

Level5opaedia

‘A level is a level’

Compiled for www.glosmaths.org, 2008

Please note that Using and Applying assessment criteria are not included within the Levelopaedia

Numbers and the Number System

Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 and 1000 and explain the effect

Know that, e.g.

- in 5.239 the digit 9 represents nine thousandths, which is written as 0.009
- the number 5.239 in words is 'five point two three nine' not 'five point two hundred and thirty five'
- the fraction $\frac{5239}{1000}$ is read as 'five and two hundred and thirty-nine thousandths'

Complete statements such as, e.g.

- $4 \div 10 = \square$
- $4 \div \square = 0.04$
- $0.4 \times 10 = \square$
- $0.4 \times \square = 400$
- $0.4 \div 10 = \square$
- $0.4 \div \square = 0.004$
- $\square \div 100 = 0.04$

Show me:

- a number when multiplied by 10 gives an answer greater than 3.5
- a number when divided by 100 gives an answer less than 3.5

True / Never / Sometimes:

- To multiply by 100, you move the digits two places to the left
- To multiply by 100, you move the digits two places to the right
- To divide by 100, you move the digits two places to the left
- To divide by 100, you move the digits two places to the right
- To divide by 100, you move the decimal point two places to the left
- To divide by 100, you move the decimal point two places to the right

What is the same/different:

0.46×10 , $46 \div 10$, 4.6×10 , $460 \div 100$

Convince me:

- that 0.35 is greater than 0.035.
- that $0.046 \times 100 = 4.6$
- that $4 \div 100 = 0.04$
- that $25 \div 10$ and $250 \div 100$ give the same answer.
- how to multiply a decimal by 10.
- how to divide a decimal by 100.

Round decimals to the nearest decimal place and order negative numbers in context

Round, e.g.

- 2.75037 to 1 decimal place
- 176.05 to 1 decimal place
- 24.9316 to 2 decimal places
- 137.4996 to 3 decimal places

Order the following places from coldest to warmest:

- Moscow, Russia: 4°C
- Oymyakou, Russia: -96°C
- Vostok, Antarctica: -129°C
- Rogers Pass, Montana, USA: -70°C
- Fort Selkirk, Yukon, Canada: -74°C
- Northice, Greenland: -87°C
- Reykjavik, Iceland: 5°C

Show me:

- a number that rounds to 4.3 to 1 decimal place
- a situation where you would need to order negative numbers

What is wrong:

- 2.399 rounds to 2.310 to 2 decimal places
- -6 is smaller than -4

What is the same / different:

- 72.344 and 72.346

True / Never / Sometimes:

- 3.5 is closer to 4 than it is to 5
- -36 is bigger than -34

Convince me that:

- 8.4999 rounds to 8.5 to 3 decimal places
- -14 is greater than -16

Recognise and use number patterns and relationships

Identify a pattern of numbers within a 1-100 grid and use this to decide whether or not a number greater than 100 is in this pattern

Continue sequences involving decimals

Describe number relationships including multiple, factor and square

Understand and use prime numbers

Show me:

- A prime number greater than 100
- Two prime numbers that add to 98

True/Never/Sometimes:

- The sum of the factors of a number (except the number itself) have a total greater than that number
- The sum of the factors of a number (except the number itself) have a total less than that number

