St Walburga's Catholic Primary School
Year 4 – Fluency and Reasoning

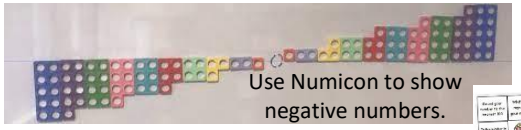
Number, Place Value and Rounding

Key vocab: thousands, four-digit, negative number, one thousand more, one thousand less, decimal, decimal place, rounding, place holder, nearest ten, nearest hundred, nearest thousand, one place, whole number, integer, tenths, hundredths

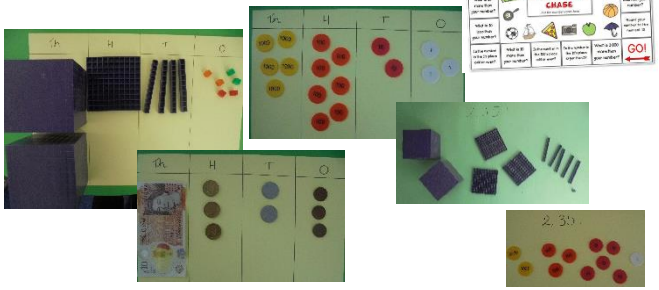
NC Objectives:

- Count backwards through zero to include negative numbers.
- Identify, represent, and estimate numbers using different representations.
- Recognise the place value of each digit in a 4-digit number.
- Solve number problems and practical problems that involve place value.
- Read Roman Numerals to 100 (I to C) and understand that over time, the numeral system changed to include the concept of zero and place value.

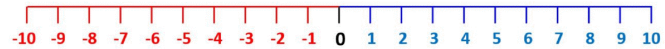
Concrete



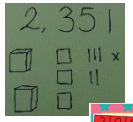
Use Numicon to show negative numbers.



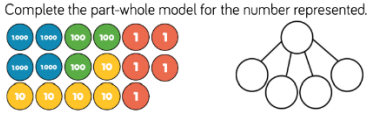
Pictorial



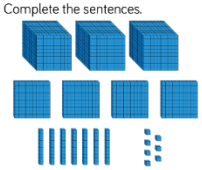
Draw jumps on a number line or use to support counting forwards and backwards across zero.



Complete the part-whole model for the number represented.



Complete the sentences.



There are ____ thousands, ____ hundreds, ____ tens and ____ ones.

The number is ____.

____ + ____ + ____ + ____ = ____

Abstract

- Count forwards and backwards across zero out loud from different start numbers.

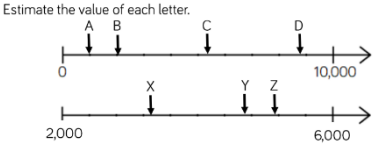
IX = _____

XII = _____

XV = _____

XX = _____

Estimate the value of each letter.



Eva describes a number. She says,
"My number has 4 thousands and 301 ones"
What is Eva's number?
Can you describe Eva's number in a different way?

____ 5,000 + 500 + 80 + 7

____ 8,000 + 700 + 90 + 2

____ 6,000 + 900 + 70 + 1

What is the value of the underlined digit in each number?

6,983 | 9,021 | 789 | 6,570

Reasoning

Can you spot the mistake in these number sequences?

a) 2, 0, 0, −2, −4

b) 1, −2, −4, −6, −8

c) 5, 0, −5, −10, −20

Explain how you found the mistake and convince me you are correct.

Jack says: My number has five thousands, three hundreds and 64 ones.

Amir says: My number has fifty three hundreds, 6 tens and 4 ones.

Who has the largest number? Explain.

Which is the odd one out?

3,500 | 3,500 ones

2 thousands and 15 hundreds | 35 tens

Explain how you know.

Different ways

To turn **2940** into **3000** you can...

add ____ tens

OR add ____ ones

OR add ____ tens and ____ ones

OR add ____ hundred and subtract ____ tens

Solve the following calculation:

XIV + XXXVI = ____

How many other calculations, using Roman Numerals, can you write to get the same total?

Number, Place Value and Rounding

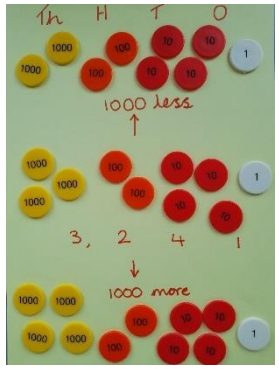
Key vocab: thousands, four-digit, negative number, one thousand more, one thousand less, decimal, decimal place, rounding, place holder, nearest ten, nearest hundred, nearest thousand, one place, whole number, integer, tenths, hundredths

NC Objectives:

- Count in multiples of 25 and 1000.
- Find 1000 more or less than a given number.

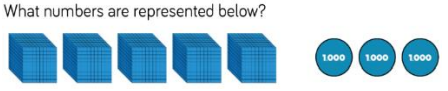
Concrete

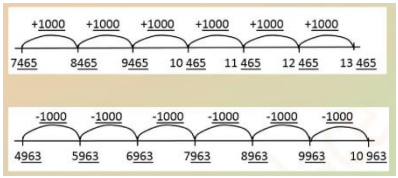
Use place value counters to show 1000 more/less than a number.

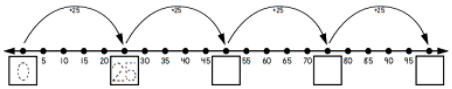


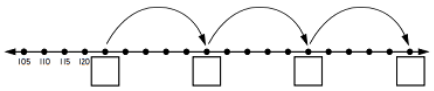
Pictorial

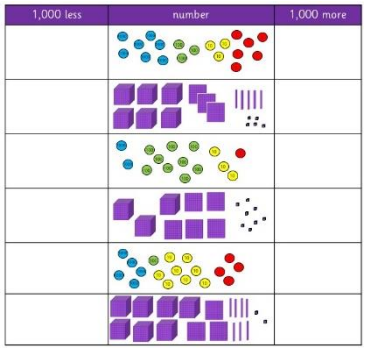
What numbers are represented below?











Abstract

1000	____	3000	____	5000	6000
2100	3100	____	5100	6100	____
10 000	____	12 000	13 000	14 000	____
3020	4020	____	____	7020	8020

Fill in the missing values.

9,523 + 10 = ☐

☐ + 3,589 = 3,689

3,891 + ☐ = 4,891

Find 1,000 more and 1,000 less than each number.

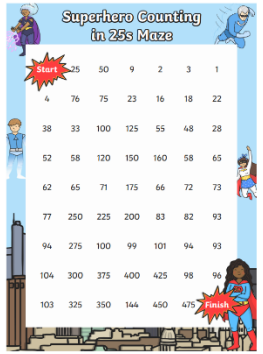
5,000 | 7,500 | 2,359 | 8,999

Complete the number tracks

25		75		125	150				250
	725	700		650		600			

Circle the mistake in each sequence.

2, 275	2,300	2,325	2,350	2,400, …
1,000	975	925	900	875 …



Reasoning

Whitney is counting in 25s and 1,000s. She says:

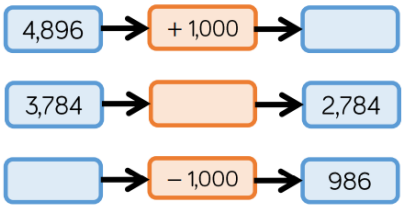
- Multiples of 1,000 are also multiples of 25
- Multiples of 25 are therefore multiples of 1,000

Do you agree with Whitney? Explain why.

Ron is counting down in 25s from 790. Will he say 725?

Explain your answer.

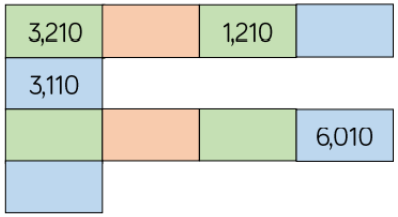
Complete the missing boxes:



10 less than my number is 1,000 more than 5,300. What is my number?

Can you write your own problem similar to this?

Fill in the boxes by finding the patterns:



Jack says:

When I add 1,000 to 4,325, I only have to change 1 digit.

Is he correct?
Which digit does he need to change?

Zippy Onion also claims that he can make a number which is 1000 less than 3512 using the number cards 1, 2, 3 and 4.

Do you agree with him? Explain your thinking.

Number, Place Value and Rounding

Key vocab: thousands, four-digit, negative number, one thousand more, one thousand less, decimal, decimal place, rounding, place holder, nearest ten, nearest hundred, nearest thousand, one place, whole number, integer, tenths, hundredths

NC Objectives:

- Compare and order numbers beyond 1000.

Concrete

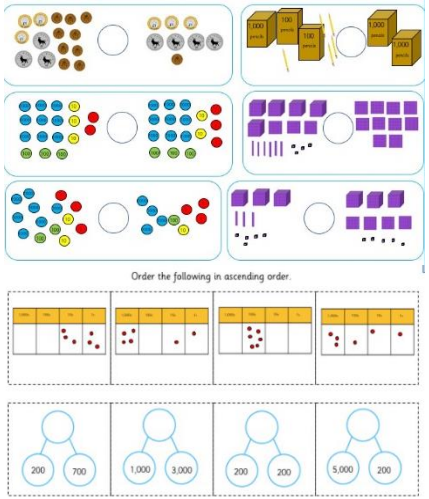
Use different materials to create number sentences which compare and order numbers beyond 1,000 correctly.

Rearrange four counters in the place value chart to make different numbers.

1000s	100s	10s	1s

Record all your numbers and write them in descending order.

Pictorial



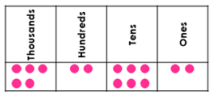
4. Tick all of the numbers which are greater than 3,000 but less than 7,000.

A **7,453**

B **2,000 + 200 + 20 + 13**

C

D



E **six thousand, two hundred and ninety-one**

Fill in the circle using <, > or =

2,764 ◯ XXVII

Abstract

Circle the smallest amount in each pair.	
Two thousand, three hundred and ninety seven	3,792
6,000 + 400 + 50 + 6	6,455
9 thousands, 2 hundreds and 6 ones	9,602

Order the following from the least to greatest.

1,450	5,550	500	9,080	6,510
645	54	6,790	8,000	1,700
7,100	700	9,600	100	1,000

Here are four digit cards: 4 0 5 3

Arrange them to make as many different 4-digit numbers as you can and put them in ascending order.

2,700 ◯ 2,200 600 ◯ 6,000 1,000 ◯ 1,009

2,500 ◯ 8,500 7,100 ◯ 7,800 9,990 ◯ 9,900

Reasoning

I am thinking of a number. It is greater than 3,000, but smaller than 5,000

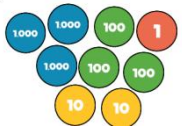
The digits add up to 15
What could the number be?

Write down as many possibilities as you can.

The difference between the largest and smallest digit is 6. How many numbers do you now have?

Put these amounts in ascending order.

Half of 2,400 LXXXVI



Use digit cards 1 to 5 to complete the comparisons:

564□ < □73□

2□38 > 23□5

You can only use each digit once.

