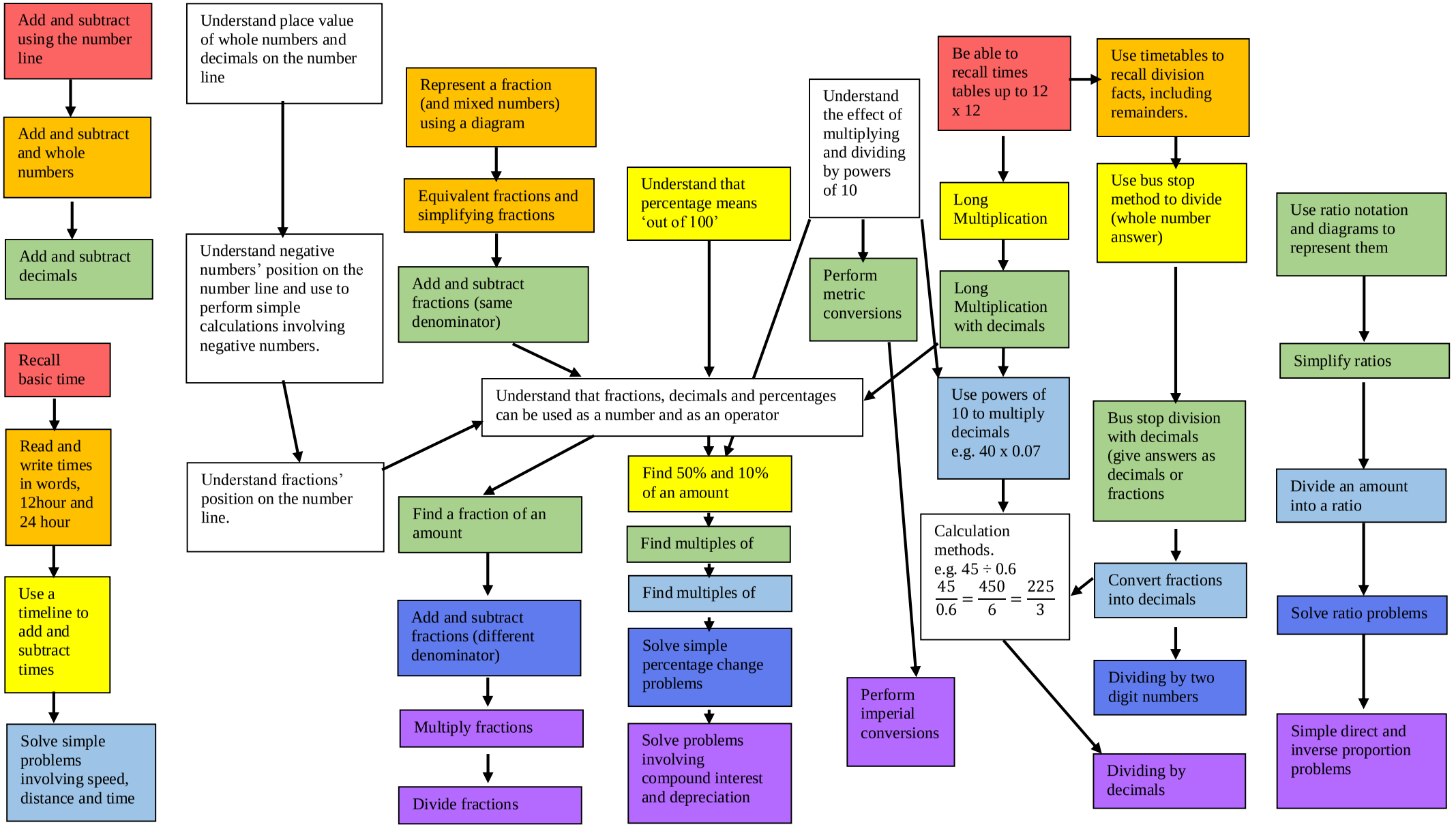
NOTRE DAME HIGH SCHOOL
NDHS
SURREY ST., NORWICH, NR1 3PB
MATHEMATICS

Year 9 Foundation

Student Booklet

Name……

Rainbow Number - Colours



T1	Test Mark	/	6 Skills Target		Class Rank	
	Strength					Date Completed
	1st Target:					
	2nd Target:					