	<p>What is the same different about</p> <ul style="list-style-type: none"> ▪ 4.3, 4.6, 4.9, 5.2, ... ▪ 16.8, 17.1, 17.4, 17.7, ... ▪ 9.4, 9.1, 8.8, 8.5, ... ▪ Multiple, factor, square, prime <p>Convince me that 1 is not a prime number</p>
Use equivalence between fractions and order fractions and decimals	
<p>Find two fractions equivalent to $\frac{4}{5}$</p> <p>Show that $\frac{12}{18}$ is equivalent to $\frac{6}{9}$, $\frac{4}{6}$ or $\frac{2}{3}$</p> <p>Find the unknown numerator or denominator in equivalent fraction statements</p> <p>Order fractions with different denominators</p> <p>Know there is more than one way to find a percentage using a calculator. For example, to find 12% of 45: Convert a percentage calculation to an equivalent decimal calculation 0.12×45. Or, convert a percentage calculation to an equivalent fraction calculation $\frac{12}{100} \times 45$. Recognise that the second method is less efficient than the first.</p> <p>Convert fractions such as $\frac{2}{5}$ into tenths or hundredths and express them as decimals or percentages and vice versa</p>	<p>Show me:</p> <ul style="list-style-type: none"> ▪ two equivalent fractions. ▪ some fractions that are equivalent $\frac{3}{5}$. ▪ a set of equivalent percentages, fractions and decimals. ▪ a percentage of a given quantity that you can easily work out. <p>True / Never / Sometimes:</p> <ul style="list-style-type: none"> ▪ 10% is the same as $\frac{1}{10}$ so 20% must be the same as $\frac{1}{20}$. ▪ Equivalent fractions can be found by adding the same amounts to the numerators and denominators ▪ Equivalent fractions can be found by subtracting the same amounts to the numerators and denominators <p>Convince me:</p> <ul style="list-style-type: none"> ▪ that $\frac{12}{18}$ is equivalent to $\frac{2}{3}$ ▪ how to order $\frac{2}{3}$, $\frac{3}{5}$, $\frac{1}{2}$, $\frac{3}{10}$ from smallest to largest. ▪ how you use a calculator to find 13% of £25
Reduce a fraction to its simplest form by cancelling common factors	
<p>Cancel these fractions to their simplest form by looking for highest common factors:</p> <ul style="list-style-type: none"> • $\frac{9}{15}$ • $\frac{12}{18}$ • $\frac{42}{56}$ 	<p>Show me a fraction that can be reduced to $\frac{2}{3}$ in its simplest form</p> <p>What is wrong with $\frac{2}{3} = \frac{1}{1.5}$?</p> <p>True / Never / Sometimes: To cancel a fraction, you halve the numerator and denominator until you can't do it any more</p> <p>What is the same/different: $\frac{9}{15}$, $\frac{30}{50}$, $\frac{9}{30}$, $\frac{15}{50}$</p> <p>Convince me that $\frac{42}{56}$ in its simplest form is $\frac{3}{4}$</p>
Understand simple ratio	
<p>Write 16:12 in its simplest form</p> <p>A teaspoon holds 5ml of medicine and a bottle holds 100ml of medicine. Find the ratio of the capacity of the teaspoon to the capacity of the bottle. Write the answer in its simplest form</p> <p>Understand the meaning of 'mix sand and cement in the ratio 5:1'</p>	<p>Show me a ratio which simplifies to 2:7</p> <p>What is wrong: To simplify the ratio 32:48 keep dividing both sides by 2 until you can't do it any more</p> <p>True / Never / Sometimes: To simplify the ratios keep dividing both sides by 2 until you can't do it any more</p> <p>What is the same / different: 4:5 and £4:500p 2:3, 34:51 and 3:2</p> <p>Convince me that $19:95 = 1:5$</p>

Calculating

Use known facts, place value, knowledge of operations and brackets to calculate including using all four operations with decimals to two places

Multiply or divide decimal numbers by a single digit e.g.

- 31.62×7
- $109.6 \div 8$
- $239.22 \div 6$

Know and use the order of operations, including brackets

Use factors, e.g.

- 3.2×30 : $3.2 \times 10 = 32$; $32 \times 3 = 96$
- $156 \div 6$: $156 \div 3 = 52$ $52 \div 2 = 26$

Use partitioning, e.g. for multiplication, partition either part of the product: $7.3 \times 11 = (7.3 \times 10) + 7.3 = 80.3$

Use $1/5 = 0.2$ to convert fractions to decimals mentally. e.g. $3/5 = 0.2 \times 3 = 0.6$

Show me an example of how you could use partitioning to multiply a decimal by a two digit whole number

What is wrong:

- $7.3 \times 12 = (7 \times 10) + (0.3 \times 2) = 70.6$
- $156 \div 6 = 156 \div (2 \times 3) = (156 \div 2) \times 3 = 78 \times 3 = 234$

Convince me that:

- $7.3 \times 11 = 80.3$
- $3.2 \times 30 = 96$
- $156 \div 6 = 26$
- $3/5 = 0.6$

Use a calculator where appropriate to calculate fractions/percentages of quantities/measurements

Use mental calculations, e.g.

