

Managing the transition to Secondary Mathematics

Matching Numicon Big Ideas to the KS3 resources you know and love

Numicon Big Ideas is a 12-week programme for students aged 10 to 12 who would benefit from revisiting key concepts from the upper KS2 Primary Maths curriculum to help ease their transition to Secondary school.

Using the proven Numicon approach, Numicon Big Ideas reteaches these concepts, using structured imagery and apparatus to reinforce and embed the ideas and break down any misconceptions a student might have. The big ideas selected for the programme are those areas in the Primary curriculum which underpin subsequent mathematical learning.

We have correlated the sessions in Numicon Big Ideas with sections in our Key Stage 3 resources: Discovering Mathematics 1A and 1B, MyMaths for Key Stage 3 1A and 1B, and with MyMaths lessons. These links allow teachers to identify where Year 7 teaching plans combine with concepts from Numicon Big Ideas and where they can provide students with the chance to develop their knowledge of those concepts.

We hope that the combination of our resources will support new students entering Year 7 in September who have gaps or weaknesses in their upper KS2 knowledge which could be more pronounced this year because of disruptions caused by the pandemic.

You can find support to help you get started with Numicon Big Ideas at www.oxfordsecondary.co.uk/numicon.

Moreover, we have also included matching to other Numicon sessions in the matching table.

Teaching materials featured in this resource:

Numicon: Big Ideas

ISBN: 9780198417040

Numicon: Number, Pattern and Calculating 4 Teaching Pack

ISBN: 9780198389842

Numicon: Geometry, Measurement and Statistics 4 Teaching Pack

ISBN: 9780198389859

Numicon: Number, Pattern and Calculating 5 Teaching Pack

ISBN: 9780198489719

Numicon: Geometry, Measurement and Statistics 5 Teaching Pack

ISBN: 9780198489726

Discovering Mathematics, Student book 1A

ISBN: 9780198421726

Discovering Mathematics, Student book 1B

ISBN: 9780198421719

MyMaths for Key Stage 3, Student book 1A

ISBN: 9780198304470

MyMaths for Key Stage 3, Student book 1B

ISBN: 9780198304487

mymaths.co.uk

ISBN: 9780199129898

NBI unit	Numicon Big Ideas lesson	Learning objectives	Numicon Teaching Packs	Discovering Mathematics		MyMaths for KS3		MyMaths lessons
				Student book IA	Student book IB	Student book IA	Student book IB	
1	1: Becoming familiar with Numicon Shapes	To become sufficiently familiar with Numicon Shapes so they can be used as a concrete manipulative in the forthcoming sessions.						
	2: Getting to know number rods	- To be able to match number rods with numerals. - To represent numbers using base-ten apparatus and arrow cards. - To become familiar with using number rods for whole numbers, doubles, halves and number bonds to 20, 60 and 100.						1336, 1346, 1347, 1397
	3: Base ten	- To use regrouping when crossing multiples of ten. - To represent numbers using base-ten apparatus and arrow cards.		Number hacks, Number Bonds to 10: p.362				1221, 1348
	4: Properties of number	- To introduce the term 'commutative' in context. - To work systematically to produce number bonds of 8. - To identify odd and even numbers and to use them in context. - To look for patterns, predict answers and check them using manipulatives.						1218, 1398
2	1: Whole numbers with four digits and zero as a place holder	- To visualize, describe or draw 2-, 3- and 4-digit numbers. - To understand and explain the role of 0 as a place holder in 2-, 3- and 4-digit numbers.	NPC 4, Numbers and the Number System 1, Activities 3–6; Numbers and the Number System 2, Activities 3 and 4.	1.1 Place Values and Order of Numbers: p.5		1a Place Value: p.4		1216, 1352, 1918, 1972
	2: Ordering and comparing numbers: 4-digit and 5-digit numbers	- To understand the quantity and column value of digits in numbers between 1000 and 100 000. - To recognize the place value of each digit in 5-digit numbers. - To order and compare numbers up to 100 000.	NPC 4, Numbers and the Number System 2, Activities 2 and 3. NPC 5, Numbers and the Number System 1, Activities 6 and 7.	1.1 Place Values and Order of Numbers: p.5				1918, 1972
	3: Counting forwards and backwards, across boundaries, using multiples of ten	- To order and compare numbers greater than 1000. - To use place value for addition and subtraction (for up to 7-digit numbers). - To recognize the place value of each digit up to 7-digit numbers (millions, hundred thousands, ten thousands, thousands, hundreds, tens and ones).	NPC 4, Calculating 2, Activities 1 and 2. NPC 5, Numbers and the Number System 1, Activities 6 and 7. Repeat for larger numbers.	1.2 Addition: p.10				1399
	4: Rounding numbers to use in calculations	- To round 5-digit numbers to the nearest 10, 100, 1000, 10 000, 100 000. - To compare rounded numbers with unrounded numbers. - To check that calculations are of the correct magnitude using rounding.	NPC 4, Numbers and the Number System 3, Activity 5. NPC 5, Numbers and the Number System 4, Activities 2–4.	1.4 Efficient Addition and Subtraction by Hand: p. 21, 3.1 Rounding Numbers: p.71		1g Rounding and estimating: p.16	7a Rounding: p.126	1003, 1840, 1373, 1219
3	1: Estimating	- To know estimates are not exact amounts and are often given as round multiples of 10, 100 or 1000. - To use rounding to estimate answers in calculations involving numbers with up to 4 digits. - To estimate to check the reasonableness of an answer.	NPC 4, Numbers and the Number System 3, Activity 3. NPC 5, Numbers and the Number System 4, Activities 1, 7 and 8.	3.1 Rounding Numbers: p.71 3.2 Estimation: p.75				1002, 1003, 1219, 1840
	2: Column adding	- To add numbers with up to four digits using the formal written method of column adding. - To estimate the answer to an adding calculation before calculating and then to check answers.	NPC 4, Calculating 8, Activity 4. NPC 5, Calculating 5, Activities 1–3.	1.2 Addition: p.10		7c Written addition and subtraction 1: p.134, 7d Written addition and subtraction 2: p.136	1e Written methods of addition and subtraction: p.12	1020, 1399, 1901, 1902
	3: Column subtracting	- To subtract numbers with up to four digits using the formal written method of column subtracting. - To estimate the answer to a subtracting calculation before calculating and then to check answers.	NPC 4, Calculating 9, Activities 2–4. NPC 5, Calculating 6, Activities 2 and 3.	1.3 Subtraction: p.15		7c Written addition and subtraction 1: p.134, 7d Written addition and subtraction 2: p.136	1e Written methods of addition and subtraction: p.12	1901, 1903, 1908, 1028
	4: Inverse relationships	- To use the inverse relationship between adding and subtracting to solve a variety of problems. - To know that using the inverse relationships can be useful to check calculations.	NPC 4, Pattern and Algebra 2, Activities 1 and 2; Calculating 1, Activity 3. NPC 5, Calculating 1, Activities 1 and 2.					1398