T2	Test Mark	/	6 Skills Target		Class Rank	
	Strength					Date Completed
	1st Target:					
	2nd Target:					

T3	Test Mark	/	6 Skills Target		Class Rank	
	Strength					Date Completed
	1st Target:					
	2nd Target:					

T4	Test Mark	/	6 Skills Target		Class Rank	
	Strength					Date Completed
	1st Target:					
	2nd Target:					

T5	Test Mark	/	6 Skills Target		Class Rank	
	Strength					Date Completed
	1st Target:					
	2nd Target:					

T6	Test Mark	/	6 Skills Target		Class Rank	
	Strength					Date Completed
	1st Target:					
	2nd Target:					

Number Objectives

Level	Number Properties & Calculations	Assessment	I can do this already	Covered in Class	Strength?	Revised it?	Aced it
5a	Be able to add and subtract more than two integers with varying numbers of significant figures						
5a	Be able to add and subtract more than two decimals with up to two decimal places						
6c	Convert numbers such as 2 360 000 to 2.36 million						
5a	Use mental strategies for multiplication - doubling and halving strategies						
5a	Multiply 4-digit integers and decimals by a single digit integer						
5a	Multiply 3- or 4-digit integers by a 2-digit integer						
5b	Divide 3-digit integers by a single digit integer with remainder						
5b	Divide 3-digit by 2-digit integers – no remainder						
5a	Divide decimals with one or two places by single-digit integers						
5a	Divide £.p by a 2-digit number to give £.p						
6c	Divide an integer or decimal with 1 or 2 dp by a decimal number with 1 d.p.						
6c	Multiply negative integers by a negative number						
5b/ 6c	Divide negative integers by a positive or negative numbers						
6c	Understand the infinite nature of the set of real numbers (whole numbers and decimals here)						
5a	Know all the squares of numbers less than 16 and give the positive and negative square root of a square number						
6c/ 5a	Work out cubes and cube roots mentally or with a calculator						
6c	Use index notation for small integer powers, eg up to 5						
6b	Establish index laws for positive powers where the answer is a positive power						
6b	Find the prime factor decomposition of a number >100						
5a	Find the HCF or LCM of 2 numbers less than 100 using prime factor decomposition						
5b/ 5a/ 6c/ 6b	Combine laws of arithmetic for brackets with mental calculations of squares, cubes and square roots						
6c	Be able to work with decimals and a calculator with expressions that contain brackets, squares and square roots as well as the four operations						
6c	Be able to estimate answers to calculations involving 2 or more operations						

Level	Fractions, Decimals, Percentages & Ratio	Assessment	I can do this already	Covered in Class	Strength?	Revised it?	Aced it
5a	Be able to add and subtract more than two decimals with up to two decimal places, but with varying numbers of decimal places and using a mixture of operations within the calculation						
5a	Recall known facts including fraction to decimal conversions						
5a/ 6c	Convert terminating decimals to fractions						
5a	Learn fractional equivalents to key recurring decimals, e.g. 0.333333..., 0.66666666..., 0.11111…						
6c	Interpret rounded off recurring decimals displayed on a calculator as fractions – 2/3, 1/6, 1 2/3, 1 1/6						
6c	Know the denominators of simple fractions that produce recurring decimals, and those that do not						
6c	Use division to convert a fraction to a decimal						
5a	Add and subtract simple fractions with denominators of any size						
6c	Check addition or subtraction of fractions with an inverse calculation						
6c/ 6b	Add and subtract mixed number fractions without common denominators						
6c	Add and subtract up to 3 fractions mixing both addition and subtraction in the calculation						
6c	Interpret division as a multiplicative inverse; know that 1 divided by 1/4 is the same as 1 × 4						
6b	Understand the effect of multiplying a positive number by a fraction less than 1						
6c	Multiply a fraction by a fraction						
6b	Divide an integer by a fraction						
5a	Recall equivalent fractions, decimals and percentage						
6c	Use the equivalence of fractions, decimals and percentages to compare proportions (i.e. compare a fraction and a percentage)						
6c/ 6b	Find the outcome of given percentage increase or decrease						

