Jeavons Wood
Primary School

Year 5

Key Mathematical Concepts and representations

Number and Place Value

Year 5

Tenths and Hundredths

Vocabulary:

Ones Tens Tenths Hundredths Place Value Counters Pence Coin Tens Frame Multiple Previous Next Gattegno Deines One-tenth the size Ten-times the size Centimetres Metres

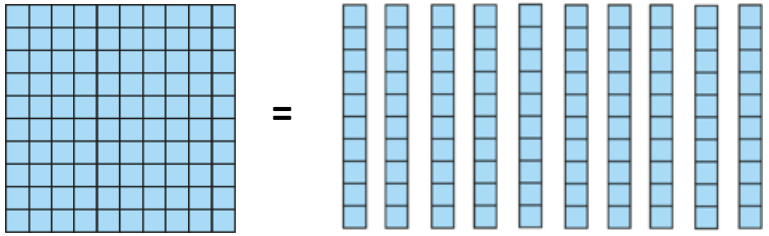
1

Ten tenths are equal to one (whole).

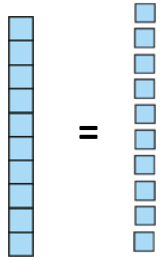
0.1

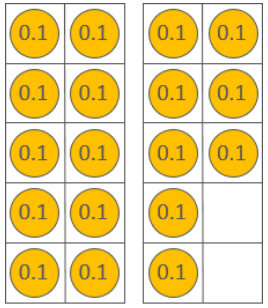
Ten hundredths are equal to one tenth.

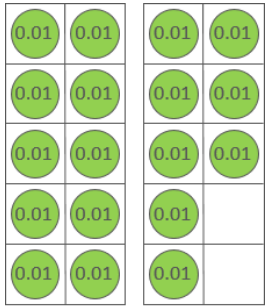
One (whole) is equal to ten tenths.



One tenth is equal to ten hundredths.







Grouping and Exchanging Models

Recognise the number of tenths and hundredths

18 tenths are equivalent to 1.8

18 hundredths are equivalent to 0.18

Dual count in tenths and hundredths

Eight tenths, nine tenths, ten tenths, eleven tenths…

0.8, 0.9, 1.0, 1.1

Eight hundredths, nine hundredths, ten hundredths, eleven hundredths…

0.08, 0.09, 0.10, 0.11

Number and Place Value

Year 5

Tenths and Hundredths (2)

Vocabulary:

Ones Tens Tenths Hundredths Place Value Counters Pence Coin Tens Frame Multiple Previous Next Gattegno Deines One-tenth the size Ten-times the size Centimetres Metres

0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2
2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3
3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4
4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5
5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6
6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7
7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8
8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9
9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10

0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1
0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.2
0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.3
0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.4
0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.5
0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.6
0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.7
0.61	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.8
0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.9
0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1

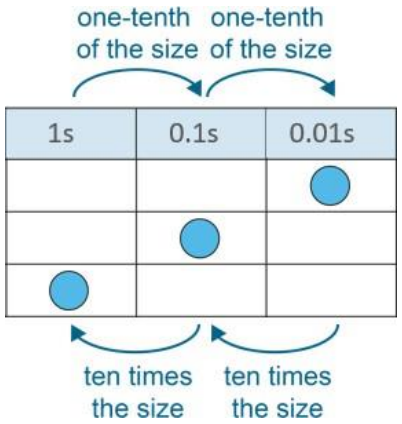
Count in multiples of tenths and hundredths.

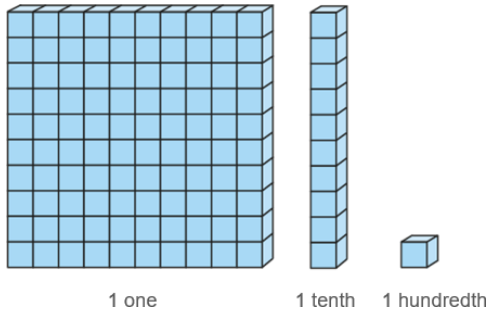
Eight tenths, nine tenths, ten tenths, eleven tenths…

0.8, 0.9, 1.0, 1.1

Eight hundredths, nine hundredths, ten hundredths, eleven hundredths…

0.08, 0.09, 0.10, 0.11





Scaling Models

Consider how a number increases/decreases in size using scaling models.

1 is ten times the size of 0.1.

0.1 is one-tenth the size of 1.

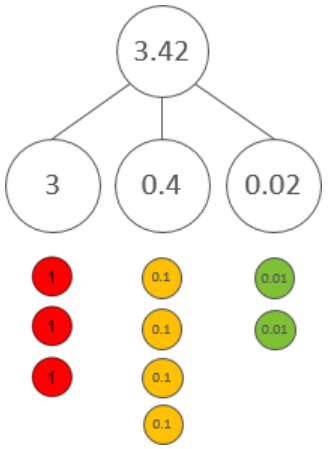
Number and Place Value

Year 5

Place Value in decimal fractions

Vocabulary:

Ones Tens Tenths Hundredths Represents Digit Place Value Counters Gattegno Partition Combine Equation Addend Sum Minuend Subtrahend Difference



3 + 0.4 + 0.02 = 3.42

Form decimal fractions using place value counters and the part-part-whole model.

The 2 represents 2 hundredths

The 4 represents 4 tenths

The 3 represents 3 ones.

Write as an additive equation.

10s	1s	0.1s	0.01s
5	3	4	2

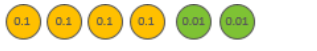
Represent on a Place Value Chart and describe each value.

The digit in the tens place is 5. It has a value of 50.

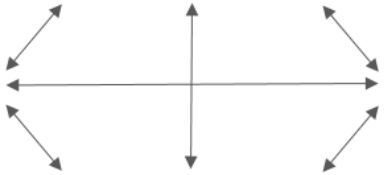
The digit in the ones place is 3. It has a value of 3.

The digit in the tenths place is 4. It has a value of 0.4.

The digit in the hundredths place is 2. It has a value of 0.02.



0.42



4 tenths and 2 hundredths

1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
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
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

Make connections between different representations of decimal fractions with the Gattegno Chart.

Skip count in one-hundredths recognising the number of hundredths in a 2-digit decimal fraction.

Number and Place Value

Year 5

Place Value in decimal fractions

Vocabulary:

Ones Tens Tenths Hundredths Represents Digit Place Value Counters Gattegno Partition Combine Equation Addend Sum Minuend Subtrahend Difference

53.42

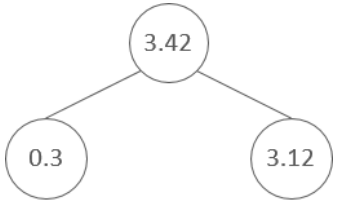
1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

0.02 + 0.4 + 3 + 50 = 53.42

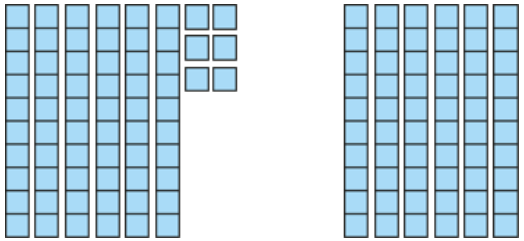
72.49 = 0.09 + 2 + _____ + _____

Form 4-digit numbers including decimals using a Gattegno chart.

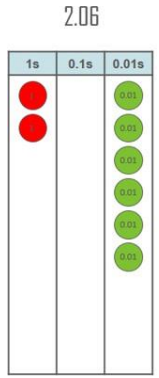
Identify missing parts of an equation.

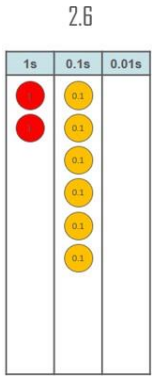


Explore non-standard partitioning using part-part-whole models and place value counters.



Compare decimal fractions using deines, place value counters and a place value chart.