Alex has ordered five 4-digit numbers. The smallest number is 3,450, and the largest number is 3,650

All the other numbers have digit totals of 20

What could the other three numbers be?

What mistake has been made?

1,354 3,273 3,314 989 9,993

smallest greatest

Put one number in each box so that the list of numbers is ordered smallest to largest.

1000s	100s	10s	1s
1	1		3
1		2	7
1	2	5	
1		5	9
1	3	8	
1		1	5

Can you find more than one way?

Number, Place Value and Rounding

Key vocab: thousands, four-digit, negative number, one thousand more, one thousand less, decimal, decimal place, rounding, place holder, nearest ten, nearest hundred, nearest thousand, one place, whole number, integer, tenths, hundredths

NC Objectives:

- Round any number to the nearest 10, 100 or 1000.

Concrete

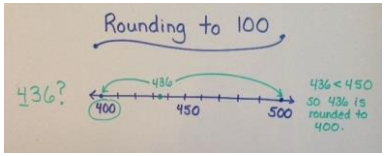
Pictorial

- Fill in the number marked by the arrow.
- Draw an arrow to show where the nearest 1000 is.

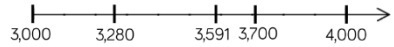
Remember: if the number is in the middle, it rounds up to the next 1000.

Example

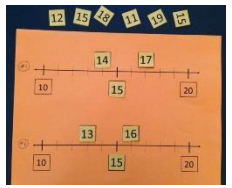
1)

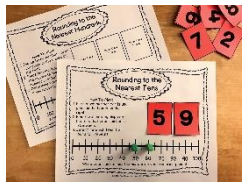


Say whether each number on the number line is closer to 3,000 or 4,000

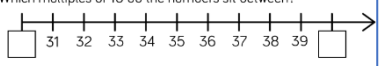


Round 3,280, 3,591 and 3,700 to the nearest thousand.

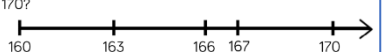




Which multiples of 10 do the numbers sit between?



Say whether each number on the number line is closer to 160 or 170?



Round 163, 166 and 167 to the nearest 10

Abstract

Round these numbers to the nearest 1000:

1278 → _____

608 → _____

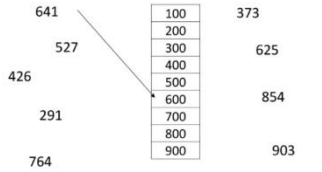
8574 → _____

NUMBER	NEAREST 10	NEAREST 100	NEAREST 1000
327	330		
192	190	200	
853			1000
769			
407			

Complete the table.

Start number	Rounded to the nearest 10	Rounded to the nearest 100	Rounded to the nearest 1,000
			
4,999			
LXXXII			

Draw an arrow to match each number to its nearest 100.



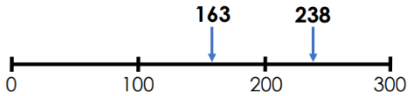
Reasoning

Explain

163 and 238 round to the same 100.

163 and 238 round to a different 10.

Explain why.



Explain the mistakes

What is 245 rounded to the nearest 10?

Mistake 1: 50

Mistake 2: 240

Mistake 3: 200

Which answer?

What is the largest whole number that, when rounded to the nearest 10, is 150?

(a) 149

(b) 154

(c) 155

How many ways?

Rounded to the nearest 10, my number is 250.

Rounded to the nearest 100, my number is 300.

My number is odd.

What could my number be?

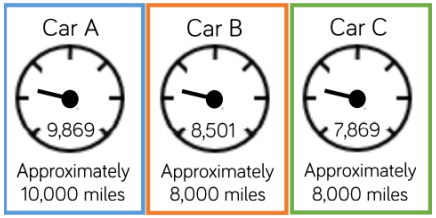
Level 1: I can find one possible answer

Level 2: I can find different possible answers

Level 3: I know how many possible answers there are

David's mum and dad are buying a car.

They look at the following cars:



Are all of the cars correctly advertised?

Explain your reasoning.

A number is rounded to the nearest thousand.

The answer is 7,000

What could the original number have been?

Give five possibilities.

What is the greatest number possible?

What is the smallest number possible?

Addition and Subtraction

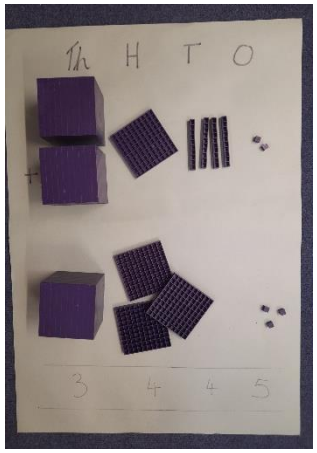
Key vocab: two-step problems, context, four-digit

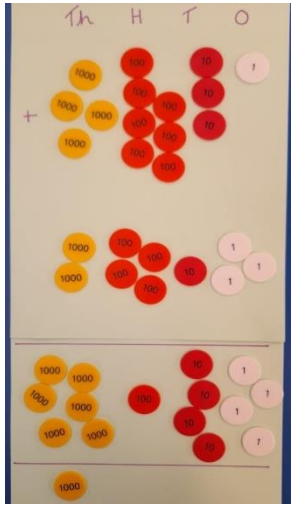
NC Objectives:

- **Add** numbers with up to 4 digits, using formal written methods of columnar addition and subtraction where appropriate.
- Estimate and use the inverse operations to check answers to a calculation.
- Solve **addition** and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

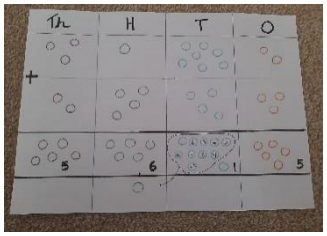
Concrete

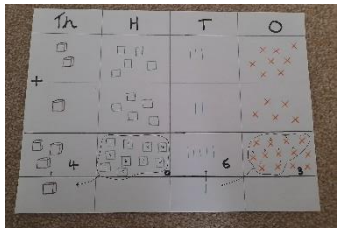
- Use place value counters and/or Base 10 to solve addition calculations.





Pictorial

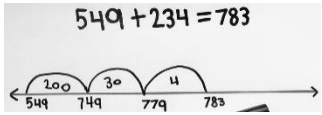




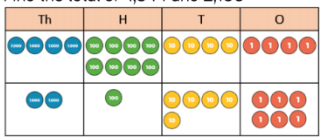
Complete the bar models.

1,185	405

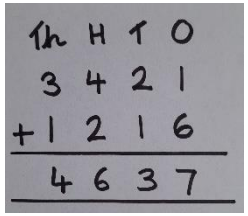
3,535	2,634

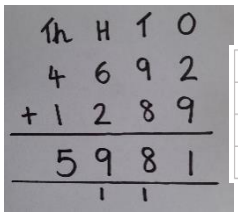


Find the total of 4,844 and 2,156



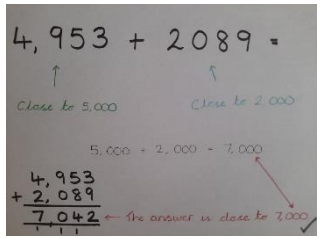
Abstract

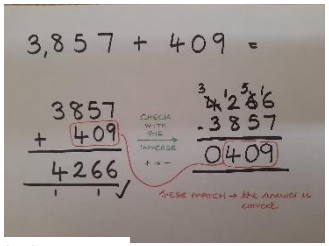




Work out the missing numbers.

	Th	H	T	O
	4	___	6	___
+	2	5	___	1
	___	7	8	9





Dexter buys a laptop costing £1,265 and a mobile phone costing £492
How much do the laptop and the mobile phone cost altogether?

5467 + 2891 =

Reasoning

Missing digits

$$\begin{array}{r} 73\square \\ +\ \square 46 \\ \hline \square 0\square 5 \end{array}$$

Fill in the missing digits.

How many ways?

$$\begin{array}{r} \square 3\square \\ +\ \ \square 4 \\ \hline \square\square\square 1 \end{array}$$

Fill in the missing digits.

Level 1: I can find a way
Level 2: I can find different ways
Level 3: I know how many ways there are

Annie, Mo and Alex are working out the solution to the calculation 6,374 + 2,823

Annie's Strategy

6,000 + 2,000 = 8,000
300 + 800 = 110
70 + 20 = 90
4 + 3 = 7
8,000 + 110 + 90 + 7 = 8,207

Mo's Strategy

	6	3	7	4
+	2	8	2	3
	8	1	9	7

Alex's Strategy

	6	3	7	4
+	2	8	2	3
				7
			9	0
	1	1	0	0
	8	0	0	0
	9	1	9	7

Who is correct?

Rosie adds 2 numbers together that total 4,444

Both numbers have 4 digits.

All the digits in both numbers are even.

What could the numbers be?
Prove it.
How many ways can you find?

Two children completed the following calculation:

1,234 + 345

Dora: My answer is 1,589

Alex: My answer is 4,684

Both of the children have made a mistake in their calculations.
Calculate the actual answer to the question.
What mistakes did they make?

Addition and Subtraction

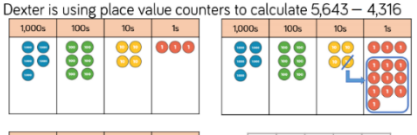
Key vocab: two-step problems, context, four-digit

NC Objectives:

- **Subtract** numbers with up to 4 digits, using formal written methods of columnar addition and subtraction where appropriate.
- Estimate and use the inverse operations to check answers to a calculation.
- Solve addition and **subtraction** two-step problems in contexts, deciding which operations and methods to use and why.

Concrete

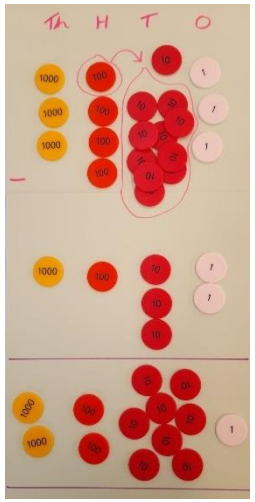
Dexter is using place value counters to calculate 5,643 – 4,316



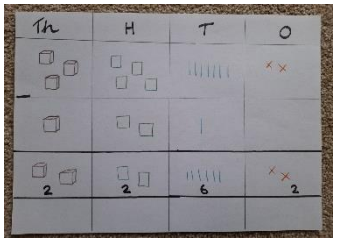
	Th	H	T	O
	5	6	3	13
–	4	3	1	6
	1	3	2	7

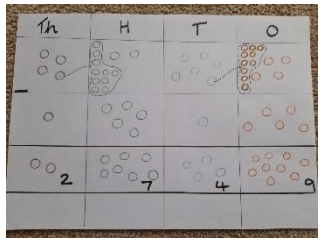
Use Dexter's method to calculate:

4,721 – 3,605 = 4,721 – 3,650 = 4,172 – 3,650 =



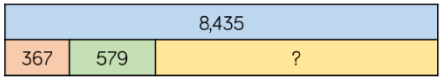
Pictorial



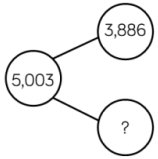


A shop has 8,435 magazines.
367 are sold in the morning and 579 are sold in the afternoon.

