1. Knowledge Organisers – Number & Place Value

Number and Place Value is a key priority in our school 2022- 2023

What are these?

The following knowledge organisers are developed based on the NCTEM progression documents for number and place value.

Every effort has been made to provide the learners with support for learning and understanding the essential skills in each aspect of number and place value.

Children should learn to and understand the key vocabulary and should be utilising this in varying contexts.

The teacher must use opportunities to link these facts to other areas of maths and other areas of the curriculum.

Simply providing the children with these organisers will not support them in their learning. Their use needs to be specifically taught and the children must see these as a learning aid.

The knowledge organisers are developed to be double sided with each child having their own copy (preferably printed on card) which they annotate to help support them further and or use to track their progress. The number on each knowledge organiser relates to the year group which the content relates to.

Why use them?

Working memory - This is where thinking actually happens. It has a very finite capacity; it can only hold and process about four different items at a time. If it receives too much it fails.

Long-term memory - Long-term memory has huge – almost infinite – capacity. It is here that we store our knowledge of facts and procedures. The goal is to stock our long-term memories with knowledge in a well organised, easily retrievable way and make recall of key aspects automatic. This frees up the working memory for new information.

Cognitive load - This is the term used in cognitive science to describe how much capacity something takes up in the working memory. Cognitive overload is what happens if too many demands are placed on working memory at once.

The aim of the knowledge organisers is to improve the speed with which information is stored in the long term memory, thus improving the learners ability to develop deep learning in more areas of the curriculum.

How can these be used?

There are several ways that you can use knowledge organisers with children.

1. Send the previous knowledge organiser home with the children before the start of a new topic to encourage discussion and recap of prior learning.
2. Display an enlarged copy of the knowledge organiser on the working wall, encourage children to add information (particularly different visual representations) around it during the topic.
3. All children to have a card copy of the knowledge organiser which is always available with their bank of other knowledge organisers. The footers and headers are purposely blank as children should annotate their individual knowledge organisers to support them further eg starring any aspects that they find tricky, adding any STEM sentences which they struggle with.
4. During lessons learners can be directed to question each other on a specific area (in a short time frame before swapping over).
5. Vocabulary prompts – use the vocabulary bank to insist the ALL children are supported in utilising the correct topic related vocabulary.
6. Teachers can challenge children to find the appropriate information at speed and put their finger on the relevant place on the organiser – children can also complete these task in pairs with a short time scale.

How are they not to be used?

These provide a brief overview of what the children should securely know by the end of that year group. They should NOT be utilised as an end point and links must be made to other areas of learning.

They are not the planning for the topic.

Currently, these knowledge organisers, are a starting point and will need to be adapted over time in response to the needs of the children.

Top Tip: Number bonds, times tables, measurement conversions should all go into long-term memory.

COUNTING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number			count backwards through zero to include negative numbers	interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero	use negative numbers in context, and calculate intervals across zero
count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens	count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward	count from 0 in multiples of 4, 8, 50 and 100;	count in multiples of 6, 7, 9, 25 and 1000	count forwards or backwards in steps of powers of 10 for any given number up to 1000 000	
given a number, identify one more and one less		find 10 or 100 more or less than a given number	find 1000 more or less than a given number		
COMPARING NUMBERS					
use the language of: equal to, more than, less than (fewer), most, least	compare and order numbers from 0 up to 100; use <, > and = signs	compare and order numbers up to 1000	order and compare numbers beyond 1000 compare numbers with the same number of decimal places up to two decimal places (copied from Fractions)	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)	read, write, order and compare numbers up to 10 000000 and determine the value of each digit (appears also in Reading and Writing Numbers)
IDENTIFYING, REPRESENTING AND ESTIMATING NUMBERS					
identify and represent numbers using objects and pictorial representations including the number line	identify, represent and estimate numbers using different representations, including the number line	identify, represent and estimate numbers using different representations	identify, represent and estimate numbers using different representations		