Number and Place Value

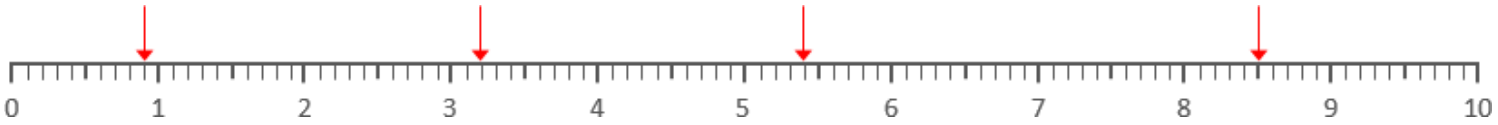
Year 5

Decimal Fractions in the Linear Number System

Vocabulary:

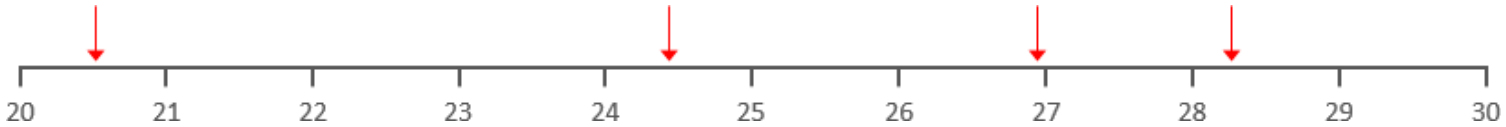
Ones Tens Hundreds Thousands Place Value Number line Halfway
Multiples of 100/1000 Previous Next Between Round Greater than
Less than Estimate

Recognise the intervals found between on each number line.



Recognise the value of a position on a number line split into tenths.

The arrow is pointing to 5.4 because it is 4 one-tenth intervals after 5 and because it is 1 one-tenth interval before the halfway point between 5 and 6.



Estimate the value of an arrow on a blank number line split into ones.

Number and Place Value

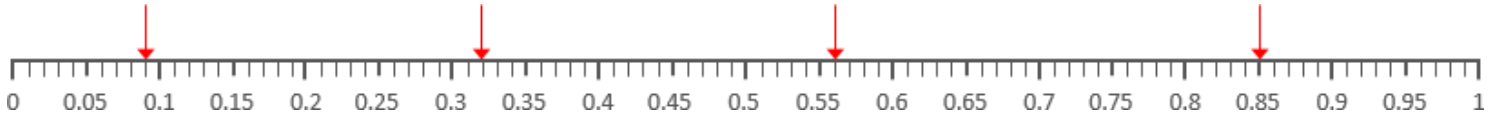
Year 5

Decimal Fractions in the Linear Number System (1)

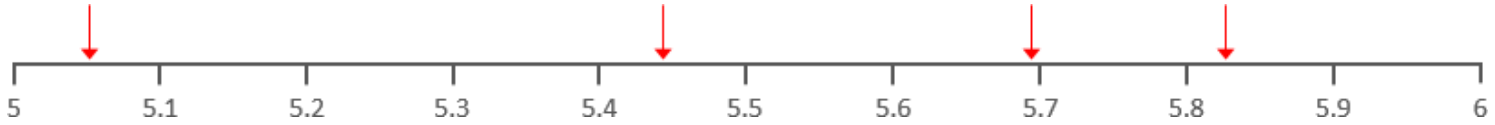
Vocabulary:

Ones Tens Hundredths Tenths Place Value Number line Halfway Previous Next Multiple of… Between Round Greater than

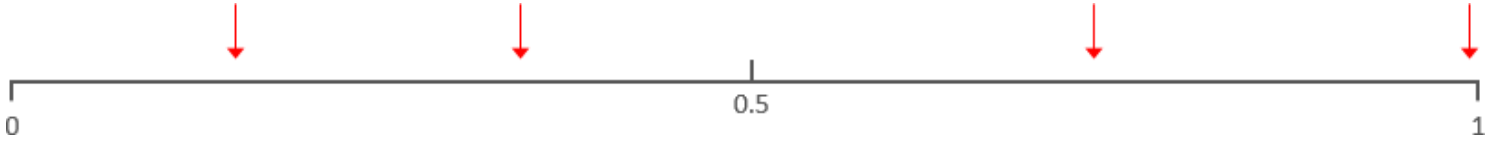
Less than Grams Millilitres Litres Grams Kilograms Metres Centimetres Estimate Round



Recognise the value of a position on a number line split into hundredths.

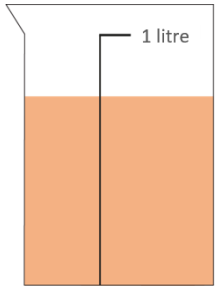


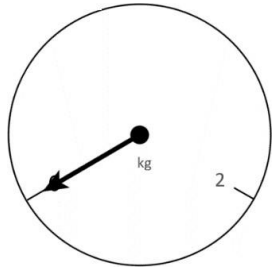
Estimate the value of an arrow on a blank number line split into tenths.

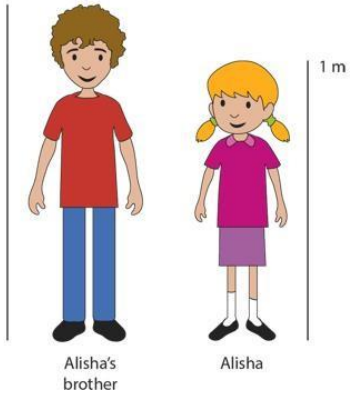


Estimate the value of an arrow on a blank number line.

Estimate the position of a 3 digit number number lines that contextualised.







Estimate a value when given one known value.

Number and Place Value

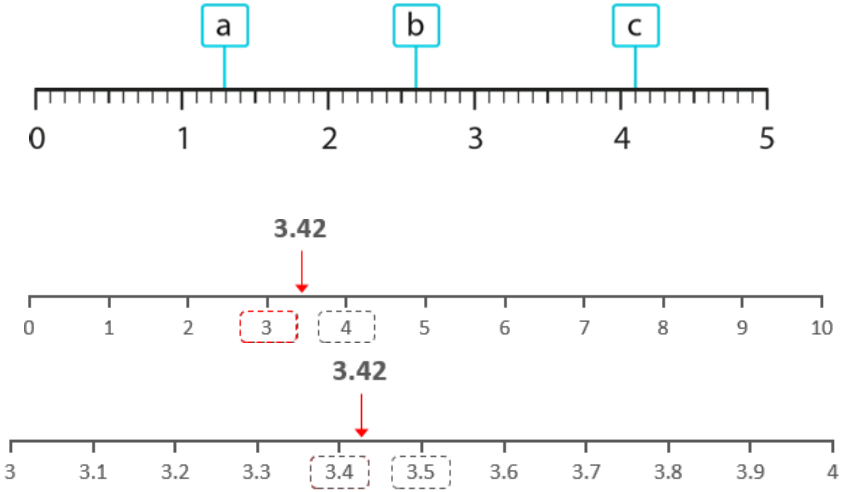
Year 5

Decimal Fractions in the Linear Number System (2)

Vocabulary:

Ones Tens Hundredths Tenths Place Value Number line Halfway
Previous Next Multiple of… Between Round Greater than

Less than Grams Millilitres Litres Grams Kilograms Metres
Centimetres Estimate Round



Identify the previous and next multiple of 1 that a value sits between.

Round to the nearest 1 and nearest tenth.

The previous multiple of 1 is ___.

The next multiple of 1 is ___.

a is greater than ____and less than ____.

a is nearest to ____.

Previous multiple of 1		Next multiple of 1
3	3.42	4

Previous multiple of 0.1		Next multiple of 0.1
3.4	3.42	3.5

57.62

57.6 nearest 0.1

58 nearest 1

Generalise which digit you need to look at in order to round to the nearest 1 and nearest tenth.

