Math at the Primary Level

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Issues

- Composing and decomposing numbers
- Using manipulatives effectively

Composing and decomposing

Show me 6 so that:

- There are more than 2 parts
- There are 2 parts- one little and one big
- There are 2 parts- similar in size

Did you notice?

- My question was not : show me 6, some red and some blue.
- It required thinking, not just doing?

Composing and decomposing

Show me 25 so that:

- There are more than 2 parts
- There are 2 parts- one little and one big
- There are 2 parts- similar in size

Composing and decomposing

Show me 25 so that:

- There are 3 parts
- Two parts are about the same size
- One part is much smaller in size.

Composing and decomposing

Show me 10 so that:

- There are 3 parts
- Two parts are about the same size
- One part is much larger in size.

Composing and decomposing

Show me 10 and show me 12 so that:

- Each is shown in two parts.
- One part for 10 is the same size as one part for 12.

Composing and decomposing

When would you break up 42 into

- tens and ones?
- 5s, 10s and 25s?
- 6s?

Composing and decomposing

What numbers can you make if you only put together

- 3s and 4s?
- 2s and 5s?

You try

- Try to make up a “rich” composing/ decomposing question.

Manipulatives of Value

- Counters
- Linking cubes/ with pan balance
- Ten Frames
- Square tiles

Manipulatives of Value

- Base ten blocks
- Coins
- Cuisenaire rods

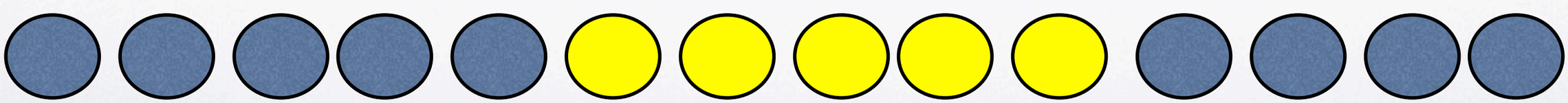
Counters

Certainly to count and represent numbers

- If you alternate colours with every 5 counters and line them up, you can replace a rekenrek

Counters

- A doing question: For example, show 14 as



Counters

- A thinking question: You alternate colours after every 5 counters. Your last group is only 3 of a colour. What could your number have been?

Counters

- Compose and decompose
- For example, show that 15 can be decomposed into two next-to-each other numbers

Counters

- What numbers can you decompose into a number and twice as much?
- What numbers can you decompose into three next to each other numbers?

Counters

- Estimating total in a pile (or jar)
- For example, put 45 counters in a container and let kids see what 5 look like. They estimate the number in the container.

Counters

- Addition and subtraction
- Doing: Show me how you would model 12 – 7.
- Thinking: You subtract two numbers and the answer is 4. What could they be?

Counters

- Multiplication and division
- Doing: What does 3 x 4 look like?
- Thinking: The answer to a division question is the same as the answer to a multiplication question. How could that happen?

Division

- Be sure to show, e.g. 18÷ 3 both as how many groups of 3 in 18 AND sharing 18 into three groups.

Counters

- Building patterns visually
- Doing: How might you show how the pattern 3, 7, 11, 15, … continues with counters?
- Thinking: The 4th number in a pattern is 15. What could the pattern be?

Linking cubes

- Great for skip counting, e.g. skip counting by 2s– start with individual cubes and then pile in 2s

Linking cubes

- Commutativity of addition
- E.g. show 4 + 3 using two different colours.
- Turn it around in your hand.

Linking cubes

- Associativity of addition
- E.g. use 3 colours to show 4 + 3 + 5
- Change the middle 3 to the first colour
- Change the middle 3 to the second colour

Linking cubes

- Constant difference
- Show a link of 12 and a link of 8 and see how much longer 12 is than 8
- Now add 2 to the matching ends of 12 and 8.
- How do I know 14 – 10 = 12 – 8?

