Just-in-Time Maths

Vignette

4

A big idea - Place Value

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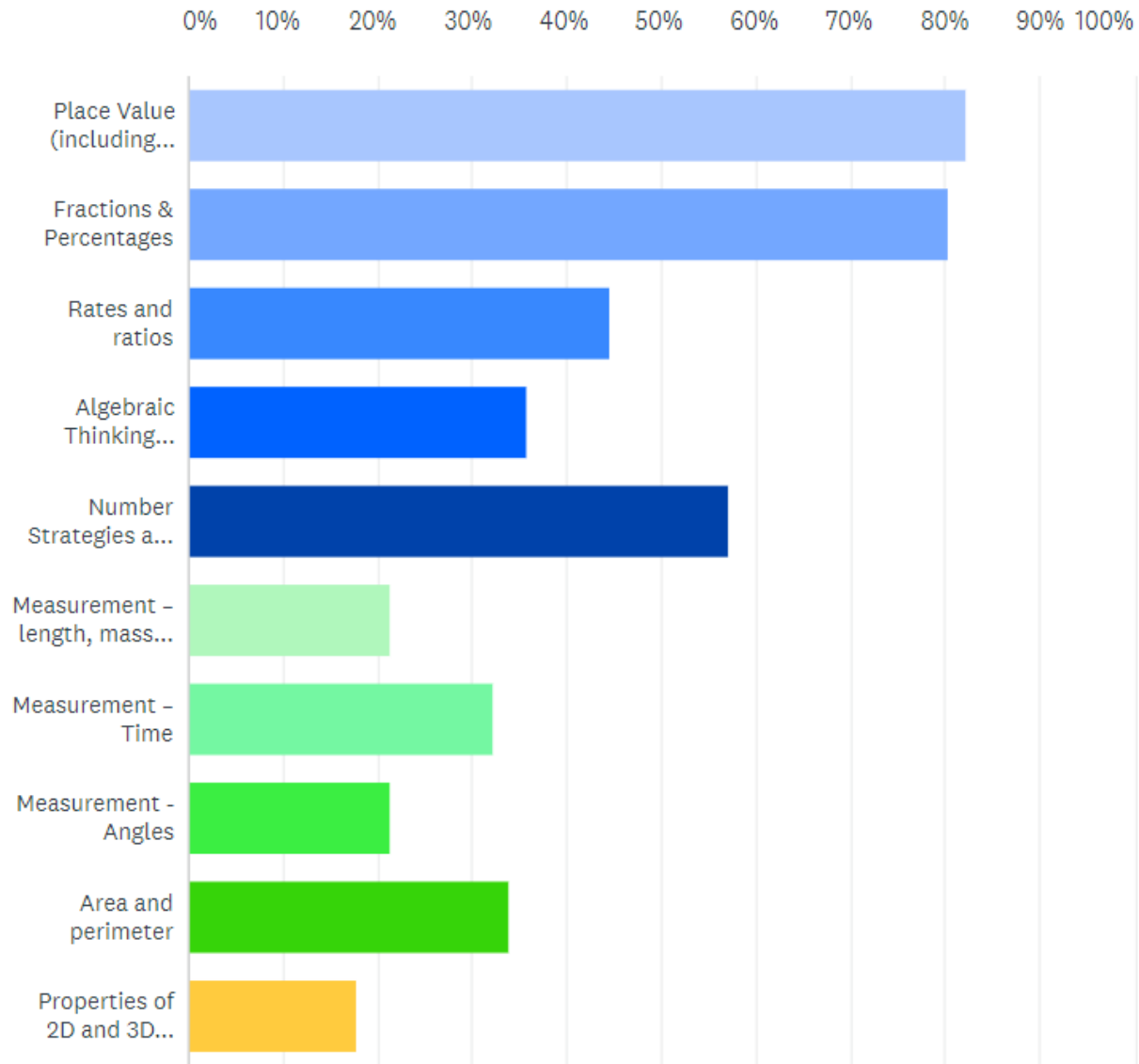
Scope and sequence to Level 4