- $1/8$ of 20 = 2.5; find one quarter and halve it
- 75% of 24 = 18; find 50% then 25% and add the results
- 15% of 40 = 6; find 10% then 5% and add the results
- 40% of 400kg = 160kg; find 10% then multiply by 4

Calculate simple fractions or percentages of a number/quantity e.g. $3/8$ of 400g or 20% of £300

Show me a percentage of a given quantity that you can you easily work out

What is wrong:

- 15% of 45 = $45 \div 15 = 3$
- 40% of 400kg = $400 \div 40 = 10$

True / Never / Sometimes:

To calculate 15% of a quantity, you divide by 15
40% is greater than 15%

Convince me that:

- 75% of 24 = 18
- 15% of 40 = 6
- 40% of 400kg

Understand and use an appropriate non-calculator method for solving problems that involve multiplying and dividing any three digit number by any two-digit number

Understand and use an appropriate non-calculator method for solving problems that involve multiplying and dividing any three-digit number by any two-digit number, e.g. 6.24×8 , 673×24 , $3199 \div 7$

What is wrong:

- $6.24 \times 8 = (6 \times 8) + (0.2 \times 8) + (0.04 \times 8) = 48 + 0.16 + 0.032 = 48.192$
- $673 \times 24 = (673 \times 2) + (673 \times 4) = 1346 + 2692 = 4038$
- $3199 \div 7 = (319 \div 7) + (9 \div 7) = (45r4) + (1r2) = 46r6$

Convince me that:

- $6.24 \times 8 = 49.92$
- $673 \times 24 = 16152$
- $3199 \div 7 = 457$

Solve simple problems involving ordering, adding, subtracting negative numbers in context

Work out the resulting temperature after a change which passes 0°C , or one which involves negative numbers only

Solve problems involving overdrawn amounts on bank statements

Show me an addition / subtraction with the answer -7

True / Never / Sometimes:

- Addition makes numbers bigger.
- Subtraction makes numbers smaller.

Convince me that:

- $-6 < -4$
- $4 - 7 = -3$

Solve simple problems involving ratio and direct proportion

Solve simple problems involving ratio and direct proportion, beginning to use multiplication rather than trial and improvement to solve ratio problems

Show me a quantity divided correctly into a ratio of two parts.

Show me how pupils could be in a school if the ratio of boys to girls in a school is 4:5.

What is wrong:

A map is drawn to the scale 1:500. Therefore 1cm on the map represents 500m on the ground.

Convince me that if 28 red cubes are arranged with a number of green cubes in the ratio 2:7 then there will be 126 cubes altogether.

Apply inverse operations and approximate to check answers to problems are of the correct magnitude

Discuss questions such as, e.g.

- A girl worked out the cost of 8 bags of apples at 47p a bag. Her answer was £4.06. Without working out the answer, say whether you think it is right or wrong.
- I buy six items costing 76p, 89p, 36p, £1.03, 49p and 97p. I give the shop assistant a £10 note and get £3.46 change. I immediately think the change is wrong. Without calculating the sum, explain why you think I am right.
- A boy worked out $£2.38 + 76p$ on a calculator. The display showed 78.38. Why did the calculator give the wrong answer?

Check by doing the inverse operation, e.g.

- use a calculator to check $43.2 \times 26.5 = 1144.8$ with $1144.8 \div 43.2$
- $3/5$ of 320 = 192 with $192 \times 5 \div 3$
- $3 / 7 = 0.4285714\dots$ with 7×0.4285714

Convince me how you could use inverse operations to check that a calculation is correct.

