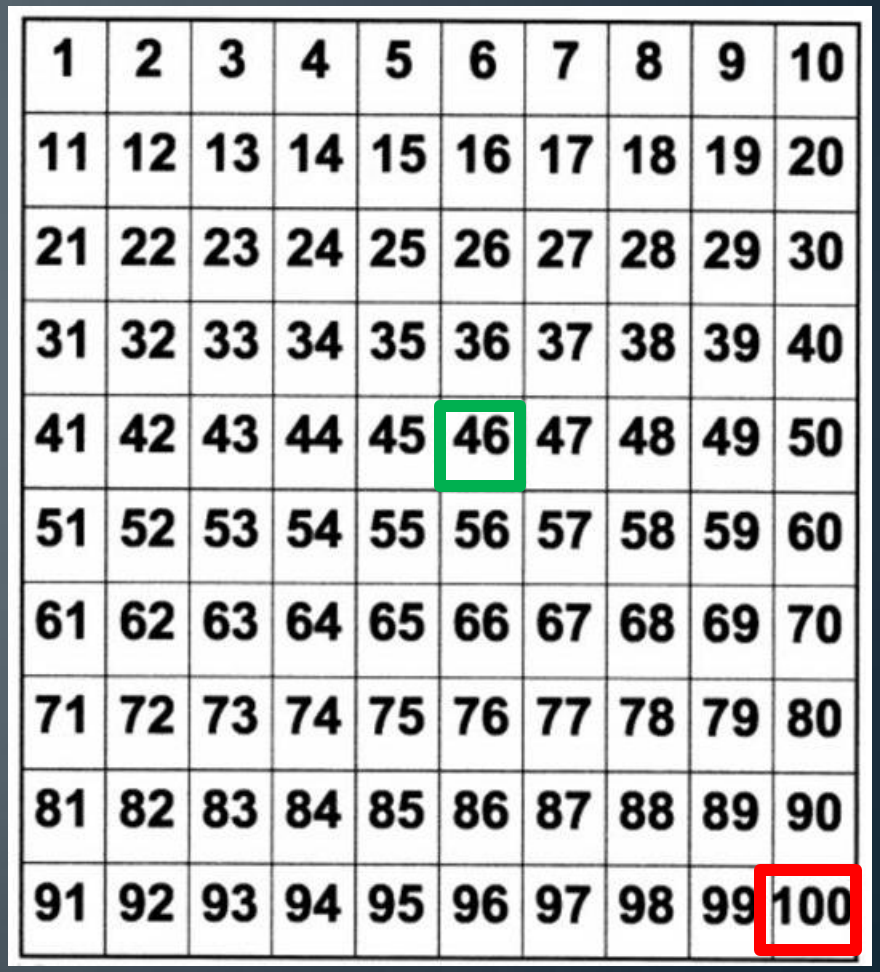
Hundreds chart counting

- Join Change Unknown:

We have been in school for 46 days. How many days until we have a party on the 100th day of school?

