YEAR 4
Mathematics
Exemplification Materials

National Centre
for Excellence in the
Teaching of Mathematics

PLACE VALUE Exemplification

count in multiples of 6, 7, 9, 25 and 1000

Children should be able to:

Explain how to work out the 6 times-table from the 3 times-table or the 9 times-table from the 3 times-table.

Know that 9 × 8 = 72 so that 72 ÷ 9 = 8 and deduce 720 ÷ 9.

Explain the relationship between 8 × 7 = 56, 6 × 7 = 42 and 14 × 7 = 98.

find 1000 more or less than a given number

Children should be able to:

Answer questions such as, what is the missing number in the number sentence and how do you know? 5742 + □ = 9742

count backwards through zero to include negative numbers

Children should be able to:

Create a sequence that includes the number –5 and then describe the sequence to the class.

Explain how to find the missing numbers in a sequence eg. _ *–9, –5, –1,* _ and explain the rule.

Answer questions such as, What number can you put in the box to make this statement true? __ < –2

Know that the current western numeral system is the modified version of the Hindu numeral system developed in India to include the concept of zero and place value.

ADDITION & SUBTRACTION Exemplification

recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)

Children should be able to:

Give the value of a digit in a given number e.g. the 7 in 3 274

Write in figures a given number e.g. four thousand and twenty.

Recognise a number partitioned like this: 4 000 + 200 + 60 + 3 and be able to read and write the number.

Create the biggest and smallest whole number with four digits eg. 3, 0, 6, 5

Find missing numbers in a number sentence e.g. _ +_ = 1249

order and compare numbers beyond 1000

Children should be able to:

Find numbers that could go in the boxes to make these correct, □ + □ < 2000, 3000 > □ – □

identify, represent and estimate numbers using different representations

Children should be able to:

Answer questions such as, which of these numbers is closest to the answer of 342 – 119: 200 220 230 250 300

Identify what the digit 7 represents in each of these amounts: £2.70, 7.35m, £0.37, 7.07m

round any number to the nearest 10, 100 or 1000

Children should be able to:

Explain tips to give someone who is learning how to round numbers to the nearest 10, or 1000.

Answer questions such as, I rounded a number to the nearest 10. The answer is 340. What number could I have started with? Know what to look for first when you order a set of numbers and know which part of each number to look at to help you.

ADDITION & SUBTRACTION Exemplification

solve number and practical problems that involve all of the above and with increasingly large positive numbers

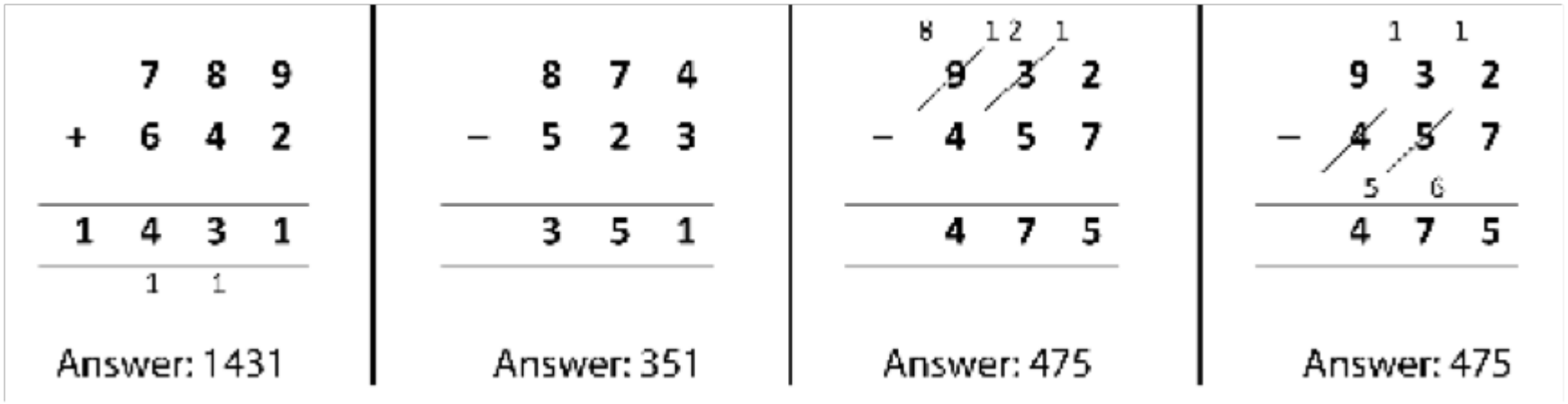
Children should be able to:

Sort problems into those they would do mentally and those they would do with pencil and paper and explain their decisions. Answer questions such as, There are 70 children. Each tent can accommodate up to 6 children. What is the smallest number of tents they will need? The distance to the park is 5 km when rounded to the nearest kilometre. What is the longest/shortest distance it could be? How would you give somebody instructions to round distances to the nearest kilometre?

read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value

ADDITION & SUBTRACTION Exemplification

add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate



estimate and use inverse operations to check answers to a calculation

Tina has read the first 85 pages in a book that is 150 pages long. Which number sentence could Tina use to find the number of pages she must read to finish the book?

A 150 + 85 = ☐

B ☐ – 85 = 150

C 150 ÷85 = ☐

D 150 – 85 = ☐

ADDITION & SUBTRACTION Exemplification

solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

Children should be able to carry out practical tasks such as that represented here in an[Australian classroom](#).

Children were asked to individually run the class market stall. They were told they could use mental strategies or the whiteboard provided to assist them in their calculations. The customer (their teacher) would come to purchase some items. Each child was asked to solve a transaction problem involving a single item (calculating change – subtraction) and then a transaction involving two items (adding together values and then calculating change or two subsequent subtractions). They were also asked to explain their thinking and asked how to give the change in a different way (representing money values in various ways).

Children should be able to solve problems such as:

- I have read 134 of the 512 pages of my book. How many more pages must I read to reach the middle?
- There are 8 shelves of books. 6 of the shelves hold 25 books each. 2 of the shelves have 35 books each. How many books altogether are on the shelves?
- I think of a number, subtract 17, and divide by 6. The answer is 20. What was my number?
  You start to read a book on Thursday. On Friday you read 10 more pages than on Thursday. You reach page 60. How many pages did you read on Thursday?

page 60.
read on

Amir and Lara buy some fruit.

grapes	pineapples	peaches
£2.50	£1.40	£1.99
for 1 kg	each	for a box

Amir buys 2 pineapples and a box of peaches.
How much does he pay?

Lara buys half a kilogram of grapes and one pineapple.
How much change does she get from £5?

How
Thurs-

A shop sells sun hats.

Ryan buys some sunglasses for £4.69 and a sun hat. How much change does he get from £10?

many pages did you
day?

MULTIPLICATION & DIVISION Exemplification

recall multiplication and division facts for multiplication tables up to 12 × 12

Children should be able to:

Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency.

e.g. One orange costs nineteen pence. How much will three oranges cost?

What is twenty-one multiplied by nine?

How many twos are there in four hundred and forty?

use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers

Children should be able to:

Pupils practise mental methods and extend this to three-digit numbers to derive facts, for example 200 × 3 = 600 into 600 ÷ 3 = 200.

e.g. Divide thirty-one point five by ten.

Ten times a number is eighty-six. What is the number?

recognise and use factor pairs and commutativity in mental calculations

Children should be able to:

Pupils write statements about the equality of expressions (e.g. use the distributive law 39 × 7 = 30 × 7 + 9 × 7 and associative law (2 × 3) × 4 = 2 × (3 × 4)). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations e.g. 2 x 6 x 5 = 10 x 6.

e.g. Understand and use when appropriate the principles (but not the names) of the commutative, associative and distributive laws as they apply to multiplication:

Example of commutative law 8 × 15 = 15 × 8

Example of associative law 6 × 15 = 6 × (5 × 3) = (6 × 5) × 3 = 30 × 3 = 90

Example of distributive law 18 × 5 = (10 + 8) × 5 = (10 × 5) + (8 × 5) = 50 + 40 = 90

MULTIPLICATION & DIVISION Exemplification

solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects

Children should be able to:

Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children.

e.g. 185 people go to the school concert. They pay £l.35 each. How much ticket money is collected?

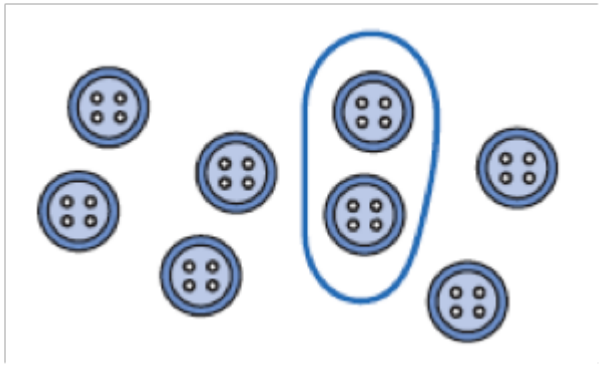
Programmes cost 15p each. Selling programmes raises £12.30. How many programmes are sold?