NBI unit	Numicon Big Ideas lesson	Learning objectives	Numicon Teaching Packs	Discovering Mathematics		MyMaths for KS3		MyMaths lessons
				Student book IA	Student book IB	Student book IA	Student book IB	
4	1: Multiplying and dividing	- To recognize that multiplying and dividing are inverse operations (e.g. $10 \times 5 = 50$ and $50 \div 5 = 10$). - To recognize that multiplying is repeated adding of the same number. - To recognize that dividing is repeated subtracting of the same number. - To understand the role of zeros in multiplying.	NPC 4, Calculating 5, Activities 1 and 3; Calculating 6, Activity 5. NPC 5, Calculating 4, Activity 3.	2.1 Multiplication: p.32 2.2 Division: p.45		14a Multiplication: p.258		1910, 1367, 1401, 5682
	2: Multiplying and dividing by 10, 100, 1000	- To multiply a single-digit number by 10, 100 or 1000. - To divide a thousands, hundreds or tens number by 10, 100 or 1000 leaving a whole number.	NPC 4, Calculating 7, Activities 1–5.	2.1 Multiplication: p.32 2.2 Division: p.45 6.3 Multiplying and Dividing by 10, 100 and 1000		14b Multiplying by 10 and 100: p.260	1b Multiply and divide by 10, 100 and 1000: p.6	1027, 1368, 1392
	3: Multiplying: $HTO \times O$	- To be able to multiply a 3-digit number by a 1-digit number. - To be able to use the long and short written methods of multiplying.	NPC 4, Calculating 10, Activities 4 and 5. NPC 5, Calculating 4, Activity 5.			14d Written methods of multiplication: p.264		1024, 1025, 1904, 1911
	4: Dividing with informal methods	- To reinforce the understanding that dividing is the inverse of multiplying. - To understand that dividing is repeated subtracting (of the same number). - To recognize that dividing results in equal parts.	NPC 4, Calculating 6, Activities 3 and 4. NPC 5, Calculating 8, Activity 4.			14e Mental methods of division: p.266		1228, 1391, 1775, 5682
5	1: Unit fractions	- To be able to show basic fractions on a number line. - To understand that fractions involve dividing. - To know that in unit fractions of the type $1/d$ as d gets bigger the fraction gets smaller.	NPC 4, Numbers and the Number System 5, Activities 1 and 4; Calculating 11, Activity 5.	5 Understanding Fractions: p.110		4a Writing fractions: p.66		1062, 1018, 1220, 1369
	2: Non-unit fractions	- To be able to show basic non-unit fractions on a number line. - To understand that non-unit fractions involve dividing and multiplying. - To know that fractions of the type n/d are n times bigger than the unit fraction $1/d$	NPC 4, Numbers and the Number System 5, Activity 3; Calculating 11, Activity 5.	5 Understanding Fractions: p.110			4a Fractions p.64	1018, 1062
	3: Fractions of amounts	- To be able to calculate a non-unit fraction of an amount, e.g. $4/5$ of 20. - To use a number line for tenths accurately.	NPC 4, Numbers and the Number System 5, Activity 3. NPC 5, Numbers and the Number System 6, Activities 1 and 2.	5 Understanding Fractions: p.110		4d Fractions of an amount 1: p.72	4e Fraction of a quantity: p.72	1018, 1370
	4: Equivalent fractions	- To recognize equivalent fractions. - To understand that equivalent fractions have the same value. - To be able to generate equivalent fractions. - To recognize and use b/a as the equivalent fraction convertor.	NPC 4, Numbers and the Number System 5, Activity 2; Numbers and the Number System 7, Activity 4. NPC 5, Numbers and the Number System 2, Activities 5 and 7.	5.3 Equivalent Fractions p.128		4b Equivalent fractions: p.68	4b Equivalent fractions: p.66	1042, 1773, 1984, 1371
6	1: Adding and subtracting fractions (same denominator)	- To be able to add and subtract two (or more) fractions with the same denominator. - To understand how denominators and numerators are manipulated in these calculations.	NPC 4, Numbers and the Number System 5, Activities 3–5. NPC 5, Numbers and the Number System Calculating 1, Activity 4.		5.3 Addition and Subtraction of Fractions and Mixed Numbers, p.124		4c Addition and subtraction of fractions: p.68	1017
	2: Fractions and decimal equivalents	- To recognize common fractions and their decimal fractions equivalents (e.g. $1/2 = 0.5$, $1/4 = 0.25$, $4/10 = 0.4$). - To compare and order decimal fractions (e.g. 0.1 is 10 times bigger than 0.01).	NPC 4, Numbers and the Number System 6, Activities 3 and 4; Numbers and the Number System 8, Activity 3.	6.1 Decimal Place Values: p.146, 6.2 Conversion between Fractions and Decimals: p.154			4d Decimals and fractions: p.70	1009, 1016, 1072, 1378
	3: Percentages	- To know that percentages are a way of expressing hundredths. - To be able to work out simple percentages of amounts (e.g. 25% of 200, 1% of 400). - To know the fraction equivalents of 1%, 50% and 10%. - To understand that, e.g. 5% is half of 10% when the total amount is the same.	NPC 5, Numbers and the Number System 7, Activities 1 and 2; Calculating 11, Activities 1 and 2.	6.4 Introducing Percentages: p.168 6.5 Percentages of Quantities: p.174		4f Percentages: p.76, 4g Finding percentages: p.78	4f Percentages: p.74	1029, 1030, 5688
	4: Multiplying a fraction by a whole number	- To multiply a whole number by unit and non-unit fractions (e.g. $1/5 \times 200$ and $3/5 \times 200$). - To represent fraction calculations on a number line.	NPC 5, Calculating 14, Activities 2–4; Calculating 15, Activity 5.		5.4 Multiplication of Fractions: p.128			1768