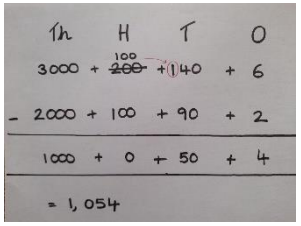
How many magazines are left?

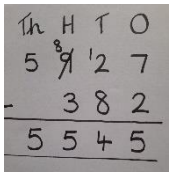


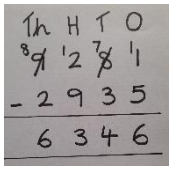
There are ___ magazines left.



Abstract







Find the missing 4-digit number.

There are 3,597 boys and girls in a school.
2,182 are boys. How many are girls?

	Th	H	T	O
	?	?	?	?
+	4	6	7	8
	7	4	3	1

Car A travels 7,653 miles per year.
Car B travels 5,612 miles per year.
How much further does Car A travel than Car B per year?

2,300 + 4,560 = 6,860

Use a subtraction to check the answer to the addition.
Is there more than one subtraction we can do to check the answer?

Reasoning

Rank by difficulty

3003 – 1996

2000 – 60

2645 – 1082

Missing digits

$$\begin{array}{r} 34\square \\ -\square\square 2 \\ \hline \square 94 \end{array}$$

Fill in the missing digits.

I know... so...

437 + 285 = 722

722 - _____ = 287

_____ - 435 = 285

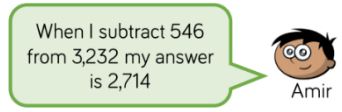
I know... so...

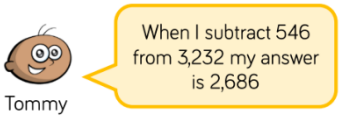
603 – 194 = _____

600 – 200 = 400

_____ – 401 = 199

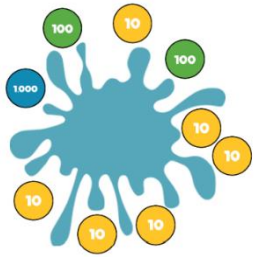
Amir and Tommy solve a problem.





Who is correct?
Explain your reasoning.
Why is one of the answers wrong?

There are counters to the value of 3,470 on the table but some have been covered by the splat.



What is the total of the counters covered?
How many different ways can you make the missing total?

Eva is performing a column subtraction with two four digit numbers.

The larger number has a digit total of 35

The smaller number has a digit total of 2

Use cards to help you find the numbers.

What could Eva's subtraction be?

How many different options can you find?

Multiplication and Division

Key vocab: derived facts, factors, factor pairs, scaling problems, three-digit

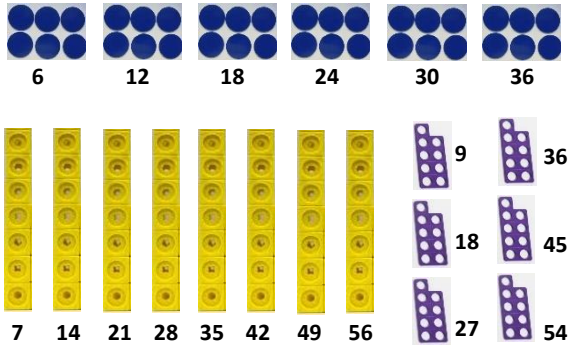
NC Objectives:

- Count in multiples of 6, 7 and 9.
- Use place value and known and derived facts to multiply and divide mentally, including multiplying by 0 and 1; dividing by 1; multiplying together three numbers.
- Recognise and use factor pairs and commutativity in mental calculations.
- Recall and use multiplication and division facts up to 12x12.

Concrete

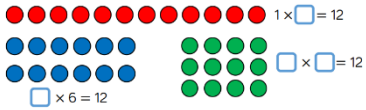
Use counters and hands to complete.

- 4 counters **shared** between 4 hands ___ ÷ ___ = ___
- 4 counters **shared** between 1 hand ___ ÷ ___ = ___
- 9 counters **grouped** in 1s ___ ÷ ___ = ___
- 9 counters **grouped** in 9s ___ ÷ ___ = ___



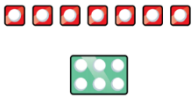
Pictorial

Complete the factor pairs for 12



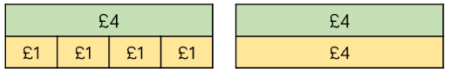
12 has ___ factor pairs. 12 has ___ factors altogether.
Use counters to create arrays for 24
How many factor pairs can you find?

Complete the calculation shown by the number pieces.

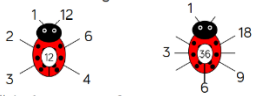


There are ___ ones.
___ × ___ = ___
There is ___ six.
___ × ___ = ___

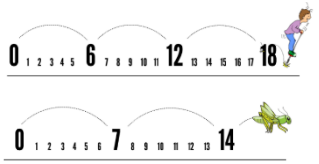
Choose the correct bar model to help you answer this question.
Annie has £4 in total. She gives away £4 at a time to her friends.
How many friends receive £4?



Here is an example of a factor bug for 12
Complete the factor bug for 36



Are all the factors in pairs?
Draw your own factor bugs for 16, 48, 56 and 35



Abstract

Complete:

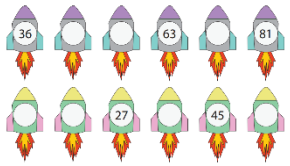
Count out loud in multiples of 6, 7 and 9.

4 × ___ = 4 ___ = 1 × 7 0 = ___ × 42

63 × 1 = ___ ___ × 27 = 0 50 × ___ = 50

6	12			30		

36				60		



X	1	2	3	4	5	6	7	8	9	10	11	12
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

___ × 3 = 21	48 = 12 × ___
8 × ___ = 72	8 × ___ = 24
5 × 4 = ___	120 = ___ × 10

Reasoning

I am thinking of two numbers.
The sum of the numbers in 17.
The product of the numbers is 72.
What are my secret numbers?

Can you choose your own two secret numbers from the 9 times table and create clues for your partner?

Always, Sometimes, Never

When you multiply any whole number by 6 it will always be an even number.

Explain your answer.

I know... so...

6 × ___ = 48

6 × 6 = 36 → 36 (6 6 6 6 6 6)

12 × 6 = ___

True or False?

6 × 9 = 9 × 3 × 2

9 × 6 = 3 × 9 + 9

Explain your answer.

Mrs White's class are selling tickets at £2 each for the school play.

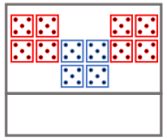
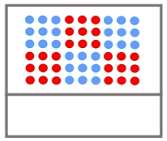
The class can sell one ticket for each chair in the hall.

There are 7 rows of chairs in the hall. Each row contains 9 chairs.

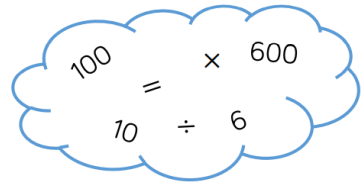
How much money will they make?

Which number sentence?

Write a multiplication number sentence for each example. One has been done for you.

6 + 12 + 12 6 × 5 = 30		5 × 4 - 5
7 × 4 + 7 + 7		4 + 8 + 12

Choose the correct number or symbol from the cloud to fill in the boxes.



___ ÷ ___ = 6

60 = 600 ___ 10

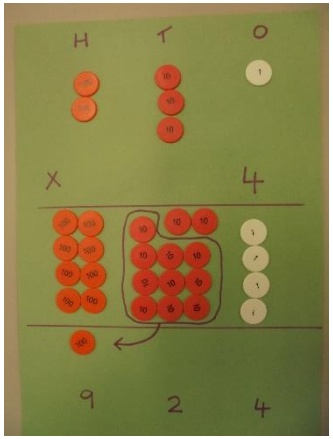
Multiplication and Division

Key vocab: derived facts, factors, factor pairs, scaling problems, three-digit

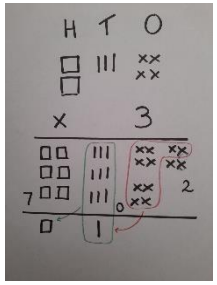
NC Objectives:

- Multiply 2-digit and 3-digit numbers by a 1-digit number using formal written methods.
- Recall and use multiplication and division facts up to 12x12.
- Estimate and use the inverse operations to check answers to a calculation.
- Solve problems involving multiplying and adding, including using the distributive law to multiply 2-digit numbers by one digit, integer scaling problems and harder correspondence problems, such as n objects are connected to m objects.

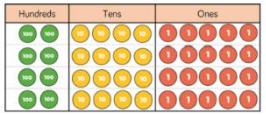
Concrete



Pictorial



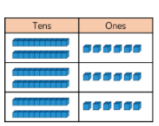
A school has 4 house teams.
There are 245 children in each house team.
How many children are there altogether?

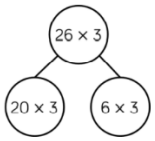


In a classroom, there are 3 times as many girls as boys.

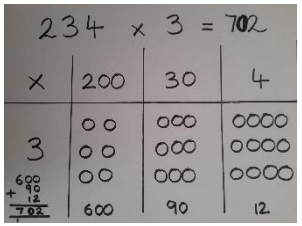
Which bar model represents the number of boys and girls? Explain your choice.

Rosie uses Base 10 and a part-whole model to calculate 26 × 3
Complete Rosie's calculations.

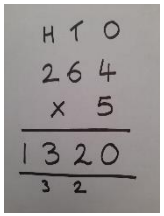


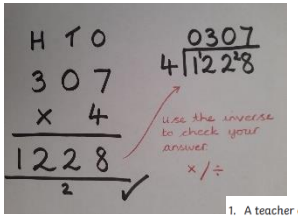


Use Rosie's method to work out:
36 × 3
24 × 6
45 × 4



Abstract





1) 2 3 × 2

2) 2 1 × 3

613 x 5 =

We partition 613 into 600 and 10 and 3 and put it in a table.

x	600	10	3
5	3000	50	15

Add up 3000, 50 and 15 to make 3065.

613 x 5 = 3065

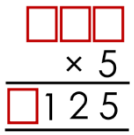
1. A teacher asks some children to arrange some chairs into 12 rows of eight chairs. How many chairs will be laid out?
2. A crate contains 32 packs of four water bottles. How many bottles are there on each crate?
3. A photo album contains 28 pages. Each page can hold six photos. How many photos can each album hold?
4. A grocer has 37 packs of bananas. Each pack contains seven bananas. How many bananas are in the packs?

The product of 8 and 83	46 x 4	88 x 4
94 x 3	67 x 4	64 multiplied by 4

1. There are three biscuits in a packet. How many are there in seven packets?

Reasoning

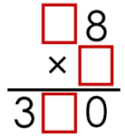
How many ways?