Algebra

Construct, express in symbolic form, and use simple formulae involving one or two operations

Substitute integers into simple formulae

Simplify $P=x+x+y+y$

Write $P = 2(x+y)$ as $P=2x+2y$

Recognise that in the expression $2 + 5a$ the multiplication is to be performed first

Understand that the letter stands for an unknown number or variable number and not a label, e.g. '5a' cannot mean '5 apples'

Understand the difference between expressions such as:

- $2n$ and $n+2$
- $3(c + 5)$ and $3c + 5$
- n^2 and $2n$
- $2n^2$ and $(2n)^2$

Show me a formula involving a and b such that when you substitute $a = 2$ and $b = 7$ into the formula you get 18.

Show me a formula involving a and b such that when you substitute $a = -2$ and $b = 3$ into the formula you get 18.

What is wrong:

- $4(b+2) = 4b + 2$
- $3(p - 4) = 3p - 7$
- $-2(5 - b) = -10 - 2b$
- $12 - (n - 3) = 9 - n$

Convince me that:

- $3(x+4) = 3x + 12$
- $4(y - 3) = 4y - 12$
- $-3(6 - m) = -18 + 3m$
- $15 - (g - 2) = 17 - g$

Use and interpret coordinates in all four quadrants

Plot and interpret graphs such as

- $y = x$
- $y = 2x$
- $y = x + 1$
- $y = x - 1$

Given the coordinates of three vertices of a parallelogram, find the fourth

You might like to try:
x is a cross, wise up!

Show me a pair of co-ordinates of a point on the line i) $x = 2$ ii) $y = 2$ iii) $y = x$ iv) $y = x + 1$

Show me four pairs of co-ordinates that when plotted in would form a i) square enclosing the origin ii) rectangle enclosing the origin

What is wrong:

the point $(3, 6)$ is on the line $y = x + 2$.

True/Never/Sometimes:

- It doesn't matter which axes you use first
- The first number is the x value
- The first number is the y value
- The x value has to be less than or equal to the y - value

What is the same/different about:

$(-2, 1)$, $(-2, -4)$, $(-2, 6)$, $(-2, -8)$ and $(0,0)$, $(-1,-2)$, $(2, -2)$, $(-3, 4)$

Convince me:

- how to use the scale on the axes to help you to read a co-ordinate that has been plotted
- how to use the scale on the axes to help plot a co-ordinate accurately
- that $(-2, 3)$ is in a different quadrant to $(2, -3)$

Shape, Space and Measures

Use a wider range of properties of 2-D and 3-D shapes and identify all the symmetries of 2-D shapes

Find lines of reflection symmetry in shapes and diagrams

Draw shapes with a fixed number of lines of symmetry

Recognise the rotation symmetry of familiar shapes, such as parallelograms and regular polygons.

Also: reason about shapes, positions and movements, e.g.

- visualise a 3-D shape from its net and match vertices that will be joined
- visualise where patterns drawn on a 3-D shape will occur on its net

Show me:

- a quadrilateral that has i) no lines of symmetry ii) 1 line of symmetry, iii) 2 lines, iv) 4 lines.
- a polygon that has i) no lines of symmetry ii) 1 line of symmetry, iii) 2 lines, iv) 3 lines v) more than 4 lines
- a quadrilateral that has i) no rotational symmetry ii) order of rotational symmetry 1, iii) order of rotational symmetry 2 iv) order of rotational symmetry 4
- a polygon that has i) no rotational symmetry ii) order of rotational symmetry 1, iii) order of rotational symmetry 2 iv) order of rotational symmetry 3 v) order of rotational symmetry greater than 4.

