

# Level2opaedia

‘A level is a level’

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

## Numbers and the Number System

### **Count sets of objects reliably**

Group objects in tens, twos or fives to count them

Know that you can count objects in different step/group sizes and that these could be combined to reach the total in the set

Have two different arrays of e.g. 10 objects. Ask what is the same and what is different about these sets.

How can you change this set of objects so that it has the same number (more/less) than this one?

How can you sort these sets of objects so that they are grouped in the same way (e.g. in 2s, 5s, 10s)?

Convince me that I can't sort 13 toys into groups of 2

How could you count this set of toys? Could you do it in a different way? Does it matter where you start?

### **Begin to understand the place value of each digit; use this to order numbers up to 100**

Demonstrate knowledge using a range of models or images

Order numbers to 100 using terms such as greater, less than, in between

Begin to explain the importance of 0 as a place holder

Show me:

- A number that has more/less tens/units than this number
- On the arrow cards the number represented by this bead string/abacus

What is wrong with this:

- 27 is bigger than 67
- 68 is made up of 8 tens and 6 units

What is the same and different about these two numbers e.g. 13 and 31?

What is different about these two numbers e.g. 30 and 300? What do the 0's mean?

Always/sometimes/never: A number with 9 units is going to be bigger than one with 6 units

Convince me that 20 is less than 27

### **Begin to use halves and quarters and relate the concept of half of a small quantity to the concept of half of a shape**

Use the concept of a fraction of a number in practical contexts such as sharing sweets between two to get  $\frac{1}{2}$  each

Shade one half of a given shape including those divided into equal regions

What is wrong: Half of 19 is 9 ?

Always/sometimes/never: 17 divided by 2 is impossible? (You can share 17 bananas equally between 2 people, but you cannot sort 17 children into two equal groups)

Convince me that half of 20 sweets is more than half of 10 sweets

## Calculating

<b><i>Use the knowledge that subtraction is the inverse of addition and understand halving as a way of 'undoing' doubling and vice versa</i></b>	
Given 14, 6 and 8, make related number sentences; <ul style="list-style-type: none"> <li>▪ <math>6 + 8 = 14</math>, <math>14 - 8 = 6</math>,</li> <li>▪ <math>8 + 6 = 14</math>, <math>14 - 6 = 8</math></li> </ul>	Show me an addition with an answer of 20, now show me a number sentence with the inverse operation
<b><i>Use mental recall of addition and subtraction facts to 10</i></b>	
Use addition / subtraction facts to 10 and place value to add or subtract multiples of 10; e.g. know $3 + 7 = 10$ and use place value to derive $30 + 70 = 100$ .	Show me an addition/subtraction number fact with the answer 8  True/Never/Sometimes: I can say two addition number sentences to make any answer up to 10  Convince me that 10 take away 4 is not 5
<b><i>Use mental calculation strategies to solve number problems including those involving money and measures</i></b>	
Recall doubles to 10+10 and other significant doubles e.g. double 50p is 100p or £1  Use knowledge of doubles to $10 + 10$ to derive corresponding halves  Add/subtract two-digit and one-digit numbers, bridging tens where necessary in contexts using units such as pence, pounds, centimetres	What is wrong: To add 1 pound and 30p, I do 1 add 30 which is 31p  How can you change this calculation $23 + 8 = 31$ so it will help you answer this problem: I have 33p then I find 8p more, how much have I got now?  True/Never/Sometimes: To find the total weight of two objects I need to add their weights together.  Convince me that $34p + 58p = 92p$
<b><i>Record their work in writing</i></b>	
Record their mental calculations as number sentences  Show appropriate jottings to support their thought process/es for example the use of the number line	Show me a jotting/picture/sentence/number sentence that shows what's happening in this story: a shop had 25 ice-creams, then 8 were sold and there were 17 left.  True/Never/Sometimes: I need to use all the numbers in a problem to help me find the answer
<b><i>Choose the appropriate operation when solving addition and subtraction problems</i></b>	
Begin to use repeated subtraction or sharing equally to solve division problems  Decide whether they need to add or subtract to solve the problem and begin to explain how/ why they have made that decision	Tell me a story that you would solve by using this addition $16 + 7 = 23$ , tell me another...  Tell me a story that you would solve by adding 7, tell me another...  15, 19, 4: Order these numbers and add the appropriate operation so it shows this problem: there were 19 people on the bus then four got off, how many are left?  True/Never/Sometimes: When I need to work out the change in a money problem, I use subtraction  Convince me that you need to use addition/subtraction to solve this problem