Fill in the missing digits.

Level 1: I can find a way
Level 2: I can find different ways
Level 3: I know how many ways there are

Missing digits



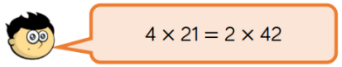
Fill in the missing digits.

Which one's correct?

Find the correct calculation. Spot the mistakes.

326 × 7

Dexter says,



Is Dexter correct?

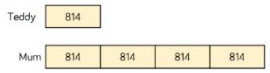
Always, sometimes, never

- When multiplying a two-digit number by a one-digit number, the product has 3 digits.
- When multiplying a two-digit number by 8 the product is odd.
- When multiplying a two-digit number by 7 you need to exchange.

Prove it.

Teddy and his mum were having a reading competition.
In one month, Teddy read 814 pages.

His mum read 4 times as many pages as Teddy.
How many pages did they read altogether?
How many fewer pages did Teddy read?
Use the bar model to help.



Here are the meal choices in the school canteen.

Starter	Main	Dessert
Soup Garlic Bread	Pasta Chicken Beef Salad	Cake Ice-cream Fruit Salad

There are 2 choices of starter, 4 choices of main and 3 choices of dessert.

How many meal combinations can you find? Can you use a systematic approach?
Can you represent the combinations in a multiplication?

If there were 20 meal combinations, how many starters, mains and desserts might there be?

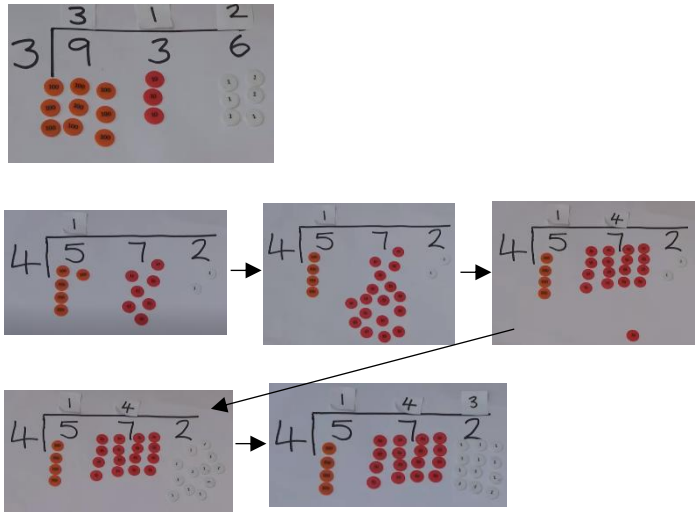
Multiplication and Division

Key vocab: derived facts, factors, factor pairs, scaling problems, three-digit

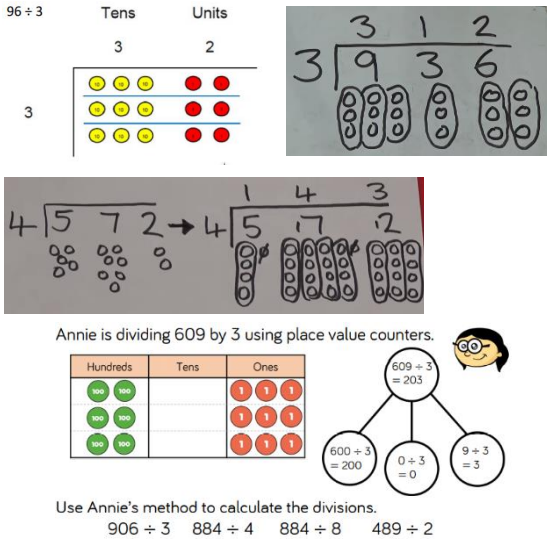
NC Objectives:

- Divide 2-digit and 3-digit numbers by a 1-digit number using formal written methods.
- Recall and use multiplication and division facts up to 12x12.
- Estimate and use the inverse operations to check answers to a calculation.
- + - x ÷ Solve mixed operation questions.

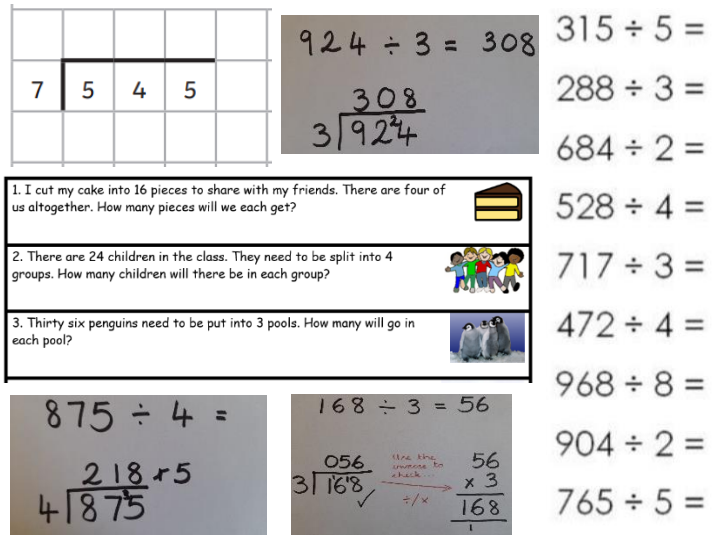
Concrete



Pictorial

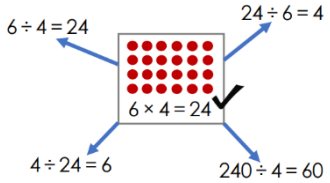


Abstract



Reasoning

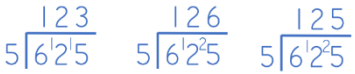
True or false?



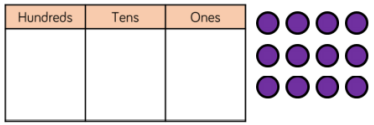
Which one's correct?

Find the correct calculation. Spot the mistakes.

625 ÷ 5



You have 12 counters and the place value grid. You must use all 12 counters to complete the following.



Create a 3-digit number divisible by 2
Create a 3-digit number divisible by 3
Create a 3-digit number divisible by 4
Create a 3-digit number divisible by 5
Can you find a 3-digit number divisible by 6, 7, 8 or 9?

37 sweets are shared between 4 friends. How many sweets are left over?

Four children attempt to solve this problem.

- Alex says it's 1
- Mo says it's 9
- Eva says it's 9 r 1
- Jack says it's 8 r 5

Can you explain who is correct and the mistakes other people have made?

Whitney is thinking of a 2-digit number that is less than 50

When it is divided by 2, there is no remainder.

When it is divided by 3, there is a remainder of 1

When it is divided by 5, there is a remainder of 3

What number is Whitney thinking of?

Rosie writes,
85 ÷ 3 = 28 r 1

She says 85 must be 1 away from a multiple of 3
Do you agree?

Which calculation is the odd one out?
Explain your thinking.

64 ÷ 8	77 ÷ 4
49 ÷ 6	65 ÷ 3

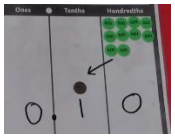
Fractions, Decimals and Percentages

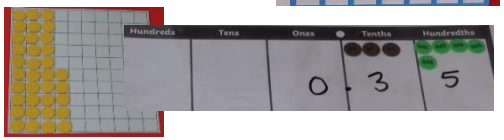
Key vocab: hundredths, decimal, decimal place, one decimal place, two decimal places, round decimals, whole number, common equivalent fractions, decimal equivalents, dividing, ones, tenths, hundredths, simple measure, money problems

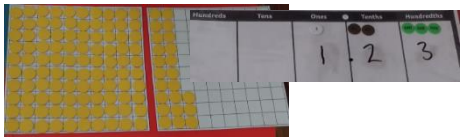
NC Objectives:

- Count up and down in hundredths.
- Recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.
- Find the effect of dividing a 1-digit or 2-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths.
- Recognise and write decimal equivalents on any number of tenths or hundredths.

Concrete



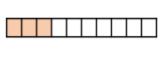


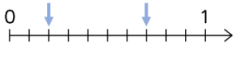


- Move counters on a place value chart to the left or right to show x and ÷ of 10/100.

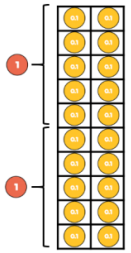
Pictorial

What fractions and decimals are represented in these diagrams?





Eva uses counters to make a 1-digit number.



Tens	Ones	Tenths	Hundredths
	●		

To divide the number by 10, we move the counters one column to the right.
What is the value of the counters now?

Use this method to solve:

3 ÷ 10 = ☐ 7 ÷ 10 = ☐ ☐ = 4 ÷ 10

Complete the table.

Image	Words	Fraction	Decimals
	56 hundredths		
		$\frac{17}{100}$	
			0.2
			

Abstract

- Count out loud forwards and backwards in hundredths.

1. $\frac{76}{100}$ = 0.76
2. $\frac{49}{100}$ = _____
3. $\frac{20}{100}$ = _____

70 ÷ 100 = _____

6 x 10 = _____

2 x 100 = _____

28 ÷ 10 = _____

Reasoning

Who is correct?

Dora: 5 hundredths is equivalent to 50 tenths.

Amir: 50 hundredths is equivalent to 5 tenths.

Explain why.

Teddy says,

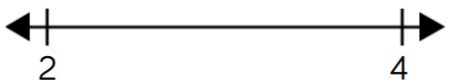
45 divided by 100 is 0.45 so I know 0.45 is 100 times smaller than 45

Mo says,

45 divided by 100 is 0.45 so I know 45 is 100 times bigger than 0.45

Who is correct?
Explain your answer.

Place the decimals on the number line.



2.7 2.3 1.9 2.5 2.9 3.2

Which order did you place your numbers on the number line?

Who is correct?

Annie: 1.2 is equivalent to 1 whole and 2 tenths.

Dexter: 1.2 is equivalent to 12 tenths.

Explain why.

Fractions, Decimals and Percentages

Key vocab: hundredths, decimal, decimal place, one decimal place, two decimal places, round decimals, whole number, common equivalent fractions, decimal equivalents, dividing, ones, tenths, hundredths, simple measure, money problems

NC Objectives:

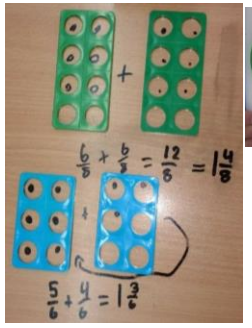
- Add and subtract fractions with the same denominator.
- Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number.

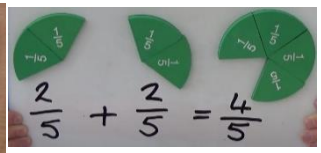
Concrete

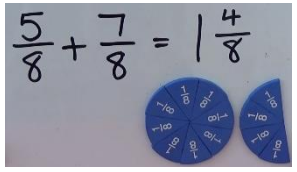
Take two identical strips of paper.
Fold your paper into quarters.
Can you use the strips to solve

$\frac{1}{4}+\frac{1}{4}$ $\frac{1}{4}+\frac{1}{4}+\frac{1}{4}$ $\frac{3}{4}+\frac{3}{4}$ $\square+\square=\frac{7}{4}$

What other fractions can you make and add?





