

Looney Math Consulting

www.looneymathconsulting.com

looneyconsulting@comcast.net

Let's Be Detectives
The Search for Rules, Patterns, and
Understanding - SMP 7 & 8 in the Early
Years

Introducing US and the plan for today

Susan Looney

Heather Johnson

Molly Vokey

Heidi Sabnani

Overview

4 strategies for implementation

Standards for Mathematical Practice 7 & 8

Look for and make use of structure.
Mathematical Practice 7



I can see and understand how numbers and shapes are put together as parts and wholes.

Numbers


= 11

$10 + 1 = 11$


=

+


$2 + 1 = 1 + 2$

Shapes















Look for and express regularity in repeated reasoning.
Mathematical Practice 8



I can notice when calculations are repeated.

I see number patterns!

11 = 10 + 1

12 = 10 + 2

13 = 10 + 3

14 = 10 + 4

15 = 10 + 5

- 1 
- 2 
- 3 
- 4 
- 5 



Four Strategies for Implementation

★ Stern Blocks

★ Constructing 100s Chart

★ Unifix Cube Ten Sticks

★ Beaded Number Lines

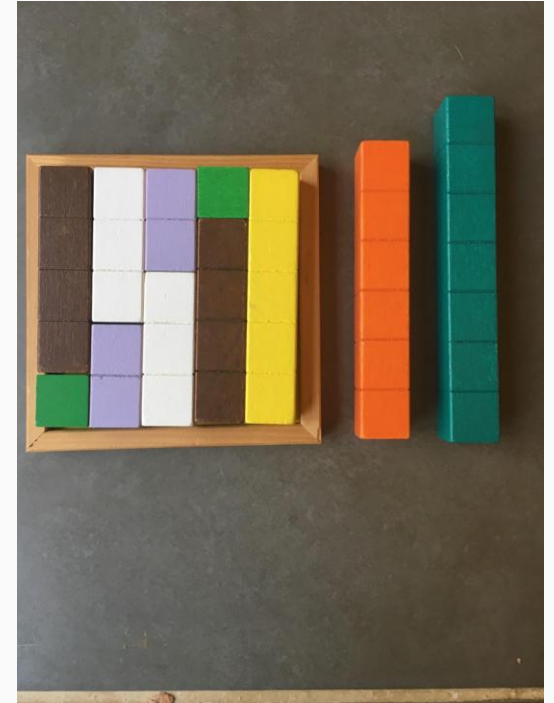
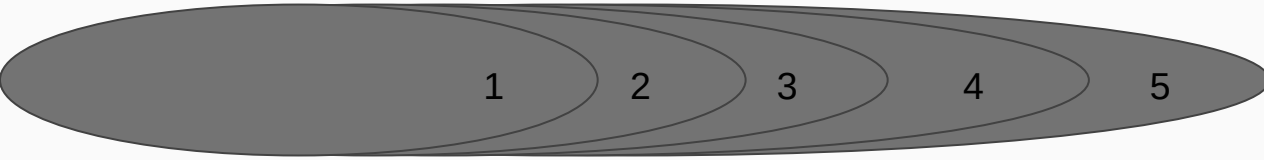


The Structure of Numbers - using STERN Blocks

Stern blocks were developed by Dr. Catherine Stern, a German psychologist and educator, in the 1920's. Dr. Stern's theory was, "that learning should not be based on rote memory, but on visualization of the structural characteristics of the concept, thus giving pupils insight into the relationships that are to be grasped."



Stern Blocks are a perfect vehicle helping students to understand the structure of a number. If we look at 5, we can see it is composed of all the other numbers that come before it.