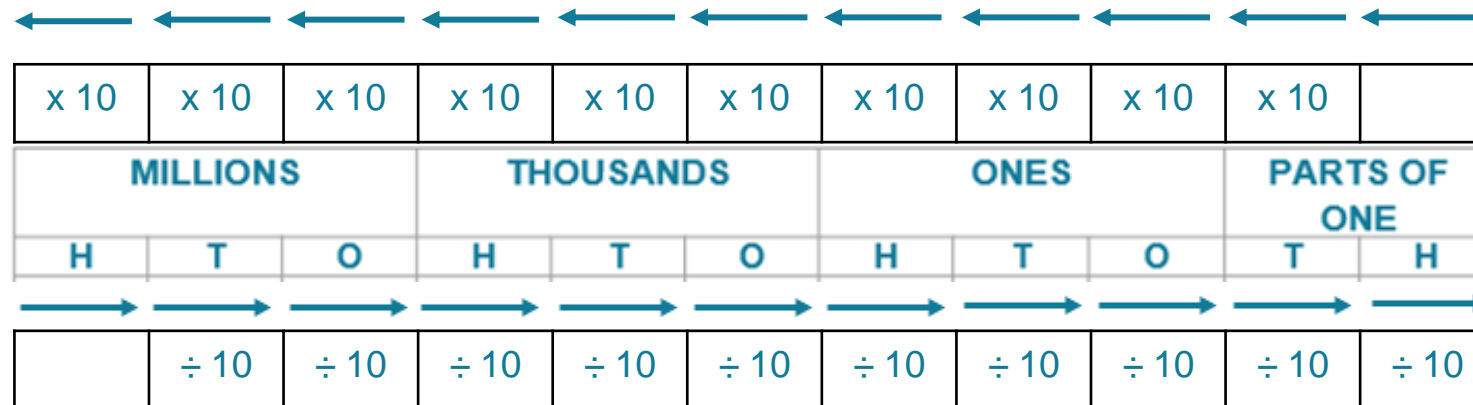| Number Knowledge								
	Level 1		Level 2		Level 3		Level 4	
	After 1 year	After 2 years	After 3 years	After 4 years	After 5 years	After 6 years	After 7 years	After 8 years
Number Range *at least to*	**20**	**100s**	**1000s**	**10 000s**	**100 000s & 0.1**	**1 000 000 & 0.01**	**>1 000 000 and < 0.01**	
Read & write *Represent, read and record numbers*	Seventeen (17)	One hundred and twenty-five (125)	Two thousand and twenty-five (2025)	Twenty thousand, four hundred & five (20,405)	3 and 4 tenths (3.4)	Ten and fifteen hundredths (10.15)	millions and billions thousandths, millionths	
Order & compare *Numbers in the range ..*	0-20	0-100	0-1,000	0-100,000	0-1,000,000	tenths & hundredths	tenths, hundredths and thousandths	
Round *Round numbers to the nearest ..*		ten	hundred	thousand	million	tenths & hundredths	tenths, hundredths and thousandths	
Name & Expand *Name, model and expand*	**17** 10+7	**125** 100+20+5 1hundred, 2 <u>tens</u> and 5 ones	**2,025** 2,000+20+5 5 means 5 ones	**20,405** 20,000+400+5 4 means 4 hundreds	**175 525** 100,000+70, 000+5,000+500+20+5 2 means 2 tens	**12.5** 10 + 2 + 0.5 1 ten, 2 ones, 5 tenths 1 means 1 ten	$8753 = 8 \times 10^3 + 7 \times 10^2 + 5 \times 10^1 + 3 \times 10^0$ $2. 45 = 2 \times 10^0 + 4 \times 10^{-1} + 5 \times 10^{-2}$	
Nesting *Number can have different names without changing the value. (includes unitising and re-unitising – 30 ones is 3 tens)*	**17** 1 ten, 7 ones	**125** 12 hundreds and 5 ones **1,000** is 10 hundreds *or* 1 thousand	**656** 65 tens and 6 ones **1,000** is 10 hundreds *or* 1 thousand	**20,405** 20 thousands and 405 ones *or* **10,000** is 100 hundreds *or* 10 thousands	**175,525** 17 tens thousands, 50 hundreds, 2 tens, 5 ones **100,000** is 1,000 hundreds *or* 100 thousands	**12.5** 1 ten and 25 tenths **1.00** is 10 tenths, 100 hundredths	**2.47** 2 whole and 47 hundredths **10 000 000** is 10 000 thousands	
Renaming *Numbers can be rearranged in terms of place value without changing the value*		**125** is 11 tens and 15 ones	**3250** is 30 hundreds and 250 ones	**12 505** is 11 ten thousands and 1505 ones	**125 475** is 124 thousands and 1475 ones	**1.2** is 11 tenths and 10 hundredths	**10.75** is 107 tenths and 5 hundredths *or* 1 ten and 75 hundredths	