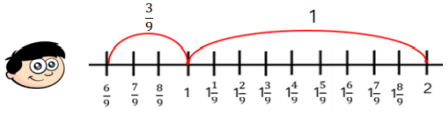


Use identical strips of paper and fold them into eighths.
Use the strips to solve the calculations.

$\frac{8}{8}-\frac{3}{8}=$ $\frac{7}{8}-\frac{3}{8}=$ $\frac{16}{8}-\frac{9}{8}=$ $\frac{13}{8}-\square=\frac{7}{8}$

Pictorial

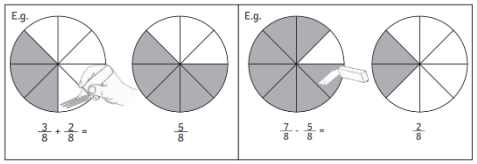
Dexter uses a number line to find the difference between 2 and $\frac{6}{9}$

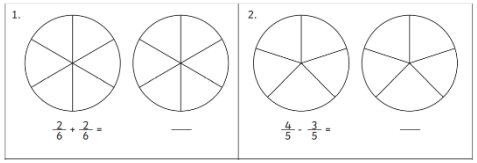


$2-\frac{6}{9}=1\frac{3}{9}$

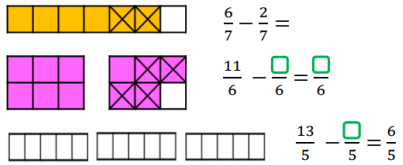
Use a number line to find the difference between:

2 and $\frac{2}{3}$ 2 and $\frac{2}{5}$ $\frac{2}{5}$ and 4





Use the bar models to subtract the fractions.

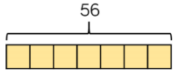


$\frac{6}{7}-\frac{2}{7}=$

$\frac{11}{6}-\square=\frac{\square}{6}$

$\frac{13}{5}-\square=\frac{6}{5}$

Use a bar model to help you represent and find:



$\frac{1}{7}$ of $56 = 56 \div \square$

$\frac{2}{7}$ of 56 $\frac{3}{7}$ of 56 $\frac{4}{7}$ of 56 $\frac{4}{7}$ of 28 $\frac{7}{7}$ of 28

Abstract

Whitney eats $\frac{3}{8}$ of 240 g bar of chocolate.
How many grams of chocolate has she eaten?

$\frac{3}{4}+\frac{2}{4}=\frac{\square}{\square}=1\frac{\square}{\square}$

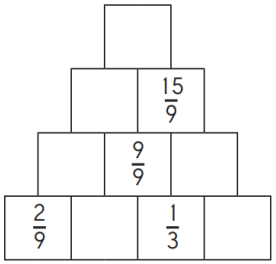
$\frac{2}{3}+\frac{2}{3}=\frac{\square}{\square}=\square$

$\frac{7}{10}+\frac{6}{10}=\frac{\square}{\square}=\square$

$\frac{10}{3}=\frac{9}{3}+\frac{\square}{3}=3\frac{\square}{3}$

$\frac{\square}{3}=\frac{6}{3}+\frac{2}{3}=\square\frac{2}{3}$

$\frac{\square}{8}=\frac{16}{8}+\frac{3}{8}=\square\frac{\square}{\square}$



Reasoning

How many ways?

Fill in the missing numbers:

$$\frac{7}{10}-\frac{\square}{10}>\frac{\square}{10}+\frac{3}{10}$$

Level 1: I can find a way
Level 2: I can find different ways
Level 3: I know how many ways there are

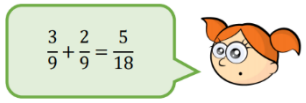
Rank by difficulty

$\frac{4}{5}+\frac{1}{5}$ $\frac{3}{4}+\frac{3}{4}$ $\frac{3}{7}+\frac{2}{7}$ $\frac{1}{2}+\frac{2}{4}$

Fill the gaps

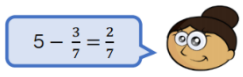
$\frac{3}{8}\square\frac{2}{8}=\frac{5}{8}$ $\frac{3}{8}+\frac{\square}{8}=1$ $\frac{3}{8}-\frac{2}{\square}=\frac{\square}{8}$

Alex is adding fractions.



Is she correct? Explain why.

Dora is subtracting a fraction from a whole.



Can you spot her mistake?
What should the answer be?

Match the number stories to the correct calculations.

Teddy eats $\frac{7}{8}$ of a pizza. Dora eats $\frac{4}{8}$ How much do they eat altogether?	$\frac{7}{8}+\frac{3}{8}=-$
Teddy eats $\frac{7}{8}$ of a pizza. Dora eats $\frac{4}{8}$ less. How much do they eat altogether?	$\frac{7}{8}+\frac{4}{8}=-$
Teddy eats $\frac{7}{8}$ of a pizza. Dora eats $\frac{3}{8}$ less. How much does Dora eat?	$\frac{7}{8}-\frac{3}{8}=-$

Mo and Teddy are solving:

$\frac{6}{13}+\frac{5}{13}+\frac{7}{13}$

Mo

The answer is 1 and $\frac{5}{13}$

Teddy

The answer is $\frac{18}{13}$

Who do you agree with?
Explain why.

Fractions, Decimals and Percentages

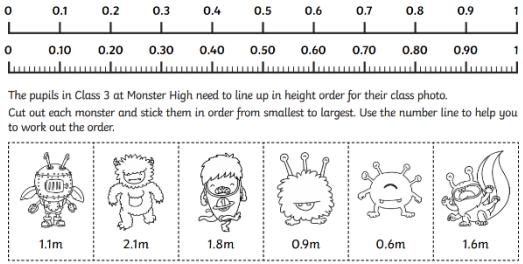
Key vocab: hundredths, decimal, decimal place, one decimal place, two decimal places, round decimals, whole number, common equivalent fractions, decimal equivalents, dividing, ones, tenths, hundredths, simple measure, money problems

NC Objectives:

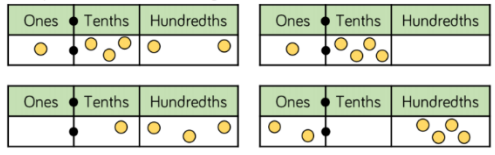
- Compare numbers with the same number of decimal places up to two decimal places.

Concrete

Pictorial



Write down the decimals represented in the place value grid and then place them in ascending order.



Write the numbers shown and compare using < or >

Abstract

Place the numbers in descending order.

46.2	9.64	46.02	40.46

Complete.

1.11 ◯ 1.12 ◯ 1.13

3.32 ◯ 3.23 ◯ 2.32

4.44 ◯ 4.34 ◯ 4.04

Complete.

5.5 ◯ 5.7

0.14 ◯ 0.29

1 ◯ 0.64

3.32 ◯ 3.23

0.1_ < 0.1_ < 0.15

1.9_ < 1.9_ < 2.01

6.67 > 6._7 > 6.37

0.37 < 0._7

2._2 > 2._2

1._1 > 1._1

9.9_ < 9.9_

Use <, > or = to compare the decimal numbers.

12.35		12.53
1.5		0.3
three ones, four-tenths and six-hundredths		3.46
11.03		11.3
2.79		two ones and eight-tenths

0.6 ☐ 0.3 27.6 ☐ 27.1

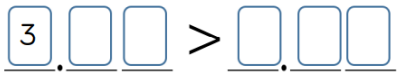
0.2 ☐ 0.8 7.8 ☐ 8.7

Ordering decimals

Units	Tenths	Hundredths	Thousandths
1	3		
1	3	2	5
1	3	5	
1	3	7	5
1	4		
1	4	2	5
1	4	5	
1	4	7	5
1	5		
1	5	2	5

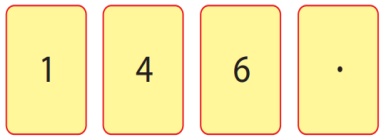
Reasoning

Use each digit card **once** to make the statement correct.

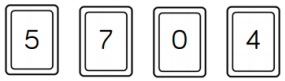


Can you find eight different possible solutions?

Using these cards can you make a number between 4·1 and 4·61?



What is the smallest number you can make using all four cards?
What is the largest number you can make using all four cards?



Use three digit cards to make the greatest possible number.

Use three digit cards to make the smallest possible number.

Some children have planted sunflowers and have measured their heights.

Child	Height
Beth	1.23 m
Tony	0.95 m
Rachel	1.02 m
Kate	1.2 m
Faye	99 cm
Emma	0.97 m

Order the children based on the heights of their sunflowers in both ascending and descending order.

Spot the Mistake

Rosie is ordering some numbers in ascending order:

0.09 < 0.99 < 10.01 < 1.35 < 9.09

Can you explain her mistake?

Fractions, Decimals and Percentages

Key vocab: hundredths, decimal, decimal place, one decimal place, two decimal places, round decimals, whole number, common equivalent fractions, decimal equivalents, dividing, ones, tenths, hundredths, simple measure, money problems

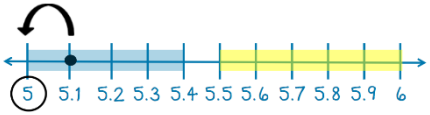
NC Objectives:

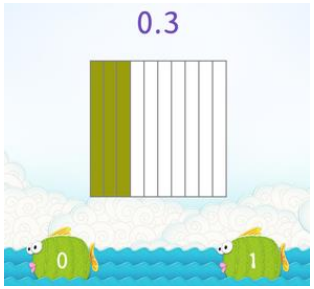
- Round decimals with one decimal place to the nearest whole number.

Concrete

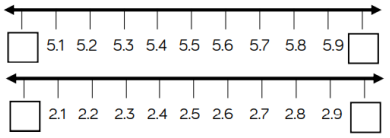
Pictorial

How do you round 5.1 to the nearest whole number?

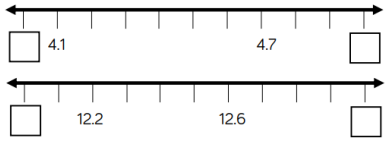




Which integers do the decimals lie between?



Complete the sentences to describe each decimal.



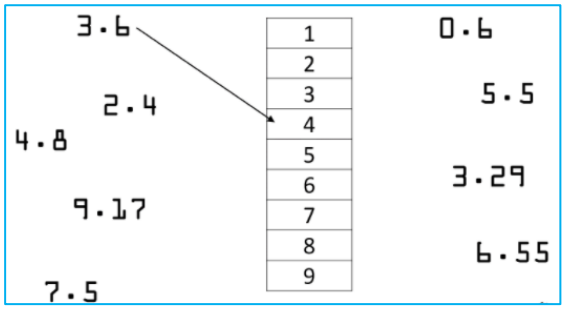
___ is closer to ___ than ___

___ rounds to ___ to the nearest whole number.

Abstract

Circle the numbers that round up to the nearest whole number.