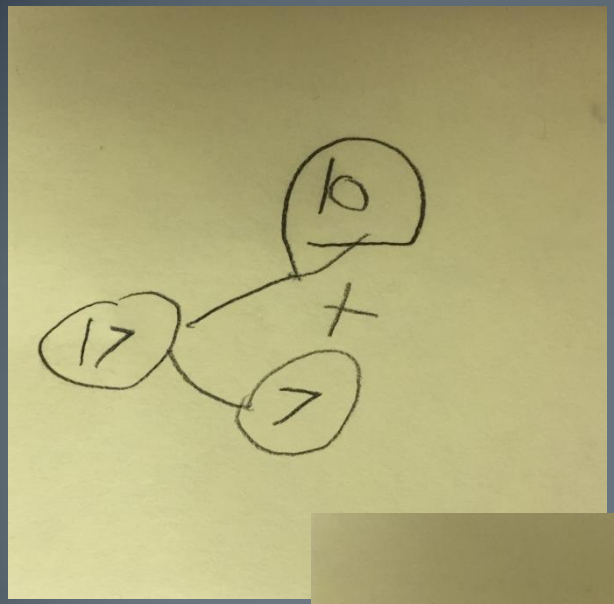
$$46 + \_\_ = 100$$

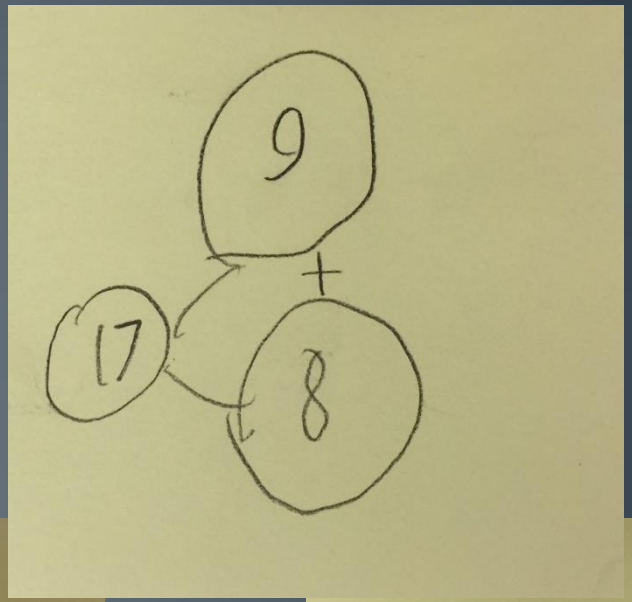
- How would you solve this problem?

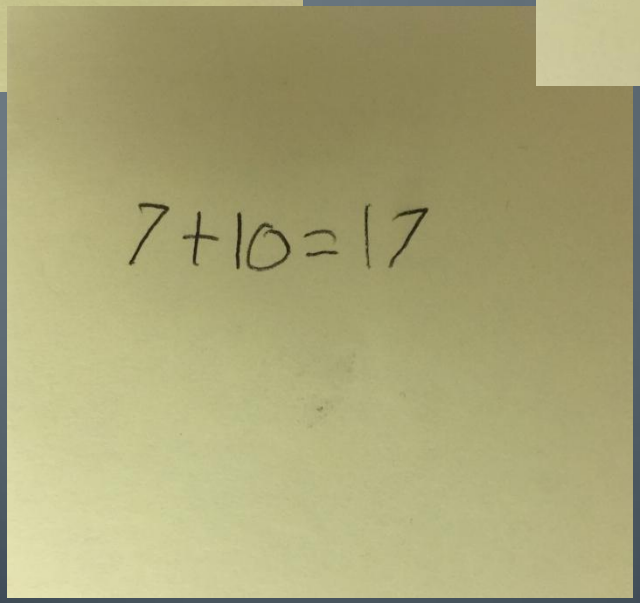


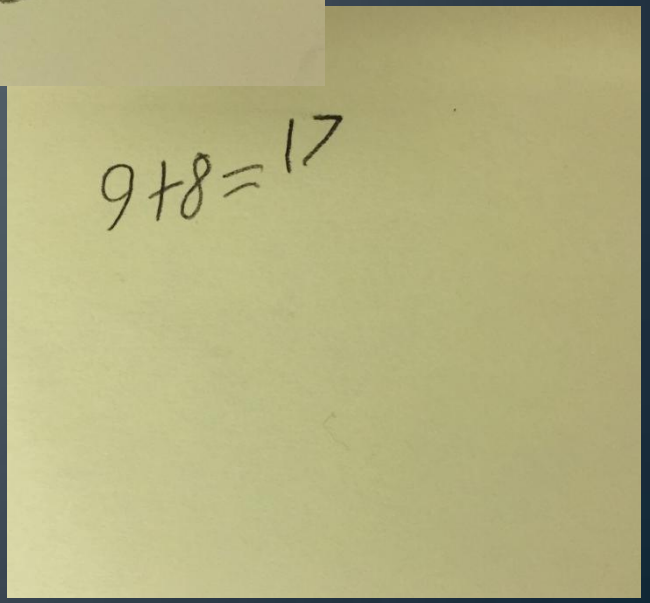
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Showcasing Student Thinking