Number and Place Value

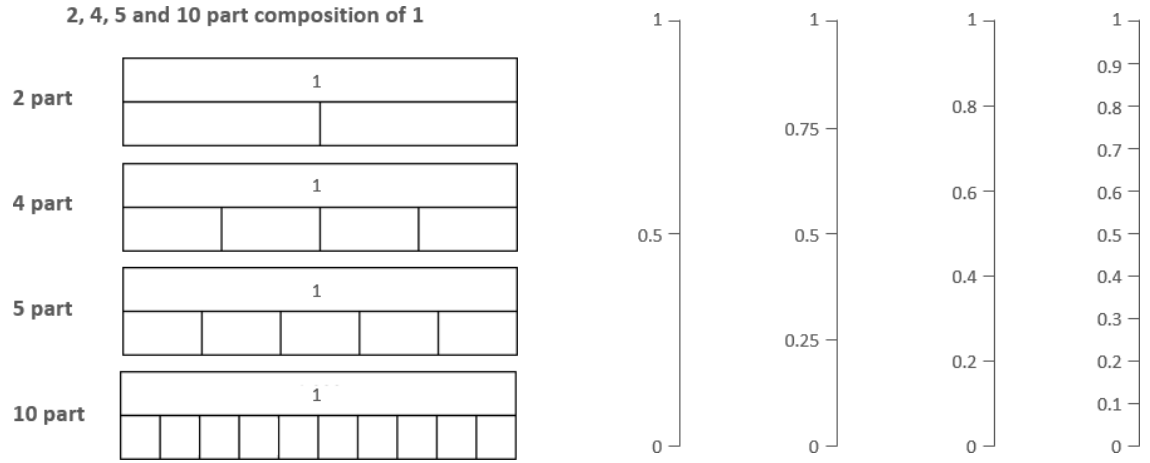
Year 5

Reading Scales with 2, 4, 5, or 10 intervals

Vocabulary:

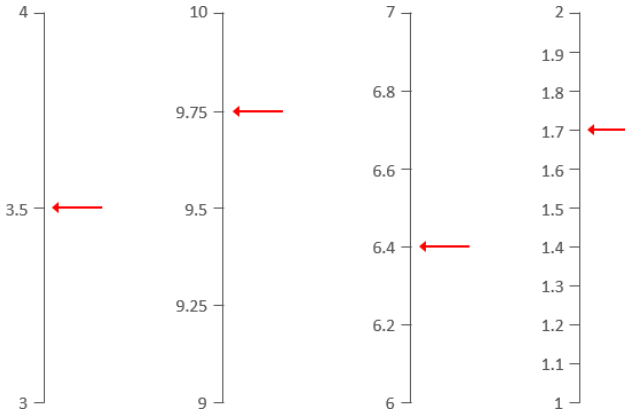
Intervals Scales Divisions Equal Parts Whole Value

Bar model Plus Minus Multiply Divide Grams Millilitres Litres Grams Kilograms Metres Centimetres Estimate

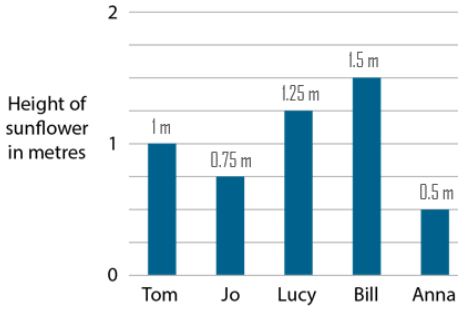


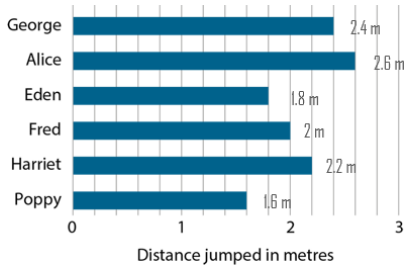
Identify intervals and count forwards/backwards using these intervals with both bar models and vertical number lines.

Use the number of intervals given to find values in other contexts (e.g. weighing scales/bar graphs)



Use the number of intervals given to find the numbers that the arrows are pointing to.





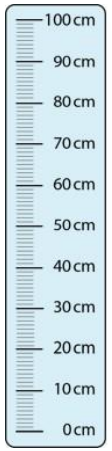
Number and Place Value

Year 5

Convert between Units of Measure

Vocabulary:

Intervals Scales Divisions Equal Parts Whole Value
Bar model Plus Minus Multiply Divide Grams Millilitres Litres
Grams Kilograms Metres Centimetres Estimate

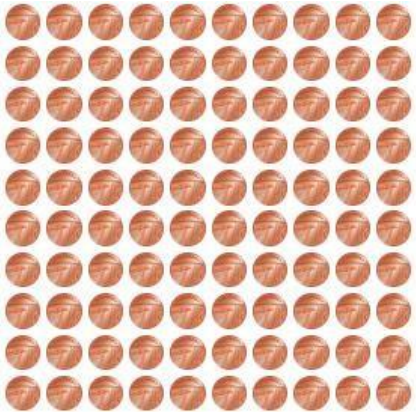


100 cm 1 metre

Recognise that 10 lots of 10cm is equivalent to 1m.

Practice counting forwards and backwards along the scale.

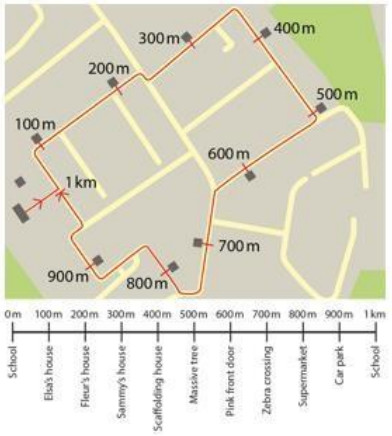
1 metre is equivalent to 100 centimetres.



Recognise that 100p is equivalent to £1.

Practice counting forwards and backwards along the scale.

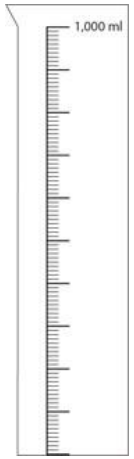
1 pound is equivalent to 100 pence.



Recognise that 1000m is equivalent to 1km.

Practice counting forwards and backwards along the scale.

1 kilometre is equivalent to 1000 metres.



Recognise that 1000ml is equivalent to 1L.

Practice counting forwards and backwards along the scale.

1 litre is equivalent to 1000 millilitres.

Number and Place Value

Year 5

Convert between Units of Measure

Vocabulary:

Conversions Pounds Pence Grams Millilitres Litres Grams Kilograms Metres Centimetres Decimal Fraction Whole Number Multiple Divide

1km = 1,000m

1 litre = 1,000ml

1m = 100cm

1kg = 1,000g

1cm = 10mm

£1 = 100p

Make connections from the conversions to larger numbers.

If 1km = 1000m, then 3km = _____.

These conversions must be memorised. Practice recall of these conversions over time.

Distance in km expressed as a fraction	Distance in km expressed as a decimal fraction	Distance in metres
$\frac{1}{5}$km	0.2km	200m
$\frac{1}{4}$km	0.25km	250m
$\frac{1}{2}$km	0.5km	500m
$\frac{3}{4}$km	0.75m	750m
$\frac{1}{10}$km	0.1km	100m
all other multiples of $\frac{1}{10}$km, for example, $\frac{7}{10}$km	0.7km	700m

Recognise how units can be converted between fractions, decimals and whole numbers.

$\frac{1}{5}$ = 0.2 so $\frac{1}{5}$ km = 0.2km

1km = 1,000m

so $\frac{1}{5}$ km = 1,000 ÷ 5 = 200m

1m	100cm
$\frac{3}{4}$m	

Use known conversion facts to solve conversions from a fraction.