4.5 3.7 2.3 4.2 16.8 1.9



2.8 → _____

8.2 → _____

1.1 → _____

Reasoning

Gregg is thinking of a decimal.

My decimal rounds up to 4. It is greater than 35 tenths. The digit in the tenths column is odd. The digits in the ones and tenths columns add up to 12.

What is the decimal Gregg is thinking of?

A number with one decimal place rounded to the nearest whole number is 45

What could the number be?

Mo says 0.4 rounded to the nearest whole number is zero.

Whitney says 0.4 rounded to the nearest whole number is one.

Who is correct? Why?

Ella used number cards to make two decimals, but then her number cards got mixed up!

9	7	2	4

She remembers that her decimals rounded to 3 and 7.
What were the two decimals Ella made?

Two motorbikes are different lengths.
The lengths both round down to 2m.

There is a difference of 0.2m between the actual lengths of the two bikes.

Is what the mechanic says possible?
Explain your answer.

Fractions, Decimals and Percentages

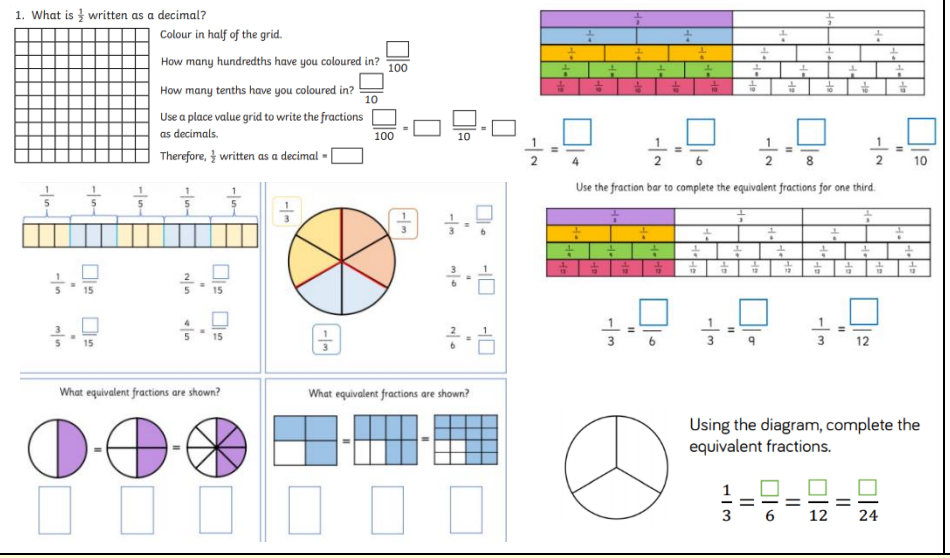
Key vocab: hundredths, decimal, decimal place, one decimal place, two decimal places, round decimals, whole number, common equivalent fractions, decimal equivalents, dividing, ones, tenths, hundredths, simple measure, money problems

NC Objectives:

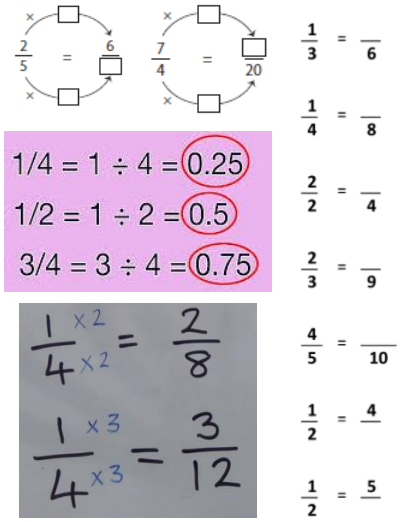
- Recognise and show, using diagrams, families of common equivalent fractions.
- Recognise and write decimal equivalents to $^1/_4$, ½ and $^3/_4$.

Concrete

Pictorial



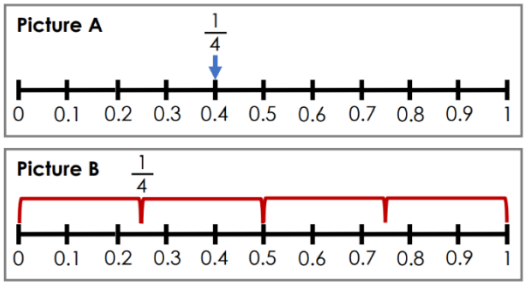
Abstract



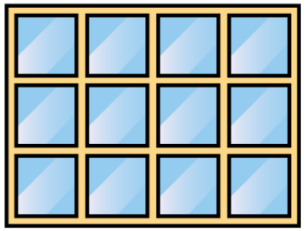
Reasoning

Which picture?

Which picture shows the correct position of $\frac{1}{4}$?



How many equivalent fractions can you see in this picture?



Eva says,

I know that $\frac{3}{4}$ is equivalent to $\frac{3}{8}$ because the numerators are the same.

Is Eva correct?
Explain why.

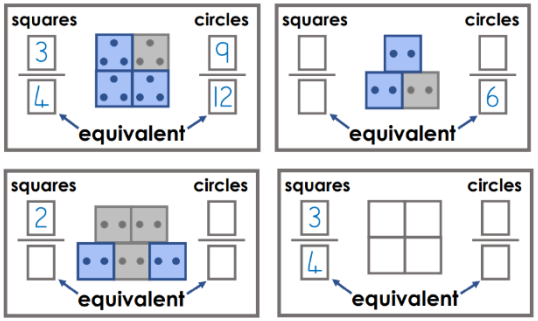
Alex says:

If I know $\frac{1}{2}$ is 0.5 as a decimal, I also know $\frac{3}{6}$, $\frac{4}{8}$ and $\frac{6}{12}$ are equivalent to 0.5 as a decimal.

Explain Alex's thinking.

Read the pictures

What fraction of each picture is blue?



finish the drawing

Measurement

Key vocab: estimate, rectilinear figure, area, rectilinear shapes, convert

NC Objectives:

- Estimate, compare and calculate different measures, including money in pounds and pence.
- Solve simple measure and money problems involving fractions and decimals to two decimal places.

Concrete

- Use coins to make/add amounts of money.

  £1.25 + 46p = £1.71

- Role play giving change from different amounts.

£1.71 – How much change from £2?

Pictorial

How much money is in each purse?

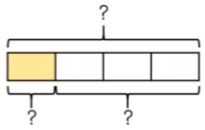
There is ___ pence.
There is ___ pounds.
There is £___ and ___ p
There is £___.___

There is ___ pence.
There is ___ pounds.
There is £___ and ___ p
There is £___.___

Complete the part-whole models to show how many pounds and pence there are.

Ron has £48. He spends one quarter of his money.

How much does he have left?
Use the bar model to help.



Abstract

Convert these amounts to pounds and pence:

357 p | 307 p | 57 p | 370 p

Order the amounts in ascending order.

130 p | £0.32 | 132 p | £13.20

Order the amounts in descending order.

257 p | £2.50 | 2,057 p | £25.07

Amir buys some clothes in a half price sale.

- Jumper £14
- Scarf £7
- Hat £2.50
- T-shirt £6.50

What would the full price of each item be?
How much would he have paid altogether if they were full price?
How much does he pay in the sale?
How much does he save?

Write the amounts as pence, then compare using <, > or =

6,209 p ◯ £60.09 | £0.54 ◯ 54 p

Write the amounts as pounds, then compare using <, > or =

62 p ◯ £6.02 | £5,010 ◯ 5,010 p

Complete the table by rounding each amount and finding the total.

Item 1	Item 2	Approximate Total
£5.63	£1.76	
£3.05	£11.54	

A family is going bowling.
How much does it cost for 1 child and 1 adult at peak time?
How much does it cost for 1 adult and 2 children off peak?

Tickets	Peak	Off Peak
Adult	£8	£6
Child	£4.20	£5.30

Annie has £15 to spend at the theme park.
She rides on the roller coaster which costs £4.34
Then she rides on the big wheel which costs £3.85
Approximately how much money will she have left?

Reasoning

Which answer?

I spend £16.99 at the shop. I pay with a £20 note. How much change am I given?

(a) £4 and 1p
(b) £3.01
(c) £3.1

Which answer?

£10 - £7.90

(a) £2.10
(b) £3.1
(c) £3.10

Amir has these digits cards.

4 | 6 | 3 | 2

He uses them to fill the frame below:

£ □ . □ □

He makes a total that is more than three pounds but less than six pounds.

How many amounts can he make?

Order your amounts in ascending order.

Here is Dora's receipt.

Receipt	
Sandwich	
Orange juice	
Crisps	60 p
Banana	
TOTAL	

Use the information to complete the receipt:

- The sandwich costs £2.15 more than the crisps.
- The orange juice is the same price as the crisps and banana together.
- The banana is half the price of the crisps.

Which picture?

I pay for four packs of stickers with a £5 note.
I get £1.80 change.
What is the cost of a pack of stickers?

Which bar model represents the question correctly?

OR

Work out the cost of a pack of stickers.

Measurement

Key vocab: estimate, rectilinear figure, area, rectilinear shapes, convert

NC Objectives:

- Read, write, and convert time between analogue and digital 12- and 24-hour clocks.
- Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days
- Convert between hours and minutes.

Concrete	Pictorial	Abstract

Record the time of each activity in digital format.

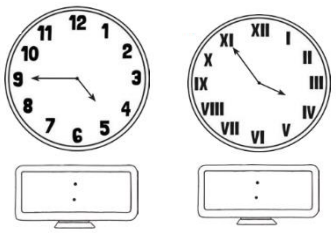
Netball	p.m.	
Football	a.m.	
Rock climbing	p.m.	
Roller disco	a.m.	

Complete the table.

Number of days	Number of weeks
	5
49	
	12

Sort the activities under the headings depending on the approximate length of time they take to complete.

One hour	One minute	One second
Clap	Run around the playground	Blink
Swimming lesson	PE lesson	Tie your shoe laces



One hour = ___ minutes

Two hours = ___ minutes

Half an hour = ___ minutes

One minute = ___ seconds.

Three minutes = ___ seconds.

___ minutes = 240 seconds

Sally is 7 years and 2 months old.
Macey is 85 months old.
Who is the oldest?
Explain your answer.

Reasoning

True or false?

- 3 days > 72 hours.
- $2\frac{1}{2}$ years = 29 months
- 11 weeks 4 days < 10 weeks 14 days

Dora says,

To convert hours to minutes, I multiply the number of hours by 60

Is she correct? Can you explain why?

Jack takes part in a sponsored silence.

He says,

If I am silent for five hours at 10p per minute, I will raise £50

Do you agree with Jack?
Explain why you agree or disagree.

Always, sometimes, never?

There are 730 days in two years.

Can you match the time dominoes together so that the touching times are the same?

20:55 / Ten to two	13:50 / Five to ten	09:55 / Ten to three
15:05 / Ten past 4	02:50 / Five past 3	16:10 / Five to nine

Can you create your own version for your partner?

Three children are meeting in the park.