True/Never/Sometimes:

- Quadrilaterals have at least 2 lines of symmetry
- Quadrilaterals have at least rotational symmetry of order 2
- Polygons are symmetrical
- A trapezium has one line of symmetry

Convince me that a rectangle has only two lines of symmetry

Use language associated with angle and know and use the angle sum of a triangle and that of angles at a point

Calculate 'missing angles' in triangles, including isosceles triangles or right angled triangles, when only one/one other angle is given

Calculate angles on a straight line or at a point such as the angle between the hands of a clock, or intersecting diagonals at the centre of a regular hexagon

Understand 'parallel' and begin to understand 'perpendicular' in relation to edges or faces

Classify quadrilaterals, including trapezium, using properties such as number of parallel sides

Show me:

- a triangle with, (i) exactly one acute angle, (ii) two acute angles, (iii) exactly one obtuse angle
- three angles of a triangle
- three angles that meet at a point

True/Never/Sometimes:

- You can draw a triangle with, (i) one acute angle, (ii) two acute angles. (iii) one obtuse angle, (iv) two obtuse angles
- The sum of the angles in a triangle is 180°
- The sum of the angles at a point is 180°

Convince me that:

- the sum of the angles in a triangle is 180° .
- the sum of the angles at a point is 360° .

Reason about position and movement and transform shapes

Reflect shapes in oblique (45°) mirror lines where the shape either does not touch the mirror line, or where the shape crosses the mirror line

Reflect shapes not presented on grids, by measuring perpendicular distances to/from the mirror

Reflect shapes in two mirror lines, where the shape is not parallel or perpendicular to either mirror

Rotate shapes, through 90° or 180° , when the centre of rotation is a vertex of the shape and recognise such rotations

Translate shapes along an oblique line

Show me:

- a (i) reflection that is easy to do (ii) a rotation that is easy to do.
- (i) reflection that is hard to do (ii) a rotation that is hard to do.

True/Never/Sometimes:

- Reflected shapes are the same size and shape as the original shape.
- Rotated shapes are the same size and shape as the original shape.
- Translated shapes are the same size and shape as the original shape.
- Rotating a shape through 180° results in the same image as reflection into a mirror line presented at 45° .

What is the same/different:

	<p>rotation, reflection, translation</p> <p>Convince me how to:</p> <ul style="list-style-type: none"> reflect a shape into a mirror line presented at 45°. reflect a shape into a mirror line where the shape touches the line. rotate a shape or object about its centre. rotate a shape or object about a vertex. translate a shape or object.
<p>Measure and draw angles to the nearest degree, when constructing models and drawing or using shapes</p>	
<p>Measure and draw reflex angles to the nearest degree, when neither edge is horizontal / vertical</p> <p>Construct a triangle given the length of two sides and the angle between them (accurate to 1mm and 2°)</p>	<p>Show me i) an acute angle ii) an obtuse angle iii) a reflex angle</p> <p>True/Never/Sometimes:</p> <ul style="list-style-type: none"> To draw a triangle you need to know the size of all three angles To draw a triangle you need to know the size of all three sides. <p>Convince me:</p> <ul style="list-style-type: none"> how to draw a reflex angle with a 180° protractor. why I should estimate the size of an angle before measuring it.
<p>Read and interpret scales on a range of measuring instruments, explaining what each labelled division represents</p>	
	<p>Show me a scale measuring i) 50cm ii) 25 kg iii) 4 litres</p> <p>Convince me:</p> <ul style="list-style-type: none"> how to read a scale on measuring equipment. how to decide what each labelled division represents.
<p>Solve problems involving the conversion of units and make sensible estimates of a range of measures in relation to everyday situations</p>	
<p><u>Change a larger unit into a smaller one.</u> e.g.</p> <ul style="list-style-type: none"> Change 36 centilitres into millilitres Change 0.89km into metres Change 0.56 litres into millilitres <p><u>Change a smaller unit into a larger one.</u> e.g.</p> <ul style="list-style-type: none"> Change 750 g into kilograms Change 237 ml into litres Change 3 cm into metres Change 4mm into centimetres <p>Work out approximately how many km are equivalent to 20 miles</p> <p>Solve problems such as $1.5\text{kg} \div 30\text{g}$</p> <p>Explain what each labelled division represents on a scale</p>	<p>Show me:</p> <ul style="list-style-type: none"> a metric equivalent of an imperial measurement. another measurement that is the same as i) 3m ii) 2 kg <p>What is the same/different:</p> <ul style="list-style-type: none"> metres, miles, kilometres, inches grams, kilograms, kilometres, millimetres mile, litre, gallon, pounds <p>Convince me how you would change:</p> <ul style="list-style-type: none"> metres into feet km into miles g into kilograms <p>Convince me that 80p a litre is better value for money than £4 for a gallon of petrol.</p>
<p>Understand and use the formula for the area of a rectangle and distinguish area from perimeter</p>	
<p>Find the length of a rectangle given its perimeter and width</p> <p>Find the area or perimeter of simple L shapes, given some edge lengths</p> <p>Draw a parallelogram or trapezium of a given area on a square grid</p> <p>Reason about special triangles and quadrilaterals</p>	<p>Show me a rectangle:</p> <ul style="list-style-type: none"> with an area of 24cm^2. that has a perimeter of 24cm that has an area < perimeter that has an area = perimeter <p>True/Never/Sometimes:</p> <ul style="list-style-type: none"> Area of a rectangle = Perimeter of a rectangle Area of a rectangle < Perimeter of a rectangle Area of a rectangle > Perimeter of a rectangle