1m = 100 cm

$\frac{3}{4}$ *m = 75 cm*

Multiplication and Division

Year 5

Multiplying and Dividing by 10 and 100 (1)

Vocabulary:

Multiply Divide Unitise Ten/Hundred times Bigger Smaller One-tenth the size One-hundredth the size Gattegno chart Factor Product Multiple Groups of Inverse Ones Tens Hundreds Tenths Hundredths

8 ÷ 10 =

0.8 ÷ 10 =

1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
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
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

÷ 10
÷ 10
one-tenth the size

0.08 x 10 =

0.8 x 10 =

1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
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
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

× 10
× 10
ten times the size

We can multiply and divide a number by 10.

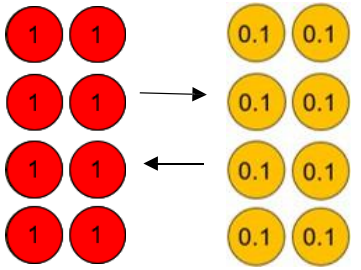
8, made one-tenth the size is 0.8.

8 divided by 10 is 0.8.

First we had 8 ones, now we have 8 tenths.

8 ÷ 10 = 0.8

one-tenth of the size



0.8 x 10 = 8

ten times the size

We can multiply and divide a number by 100.
Multiplying by 100 is the same as multiplying/dividing by 10 twice.

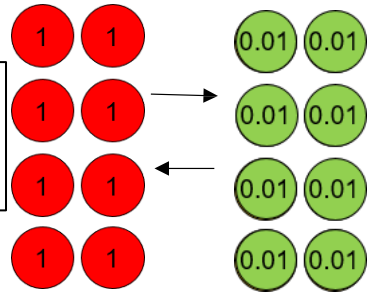
8, made 100 times smaller is 0.08.

8 divided by 100 is 0.08.

First we had 8 ones, now we have 8 hundredths

8 ÷ 100 = 0.08

one-hundredth of the size



0.08 x 100 = 8

one hundred times the size

Multiplication and Division

Year 5

Multiplying and Dividing by 10 and 100 (2)

Vocabulary:

Multiply Divide Unitise Ten/Hundred times Bigger Smaller One-tenth the size One-hundredth the size Gattegno chart Factor Product Multiple Groups of Inverse Ones Tens Hundreds Tenths Hundredths

3.6 × 10 = 36

36 ÷ 10 = 3.6

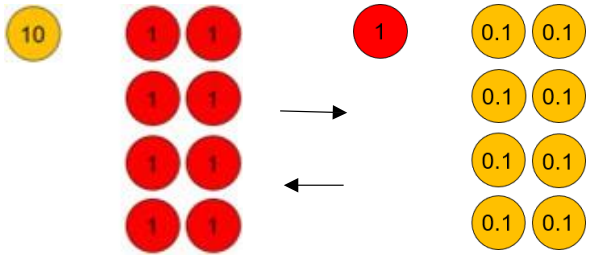
1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

18 ÷ 10 = 1.8

one-tenth of the size

1.8 is one-tenth the size of 18

18 divided by 10 is 1.8.



1.8 × 10 = 18

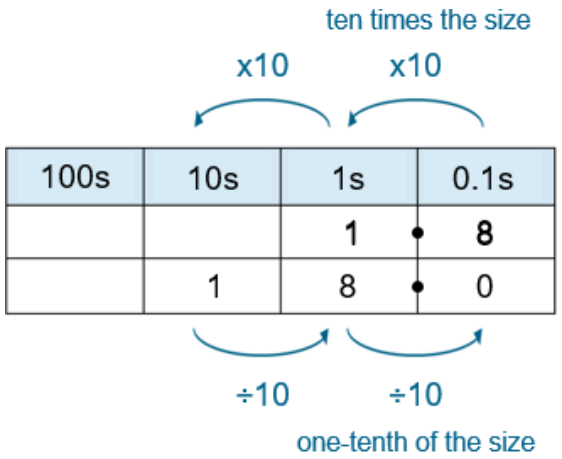
ten times the size

___divided by 10/100 is equal to___.

___is one-tenth/hundredth the size of ___.

___multiplied by 10/100 is equal to___.

___is 10/100 times the size of ___.



We can multiply and divide numbers with digits greater than 0 by 10 or 100.

Generalisation

To multiply by 10, move each digit one place to the left.

To multiply by 100, move each digit two places to the left.

To divide by 10, move each digit one place to the right.

Multiplication and Division

Year 5

Multiplying and Dividing by 10 and 100 (3).

Vocabulary:

Multiply Divide Unitise Ten/Hundred times Bigger Smaller One-tenth the size One-hundredth the size Gattegno chart Factor Product Multiple Groups of Inverse Ones Tens Hundreds Tenths Hundredths

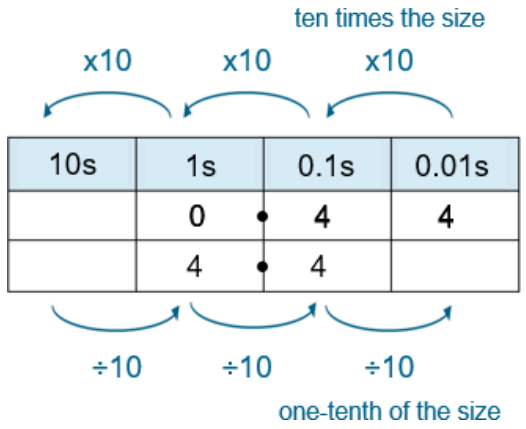
0.27 × 10 = 2.7

2.7 ÷ 10 = 0.27

1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
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
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

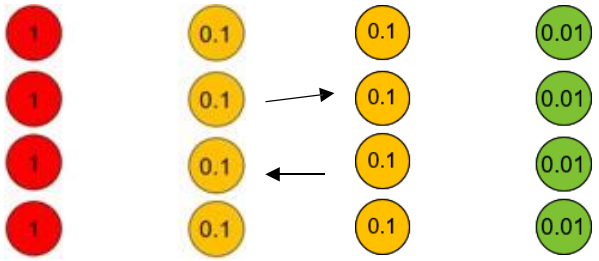
0.27 is one-tenth the size of 2.7

2.7 divided by 10 is 0.27.



4.4 ÷ 10 = 0.44

one-tenth of the size



0.44 × 10 = 4.4

ten times the size

___divided by 10/100 is equal to___.

___is one-tenth/hundredth the size of ___.

___multiplied by 10/100 is equal to___.

___is 10/100 times the size of ___.

We can multiply and divide numbers with digits greater than 0 by 10 or 100.

Generalisation

To multiply by 10, move each digit one place to the left.

To multiply by 100, move each digit two places to the left.

To divide by 10, move each digit one place to the right.

Multiplication and Division

Year 5

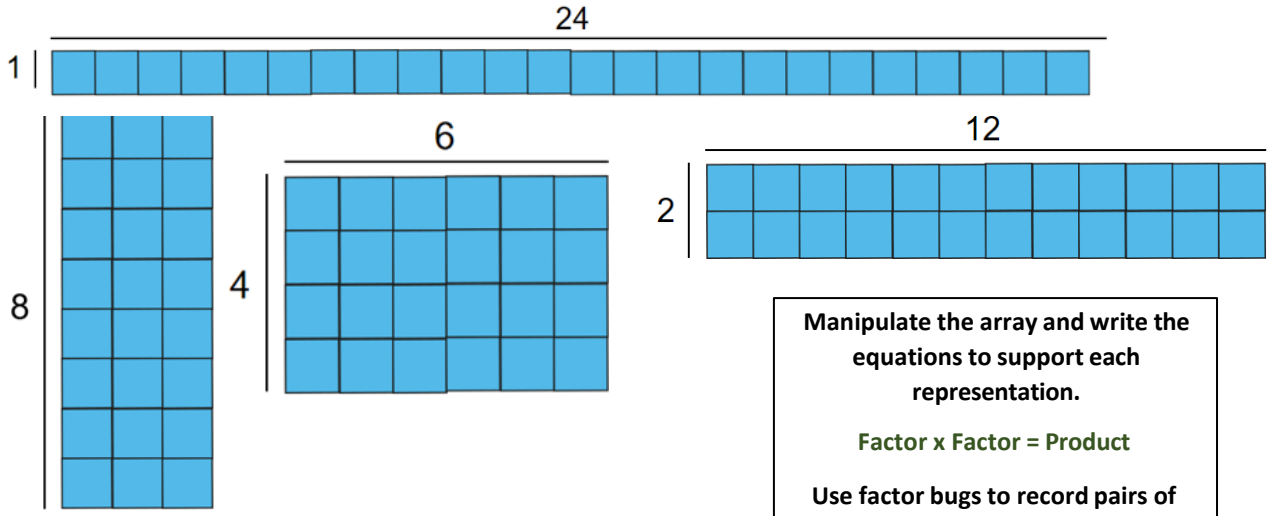
Find Factors and Multiples

Vocabulary:

Factor Multiple Composite Square Prime Common Factor

Prime Factor Factor Bug Array Positive Integer Working Systematically

Factor x Factor = Product Dividend ÷ Divisor = Quotient



8 x 3 = 24

4 x 6 = 24

2 x 12 = 24

1 x 24 = 24

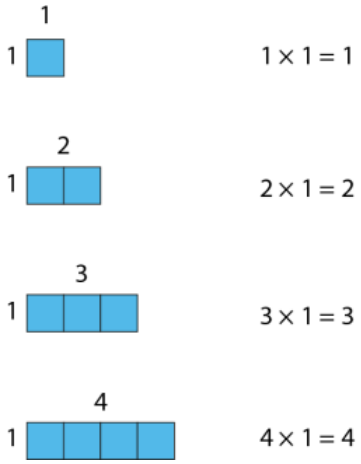
There are ____tiles. There are ____rows and ____columns. So ____and ____are factors of ____.

Generalise: Numbers that have more than two factors are composite numbers.

Manipulate the array and write the equations to support each representation.

Factor x Factor = Product

Use factor bugs to record pairs of factors.



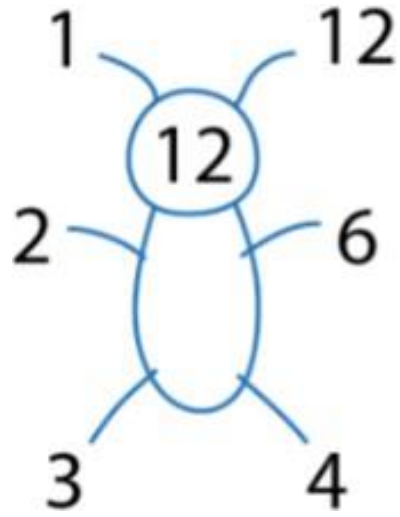
Generalise:

When one is a factor, the product is equal to the other factor.

All positive integers have a factor of 1.

Every positive integer is a factor of itself.

The smallest factor of a positive integer is always 1. The largest factor of a positive integer is always itself.



Multiplication and Division

Year 5

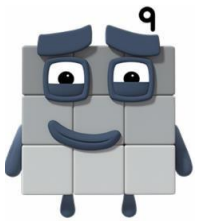
Find Factors and Multiples

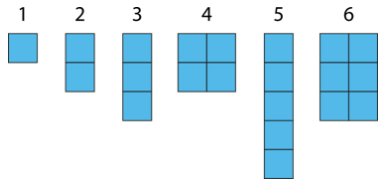
Vocabulary:

Factor Multiple Composite Square Prime Common Factor Prime Factor

Factor Bug Array Positive Integer Working Systematically

Factor x Factor = Product Dividend ÷ Divisor = Quotient





Extend this to square numbers, and prime numbers recognising the number of factors.

×	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

Make connections with factors and times tables. Make connections with factors of factors

____is a factor of ____because it is in the ____times table.

Nine is a factor of all of these numbers.

Three is a factor of nine which means it is also a factor of all of these numbers.

Is 9 a factor of 54?

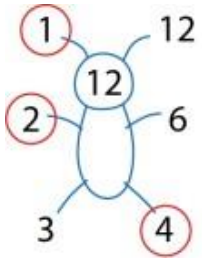
54 ÷ 9 = 6

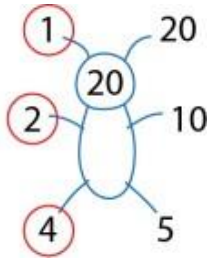
9 and 6 are factors of 54.

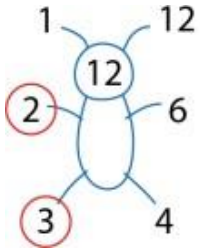
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

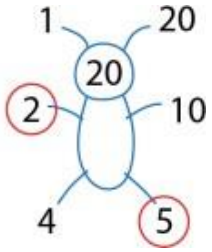
Use factor bugs to find

common factors and prime factors.









Multiplication and Division

Year 5

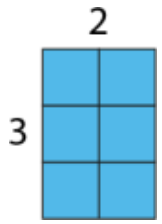
Find Factors and Multiples

Vocabulary:

Factor Multiple Composite Square Prime Common Factor Prime Factor

Factor Bug Array Positive Integer Working Systematically

Factor x Factor = Product Dividend ÷ Divisor = Quotient



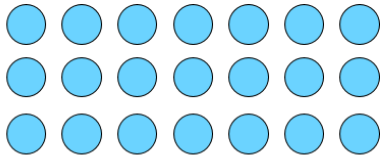
Introduce Multiples

___is a factor of ___because ___x ____= ____.

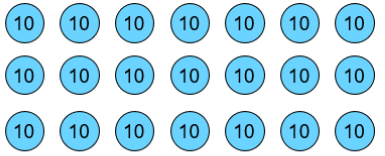
___ is a multiple of ___because ___x ___= ____

___is a factor of ___because ___÷ ____= ____.

___ is a multiple of ___because ___÷ ___= ____



7 × 3 = 21



7 × 30 = 210

70 × 3 = 210

10 x 21 = 210

Make statements about factors and multiples whilst increasing the amount of each counter in the array.

___represents the number of counters in each row.

___represents the total value of the counters in each column.

____represents the total value of the counters.

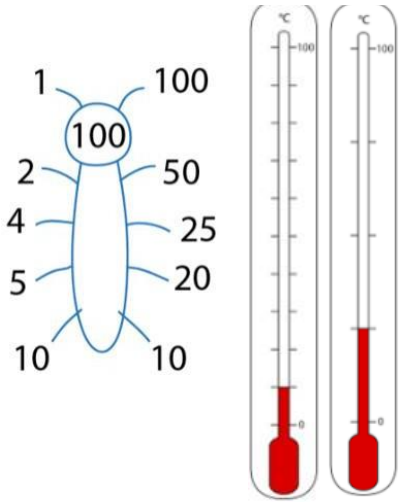
3, 7, 10, 21 and 70 are factors of 210.

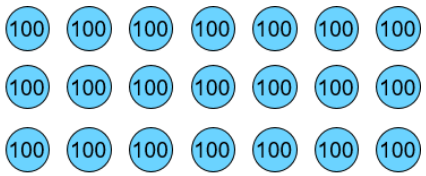
210 is a multiple of 3, 7, 10, 21 and 70.

Identify Common Multiples using a 100 square.