Unit 1 Objectives

Band	Sequences, Expressions, Formulae & Equations	Assessment	I can do this already	Covered in Class	Strength?	Revised it?	Aced it
Developing	Find outputs of more complex functions expressed in words (e.g. add 6 then multiply by 3)						
	Construct expressions from worded description, using all 4 basic operations, e.g. $30/x$, $x - y$, $m/2$, $3m + 4$, $a + a + 3$, a^2						
	Generate terms of a linear sequence using position-to term-with positive integers.						
	Generate terms from a complex practical context e.g. maximum crossings for a given number of lines						
	Solve simple two-step linear equations with integer coefficients, of the form $ax + b = c$, e.g. $3x + 7 = 25$						
Securing	Know that multiplication and division are carried out before addition and subtraction, e.g. $ab + cd$, $a \times b$ and $c \times d$ must be calculated before adding						
	Simplify simple expressions in more than one variable, including positives and negatives, by collecting like terms						
	Generate terms of a linear sequence using position-to-term with negative integers.						
	Begin to use linear expressions to describe the nth term in a two-step arithmetic sequence. e.g. nth term is $3n + 1$ or $n/2 - 5$						
	Substitute integers into simple expressions involving small powers						
	Derive complex algebraic expressions and formulae						
	Simplify expressions involving brackets and powers						
Extending	Substitute integers into formulae to give equations and solve						
	Change the subject of a formula						
	Multiply out brackets and collect like terms						
	Use the distributive law to take out single term algebraic factors						
	Apply the index laws including negative power answers						

Unit 2 Objectives

Band	Statistics	Assessment	I can do this already	Covered in Class	Strength?	Revised it?	Aced it
Developing	Find the mode and range from a frequency table						
	Select and identify the data related to a problem						
	Choose and justify appropriate diagrams, graphs and charts, using ICT as appropriate, to illustrate a short report of a statistical enquiry						
	Draw conclusions from simple statistics for a single distribution						
	Compare two simple distributions using the range and the median						
	Select appropriate level of accuracy of data from limited choices						
	From a range of sample sizes identify the most sensible answer						
	Discuss factors that may possibly affect the collection of data, e.g. time, place, type of people asked, phrasing of questions						
	Calculate the mean from a simple frequency table						
	Compare two simple distributions using the range and the mean or range and mode						
	Select the range of possible methods that could be used to collect this data as primary or secondary data						
	Compare two distributions given summary statistics						
	Use two-way tables						
	Discuss the range of possible methods that could be used to investigate a problem, e.g. questionnaire, survey, modelling, data logging, etc.						
	Design and use a data collection sheet for continuous grouped data						
Securing	Identify discrete and continuous data						
	Design tables recording discrete and continuous data						
	Draw pie charts from data presented in a table.						
	Interpret and plot scatter graphs and recognise anomalies						
	Interpret and / or compare bar graphs (with crumple zones, different scales) and frequency diagrams where data is incomplete / scales are incorrect.						
	Interpret and / or compare bar graphs and frequency diagrams which are misleading (with false origins, different scales etc.)						
	Identify further lines of enquiry from information provided for an initial enquiry						
	Recognise when it is appropriate to use mean, median, or mode in more complex cases						
	Find the modal class of a set of continuous data						
	Identify key features of data sets described in either line graphs or scatter graphs – including exceptions and correlation						
Extending	From a small choice of options identify ways to reduce bias in a sample						
	Find the modal class of a large set of data						
	Construct and use frequency polygons to compare sets of data						
	Use a line of best fit, drawn by eye, to estimate the missing value in a two variable data set						
	Calculate estimate of mean from large sets of grouped data						