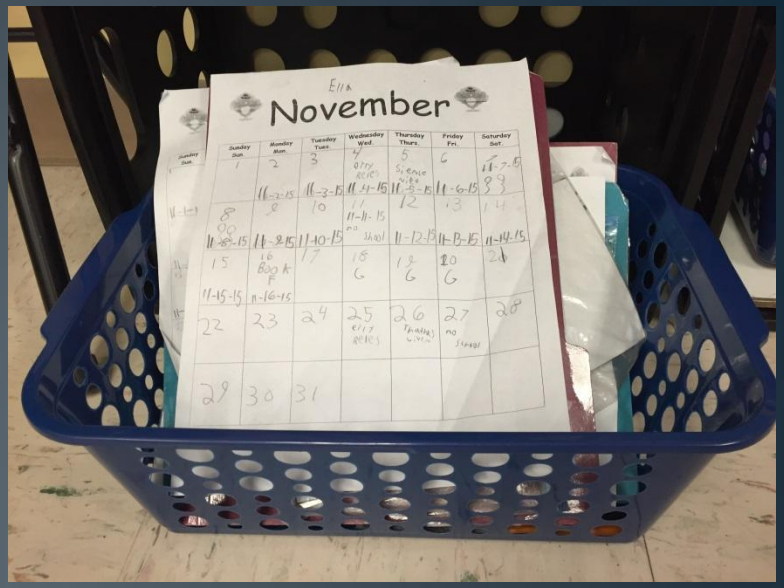


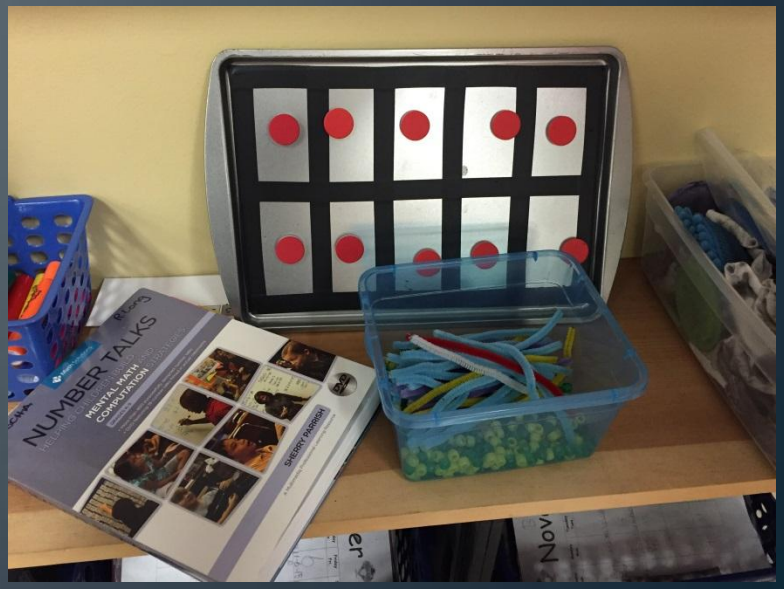






Making It Work





In Closing

- Making numbers real
  - Using the calendar to build early numeracy concepts allows for immediate real-world application
    - It's two more day's until Juana's birthday!
- Reflect:
  - What activities do you currently use to reinforce early number concepts?
  - How can you include additional activities to reinforce early number concepts and make math more meaningful?

Activity Sheet

Number Sense Calendar Activities

Activity	What it looks like in the…			MAFS and associated questions			Related SMPs
	Concrete	Representational	Abstract	Kindergarten	1st Grade	2nd Grade	
Building a ten Number Relations	Students put beads on ten frame to represent day. On days when a ten is made, beads go on pipe cleaner. Example:	Students color in ten frame to represent day of month. Example:		**OA.1.3** *(Look at incomplete ten frame to see how students arranged the beads)* How did you make the number ___ today? **OA.1.4** How many more do you need to make 10? **NBT.1.1, CC.2.5** How many do you have? *(Ex: 25 as 20 and 5)*	**OA.3.6** *(Look at incomplete ten frame to see how students arranged the beads)* How did you make the number ___ today?	**NBT.1.1** *(Student builds number with ten rods and blocks/beads and pipe cleaners)* How many do you have? *(Prompt student to count by tens and ones.)*	1, 2, 3, 4, 5, 7, 8
Writing in days on calendar Number	*See ten frame with beads activity in the concrete.*	*See Building a ten activity in the representational.*	Write in date. Modification: Students trace numbers. K picture 2nd picture	**CC.1.3** How do we write ___?	**NBT.1.1** How do we write___?	**NBT.1.3** What would the number__ look like using base-ten numerals? Using number names? Using expanded form? *(Students write date on calendar)*	2, 7, 8