Rosie says,

We are meeting at 14:10.

Teddy says,

We are meeting at 02:10 p.m.

Eva says,

We are meeting at ten to two.

Will all the children meet at the same time?
Explain your answer.

Measurement

Key vocab: estimate, rectilinear figure, area, rectilinear shapes, convert

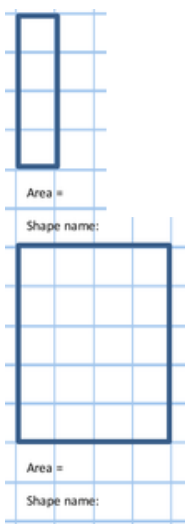
NC Objectives:

- Measure and calculate the perimeter of a rectilinear figure (including squares) in cm and m.
- Perimeter can be expressed algebraically as 2 (a + b) where a and b are the dimensions in the same unit.
- Find the area of rectilinear shapes by counting squares.

Concrete

- Use cubes to calculate the area within a shape.

Pictorial

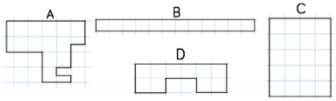


This is a square sticky note.

Estimate how many sticky notes you need to make these shapes?

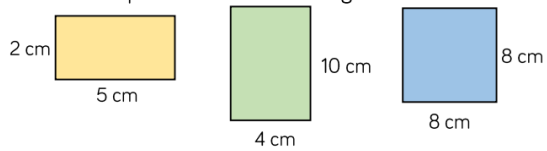
Complete the sentence stems using < and >

Put the shapes in order from largest to smallest area.



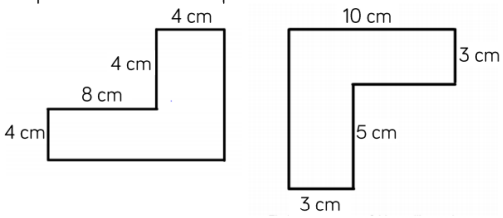
Abstract

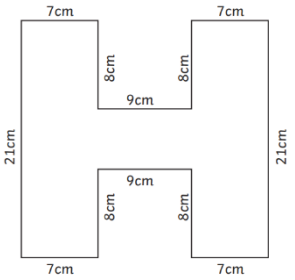
Calculate the perimeter of the rectangles.



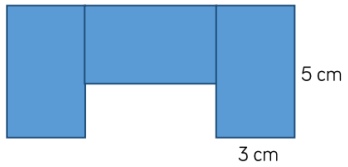
___ cm + ___ cm + ___ cm + ___ cm = ___ cm

Find the perimeter of the shapes.



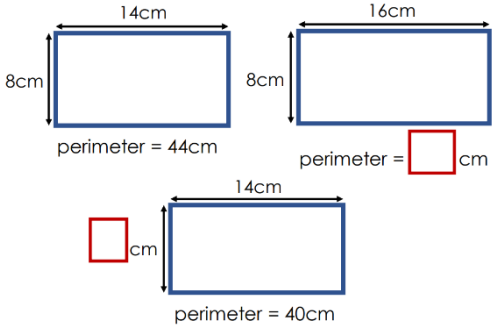


The shape is made from 3 identical rectangles.
Calculate the perimeter of the shape.



Reasoning

I know... so...



Look at the shapes. Can you spot the pattern and explain how the area is changing each time?

Draw the next shape. What is its area?

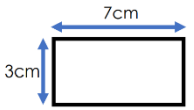
Can you predict what the area of the 6th shape would be?

Can you spot any patterns in your answers?

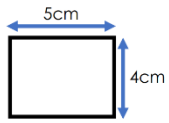
Dexter has taken a bite of the chocolate bar.

The chocolate bar was a rectangle.
Can you work out how many squares of chocolate there were to start with?

True or false?

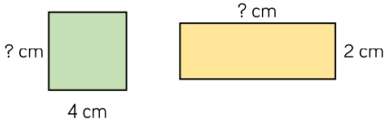


Perimeter = 10cm



Perimeter = 18cm

Each of the shapes have a perimeter of 16 cm.
Calculate the lengths of the missing sides.



Geometry

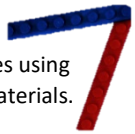
Key vocab: lines of symmetry, symmetric figure, classify, geometric shapes, quadrilaterals, acute angle, obtuse angle, co-ordinates, quadrant, grid, translate, translation, axis, x- axis/y-axis spaces, unit, plot, point, polygon, isosceles/equilateral/scalene, parallelogram, trapezium

NC Objectives:

- Identify and name different triangles (isosceles, equilateral, scalene) and quadrilaterals (parallelogram, rhombus, trapezium).
- Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.
- Identify acute and obtuse angles and compare and order angles up to two right angles by size.

Concrete

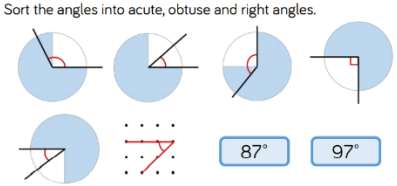
Make angles using different materials.



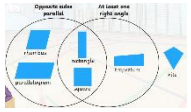
Sort real 2D shapes based on their properties and size.

Pictorial

Sort the angles into acute, obtuse and right angles.



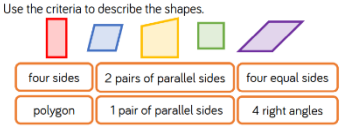
Label each of these triangles: isosceles, scalene or equilateral.



Order the angles from largest to smallest.

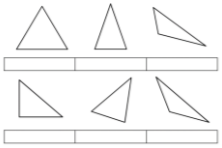
Can you draw a larger obtuse angle?
Can you draw a smaller acute angle?

Use the criteria to describe the shapes.

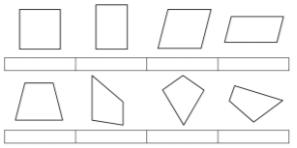


Which criteria can be used more than once?
Which shapes share the same criteria?

TRIANGLE FAMILY

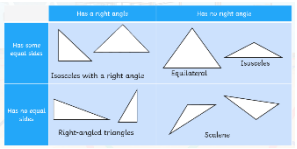


QUADRILATERAL FAMILY



Label the quadrilaterals using the word bank.

trapezium
square
rhombus
rectangle
parallelogram



Abstract

A right angle is ____ degrees.
Acute angles are ____ than a right angle.
Obtuse angles are ____ than a right angle.

Reasoning

You will need:

Some 4 centimetre straws
Some 6 centimetre straws

How many different quadrilaterals can you make using the straws?

Calculate the perimeter of each shape.

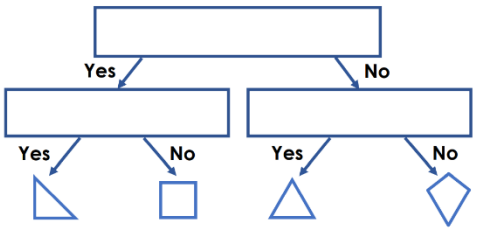
Eva

If I use 6 straws to make a triangle, I can only make an equilateral triangle.

Investigate whether Eva is correct.

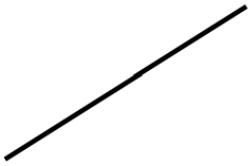
Explore

Write the questions in the branching database:

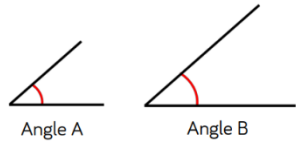


Draw two more sides to create:

- An equilateral triangle
- A scalene triangle
- An isosceles triangle



Which is the hardest to draw?

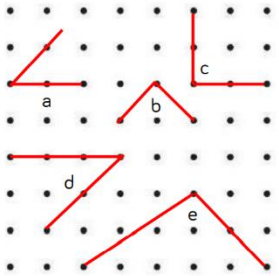


Ron

Angle B is bigger than Angle A because it has longer sides.

Do you agree with Ron? Explain your thinking.

Here are five angles.
There are two pairs of identically sized angles and one odd one out.
Which angle is the odd one out?
Explain your reason.



Geometry

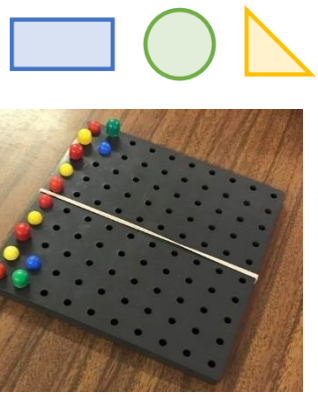
Key vocab: lines of symmetry, symmetric figure, classify, geometric shapes, quadrilaterals, acute angle, obtuse angle, co-ordinates, quadrant, grid, translate, translation, axis, x- axis/y-axis spaces, unit, plot, point, polygon, isosceles/equilateral/scalene, parallelogram, trapezium

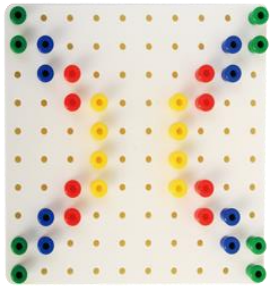
NC Objectives:

- Complete a simple symmetric figure with respect to a specific line of symmetry.
- Identify lines of symmetry in 2D shapes presented in different orientations.

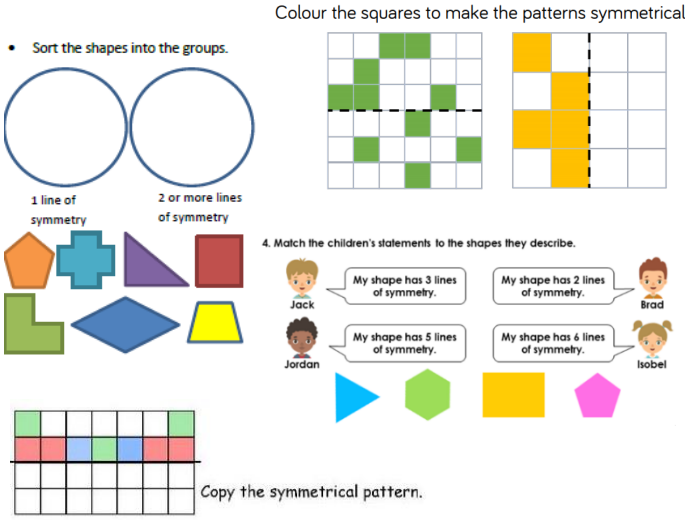
Concrete

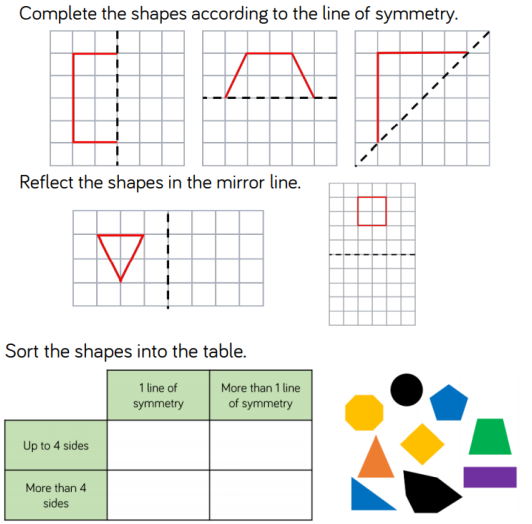
Using folding, find the lines of symmetry in these shapes.