TEST 1

Unit 3 Objectives

Band	Multiplicative Reasoning	Assessment	I can do this already	Covered in Class	Strength?	Revised it?	Aced it
Developing	Use units of measurement to calculate and solve problems in everyday contexts involving length, area, volume, mass, time and angle						
	Divide a quantity into two parts in a given ratio, where ratio given in ratio notation						
	Divide a quantity into two parts in a given ratio (whole numbers), where the answer is a decimal						
	Divide a quantity into more than 2 parts in a given ratio						
	Reduce a ratio to its simplest form, where a ratio is expressed in different units						
	Understand the relationship between ratio and proportion						
	Use multiplicative reasoning to solve a problem						
	Use the unitary method to solve simple word problems involving ratio and direct proportion						
	Solve best buy / unit price problems						
	Convert between area measures (e.g. mm^2 to cm^2, cm^2 to m^2, and vice versa)						
	Know rough metric equivalents of imperial measures in daily use (feet, miles, pounds, pints, gallons)						
Securing	Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction						
	Recognise when values are in direct proportion by reference to the graph form						
	Solve problems involving direct and inverse proportion, including graphical and algebraic representations						
	Enlarge 2D shapes, given a centre of enlargement and a positive whole number scale factor						
Extending	Find the centre of enlargement by drawing lines on a grid						
	Round numbers to a given number of significant figures						
	Solve 'original value' problems using inverse operation						
	Enlarge 2D shapes, given a fractional scale factor						
	Solve problems using compound measures						
	Solve problems using constant rates and related formulae						

TEST 2

Unit 4 Objectives

Band	Geometric Formulae & Reasoning	Assessment	I can do this already	Covered in Class	Strength?	Revised it?	Aced it
Developing	Find the measurement of a side given the perimeter of squares and rectangles, where one or more lengths are decimals						
	Substitute integers into formulae expressed in letter symbols						
	Derive formulae expressed in letter symbols						
	Substitute integers into formulae (involving brackets and more than one operation) expressed in letter symbols						
	Use a formula to calculate the area of triangles						
	Calculate the perimeter and area of shapes made from rectangles						
Securing	Understand the different role of letter symbols in formulae and functions						
	Substitute positive and negative integers into simple formulae						
	Calculate areas of compound shapes made from rectangles and triangles						
	Use a formula to calculate the area of parallelograms						
	Substitute integers into formulae to give equations and solve						
	Know the names of parts of a circle						
	Use a formula to calculate the circumference of a circle						
	Use a formula to calculate the area of a circle						
	Round to an appropriate number of decimal places after calculations						
	Use the formula for area of a circle, given the radius or diameter						
Extending	Use the formulae for the circumference, given the circumference, to calculate the radius or diameter						
	Use the formulae for area of a circle, given area, to calculate the radius or diameter						
	Know the formula for Pythagoras' theorem and how to substitute in values from a diagram						
	Use inequality notation $a < x \leq b$						
	Calculate the surface area and volume of right prisms (including cylinder)						
	Identify and calculate upper and lower bounds						
	Use and apply Pythagoras' theorem to solve problems						
	Calculate simple error intervals, such as +/– 10%						