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

Factors of 100 can be applied to contexts





7 × 300 = 2,100

700 × 3 = 2,100

100 x 21 = 2,100

Multiplication and Division

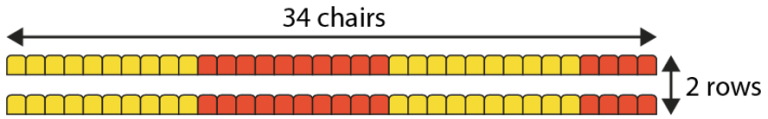
Year 5

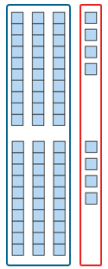
Multiply using a Formal Written Method (1)

Vocabulary:

Ones Tens Hundreds Thousands Represents Partition Recombine
Multiply Unitising Partial Product Aligned Calculation Expanded layout
Compact layout Equation Regroup Algorithm

Factor x Factor = Product

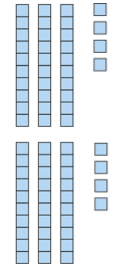




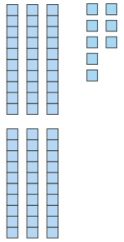
34 = 30 + 4
34 × 2 = 30 × 2 + 4 × 2

Use dienes to represent context as repeated addition and move to multiplication.

Move between representations of dienes and expanded written multiplication.

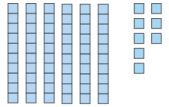


	10s	1s
	3	4
×		2



	10s	1s
	3	4
×		2
		8

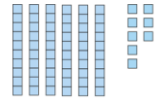
2 × 4 ones = 8 ones



	10s	1s
	3	4
×		2
		8
	6	0

2 × 4 ones = 8 ones
2 × 3 tens = 6 tens

	10s	1s
	3	4
×		2
	6	8

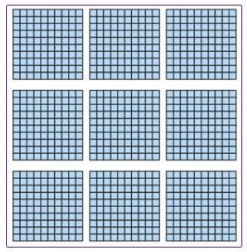


	10s	1s
	3	4
×		2
		8
	6	0
	6	8

2 × 4 ones = 8 ones
2 × 3 tens = 6 tens

Move between representations of expanded layout and compact layout.

321 × 3 = 963



	100s	10s	1s
	3	2	1
×			3
			3
		6	0
	9	0	0
	9	6	3

3 × 1 ones = 3 ones
3 × 2 tens = 6 tens
3 × 3 hundreds = 9 hundreds

	3	2	1
×			3
	9	6	3

Represent 3 digit by 1 digit multiplication without exchanges using dienes, moving from expanded layout to compact layout.

Multiplication and Division

Year 5

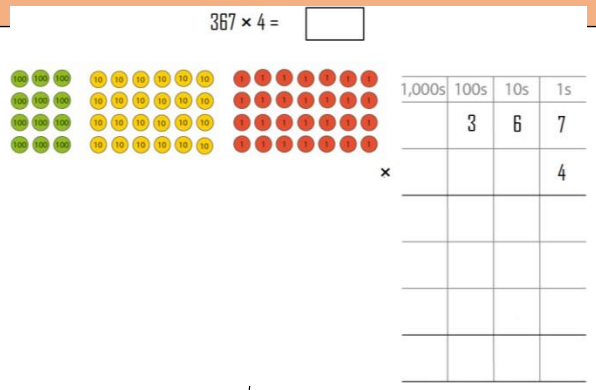
Multiply using a Formal Written Method (2)

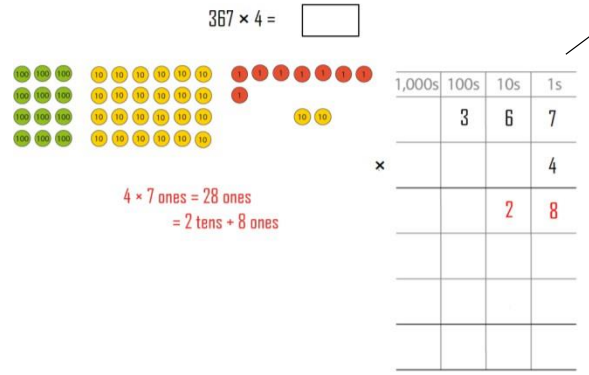
Vocabulary:

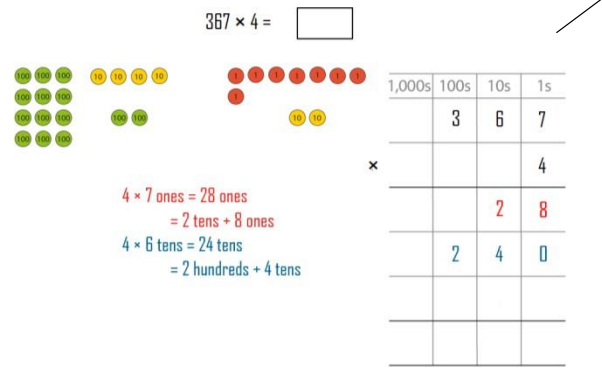
Ones Tens Hundreds Thousands Represents Partition
Recombine Multiply Unitising Partial Product Aligned
Calculation Expanded layout
Compact layout Equation Regroup Algorithm

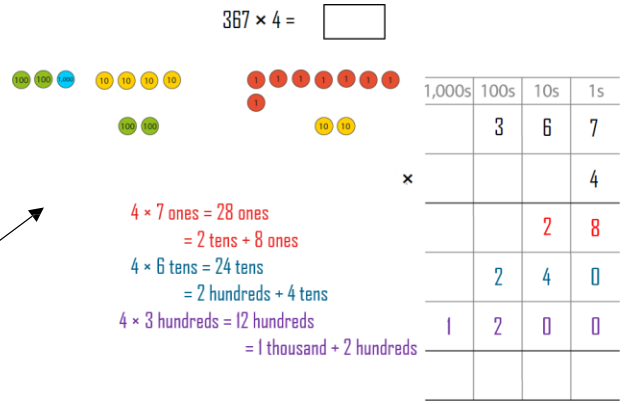
Factor x Factor = Product

Represent 3 digit by 1 digit multiplication with exchanges using place value counters, moving from expanded layout to compact layout.









Move from expanded layout to compact layout.

367 × 4 = 1,468

$$\begin{array}{r} 3\ 6\ 7 \\ \times\quad\quad 4 \\ \hline 1\ 4\ 6\ 8 \\ \hline 2\ 2 \end{array}$$

If there are 10 or more ones, we must regroup ones into tens and ones.

If there are 10 or more tens, we must regroup into hundreds and tens.

If there are 10 or more hundreds, we must regroup into thousands and hundreds.

Multiplication and Division

Year 5

Divide using a Formal Written Method (1)

Vocabulary:

Partitive (sharing) Quotitive (grouping) Ones Tens Hundreds Thousands Represents Divide Unitising Dividend Divisor Quotient Partial Quotient Aligned Calculation Equation Exchange Algorithm 'Sharees' Divisible Remainder Short Division

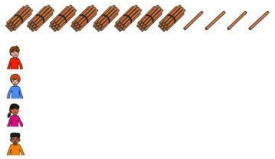
84 ÷ 4 = 21	$4\overline{)\begin{array}{cc}2&1\\8&4\end{array}}$
dividend ÷ divisor = quotient	$\text{divisor}\overline{)\text{dividend}}$ quotient

Use sticks to represent partitive (sharing) context where the dividend is divisible (to give a whole number). Skip count in multiples of the divisor.

84 sticks shared equally between 4 children. How many sticks each?

84 ÷ 4 = ☐

Step 1 – write the divisor and dividend:



10s 1s

$4\overline{)\begin{array}{cc}8&4\end{array}}$

Step 2 – share the 10s:

10s 1s

$4\overline{)\begin{array}{cc}2&\\8&4\end{array}}$

8 tens ÷ 4 = 2 tens

8 tens divided by 4 is equal to 2 tens.

Remove a group of 4 each time before sharing.

One four is one each. That's four.

Two fours is two each. That's eight.

Eight divided between 4 is equal to two each.

Each child gets two sticks.

Step 3 – share the 1s:

10s 1s

$4\overline{)\begin{array}{cc}2&1\\8&4\end{array}}$

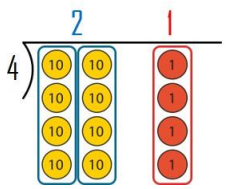
8 tens ÷ 4 = 2 tens

4 ones ÷ 4 = 1 one

Add the partial quotients to find the quotient.