Linking cubes

- Non-standard measurement unit
- Doing: How many sets of 3 pink cubes long is your arm?
- Thinking: Put together 3 pink cubes. Put together 8 yellow cubes. If you used the yellow cubes twice to measure something, how many times will you use the pink cubes?

Linking cubes

- Building patterns
- Building concrete graphs
- Probability

Pan balance

- Determining sums
- What do I need to put on the other side to balance 4 + 3?
- What do I need to balance 4 and 9?

Pan balance

- More thinking: Two stacks of cubes on one side balance two stacks (but different sizes) on the other.
- How many could be in each stack?

Pan balance

- Associativity of addition
- Put 3 + 5 on one side and 2 on the other side.
- What do I need to add to the 2?

Pan balance

- Relationships between sums, e.g.
- How much more is 8 + 3 than 6 + 2?

Pan balance

- More thinking:
- You put 6 cubes on one side and 4 on the other.
- You add to both sides and it tilts just a little.
- What could you have added to each side?

Ten frames

- To decompose 10
- Representing numbers in terms of 5s, 10s, 15s, 20s, etc.
- Making 10s to add and subtract, e.g. 9 + 3 or 12 – 4

Cuisenaire rods

- Representing numbers
- Commutativity of addition
- Associativity of addition
- Subtraction as inverse addition

Cuisenaire rods

- Non-standard length units
- Proportional reasoning with length units
- Thinking: One rod is twice as long as another. What could the rods be?

Cuisenaire rods

- Building shapes and determining perimeter

Square tiles

- Creating arrays
- Work with fractions, e.g. make a rectangle that is half red or one fourth green

Base ten blocks

- Representing numbers/decomposing numbers
- Show a number with more ten rods than unit blocks
- Show 54 four different ways

Base ten blocks

- What numbers can you show with exactly 13 blocks?

Base ten blocks

- 13
- 130
- 1300
- 121
- 301

94

85

76

184

445

Base ten blocks

- Addition and subtraction
- Let’s look at 42 + 19 and 41 – 18

Coins

- Estimate value of a collection
- Skip counting by 5s, 10s, 25s
- To decompose into 10s , 5s and 25s
- Add and subtract

Coins

- Thinking: You have 12 coins. Some are nickels and some are dimes.
- You trade some coins and it's worth the same but now you have 16 coins.
- What did you do?

Visuals that Matter

- Hundred chart
- Number Line

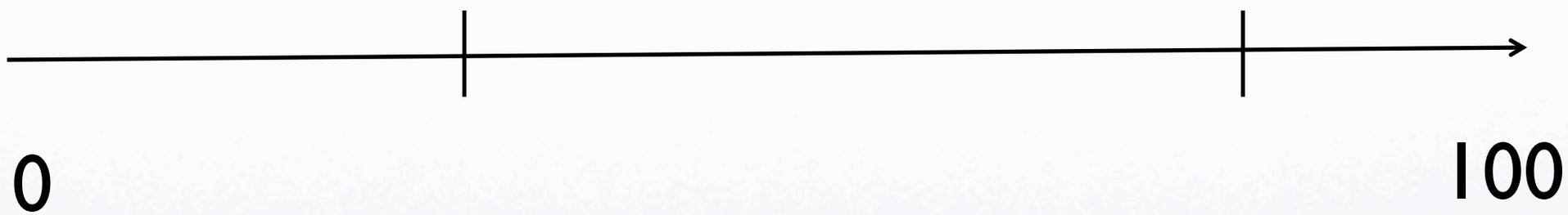
Hundred chart

- Locate numbers
- Adding and subtracting using mental math strategies

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

Number Line

- Locating numbers, e.g.
- A number line is marked in 5s and you ask students to place numbers not ending in 5. OR
- You just mark two dots with only 0 and 100 marked and students estimate what they might be.


0
100

Number Line

- Comparing numbers
- Rounding to nearest ten

Number Line

- Addition and subtraction (two ways for subtraction)
- 35 – 12 could be start at 35 and go back 12 OR start at 12 and go up to 35

Download

- www.onetwoinfinity.ca
- MathNov7