e.g. given the perimeter and one side of an isosceles triangle, find both possible triangles

- The area of a rectangle can be found by 'number of squares in a row times number of rows'

What is the same/different about:
Area, Perimeter

Convince me how to:

- find the area of compound shapes formed from rectangles.
- find the area of a rectangle given its perimeter and width.

Handling Data

Ask questions, plan how to answer them and collect the data required

Plan to answer questions such as:

- Which football team has the best goal-scoring record?
- What method of travel to school has the shortest journey time?
- Which newspaper is the easiest to read?

Convince me why you chose to collect the data in that way.

Convince me why you chose to ask that many people / select that amount of data.

In probability, select methods based on equally likely outcomes and experimental evidence, as appropriate

Describe and predict outcomes from data using the language of chance or likelihood

Compare two spinners to find which is more likely to result in an even number

Decide if a probability can be calculated or if it can only be estimated from the results of an experiment

On a fair die what is the probability of rolling, e.g.

- 5?
- an odd number?
- 0?
- a number greater than 2?
- a prime number?
- a number lying between 0 and 7?

Show me examples of equally likely outcomes with given probabilities of i) 0.5, ii) 1/6, iii) 0.2.

What is wrong:

The probability of rolling a four on a fair die is 1/4

True/Never/Sometimes:

- When rolling a fair die, the probability of getting a six is greater than the probability of getting a one.
- If when tossing a coin ten times, the outcome has been tails nine times then the probability of getting a head is more likely than a tail for the tenth toss.
- When you spin a coin, the probability of getting a head is 0.5. So if you spin a coin ten times you would get exactly 5 heads.
- Probabilities lie between 0 and 1

Convince me that the numbers on a fair die have equally likely outcomes of 1/6.

Understand and use the probability scale from 0 to 1

On a fair die what is the probability of rolling, e.g.

- 5?
- an odd number?
- 0?
- a number greater than 2?
- a prime number?
- a number lying between 0 and 7?

Mark these probabilities on a probability scale

Show me an event which should be placed at i) 0 on the probability scale ii) 1 on the probability scale iii) 1/2 on the probability scale, iv) 1/4 on the probability scale

What is wrong:

- with any probability greater than 1
- with any probability less than 0

What is the same / different with a probability scale marked with:

- Fractions, decimals, percentages, words

Convince me that I mark the probability of rolling a prime number on a die at 1/2 on the probability scale.

Understand and use the mean of discrete data and compare two simple distributions, using the range and one of mode, median or mean

Describe and compare two sets of football results, by using the range and mode

Solve problems such as, 'Find 5 numbers where the mode is 6 and the range is 8'

Use the mean of a set of measurements from a science experiment

How do pupils travel to school?