2 tens + 1 one = 21

10s 1s



8 tens ÷ 4 = 2 tens

4 ones ÷ 4 = 1 one

Multiplication and Division

Year 5

Divide using a Formal Written Method (2)

Vocabulary:

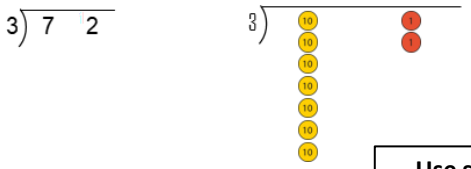
Partitive (sharing) Quotitive (grouping) Ones Tens Hundreds Thousands Represents Divide Unitising Dividend Divisor Quotient Partial Quotient Aligned Calculation Equation Exchange Algorithm 'Sharees' Divisible Remainder Short Division

84 ÷ 4 = 21	$4\overline{)84}$ 21
dividend ÷ divisor = quotient	divisor $\overline{)}$ dividend: quotient

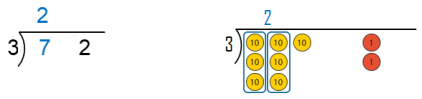
72 sticks shared equally between 3 children. How many sticks each?

72 ÷ 3 = □

Step 1 – write the divisor and the dividend:

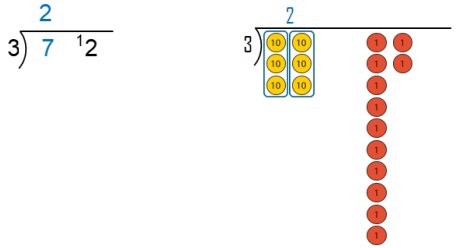


Step 2 – share the 10s:



7 tens ÷ 3 = 2 tens r 1 ten

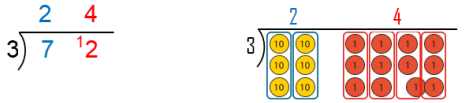
Step 3 – exchange:



7 tens ÷ 3 = 2 tens r 1 ten

72 ÷ 3 = 24

Step 4 – share the 1s:



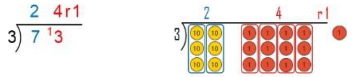
7 tens ÷ 3 = 2 tens r 1 ten

12 ones ÷ 3 = 4 ones

Use sticks and place value counters to represent partitive (sharing) context where the dividend is divisible (to give a whole number) though requires an exchange from the tens. Skip count in multiples of the divisor.

If dividing the tens gives a remainder of one or more ten, we must exchange the remaining tens for ones.

73 ÷ 3 = 24 r 1



7 tens ÷ 3 = 2 tens r 1 ten

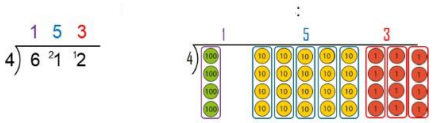
13 ones ÷ 3 = 4 ones r 1 one

Apply the same representations though this time include a remainder.

Then extend to division of 3 digits by one digit and where there can be no hundreds cannot be shared.

If dividing the hundreds gives a remainder of one or more hundred, we must exchange the remaining hundreds for tens.

612 ÷ 4 = 153



6 hundreds ÷ 4 = 1 hundred r 2 hundreds

2 hundreds = 20 tens

21 tens ÷ 4 = 5 tens r 1 ten

1 ten = 10 ones

12 ones ÷ 4 = 3 ones

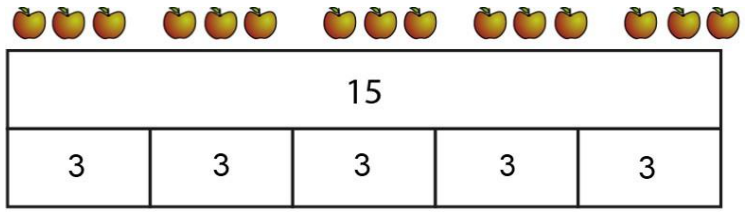
Fractions

Year 5

Find Non-Unit Fractions of Quantities.

Vocabulary:

Fraction Notation Divided Equal Numerator Denominator Whole Parts Fraction Bar (Vinculum) Half Third Quarter Fifth Sixth Seventh Eighth Ninth Tenth One-_____ Number line Part-Part-Whole Model Units Previous Next Estimate Intervals Convert Improper Fractions Mixed Numbers Add Subtract (Minus) Aggregation Augmentation Reduction Partitioning Difference



$\frac{1}{5}$ of 15 = 3

$\frac{2}{5}$ of 15 = 6

$\frac{3}{5}$ of 15 = 9

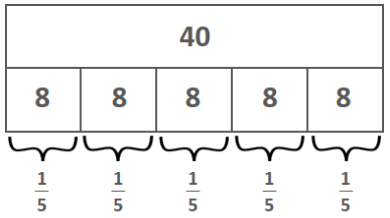
$\frac{4}{5}$ of 15 = 12

$\frac{5}{5}$ of 15 = 15

We can skip count in unit fractions to help us find the quantity of a non-unit fraction.

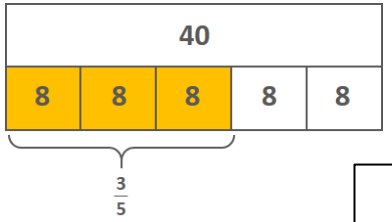
2 one-fifths of 15 is equal to 6,

3 one-fifths of 15 is equal to 9…



40 ÷ 5 = 8

so $\frac{1}{5}$ of 40 = 8



40 ÷ 5 = 8

so $\frac{1}{5}$ of 40 = 8

$\frac{3}{5}$ of 40 = 24

We can skip count in unit fractions to help us find the quantity of a non-unit fraction.

To find 3 one-fifths of 40, first find one-fifth of 40 by dividing by 5, and then multiply by 3.

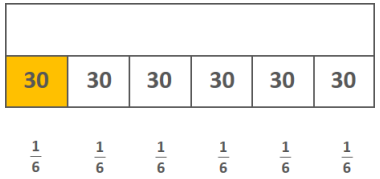
Generalisation:

Divide the whole by the denominator and then multiply quotient by the numerator.

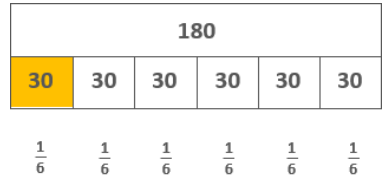
If the whole is unknown but we know the quantity of one part – we can find the size of the whole.

One-sixth of a number is equal to thirty.
6 one-sixths is equal to one whole.

To find the whole, multiply the value of 1 one-sixth by 6.



$\frac{1}{6}$ of a number is 30



$\frac{1}{6}$ of a number is 30

6 × 30 = 180

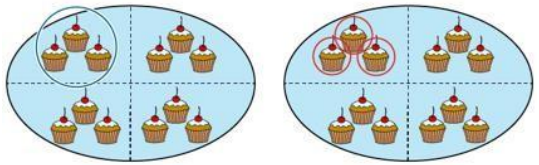
Fractions

Year 5

Find Equivalent Fractions

Vocabulary:

Fraction Notation Divided Equal Numerator Denominator Whole Parts Fraction Bar (Vinculum) Half Third Quarter Fifth Sixth Seventh Eighth Ninth Tenth One-_____ Number line Intervals Convert Portion Proportional Relationship Equivalent Vertical Horizontal



Quantities can be expressed by more than one fraction.

The whole is divided into 4 equal parts and 1 of those parts is circled.

The whole is divided into 12 equal parts and 3 of those parts are circled.