NBI unit	Numicon Big Ideas lesson	Learning objectives	Numicon Teaching Packs	Discovering Mathematics		MyMaths for KS3		MyMaths lessons
				Student book IA	Student book IB	Student book IA	Student book IB	
7	1: Place value extended to tenths and hundredths	- To link decimals with tenths and hundredths fluently and understand their position in the base-ten system. - To order decimals with two decimal places.	NPC 4, Numbers and the Number System 6, Activities 6 and 7; Numbers and the Number System 8, Activities 2–5.	6.1 Decimal Place Values: p.146		1c Place value and decimals: p.8		1072, 1076
	2: Money, money, money	- To compare and order decimals to two decimal places in the context of money. - To understand the use of zero as a place holder in the context of money.	NPC 4, Numbers and the Number System 6, Activity 7; Numbers and the Number System 8, Activity 6; Calculating 1, Activity 4. GMS 4, Measurement 2, Activity 1.			1d Decimals and money: p.10		1378, 1014, 1377, 1226
	3: Numbers to three decimal places	- To read, write, order and compare numbers with up to three decimal places. - To use a number line to represent numbers with up to three decimal places.	NPC 5, Pattern and Algebra 1, Activities 4 and 5. NPC 5, Numbers and the Number System 3, Activity 6.	6.1 Decimal Place Values: p.146				1009, 1379, 1072, 1076
	4: Ordering and rounding decimals	- To compare numbers with the same number of decimal places (with three decimal places). - To round numbers with up to two decimal places to the nearest whole number. - To round numbers with two decimal places to the nearest tenth.	NPC 4, Numbers and the Number System 6, Activities 8 and 9; Numbers and the Number System 8, Activity 8. NPC 5, Numbers and the Number System 4, Activities 5 and 6.	6.1 Decimal Place Values: p.146				1076, 1001, 1072, 1004
8	1: Using the column method with larger numbers	- To use the written column method for adding and subtracting (up to 5-digit numbers). - To use estimation and the inverse relationship between adding and subtracting to check answers.	NPC 5, Calculating 5, Activities 1 and 2; Calculating 6, Activities 1 and 2.	1 Adding and Subtracting whole Numbers: p.3		7d Written addition and subtraction 2: p.136		1020, 1028, 1908, 1987
	2: Adding and subtracting money	- To know that the decimal point separates the whole and fractional parts in decimal notation. - To add and subtract numbers up to two decimal places using the column method. - To solve simple money problems involving numbers to two decimal places.	NPC 5, Calculating 1, Activity 5; Calculating 5, Activity 4; Calculating 6, Activity 3.					1377, 1014
	3: Column methods for adding and subtracting decimals	- To know that the decimal point separates the whole and fractional parts in decimal notation. - To add and subtract numbers with up to three decimal places using the column method.	NPC 5, Numbers and the Number System 1, Activity 3; Calculating 5, Activity 5; Calculating 6, Activity 4.		6.2 Addition and Subtraction of Decimals: p.147	1e Adding decimals: p.12		1007, 1381
	4: Using inverse relationships when adding and subtracting decimals	- To use the inverse relationship between adding and subtracting to solve a variety of problems. - To add and subtract decimals up to two decimal places.	NPC 5, Calculating 1, Activities 5 and 6.					1007
9	1: Multiplying and dividing by 10, 100 and 1000 including decimals	- To multiply and divide numbers, including decimals, by 10, 100 and 1000. - To understand and demonstrate the new place values of digits resulting from these operations. - To understand the role of zero as a place holder in decimal numbers.	NPC 5, Calculating 4, Activities 8 and 9; Calculating 7, Activities 5 and 6.	6.3 Multiplying and Dividing by 10, 100 and 1000: p.159				1027, 1392, 1013
	2: Multiplying 2- and 3-digit numbers	- To develop an understanding of multiplying $TO \times TO$ and $HTO \times TO$. - To understand that multiplying can be done as repeated adding of parts.	NPC 5, Calculating 12, Activities 4 and 5.		1.4 Multiplication: p.17	14d Written methods of multiplication: p.264	7c Mental multiplication and division: p.130, 7d Written methods of multiplication: p.134	1025, 1911
	3: The short written method of dividing: $ThHO \div O$	- To link dividing to multiplying as the inverse operation. - To be able to estimate an answer. - To understand that dividing involves repeated subtracting of parts.	NPC 5, Calculating 4, Activity 6; Calculating 13, Activity 2.		1.5 Division: p.22		7e Written methods of division: p.134	1905, 1021
	4: Interpreting remainders	- To recognize a remainder. - To convert remainders to fractions and decimals. - To write a remainder as a number, fraction or decimal. - To write the quotient as a mixed number.	NPC 5, Calculating 9, Activities 1–5.			14f Division problems: p.268		1022, 1767, 1016