Compare the median and range of the times taken to travel to school for two groups of pupils such as those who travel by bus and those who travel by car.

Show me a set of 5 numbers that have:

- i) a mean of 6 ii) a range of 8 iii) a mean of 6 and a range of 8
- i) a median of 6 ii) a range 8 iii) a median of 6 and a range of 8
- i) a mode of 6 ii) a range 8 iii) a mode of 6 and a range of 8

What is wrong:

- The median of the set of numbers 2, 3, 2, 7, 3 is 2
- The mode of the set of numbers 2, 3, 2, 7, 3 is 3.
- The range of the set of numbers is 2, 3, 2, 7, 3 is 1

<p><u>Which newspaper is easiest to read?</u> In a newspaper survey of the numbers of letters in 100-word samples, compare the mean and the range</p> <ul style="list-style-type: none"> ▪ Tabloid: mean 4.3 and range 10, ▪ Broadsheet: mean 4.4 and range 14 	<p>True/Never/Sometimes:</p> <ul style="list-style-type: none"> • For a set of numbers, the mean is one of the numbers in the set. • For a set of numbers, the mode is one of the numbers in the set. • For a set of numbers, the median is one of the numbers in the set. • For a set of numbers, the range is one of the numbers in the set. • A set of numbers has one value for the mode. • A set of numbers has one value for the range. • The value for the range of a set of numbers is positive. <p>What is the same/different: mean, median, mode, range</p> <p>Convince me that :</p> <ul style="list-style-type: none"> • The median of the set of numbers 2, 3, 2, 7, 3 is 3. • The mode of the set of numbers 2, 3, 2, 7, 3 is 2 and 3 • The range of the set of numbers 2, 3, 2, 7, 3 is 5. • if two distributions both have the same range and median of 6, the two distributions may differ.
<i>Understand that different outcomes may result from repeating an experiment</i>	
<p>Carry out a coin-tossing / toast-dropping / peanut-burning experiment and compare results with others, appreciating why the results are variable</p>	<p>You flip a coin 100 times and count the number of times you get a head. A robot is programmed to flip a coin 1000 times. Convince me that the robot is most likely to be closer to getting an equal number of heads and tails.</p>
<i>Interpret graphs and diagrams, including pie charts, and draw conclusions</i>	
<p>Complete a 2-way table, given some of the data</p> <p>Interpret bar graphs with grouped data</p> <p>Interpret and compare pie charts where it is not necessary to measure angles</p> <p>Read between labelled divisions on a scale, for example read 34 on a scale labelled in tens or 3.7 on a scale labelled in ones, and find differences to answer, 'How much more...?'</p> <p>Recognise the difference between discrete and continuous data</p> <p>Recognise when information is presented in a misleading way, for example compare two pie charts where the sample sizes are different</p> <p>When drawing conclusions, identify further questions to ask</p>	<p>Show me pie chart / two way table.</p> <p>True/Never/Sometimes:</p> <ul style="list-style-type: none"> • You can read the frequency from a pie chart • You can read the proportion from a pie chart • You can read the frequency from a bar graph • If the section is the same size on two pie charts then the section represents the same frequency. • In order to interpret and compare two pie charts, • you have to measure the angles on the pie charts. <p>What is the same/different:</p> <ul style="list-style-type: none"> ▪ fraction, percentage, proportion. ▪ discrete data, continuous data <p>Convince me how to i) draw ii) interpret</p> <ul style="list-style-type: none"> ▪ a pie chart ▪ a two way table
<i>Create and interpret line graphs where the intermediate values have meaning</i>	
<p>Draw and use a conversion graph for pounds and Euros</p>	<p>Show me an example of a line graph where the intermediate values do not have a meaning.</p> <p>What is wrong with this graph? (a line graph where the intermediate values do not have a meaning)</p> <p>Convince me that you can use this graph (conversion graph between litres and gallons – up as far as 20 gallons) to find out how many litres are roughly equivalent to 75 gallons.</p>