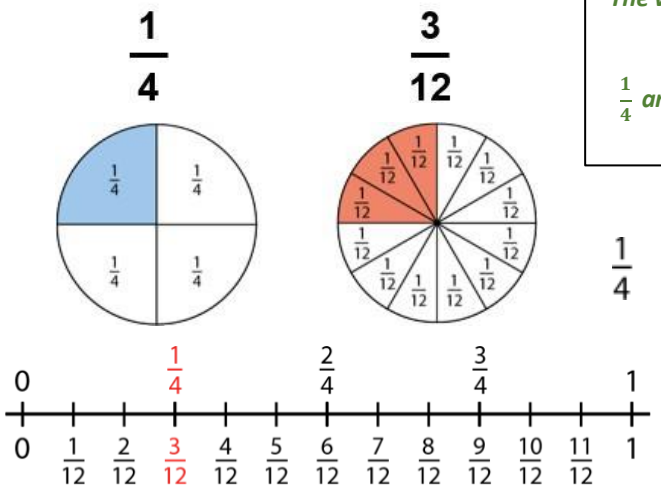
$\frac{1}{4}$ and $\frac{3}{12}$ are equivalent because 1 is the same portion of 4 as 3 is of 12.

Investigate the proportional relationship between the numerator and denominator in each individual fraction.

Investigate the proportional relationship between the numerators in both fractions and the denominators in both fractions.

The denominator is five times larger than the numerator. (Vertical relationship)

The numerator and denominator of the second fraction are both ___times greater than the first fraction. This means that the fractions are equivalent. (Horizontal relationship)

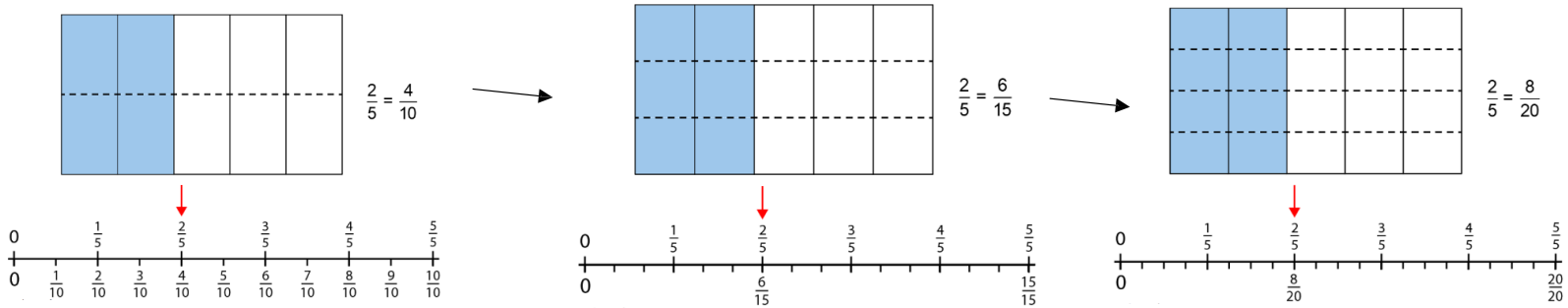


$\frac{1}{4} = \frac{3}{12}$

$\times 4 \left(\frac{1}{4} = \frac{3}{12} \right) \times 4$

$\frac{1}{4} \overset{\times 3}{=} \frac{3}{12}$ ($\times 3$ above, $\times 3$ below)

Continue to show how the same whole can be divided into different sized equal parts and how these can be seen as equivalent.



Fractions

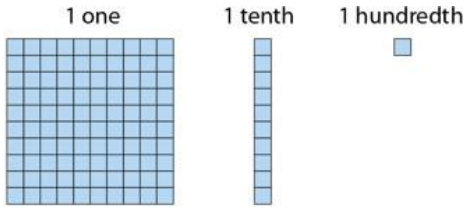
Year 5

Recall Decimal Equivalents for Common Fractions (1)

Vocabulary:

Fraction Notation Divided Equal Numerator Denominator Whole Parts Fraction Bar (Vinculum) Half Quarter Fifth Tenth One-_____ Number line Greater than Less than Multiple Common Partitions Previous Next Estimate Intervals Convert Decimal Fraction One Tenths Hundredths

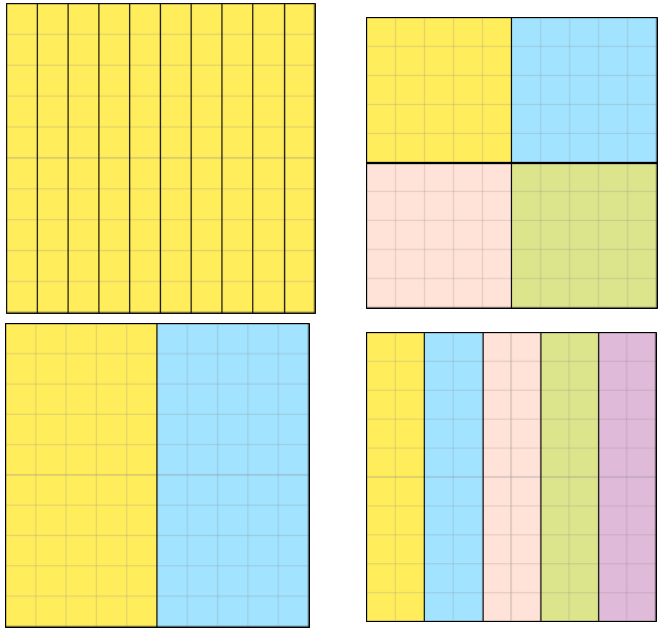
Use dienes to represent one whole and the corresponding size of one-tenth and one-hundredth.



Fraction notation	Decimal notation	Name
$\frac{1}{10}$	0.1	one-tenth
$\frac{1}{100}$	0.01	one-hundredth

We can use our knowledge of splitting 100 into common partitions and apply this to splitting a whole, made up of 100ths into common partitions.

I know ___and ___are equivalent because if the hundred grid is split into ___equal parts there would be ___hundredths in each part.

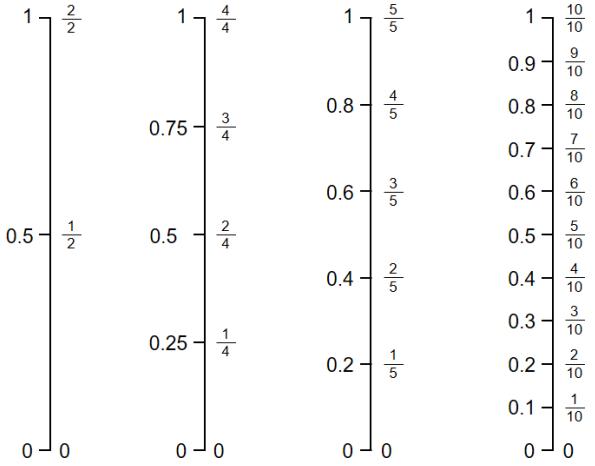


Count forward and backwards on a number line recognising the position of each decimal fraction.

0, 0.5, 1 1, 0.5, 0

Zero, one-half, two-halves.

Two-halves, one-half, zero



Unit fraction	Decimal fraction
$\frac{1}{2}$	0.5
$\frac{1}{4}$	0.25
$\frac{1}{5}$	0.2
$\frac{1}{10}$	0.1

Fractions

Year 5

Recall Decimal Equivalents for Common Fractions (2)

Vocabulary:

Fraction Notation Divided Equal Numerator Denominator Whole Parts
Fraction Bar (Vinculum) Half Quarter Fifth Tenth One-_____ Number line
Greater than Less than Multiple Common Partitions Previous Next
Estimate Intervals Convert Decimal Fraction One Tenths Hundredths

$0.6 < \frac{4}{5}$

$0.6 = \frac{3}{5}$

$\frac{3}{5} < \frac{4}{5}$

Use understanding of fractional equivalents in order to reason about the comparative size of decimals and fractions.

If I know 0.6 = $\frac{3}{5}$

and I know $\frac{3}{5} < \frac{4}{5}$,

then I know 0.6 < $\frac{4}{5}$.

Recognise the positioning of a decimal fraction and their equivalent fractional notation between numbers greater than 1.