# Algebra

## ***Recognise sequences of numbers, including odd and even numbers***

Continue a sequence increasing/decreasing in regular steps

Recognise numbers from counting in tens or twos

Show me a sequence that has 20 in it

The number 67 will be in this sequence: 5, 10, 15, 20, ...

Show two sequences that increase with the same step but start at different numbers e.g. 1, 3, 5, 7, 9 or 2, 4, 6, 8, 10. What is the same and different about these?

Convince me that the number 10 can be in more than one sequence

## Shape, Space and Measures

<b>Use mathematical names for common 3-D and 2-D shapes</b>	
<p>Identify 2-D and 3-D shapes from pictures of them in different orientations, e.g. square, triangle, hexagon, pentagon, octagon, cube, cylinder, sphere, cuboid, pyramid</p>	<p>Show me a pyramid / pentagon / hexagon / octagon</p> <p>How can you change this shape to make it a pentagon / hexagon / octagon? (using geoboards)</p> <p>Convince me that this shape is a pyramid</p> <p>True/Never/Sometimes: Hexagons have more sides than pentagons</p>
<b>Describe their properties, including number of sides and corners</b>	
<p>Make and talk about shapes referring to properties and features such as edge, face, corner</p> <p>Sort 2-D and 3-D shapes according to a single criterion e.g. shapes that are pentagons or shapes with a right angle</p> <p>Visualise frequently used 2-D and 3-D shapes</p> <p>Begin to understand the difference between shapes with two dimensions and those with three</p> <p>Recognise properties that are the same even when a shape is enlarged e.g. comparing different size squares, circles, similar triangles, cubes or spheres</p> <p>Recognise and explain that a shape stays the same even when it is held up in different orientations</p> <p>Use ordinal numbers (first, second, third...) to describe the position of objects in a row or when giving directions</p>	<p>Show me a 3D shape with rectangular faces</p> <p>How can you change this shape and keep it a pentagon / hexagon / octagon? (using geoboards)</p> <p>Convince me that a shape with three sides has three corners?</p> <p>True/Never/Sometimes:</p> <ul style="list-style-type: none"> <li>▪ A shape with three sides has three corners.</li> <li>▪ A shape with four straight sides is a square.</li> </ul>
<b>Describe the position of objects</b>	
<p>Explain/ describe where an object has been placed using terms such as under, over, between, next to, beside, above, below, on top of, behind, in front of.</p> <p>Give instructions involving the position of an object/s, evaluate the accuracy of their instructions and adjust them accordingly</p>	<p>Tell me a story about the position of this object.</p> <p>What is wrong with this set of instructions? (Give a set of positional instructions about an object that are incorrect.)</p> <p>Can you give a correct set of instructions?</p>
<b>Distinguish between straight and turning movements, recognise right angles in turns and understand angle as a measurement of turn</b>	
<p>Distinguish between straight and turning movements</p> <p>Distinguish between left and right and between clockwise and anticlockwise and use these when giving directions</p> <p>Instruct a programmable robot, combining straight-line movements and turns, to move along a defined path or reach a target destination</p> <p>Make whole turns, half-turns and quarter-turns</p>	<p>Show me a right angle in the classroom / with your body</p> <p>How can you change this shape so that it has a right angle? (using geoboards)</p> <p>Convince me that you need to turn through two right angles in order to face the opposite direction</p> <p>True/Never/Sometimes:</p> <ul style="list-style-type: none"> <li>▪ A triangle can have two right angles</li> <li>▪ A shape with four sides has four right angles</li> </ul>
<b>Begin to use a wider range of measures including to use everyday non-standard and standard units to measure length and mass</b>	
<p>Begin to understand that numbers can be used not only to count discrete objects but also to describe continuous measures e.g. length</p> <p>Know which measuring tools to use to find, e.g. how much an object weighs, how tall a child is, how long</p>	<p>Show me something you could use to measure the length of the pencil / table / classroom</p> <p>What is the same / different about these two rulers? (scales marked differently, but lengths the same)</p>