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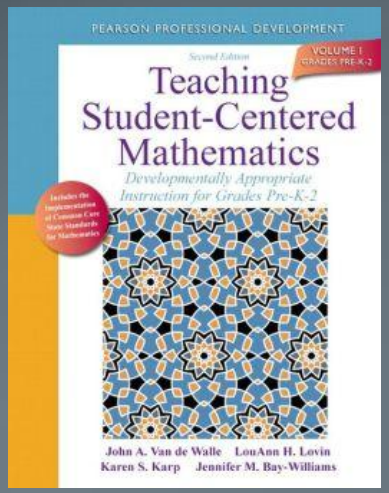
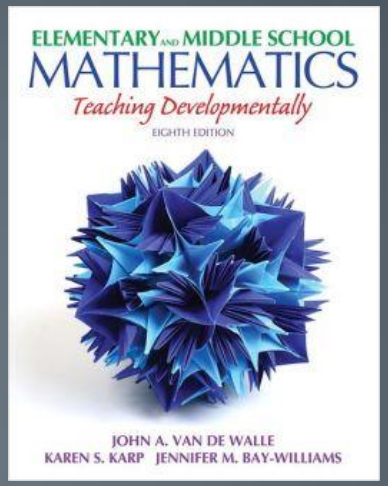
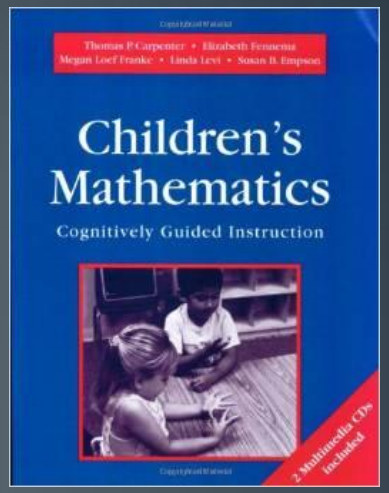
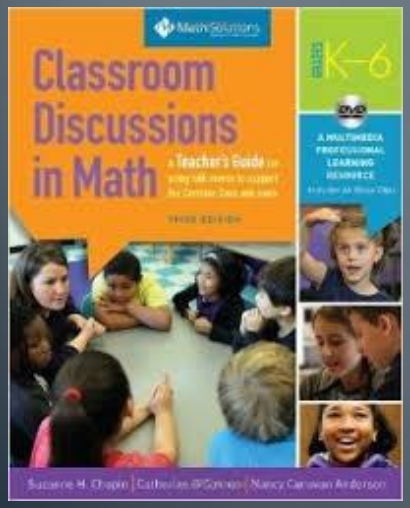
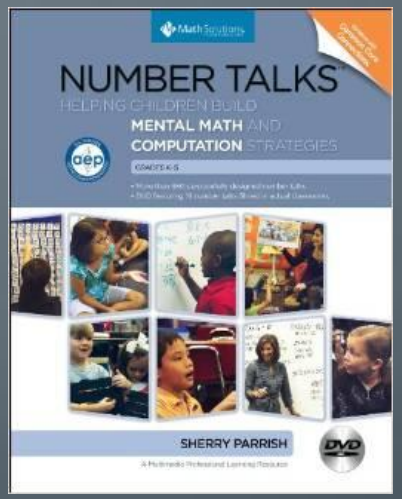
Resources

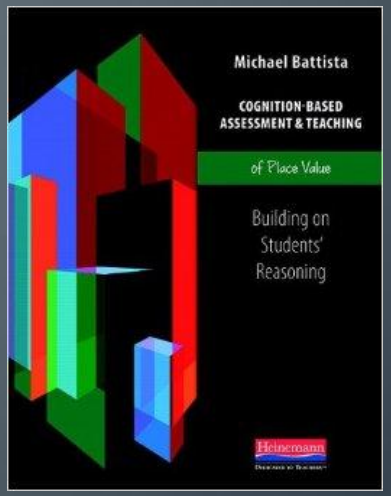


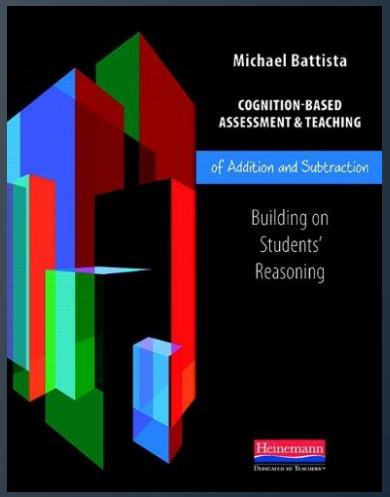












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Raffle!

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