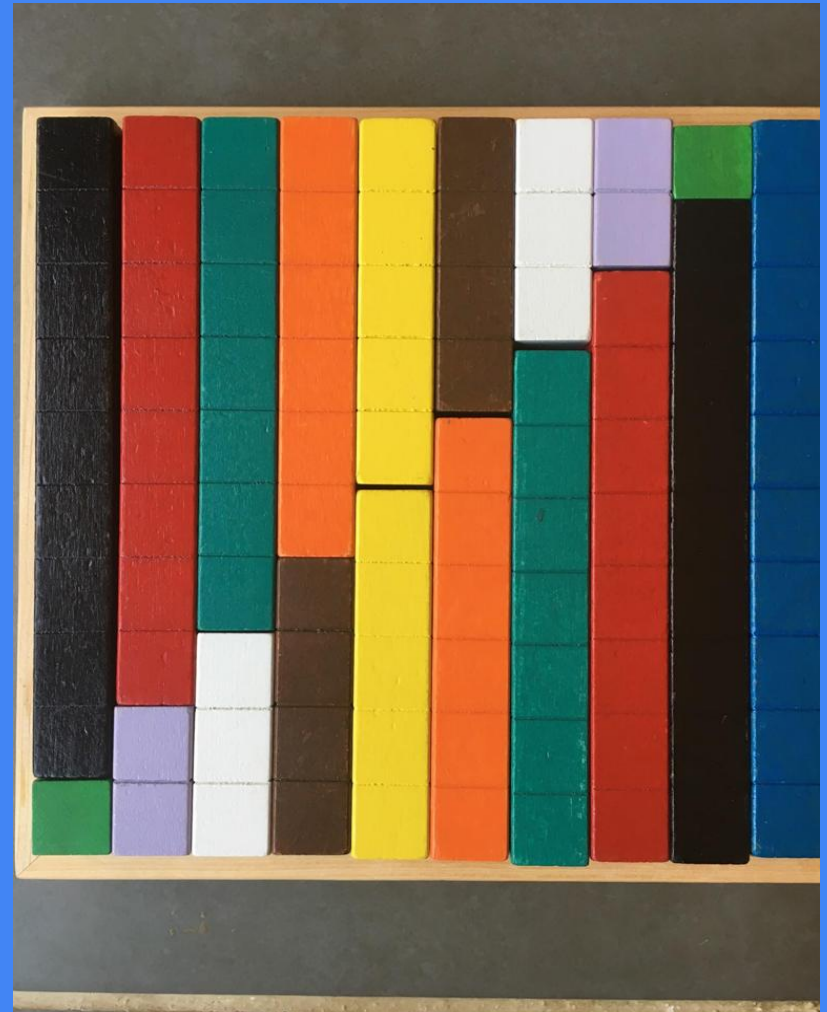


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What do you notice?



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Possibilities for Exploration

Magnitude - connection to number line

Counting - 1 more/1 less

Odd/Even Numbers

Related facts

Visual support for “How Many of Each?” type problems

Missing addend

Connection between addition and subtraction

Patterns in our Counting System

0	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



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Before

Write the missing numbers.

1	2	3	4	5	6	7	8	9	10
11	91	30	15	15	8	70	18	90	15
21	20	23	41	50	20	27	80	41	71
55	51	58	51	49	36	19	73	84	40
30	44	28	70	45	88	90	85	55	50
51	40	95	91	78	41	57	41	91	57
31	62	91	74	88	50	54	68	82	22
33	44	73	80	71	76	88	96	83	69
81	96	77	55	85	92	22	33	89	71
73	92	103	108	111	112	112	114	115	100



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After

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
101	102	103	104	105	106	107	108	109	110

Repeated Reasoning with Unifix Cubes

Using unifix cubes set up in ten sticks allows students to see/count tens and ones, make tens, and search for addends. Students repeatedly see tens and ones and use them to count, add, and subtract.