FRACTIONS Exemplification

recognise and show, using diagrams, families of common equivalent fractions

Recognise that five tenths ($\frac{5}{10}$) or one half is shaded.

Recognise that two eighths ($\frac{2}{8}$) or one quarter (¼) of the set of buttons is ringed

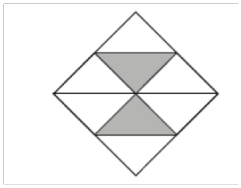


Recognise that one whole is equivalent to two halves, three thirds, four quarters… For example, build a fraction 'wall' using a computer program and then estimate parts.

Recognise patterns in equivalent patterns, such as:

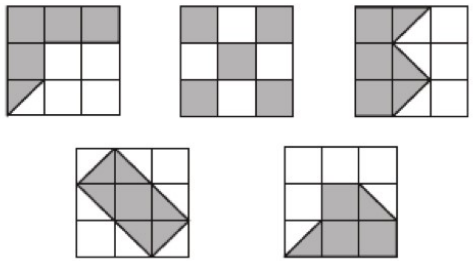
½ = $\frac{2}{4}$ = $\frac{3}{6}$ = $\frac{4}{8}$ = $\frac{5}{10}$ = $\frac{6}{12}$ = $\frac{7}{14}$ And similar patterns for ⅓, ¼, □, □, $\frac{1}{10}$.

FRACTIONS Exemplification


Here is a square.

What fraction of the square is shaded?

Here are five diagrams. Look at each one.
Put a tick (□) on the diagram is exactly ½ of it is shaded. Put a cross (□) if it us not.



count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten

Respond to questions such as:

What does the digit 6 in 3.64 represent? The 4? What is the 4 worth in the number 7.45? The 5?

Write the decimal fraction equivalent to:

two tenths and five hundredths; twenty-nine hundredths; fifteen and nine hundredths.

Continue the count 1.91, 1.92, 1.93, 1.94 ...

Suggest a decimal fraction between 4.1 and 4.2

Know how many 10 pence pieces equal a pound, how many 1 pence pieces equal a pound, how many centimetres make a metre.

FRACTIONS Exemplification

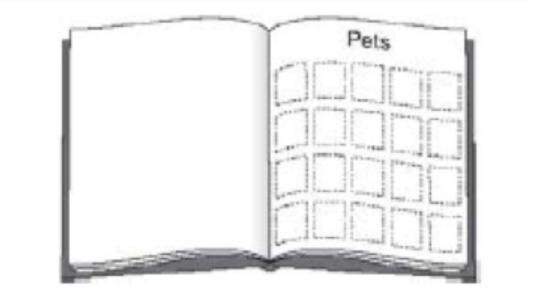
solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number

What is one-fifth of twenty-five?

Write the missing number to make this correct.

$$\frac{1}{4} \text{ of } 24 = \frac{1}{2} \text{ of } \square$$

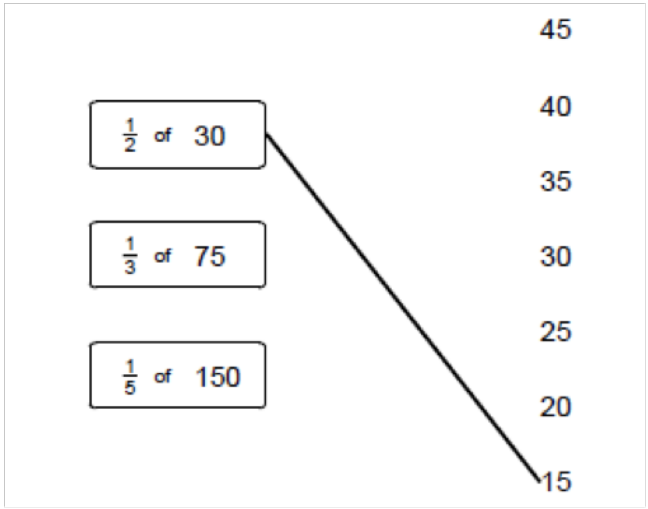
Mary has 20 pet stickers to go on this page.



¼ of them are dog stickers. ½ of them are cat stickers. The rest are rabbit stickers. How many rabbit stickers does she have?

Match each box to the correct number. One has been done for you.