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Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
read and write numbers from 1 to 20 in numerals and words.	read and write numbers to at least 100 in numerals and in words	read and write numbers up to 1000 in numerals and in words		read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Comparing Numbers)	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Understanding Place Value)
		tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks (copied from Measurement)	read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.	read Roman numerals to 1 000 (M) and recognise years written in Roman numerals.	
UNDERSTANDING PLACE VALUE					
	recognise the place value of each digit in a two-digit number (tens, ones)	recognise the place value of each digit in a three-digit number (hundreds, tens, ones)	recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)
			find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as units, tenths and hundredths (copied from Fractions)	recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents (copied from Fractions)	identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places (copied from Fractions)

ROUNDING					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			round any number to the nearest 10, 100 or 1000	round any number up to 1000000 to the nearest 10, 100, 1000, 10 000 and 100000	round any whole number to a required degree of accuracy
			round decimals with one decimal place to the nearest whole number (copied from Fractions)	round decimals with two decimal places to the nearest whole number and to one decimal place (copied from Fractions)	solve problems which require answers to be rounded to specified degrees of accuracy (copied from Fractions)
PROBLEM SOLVING					
	use place value and number facts to solve problems	solve number problems and practical problems involving these ideas.	solve number and practical problems that involve all of the above and with increasingly large positive numbers	solve number problems and practical problems that involve all of the above	solve number and practical problems that involve all of the above

Year 1 – Place Value

1 one

2 two

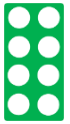
3 three

4 four

5 five

6 six

7 seven



8 eight

9 nine

10 ten

11 eleven
12 twelve
13 thirteen
14 fourteen
15 fifteen

16 sixteen
17 seventeen
18 eighteen
19 nineteen
20 twenty

Use the resources on your tables to help you!

Give Me Five, Turkey!

5	10	15	20	25
30	35	40	45	50
55	60	65	70	75
80	85	90	95	100

Vocabulary

equal	more
less	most
least	>
<	=

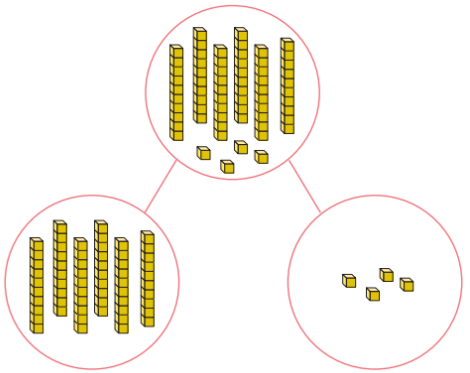
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

One more than 92 is 93.

One less than 100 is 99.

Partitioning

64 has **6** tens and **4** ones



Tens	Ones
6	4

Counting in 2s												
0	2	4	6	8	10	12	14	16	18	20	22	24
Counting in 5s												
0	5	10	15	20	25	30	35	40	45	50	55	60
Counting in 10s												
0	10	20	30	40	50	60	70	80	90	100	110	120

Concrete Resources

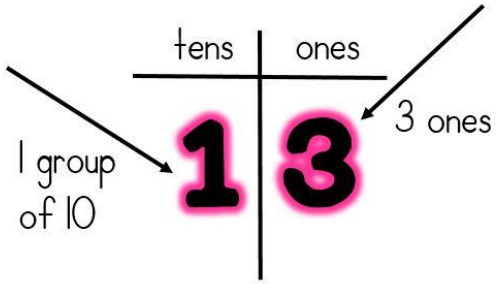
Base 10	Number Lines	Cubes	Counters
			

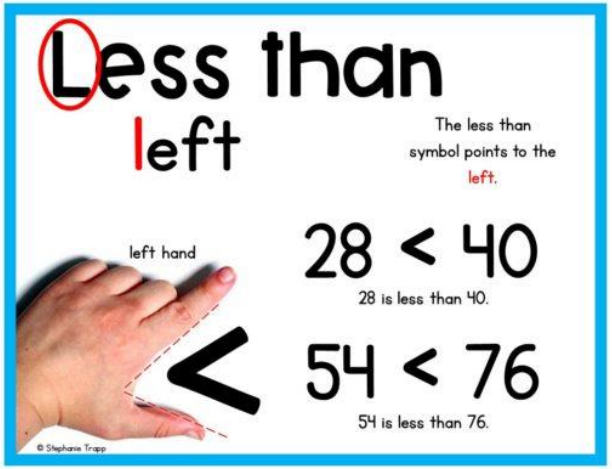
How do you know this?