Self-Understanding | Connection | Knowledge | Competency

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Scope and sequence to Level 4

Number strategies				
	Up to at least 100	**Up to at least 1000**	**Up to at least 100 000 and 0.1, 0.01**	**Up to 1 000 000 and < 0.01**
Place Value Addition & Subtraction	The students see 10 as a complete count composed of 10 ones. The student solves addition and subtraction tasks by incrementing by tens - 13,23,43…	**Standard Partitioning** 43 + 25 = (40+20) + (3+5) = 60 + 8 = 68 **Rounding and Compensation** 39 + 26 = (39+1) + (26-1) 40 + 25 = 65 **Back through Ten** 84 - 8 as 84 - 4 - 4 84 - 4 = 80 80 - 4 = 76	**Rounding and Compensating** 630 - 390 = 630 - (390 + 10) = 630 - 400 = 230 230 + 10 = 240 923 − 587 = 923 − 600 + 13 **Standard Place Value Partitioning** 604 − 388 = 60 tens − 38 tens − 1 one **Know sequences** 4.7, 4.8, 4.9, ___ with no calculation	**Estimate calculations** 37 + 41 + 40 + 38 is about 4 x 40 **Standard PV Partitioning** 4.2 − 2.68 is decomposed to difference between 420 hundredths and 268 hundredths
Place Value Multiplication & Division	The students: - use skip counting (in 10's) to solve multiplication tasks.	The students: - can skip count in 100s - recall 10x multiplication facts and corresponding division facts	Understands Base 10 − 10 of these is one of these as digits move right or left 4200 is 420 x 10 with no calculating 4.3 is 43 ÷ 10 with no calculating **Rounding and Compensating** 9 x 6 is (10 x 6) = 60 60 - (1 x 6) = 54 The students: - recall basic facts up to 10 times tables and corresponding division facts **Know multiples of 10,100,1000** 1250, 2250, 3250, _____ with no calculation 701 000 is 691 000 if 10 000 is taken from it.	Linking place value understanding to distributive law 6 x 13 = 6(10 +3) = 6 x 10 + 6 x 3 = 78 Use multiplicative understanding of pv 1.6 x 0.4 = 16 x 4 ÷ 100 = 0.64 24 ÷ 3 x 10 = 80 Link to percentages/fractions 40% of 56 = 56 ÷ 10 x 4 125/1000 = 0.125

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A key understanding

Our Hindu Arabic number system has *place value which makes it simple but very effective.*

The big idea is to make groups of 10 (10 of these is one of those) using the multiplicative feature.
It is bi-directional and exponential

x 10	x 10	x 10	x 10	x 10	x 10	x 10	x 10	x 10	x 10	
MILLIONS			THOUSANDS			ONES			PARTS OF ONE	
H	T	O	H	T	O	H	T	O	T	H
	÷ 10	÷ 10	÷ 10	÷ 10	÷ 10	÷ 10	÷ 10	÷ 10	÷ 10	÷ 10

Learners must see the groupings of three digits for reading large numbers.
Each house is 1000 times larger or smaller than the adjacent house

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Place Value Strips

BILLIONS			MILLIONS			THOUSANDS			ONES			PARTS OF ONE		THOUSANDTHS		
H	T	O	H	T	O	H	T	O	H	T	O	T	H	O	T	H
												$1 \div 10$	$1 \div 100$ $(1\div10\div10)$	$1 \div 1000$ $1\div10\div10\div10$	$1 \div 10000$	$1\div 100000$
10^{11}	10^{10}	10^{9}	10^{8}	10^{7}	10^{6}	10^{5}	10^{4}	10^{3}	10^{2}	10^{1}	10^{0}	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}

MILLIONS			THOUSANDS			ONES			PARTS OF ONE	
H	T	O	H	T	O	H	T	O	T	H

Rule: Only have one digit in each room