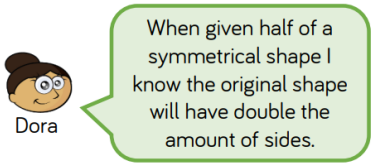
Pictorial





Abstract

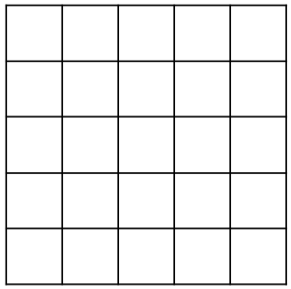
Reasoning



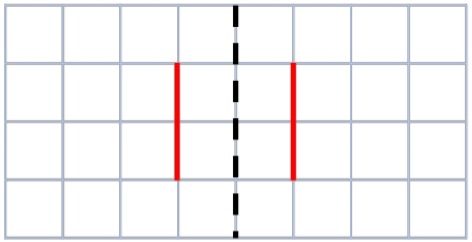
Do you agree with Dora?
Convince me.

Are the lines of symmetry correct?

How many symmetrical shapes can you make by colouring in a maximum of 6 squares?



How many different symmetrical shapes can you create using the given sides?



Always, Sometimes, Never.

A four-sided shape has four lines of symmetry.

Is Jack correct? Prove it.

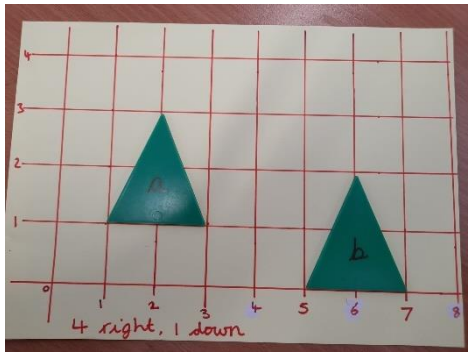
Geometry

Key vocab: lines of symmetry, symmetric figure, classify, geometric shapes, quadrilaterals, acute angle, obtuse angle, co-ordinates, quadrant, grid, translate, translation, axis, x- axis/y-axis spaces, unit, plot, point, polygon, isosceles/equilateral/scalene, parallelogram, trapezium

NC Objectives:

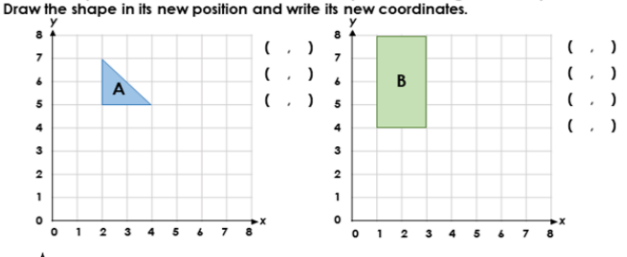
- Describe positions on a 2D grid as coordinates in the first quadrant.
- Describe movements between positions as translations of a given unit to the left/right and up/down.
- Plot specified points and draw sides to complete a given polygon.

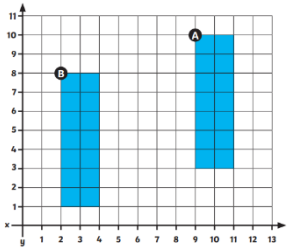
Concrete

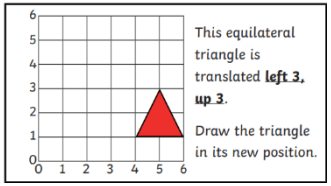


Pictorial

4. Each shape below needs to be translated 4 squares to the right and 3 squares down. Draw the shape in its new position and write its new coordinates.







This equilateral triangle is translated **left 3, up 3**.

Draw the triangle in its new position.

1. Write down the coordinates of these objects:

a)  (,)

b)  (,)

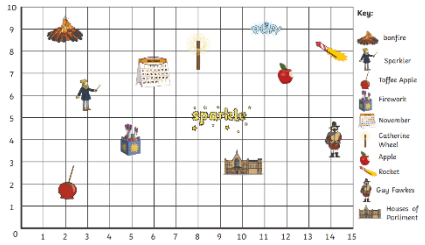
2. Write down what you can see at the coordinates below:

a) (5, 4) _____

b) (10, 3) _____

c) (2, 9) _____

3. Draw a firework of your choice on (7, 2).

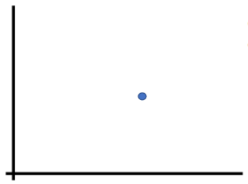


Abstract

Reasoning

Different ways

Think of possible coordinates for the blue dot.



Could the coordinates of the blue dot be:

(3,5)

(5,3)

(10,9)

Always, Sometimes, Never.

The number of points is equal to the number of vertices when they are joined together.

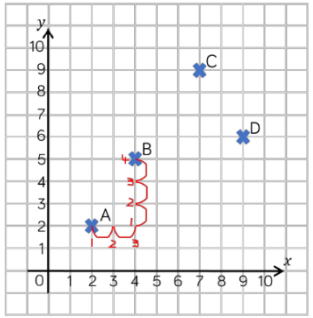
Draw

Draw a dot to show the approximate position of the coordinate point (6,4):

When you are plotting a point on a grid it does not matter whether you go up or across first as long as you do one number on each axis.

Do you agree with Amir? Convince me.

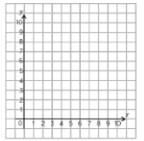
Tommy has described the translation from A to B as 3 right and 4 up.



Can you explain his mistake?

Here is a game to play in pairs:

Each player needs:



 1 small cube

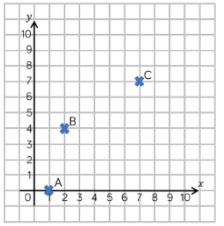
One barrier (e.g. a mini whiteboard)

The first player places a cube on their grid. They describe the original position and perform a translation.

The second player listens to the instructions and performs the same translation.

They check to see if they have placed their cube at the same coordinate.

Swap roles and repeat several times.



Which clue matches which coordinate?

Clue 1	My x coordinate is half of my y coordinate.
Clue 2	My y coordinate is less than my x coordinate.
Clue 3	Both my coordinates are prime numbers.

Statistics

Key vocab: time graphs, comparison problems

NC Objectives:

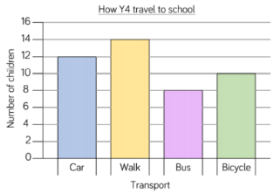
- Interpret and present discrete data using appropriate graphical methods, including:
  - bar charts
  - time graphs
- Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables, and other graphs.

Concrete

- Use counters or other objects to create bar charts/ pictograms.

Pictorial

Complete the table using the information in the bar chart.



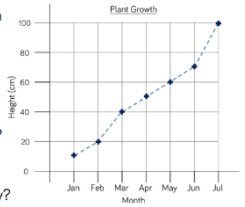
Transport	Number of children
Car	
Walk	
Bus	
Bicycle	

What is the most/least popular way to get to school?
How many children walk to school?

Produce your own table, bar chart or pictogram showing how the children in your class travel to school.

The graph shows the growth of a plant over 6 months.

- How tall was the plant when it was measured in May?
- In what month did the plant first reach 50 cm?
- How many centimetres did the plant grow between March and July?
- What was the difference between the height of the plant in February and the height of the plant in April?

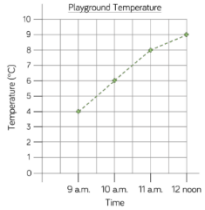


Represent the data in each table as a bar chart.

Team	Number of house points
Sycamore	
Oak	
Beech	
Ash	

= 20 points

The graph shows the temperature in the playground during a morning in April.



The temperature at 9 a.m. is _____ degrees.

The warmest time of the morning is _____.

Team	Number of house points
Sycamore	
Oak	
Beech	
Ash	

= 20 points

How many more points does the Sycamore team have than the Ash team?
How many points do Beech and Oak teams have altogether?
How many more points do Ash need to be equal to Oak?

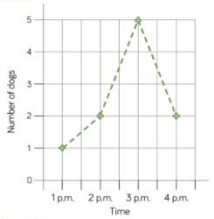
Abstract

Activity	Number of votes
Bowling	9
Cinema	10
Swimming	7
Ice-skating	14

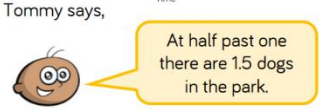
How many people voted in total?
$\frac{1}{4}$ of the votes were for _____.
7 more people voted for _____ than _____.

Reasoning

Tommy created a line graph to show the number of dogs walking in the park one afternoon.



Tommy says,



Why is Tommy incorrect?

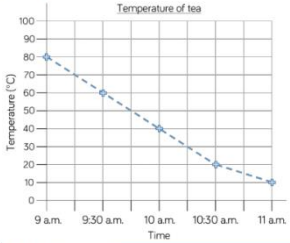
What would be a better way of presenting this data?

Attraction	Number of visitors on Saturday	Number of visitors on Sunday
Animal World Zoo	1,282	2,564
Maltings Castle	2,045	1,820
Primrose Park	1,952	1,325
Film Land Cinema	2,054	1,595

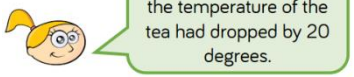
True or false?

- The same number of people visited Maltings Castle as Film Land Cinema on Saturday.
- Double the number of people visited Animal World Zoo on Sunday than Saturday.
- The least popular attraction of the weekend was Primrose Park.

Eva measured the temperature of a cup of tea every 30 minutes for 2 hours. The graph shows Eva's results.

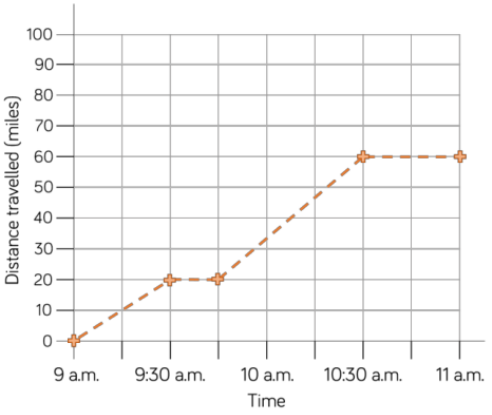


Eva says,

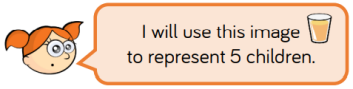


Do you agree with Eva?
Explain why.

Write a story to match the graph.



Alex wants to use a pictogram to represent the favourite drinks of everyone in her class.



Explain why this is not a good idea.

Halifax City Football Club sold the following number of season tickets:

- Male adults – 6,382
- Female adults – 5,850
- Boys – 3,209
- Girls – 5,057

Would you use a bar chart, table or pictogram to represent this data? Explain why.