CARS MATHS IN MOTION

KS2 – ENGLAND - NUMBER AND ALGEBRA

In our opinion, the following items will be covered during a typical maths based project that uses ‘Cars Maths in Motion’ as its nucleus.

Using and applying number

make connections in mathematics and appreciate the need to use numerical skills and knowledge when solving problems in other parts of the mathematics curriculum

break down a more complex problem or calculation into simpler steps before attempting a solution; identify the information needed to carry out the tasks

select and use appropriate mathematical equipment, including ICT

find different ways of approaching a problem in order to overcome any difficulties

make mental estimates of the answers to calculations; check results

Communicating

organise work and refine ways of recording

communicate mathematically, including the use of precise mathematical language

Reasoning

search for pattern in their results; develop logical thinking and explain their reasoning.

Integers

read, write and order whole numbers, recognising that the position of a digit gives its value; use correctly the symbols <, >, =; multiply and divide any integer by 10 or 100 then extend to multiplying and dividing by 1000; round integers to the nearest 10 or 100 and then 1000; order a set of negative integers, explaining methods and reasoning; multiply and divide decimals by 10 or 100

Fractions, percentages and ratio

recognise the equivalence between the decimal and fraction forms of one half, quarters, tenths and hundredths; understand that 'percentage' means the

'number of parts per 100' and that it can be used for comparisons; find percentages of whole number quantities, using a calculator where appropriate

recognise approximate proportions of a whole and use simple fractions and percentages to describe them, explaining their methods and reasoning

solve simple problems involving ratio and direct proportion

Decimals

understand and use decimal notation for tenths and hundredths in context [for example, order amounts of money, round a sum of money to the nearest number, convert a length such as 1.36 metres to centimetres and vice versa]; locate on a number line, and order, a set of numbers or measurements; then recognise thousandths (only in metric measurements)

round a number with one or two decimal places to the nearest integer or tenth; convert between centimetres and millimetres or metres, then between millimetres and metres, and metres and kilometres, explaining methods and reasoning.

Calculations

develop further their understanding of the four number operations and the relationships between them including inverses; use the related vocabulary; choose suitable number operations to solve a given problem, and recognise similar problems to which they apply

find remainders after division, then express a quotient as a fraction or decimal; round up or down after division, depending on the context

Written methods

use written methods to add and subtract positive integers less than 1000, then up to 10000, then add and subtract numbers involving decimals; use approximations and other strategies to check that their answers are reasonable

use written methods for short multiplication and division by a single-digit integer of two-digit then three-digit then four-digit integers, then of numbers with decimals; then use long multiplication, at first for two-digit by two-digit integer calculations, then for three-digit by two-digit calculations; extend division to informal methods of dividing by a two-digit divisor [for example, 64 divided_by 16]; use approximations and other strategies to check that their answers are reasonable

Calculator methods

use a calculator for calculations involving several digits, including decimals; use a calculator to solve number problems; know how to enter and interpret money calculations and fractions; know how to select the correct key sequence for calculations with more than one operation

Solving numerical problems

choose, use and combine any of the four number operations to solve word problems involving numbers in 'real life', money or measures of length, mass, capacity or time, then perimeter and area

choose and use an appropriate way to calculate and explain their methods and reasoning

estimate answers by approximating and checking that their results are reasonable by thinking about the context of the problem, and where necessary checking accuracy [for example, by using the inverse operation, by repeating the calculation in a different order]

Breadth of study

activities that extend their understanding of the number system to include integers, fractions and decimals

approximating and estimating more systematically in their work in mathematics

using patterns and relationships to explore simple algebraic ideas

applying their measuring skills in a range of contexts

drawing inferences from data in practical activities, and recognising the difference between meaningful and misleading representations of data

exploring and using a variety of resources and materials, including ICT

activities in which pupils decide when the use of calculators is appropriate and then use them effectively

using mathematics in their work in other subjects

Attainment Targets: Level 3, Level 4, Level 5, Level 6, Level 7

SHAPE, SPACE AND MEASURES

Using and applying shape, space and measures

recognise the need for standard units of measurement

select and use appropriate calculation skills to solve geometrical problems

approach spatial problems flexibly, including trying alternative approaches to overcome difficulties

use checking procedures to confirm that their results of geometrical problems are reasonable