FRACTIONS Exemplification



add and subtract fractions with the same denominator

For example:

½ + ½, ¼ + ¾, ⅜ + ⅝, □ + □ + □, $\frac{7}{10}$ + $\frac{3}{10}$ + $\frac{5}{10}$ + $\frac{8}{10}$, ¾ - ⅓, $\frac{6}{7}$- $\frac{4}{7}$, $\frac{9}{10}$ + $\frac{4}{10}$, – $\frac{3}{10}$

recognise and write decimal equivalents of any number of tenths or hundredths

Recognise that, for example:

0.07 is equivalent to $\frac{7}{100}$ 6.35 is equivalent to 6 $\frac{35}{100}$

Particularly in the contexts of money and measurement

Respond to questions such as:

Which of these decimals is equal to $\frac{19}{100}$? 1.9 10.19 0.19 19.1 Write each of these as a decimal fraction: $\frac{27}{100}$ $\frac{3}{100}$ 2 $\frac{33}{100}$

FRACTIONS Exemplification

recognise and write decimal equivalents to ¼; ½; ¾

Know that, for example

0.5 is equivalent to ½, 0.25 is equivalent to ¼, 0.75 is equivalent to ¾, 0.1 is equivalent to $\frac{1}{10}$

Particularly in the context of money and measurement.

find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as units, tenths and hundredths

Understand that:

When you divide a number by $\frac{1}{100}$, the digits move one/two places to the right.

26
2.6
0.26
0.026
Respond to oral or written questions such as:

How many times larger is 2600 than 26?

How many £1 notes are in £120, £1200?

Divide three hundred and ninety by ten.

Write in the missing number

$\square \div 10 = 20.$

FRACTIONS Exemplification

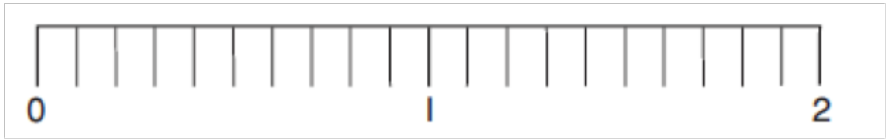
round decimals with one decimal place to the nearest whole number

Round these to the nearest whole number. For example:
9.7, 25.6, 148.3
Round these lengths to the nearest metre:
1.5m, 6.7m, 4.1m, 8.9m
Round these costs to the nearest £:
£3.27, £12.60, £14.05, £6.50

compare numbers with the same number of decimal places up to two decimal places

Place these decimals on a line from 0 to 2:

0.3, 0.1, 0.9, 0.5, 1.2, 1.9



Which is lighter: 3.5kg or 5.5kg? 3.72kg or 3.27kg? Which is less: £4.50 or £4.05?

Put in order, largest/smallest first:

6.2, 5.7, 4.5, 7.6, 5.2, 99, 1.99, 1.2, 2.1

Convert pounds to pence and vice versa. For example: Write 578p in £.

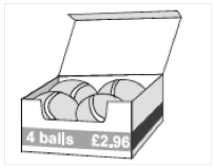
How many pence is £5.98, £5.60, £7.06, £4.00? Write the total of ten £1 coins and seven 1p coins (£10.07)

Write centimetres in metres. For example, write: 125 cm in metres (1.25 metres)

FRACTIONS Exemplification

solve simple measure and money problems involving fractions and decimals to two decimal places. These are the prices in a shoe shop

How much more do the boots cost than the trainers? Rosie buys a pair of trainers and a pair of sandals. How much change does she get from £50?



A box of four balls costs £2.96. How much does each ball cost? Dean and Alex buy 3 boxes of balls between them. Dean pays £4.50. How much must Alex pay? KS2 Paper B level 3

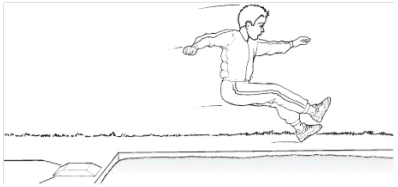
A full bucket holds 5½ litres. A full jug holds ½ a litre. How many jugs full of water will fill the bucket?

Harry spent one quarter of his savings on a book. What did the book cost if he saved: £8…£10…£2.40…?

Gran gave me £8 of my £10 birthday money. What fraction of my birthday money did Gran give me?

Max jumped **2.25 metres** on his **second** try at the long jump.

This was **75 centimetres** longer than on his **first** try.



How far in **metres** did he jump on his **first** try?

MEASUREMENT Exemplification

convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre

What is two hundred and seventy six centimetres to the nearest metre?