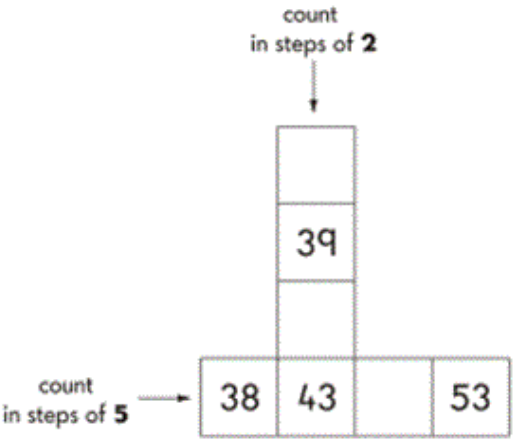
I think this because …
The strategy I used was …
I agree with the answer because …
I disagree with the answer because …

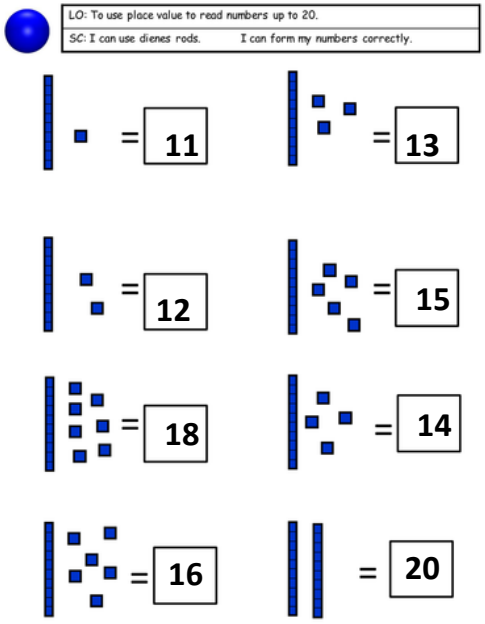
Counting in 1s Forwards	Counting in 1s Backwards	Counting in 2s Forwards	Counting in 2s Backwards	Counting in 5s Forwards	Counting in 5s Backwards
1	21	2	22	0	55
2	20	4	20	5	50
3	19	6	18	10	45
4	18	8	16	15	40
5	17	10	14	20	35
6	16	12	12	25	30
7	15	14	10	30	25
8	14	16	8	35	20
9	13	18	6	40	15
10	12	20	4	45	10
11	11	22	2	50	5
12	10			55	0
13	9				
14	8				
15	7				
16	6				
17	5				
18	4				
19	3				
20	2				
21	1				

Year 2 – Place Value









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

Vocabulary

equal	more
less	most
digit	estimate
represent	=
greater	>
<	fewer

Counting in 2s
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46

Counting in 2s
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0

Counting in 3s
0
3
6
6
12
15
18
21
24
27
30
33
36
39
42
45
48
51
54
57
60
63
69

Counting in 3s
69
63
60
57
54
51
48
45
42
39
36
33
30
27
24
21
18
15
12
9
6
3
0

Counting in 5s
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115

Counting in 5s
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0

Counting in 10s
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230

Counting in 10s
230
220
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

How do you know this?