it takes to run around the edge of the playground, how much water it takes to fill the water tray

Begin to use a wider range of measures, e.g. make and use a 'right angle checker', or use a time line to order daily events and ordinal numbers (first, second, third...) to describe the order of some regular events

Convince me that this object weighs less than 45 grams

True/Never/Sometimes: I should measure the length of a piece of string in centimetres

***Begin to understand that numbers can be used not only to count discrete objects but also to describe continuous measures***

Begin to use numbers to describe continuous measures. For example length, weight or time duration

Use numbers to make comparisons between measures such as two different lengths or the passage of time

Tell me a story about these times. (Encourage the children to use numbers to describe the passage of time between two events for example cooking, swimming, sleeping)

Convince me that this piece of string is longer than this one.

True/ Never/ Sometimes: You only use numbers to count real objects

## Handling Data

<b>Sort objects and classify them using more than one criterion</b>	
<p>Sort a given set of shapes using two criteria such as triangle / not triangle and blue / not blue</p>	<p>Show me a way of sorting these shapes / numbers into groups</p> <p>Convince me that this shape / number should go in this group (with two criteria set)</p> <p>What is wrong:</p> <ul style="list-style-type: none"> <li>▪ All of these shapes have four sides and two right angles,</li> <li>▪ All of these numbers are multiples of 5 and odd?</li> </ul>
<b>Understand vocabulary relating to handling data</b>	
<p>Understand vocabulary such as sort, group, set, list, table, most common, most popular</p>	<p>What is wrong: (looking at a list/block graph) The most/least common/popular is...?</p> <p>Show me an example of a list/table to show this data</p> <p>How can you change this bar graph so that it represents the data in this table?</p>
<b>Collect and sort data to test a simple hypothesis</b>	
<p>Test a <b>hypothesis</b> such as: <i>children in our class are in bed before 8 o'clock</i>. They decide what information they need and how to collect it.</p> <p>Solve problems such as finding which soft drink is most popular with children in the class. They ask and answer questions such as:</p> <ul style="list-style-type: none"> <li>• <i>How could we find out?</i></li> <li>• <i>How could you decide?</i></li> <li>• <i>What information do you need?</i></li> <li>• <i>How shall we organise the information?</i></li> </ul> <p>They collect data and sort it into groups according to one criterion and progress to two criteria</p>	<p>Convince me that this statement is true (<i>Children in our class are in bed before 8 o'clock</i>)</p> <p>How could you sort this data?</p> <p>True/ Never/Sometimes: We should always use a block graph to show the data that we have collected</p>
<b>Record results in simple lists, tables, pictograms and block graphs</b>	
<p>Present information in lists, tables and simple graphs where one symbol or block represents one unit</p>	<p>Show me how you could record these results</p> <p>How can you change this table if someone else joins in and tells us their favourite fruit is a banana?</p> <p>True/Never/Sometimes: A block graph shows what people like or don't like</p>
<b>Communicate their findings, using the simple lists, tables, pictograms and block graphs they have recorded</b>	
<p>Respond to questions about the data they have presented, e.g. how many of our names have 5 letters?</p>	<p>What is the same/different: about this information (a table and a block graph showing the same data)</p>