How many millimetres are in 3 centimetres?

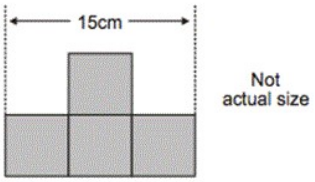
understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints

This bag of sugar weighs 1kg. Approximately how many pounds (lb) of sugar would fit into another empty bag of the same size as this one? Circle the correct answer.

20lb 14lb 2lb 4lb

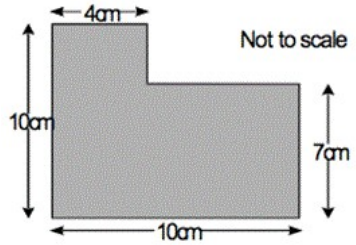
measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres

This shape is made from 4 shaded squares



MEASUREMENT Exemplification

Calculate the perimeter of the shape



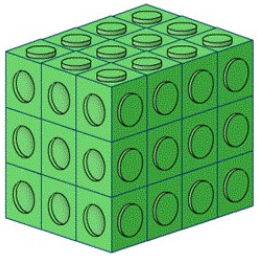
calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes

Calculate the area of a rectangle which is eleven metres long by 5 metres wide.

Which has the greatest area – a square with sides 6 cm long or a rectangle which is 7 cm long by 5 cm? How much greater is the area?

estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water]

Fitting it in is an activity to fill cuboid shapes with multilink cubes. It ends with a ‘create’ challenge that will test children’s knowledge in this area



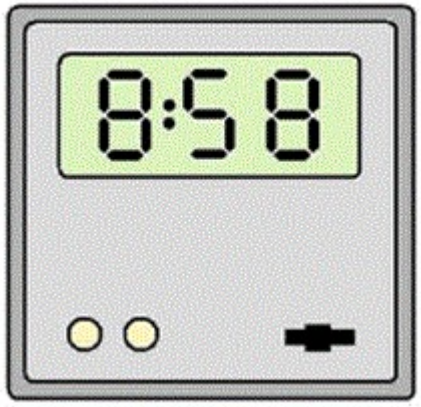
solve problems involving converting between units of time

5 on the clock is a problem that requires children to be able to convert between 12 and 24 hour clocks confidently.

MEASUREMENT Exemplification

solve problems involving converting between units of time

5 on the clock is a problem that requires children to be able to convert between 12 and 24 hour clocks confidently.



use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation,

A day with Grandpa. Is an engaging problem using imperial units that challenges children's understanding of the concept of area rather than simply requiring them to follow a rule for finding areas of rectangles. These calculations should also help learners to see the advantages of the metric system as well as understand it more fully!

MEASUREMENT Exemplification

SHAPE - GEOMETRY Exemplification

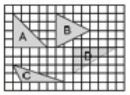
compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes

Pupils should be able to complete this sentence:

All equilateral triangles have …

identify acute and obtuse angles and compare and order angles up to two right angles by size

Here are four triangles drawn on a square grid.

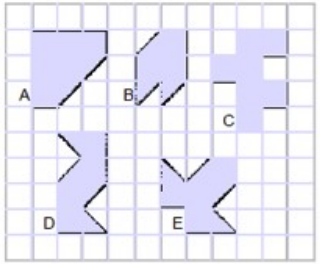


Write the letter for each triangle in the correct region of the sorting diagram. One has been done for you.

	has a right angle	has an obtuse angle	has an acute angle
is isosceles	A		
is not isosceles			

identify lines of symmetry in 2-D shapes presented in different orientations

Here are five shapes on a square grid.

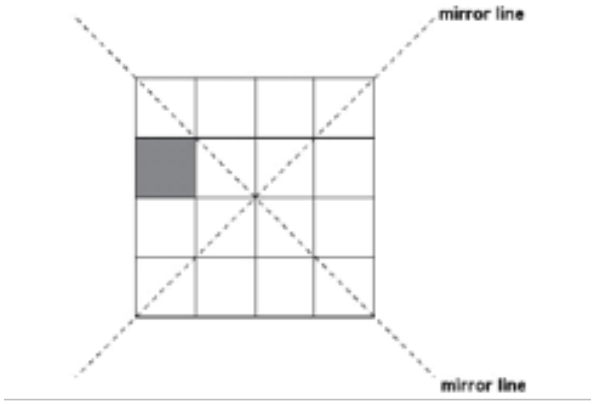


Write the letters of the two shapes which have a line of symmetry.