I think this because …
The strategy I used was …
I agree with the answer because …
I disagree with the answer because …

Year 3 – Place Value

Count in steps of **4, 8, 50** and **100**

backwards forwards

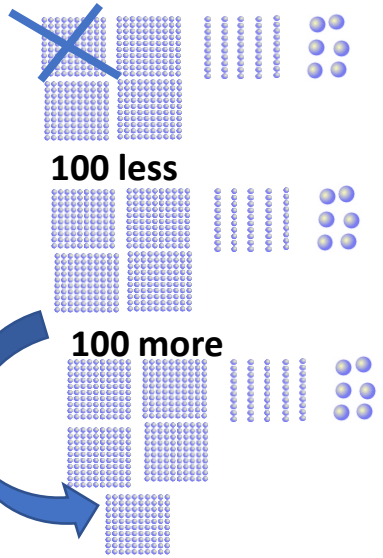
1	2	3	4	5	6	7	8		
11	12	13	14	15	16	17	18		20
21	22	23	24	25		27	28	29	30
31	32	33	34	35			38	39	40
41	42	43	44	45			48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96				

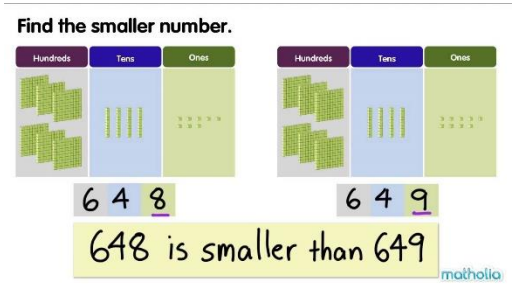
10 more

10 less

How can I use this information to find ten or one hundred more or less than any number?

100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9





Vocabulary

equal	more
less	most
digit	estimate
represent	=
greater	>
<	fewer
tens	ones
hundred	difference

Counting in 4s
0
4
8
12
16
20
24
28
32
36
40
44
48
52
56
60
64
68
72
76
80
84
88
92

Counting in 4s
92
88
84
80
76
72
68
64
60
56
52
48
44
40
36
32
28
24
20
16
12
8
4
0

Counting in 8s
0
8
16
24
32
40
48
56
64
72
80
88
96
104
112
120
128
136
144
152
160
168
176

Counting in 8s
176
168
160
152
144
136
128
120
112
104
96
88
80
72
64
56
48
40
32
24
16
8
0

Counting in 50s
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1,000
1,050
1,100
1,150

Counting in 50s
1,150
1,100
1,050
1,000
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0

Counting in 100s
0
100
200
300
400
500
600
700
800
900
1,000
1,100
1,200
1,300
1,400
1,500
1,600
1,700
1,800
1,900
2,000
2,100
2,200
2,300

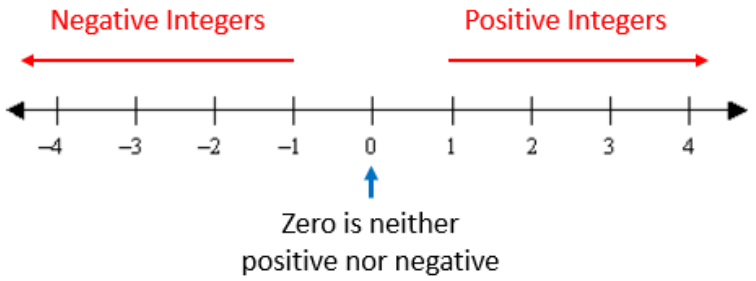
Counting in 100s
2,300
2,200
2,100
2,000
1,900
1,800
1,700
1,600
1,500
1,400
1,300
1,200
1,100
1,000
900
800
700
600
500
400
300
200
100
0

How do you know this?

I think this because …
The strategy I used was …
I agree with the answer because …
I disagree with the answer because …

Year 4 – Place Value

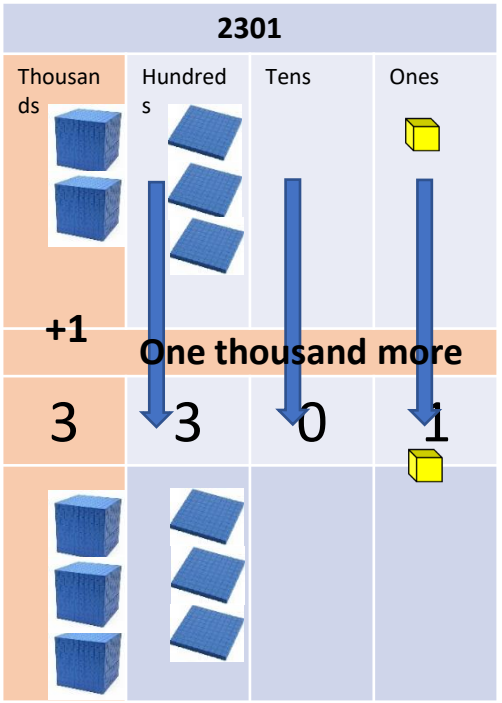
Integer Number Line



Counting across negative and positive numbers through zero.

forwards

Find 1,000 more or less than any number.