Communicating

organise work and record or represent it in a variety of ways when presenting solutions to geometrical problems

use geometrical notation and symbols correctly

present and interpret solutions to problems

Reasoning

use mathematical reasoning to explain features of shape and space

Understanding properties of shape

recognise right angles, perpendicular and parallel lines; know that angles are measured in degrees and that one whole turn is 360 degrees and angles at a point total 360 degrees, then recognise that angles at a point on a straight line total 180 degrees; know that the sum of the angles of a triangle is 180 degrees

visualise and describe 2-D and 3-D shapes and the way they behave, making more precise use of geometrical language, especially that of triangles, quadrilaterals, and prisms and pyramids of various kinds; recognise when shapes are identical

Understanding properties of position and movement

visualise and describe movements using appropriate language

transform objects in practical situations; transform images using ICT; visualise and predict the position of a shape following a rotation, reflection or translation

recognise the need for standard units of length, mass and capacity, choose which ones are suitable for a task, and use them to make sensible estimates in everyday situations; convert one metric unit to another; know the rough metric equivalents of imperial units still in daily use

recognise that measurement is approximate; choose and use suitable measuring instruments for a task; interpret numbers and read scales with increasing accuracy; record measurements using decimal notation

recognise angles as greater or less than a right angle or half-turn, estimate their size and order them; measure and draw acute, obtuse and right angles to the nearest degree

find perimeters of simple shapes; find areas of rectangles using the formula, understanding its connection to counting squares and how it extends this

approach; calculate the perimeter and area of shapes composed of rectangles.

Breadth of study

activities that extend their understanding of the number system to include integers, fractions and decimals

approximating and estimating more systematically in their work in mathematics

applying their measuring skills in a range of contexts

drawing inferences from data in practical activities, and recognising the difference between meaningful and misleading representations of data

exploring and using a variety of resources and materials, including ICT

activities in which pupils decide when the use of calculators is appropriate and then use them effectively

using mathematics in their work in other subjects

Attainment Targets: Level 1, Level 2, Level 3, Level 4, Level 5, Level 6 and Level 7

HANDLING DATA

Using and applying handling data

approach problems flexibly, including trying alternative approaches to overcome any difficulties

identify the data necessary to solve a given problem

select and use appropriate calculation skills to solve problems involving data

check results and ensure that solutions are reasonable in the context of the problem

Communicating

decide how best to organise and present findings

use the precise mathematical language and vocabulary for handling data

Reasoning

explain and justify their methods and reasoning.

Processing, representing and interpreting data

solve problems involving data

Interpret tables, lists and charts used in everyday life; construct and interpret frequency tables, including tables for grouped discrete data

represent and interpret discrete data using graphs and diagrams, including pictograms, bar charts and line graphs, then interpret a wider range of graphs and diagrams, using ICT where appropriate

draw conclusions from statistics and graphs and recognise when information is presented in a misleading way; explore doubt and certainty and develop an understanding of probability through classroom situations; discuss events using a vocabulary that includes the words 'equally likely', 'fair', 'unfair', 'certain'

Breadth of study

activities that extend their understanding of the number system to include integers, fractions and decimals

approximating and estimating more systematically in their work in mathematics

applying their measuring skills in a range of contexts

exploring and using a variety of resources and materials, including ICT

activities in which pupils decide when the use of calculators is appropriate and then use them effectively

using mathematics in their work in other subjects

Attainment Targets: Level 3, Level 4, Level 5, Level 6, Level 7, Level 8