SHAPE - GEOMETRY Exemplification

complete a simple symmetric figure with respect to a specific line of symmetry

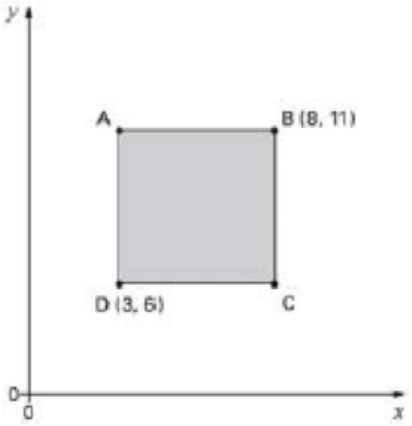
Here is a shaded square on a grid. Shade in 3 more squares so that the design is symmetrical in both mirror lines.



SHAPE - GEOMETRY - POSITION & DIRECTION Exemplification

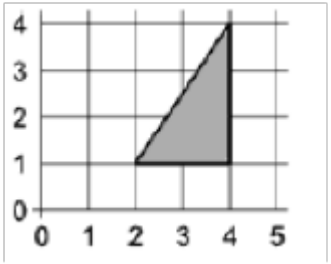
Describe positions on a 2-D grid as coordinates in the first quadrant

Here is a shaded square.



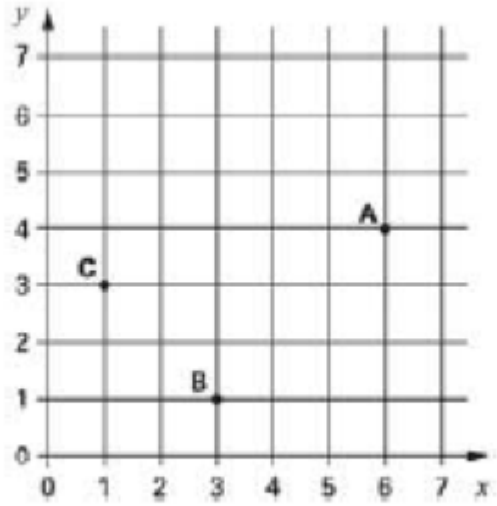
Write the coordinates for point A.

describe movements between positions as translations of a given unit to the left/right and up/down

I can describe where a shape will be after translation	This triangle is translated two squares to the left and one square down. Give the coordinates of its vertices in the new position.	

SHAPE - GEOMETRY - POSITION & DIRECTION Exemplification

plot specified points and draw sides to complete a given polygon



A, B and C are three corners of a rectangle. What are the coordinates of the fourth corner?

STASITICS Exemplification

interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs

- Collect data, measuring where necessary. They work with a range of data, such as shoe size and width of shoe across the widest part of the foot, the number of letters in children's names, the width of their hand spans, the distance around their neck and wrist, data from nutrition panels on cereal packets, and so on.
- They decide on a suitable question or hypothesis to explore for each data set they work on. For example, 'We think that…boys have larger shoes than girls', '…our neck measurements are twice as long as our wrist measurements', '…girls' names have more letters than boys' names' or '…children in our class would prefer to come to school by car but they usually have to walk'.
- Children consider what data to collect and how to collect it. They collect their data and organise it in a table. They choose a Venn or Carroll diagram, or a horizontal or vertical pictogram or bar chart to represent the data. Where appropriate, they use the support of an ICT package. They justify their choice within the group so that they can present it.
- They understand that they can join the tops of the bars on the bar-line chart to create a line graph because all the points along the line have meaning.

solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs

- Undertake one or more of three enquiries:
-
- What vehicles are very likely to pass the school gate between 10:00 am and 11:00 am? Why? What vehicles would definitely not pass by? Why not? What vehicles would be possible but not very likely? Why? What if it were a different time of day? What if the weather were different?
- Does practice improve estimation skills? Children estimate the lengths of five given lines and record the estimate, measured length and difference. They repeat the activity with five more lines to see whether their estimation skills have improved after feedback.
- What would children in our class most like to change in the school? Children carry out a survey after preliminary research to whittle down the number of options to a sensible number, e.g. no more than five.
- Children identify a hypothesis and decide what data to collect to investigate their hypothesis. They collect the data they need and decide on a suitable representation. In groups, they consider different possibilities for their representation and explain why they have made their choice.
- In the first enquiry, children use tallies and bar charts. In the second, they use tables and bar charts to compare the two sets of measurements. In the third,