Decimal Places

To round 7.63 to 1 decimal place

7.63

3 is less than 5 (half way) so round down

7.63 rounded to 1 decimal place is 7.6

To round 16.79 to 1 decimal place

16.79

9 is greater than 5 (half way) so round up

16.79 rounded to 1 decimal place is 16.8

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Place Value Chart

thousands	hundreds	tens	ones
1	1	1	1

1000 + 100 + 10 + 1 = 1,111

Multiplying and Dividing by 10, 100 and 1000

10 000	1000	100	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

Multiplying

X 10 digits move LEFT **1** space
X 100 digits move LEFT **2** spaces
X 1000 digits move LEFT **3** spaces

Dividing

÷ 10 digits move RIGHT **1** space
÷ 100 digits move RIGHT **2** spaces
÷ 1000 digits move RIGHT **3** spaces

Vocabulary

equal	more
less	most
digit	estimate
represent	=
greater	>
<	fewer
tens	ones
hundred	difference

Counting in 6s	Counting in 6s	Counting in 7s	Counting in 7s	Counting in 9s	Counting in 9s	Counting in 25s	Counting in 25s	Counting in 1000s	Counting in 1000s
0	138	0	161	0	207	25	600	0	23,000
6	132	7	154	9	198	50	575	1,000	22,000
12	126	14	147	18	189	75	550	2,000	21,000
18	120	21	140	27	180	100	525	3,000	20,000
24	11	28	133	36	171	125	500	4,000	19,000
30	108	35	126	45	162	150	475	5,000	18,000
36	102	42	119	54	153	175	450	6,000	17,000
42	96	49	112	63	144	200	425	7,000	16,000
48	90	56	105	72	135	225	400	8,000	15,000
54	84	63	98	81	126	250	375	9,000	14,000
60	78	70	91	90	117	275	350	10,000	13,000
66	72	77	84	99	108	300	325	11,000	12,000
72	66	84	77	108	99	325	300	12,000	11,000
78	60	91	10	117	90	350	275	13,000	10,000
84	54	98	63	126	81	375	250	14,000	9,000
90	48	105	56	135	72	400	225	15,000	8,000
96	42	112	49	144	63	425	200	16,000	7,000
102	36	119	41	153	54	450	175	17,000	6,000
108	30	126	35	162	45	475	150	18,000	5,000
114	24	133	28	171	36	500	125	19,000	4,000
120	18	140	21	180	27	525	100	20,000	3,000
126	12	147	14	189	18	550	75	21,000	2,000
132	6	154	7	198	9	575	50	22,000	1,000
138	0	161	0	207	0	600	0	23,000	0

How do you know this?

I think this because …
The strategy I used was …

I agree with the answer because …
I disagree with the answer because …

Year 5 – Place Value

One Million = 1, 000, 000 (six zeros – or six digits after the million digit)