Conceptual Uses for Ten Sticks

Bridge to 5

Five and some more

Count on from 10

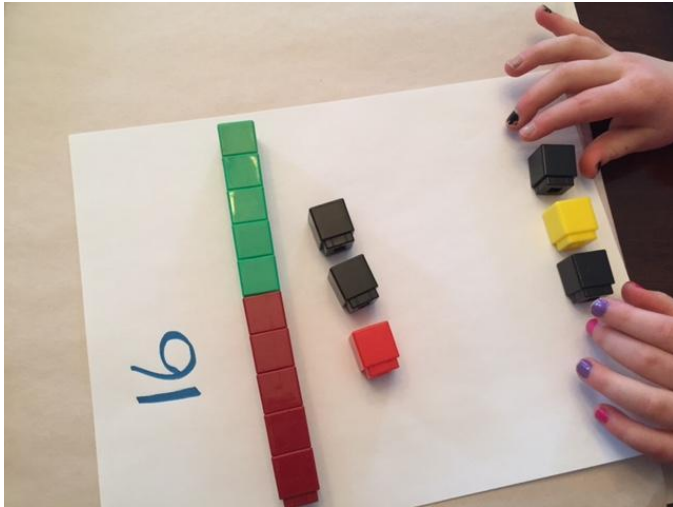
Count by tens or fives

Add and subtract

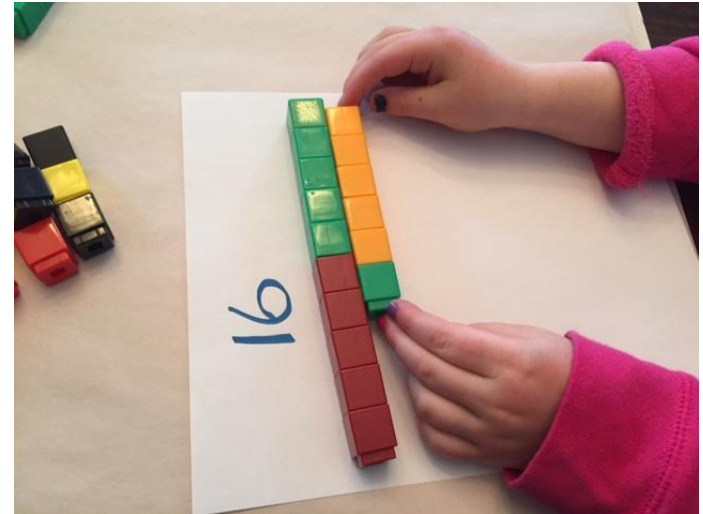


Understanding the Teens

Counting on from 10

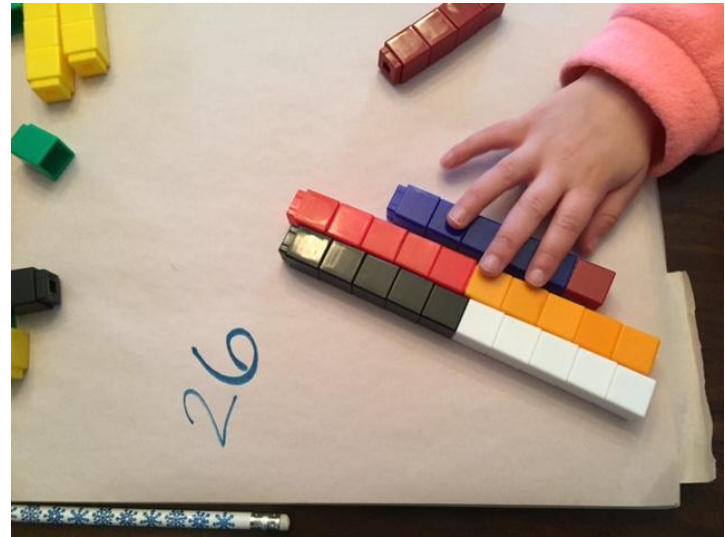
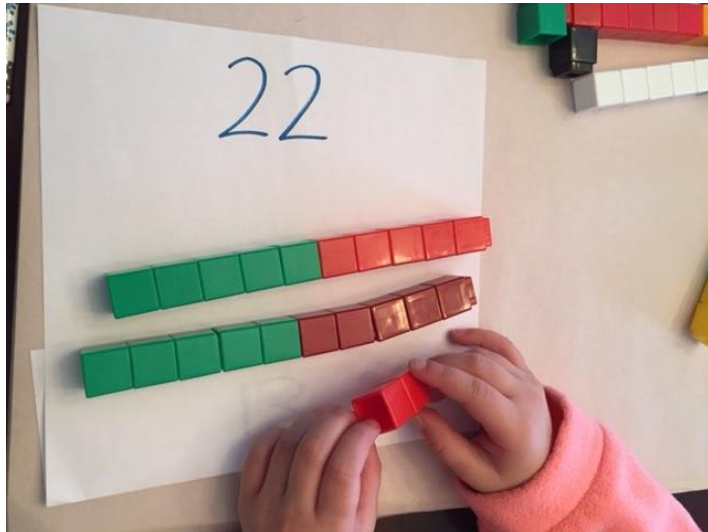