TEST 3

Unit 5 Objectives

Band	Probability	Assessment	I can do this already	Covered in Class	Strength?	Revised it?	Aced it
Developing	Apply probabilities from experimental data to a different experiment in simple situations						
	Use two-way tables for discrete data. Complete and collect probabilities						
	Identify all mutually exclusive outcomes for two successive events – with three outcomes in each event.						
	Use the language of probability to compare the choice of *x*/*a* with *x*/*b*						
	Apply probabilities from experimental data to a different experiment in applying to two step outcomes						
	Find the probability from two-way tables						
	Calculate probabilities from two-way tables with more than two columns / rows each way						
Securing	Identify conditions for a fair game – from a small set of simple options						
	Identify dependent and independent events						
	Use the language of probability to compare the choice of *x*/*a* with *y*/*b*						
	Calculate estimates of probability from experiments or survey results						
	Use experimental probabilities to predict outcomes						
	Identify all mutually exclusive outcomes for two successive events						
	Compare experimental and theoretical probabilities						
	Enumerate sets and combinations of sets systematically, using tabular, grid and Venn diagrams						
Extending	Calculate the probability of a combination of events or single missing events of a set of mutually exclusive events using sum of outcomes is one						
	Identify conditions for a fair game						
	Use P(A and B) = P(A) × P(B) for two independent events						

TEST 4

Unit 6 Objectives

Band	Graphs	Assessment	I can do this already	Covered in Class	Strength?	Revised it?	Aced it
Developing	Draw conclusions based on the shape of line graphs						
	Recognise straight-line graphs parallel to *x*- or *y*-axes						
	Interpret information from a real-life graph						
	Plot a graph of a simple linear function in the first quadrant						
	Know how to find the midpoint of a line segment						
Securing	Express simple functions in symbols, e.g. $y = x + 3$ to draw graph						
	Generate four quadrant coordinate pairs of simple linear functions						
	Plot a simple straight-line graph (distance–time graphs)						
	Discuss and interpret line graphs and graphs of functions from a range of sources						
	Find the midpoint of a horizontal (or vertical) line AB, using the coordinates of these points						
	Interpret intercept of real-life graphs						
	Plot the graphs of simple linear functions in the form $y = mx + c$ in four quadrants						
	Use graphs to solve distance-time problems						
	Generate the next term in a quadratic sequence						
	Recognise geometric sequences and appreciate other sequences that arise						
Extending	Classify sequences as linear, geometric and quadratic						
	Calculate and interpret gradient using $y = mx + c$						
	Find and interpret the *y*-intercept from $y = mx + c$						
	Plot graphs of quadratic functions by hand and using ICT						
	Recognise that any line parallel to a given line will have the same gradient						
	Construct a table of values, including negative values of *x* for a function such as $y = ax^3$						
	reduce a given linear equation in two variables to the standard form $y = mx + c$						
	Identify the solution of simultaneous equations on a graph						

EOY TEST 5

Unit 7 Objectives

Band	Geometry in 2D & 3D	Assessment	I can do this already	Covered in Class	Strength?	Revised it?	Aced it
Developing	Identify alternate angles						
	Make simple drawings, demonstrating accurate measurement of length and angle (draw accurately from a plan).						
	Be able to correctly identify the hypotenuse						
	Begin to use plans and elevations.						
	Explain how to find the sums of the interior and exterior angles of quadrilaterals, pentagons and hexagons						
	Identify corresponding angles						
	Recognise and use the perpendicular distance from a point to a line as the shortest distance to the line						
	Use scales in maps and plans						
	Use straight edge and compasses to construct the midpoint and perpendicular bisector of a line segment						
	Visualise and use a wide range of 2D representations of 3D objects						
Securing	Carry out an investigation leading to understanding of Pythagoras' theorem						
	Find volumes of shapes made from cuboids						
	Use straight edge and compasses to construct the bisector of an angle						
	Analyse 3D shapes through informal 2D representations, cross-sections, plans and elevations						
	Use and interpret maps and scale drawings						
	Identify alternate and corresponding angles on the same diagram						
	Use straight edge and compass to construct the bisector of an angle						
Extending	Use straight edge and compass to construct a triangle, given three sides (SSS)						
	Use straight edge and compass to construct the perpendicular from a point to a line segment						
	Use straight edge and compass to construct the perpendicular from a point on a line segment						
	Draw and interpret loci						
	Use straight edge and compass to construct a triangle, given right angle, hypotenuse and side (RHS)						
	Construct nets of triangular prism, pyramid and wedge shape using SSS or RHS for the triangular sections						

TEST 6