Negative Numbers

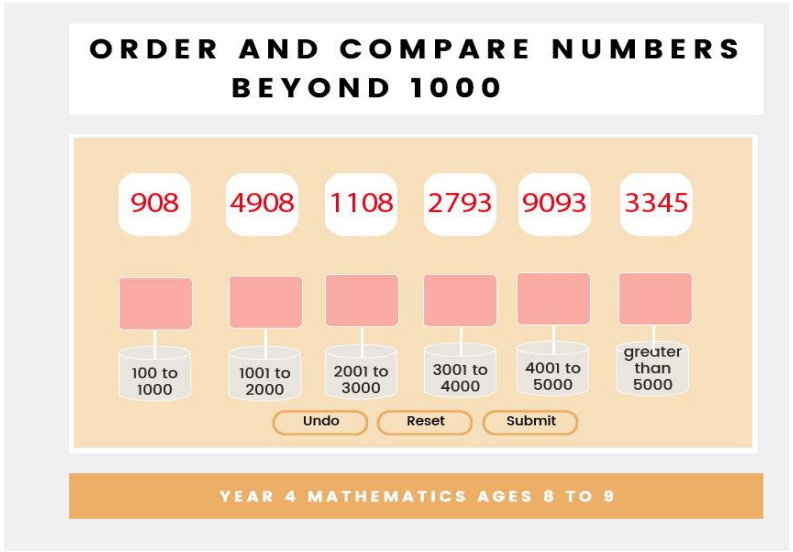
Negative numbers are numbers less than zero:

-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, ...

negative positive

The temperature during the day is 5°C. During the night, it drops by 8°C. What is the new temperature ?

Answer: 5 - 8 = ¯3 (say: minus 3 degrees)



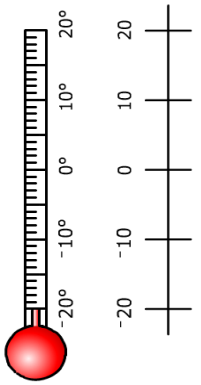
Place Value Chart

Millions			Thousands			Ones		
Hundred million	Ten million	One million	Hundred thousand	Ten thousand	One thousand	Hundreds	Tens	Ones
1	2	3,	4	5	6,	7	8	9

Standard Form: 123,456,789

Expanded Form: 100,000,000 + 20,000,000 + 3,000,000 + 400,000 + 50,000 + 6,000 + 700 + 80 + 9

Word Form one hundred twenty-three million, four hundred fifty-six thousand, seven hundred eighty-nine



Roman Numerals

1	I	1
2	II	1 + 1
3	III	1 + 1 + 1
4	IV	5 - 1
5	V	5
6	VI	5 + 1
7	VII	5 + 1 + 1
8	VIII	5 + 1 + 1 + 1
9	IX	10 - 1
10	X	10
20	XX	10 + 10
50	L	50
90	XC	100 - 10
100	C	100

Vocabulary

negative	positive
compare	value
tenth	hundredth
decimal equivalents	
nearest whole number	
one decimal place	

DECIMAL PLACE VALUE CHART

One Millions	Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones	Decimal point	Tenths	Hundredths	Thousandths
							.			

Decimal Places

To round 7.63 to 1 decimal place

7.63

3 is less than 5 (half way) so round down

7.63 rounded to 1 decimal place is 7.6

To round 16.79 to 1 decimal place

16.79

9 is greater than 5 (half way) so round up

16.79 rounded to 1 decimal place is 16.8

***Rounding** to the nearest 1000*: **Step one** identify the 1,000 digit. **Step two** identify if it rounds up or down (see the rounding coaster). **Step three** write the digits before the thousands (if there are any) **Step four** write the rounded thousand number.

12 → 10
114 → 110
57 → 60
1,334 → 1330
1,488 → 1490
97 → 100

7,891 → 7,900
15,753 → 15,800
99,961 → 100,000
3,350 → 3,300
450 → 500

8,800 → 9,000
1,015 → 1,000
12,450 → 12,000
333,878 → 334,000
400,400 → 400,000

How do you know this?

I think this because …
The strategy I used was …

I agree with the answer because …
I disagree with the answer because …

Year 6 – Place Value

One Million = 1, 000, 000 (six zeros – or six digits after the million digit)