Ten and 5 and 1



How do you
know it's 12?

Moving Beyond the Teens



Beaded Number Lines

Research by Jerome Bruner (Bruner, 2000) states that instructional strategies build understanding for students when they move from the concrete (manipulatives) to the pictorial (visual models or drawings) to the abstract (symbols).

- We want to be sure that we scaffold students through these various levels.

If number lines are a pictorial representation, beaded number lines are the concrete representation.



A progression of beaded number lines

20 Beads (in groups of 5 beads)

100 Beads (in groups of 10 beads)



Structure and Reasoning with a Beaded Number Line

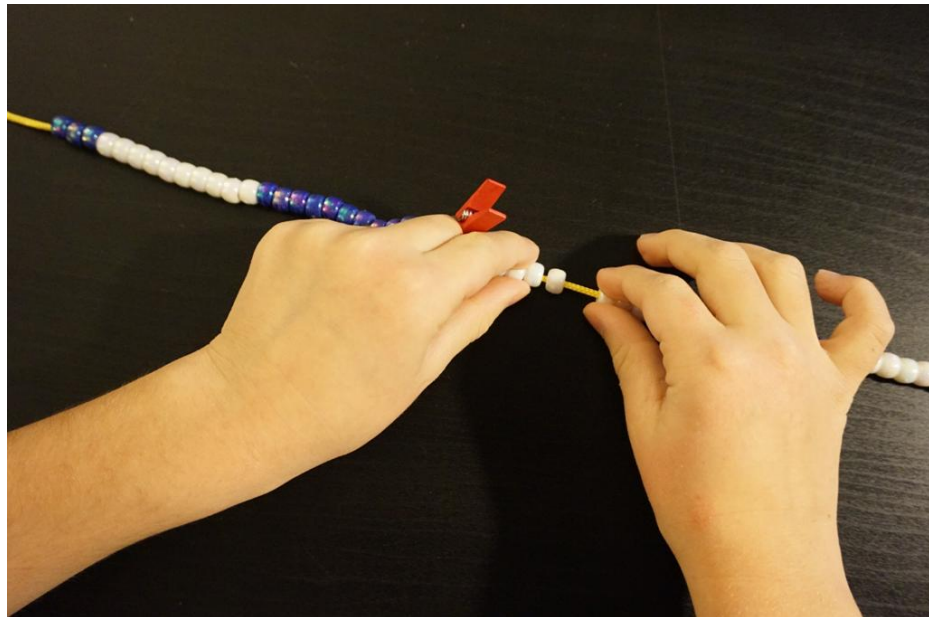
Activities:

What's my number (both strings)

Counting by (1s, 2s, 5s, 10s)

10 more 10 less

Addition and Subtraction



Thank you and
Contact US with
feedback and
questions!

To view power point



Resources

<http://www.stevewyborne.com/?p=797> - interactive
hundreds chart

www.looneymathconsulting.com - see tab for NCTM
materials