Negative Numbers

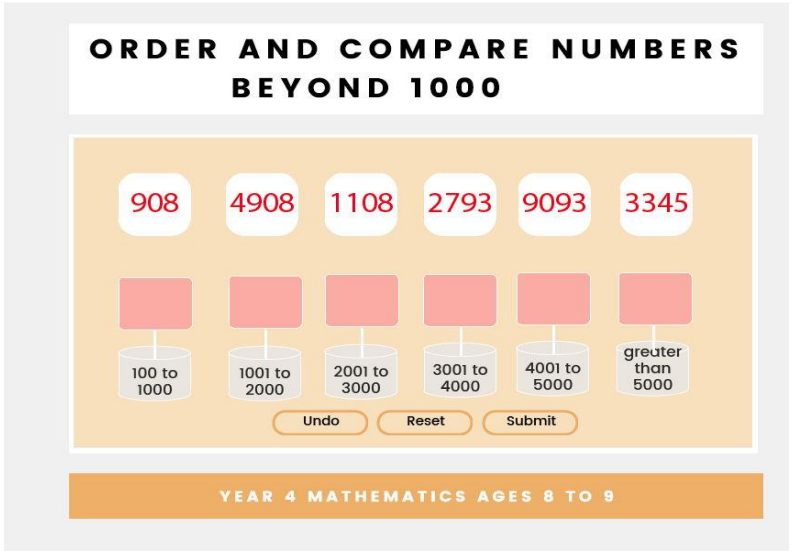
Negative numbers are numbers less than zero:

-5, -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, ...

negative positive

The temperature during the day is 5°C. During the night, it drops by 8°C. What is the new temperature ?

Answer: 5 - 8 = ¯3 (say: minus 3 degrees)



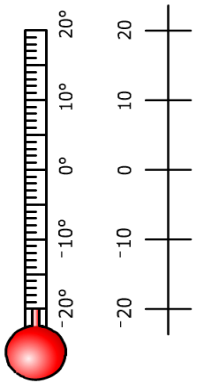
Place Value Chart

Millions			Thousands			Ones		
Hundred million	Ten million	One million	Hundred thousand	Ten thousand	One thousand	Hundreds	Tens	Ones
1	2	3,	4	5	6,	7	8	9

Standard Form: 123,456,789

Expanded Form: 100,000,000 + 20,000,000 + 3,000,000 + 400,000 + 50,000 + 6,000 + 700 + 80 + 9

Word Form one hundred twenty-three million, four hundred fifty-six thousand, seven hundred eighty-nine



Roman Numerals

1	I	1
2	II	1 + 1
3	III	1 + 1 + 1
4	IV	5 - 1
5	V	5
6	VI	5 + 1
7	VII	5 + 1 + 1
8	VIII	5 + 1 + 1 + 1
9	IX	10 - 1
10	X	10
20	XX	10 + 10
50	L	50
90	XC	100 - 10
100	C	100

Vocabulary

negative	positive
compare	value
tenth	hundredth
decimal equivalents	
nearest whole number	
one decimal place	

DECIMAL PLACE VALUE CHART

One Millions	Hundred Thousands	Ten Thousands	One Thousands	Hundreds	Tens	Ones	Decimal point	Tenths	Hundredths	Thousandths
							.			

Decimal Places

To round 7.63 to 1 decimal place

7.63

3 is less than 5 (half way) so round down

7.63 rounded to 1 decimal place is 7.6

To round 16.79 to 1 decimal place

16.79

9 is greater than 5 (half way) so round up

16.79 rounded to 1 decimal place is 16.8

***Rounding** to the nearest 1000*: **Step one** identify the 1,000 digit. **Step two** identify if it rounds up or down (see the rounding coaster). **Step three** write the digits before the thousands (if there are any) **Step four** write the rounded thousand number.

12 → 10
114 → 110
57 → 60
1,334 → 1330
1,488 → 1490
97 → 100

7,891 → 7,900
15,753 → 15,800
99,961 → 100,000
3,350 → 3,300
450 → 500

8,800 → 9,000
1,015 → 1,000
12,450 → 12,000
333,878 → 334,000
400,400 → 400,000

How do you know this?

I think this because …
The strategy I used was …

I agree with the answer because …
I disagree with the answer because …

Recommended Websites:

Teaching:

https://masterthecurriculum.co.uk/

https://mathsticks.com/my/

https://www.mathsisfun.com/place-value.html

https://reasoningmathshub.co.uk/

https://garyhall.org.uk/category/maths.html

Home Use:

https://www.topmarks.co.uk/maths-games/hit-the-button