NBI unit	Numicon Big Ideas lesson	Learning objectives	Numicon Teaching Packs	Discovering Mathematics		MyMaths for KS3		MyMaths lessons
				Student book IA	Student book IB	Student book IA	Student book IB	
10	1: Mixed numbers	- To identify proper and improper fractions. - To understand how mixed numbers are written.	NPC 5, Pattern and Algebra I, Activity 6; Numbers and the Number System 2, Activities 2–4.	5.2 Improper Fractions and Mixed Numbers: p.121		4c Improper fractions: p.70		1019
	2: Mixed numbers and the number line	- To locate a mixed number on a fraction number line. - To count on and back with mixed numbers.	NPC 4, Numbers and the Number System 6, Activity 3. NPC 5, Pattern and Algebra I, Activity 6; Numbers and the Number System 2, Activity 4.		5.1 Quantities as Fractions: p.115, 5.2 Equivalent Fractions and Comparing Fractions: p.119			1771
	3: Finding equivalent fractions	- To recognize and calculate equivalent fractions. - To recognize that 1 can be represented as $\frac{2}{2}$ or $\frac{7}{7}$ or $\frac{b}{b}$. - To understand the effect of multiplying a fraction by 1. - To know that an equivalent fraction will result from multiplying the numerator and the denominator by the same number.	NPC 5, Numbers and the Number System 2, Activities 5 and 7; Numbers and the Number System 6, Activities 2, 4 and 5.	5.3 Equivalent Fractions: p.128		4b Equivalent fractions: p.68		1042, 1371, 1773
	4: Comparing and ordering fractions	- To compare and order fractions with the same denominator and different numerators. - To compare and order fractions with the same numerator and different denominators.	NPC 5, Pattern and Algebra I, Activity 6; Numbers and the Number System 6, Activities 1 and 2; Calculating 14, Activity 1.	5.4 Comparing Fractions: p.134				1771, 1075, 1906, 5683
11	1: Adding and subtracting fractions with different denominators	- To add and subtract fractions with different denominators (e.g. $\frac{11}{12} - \frac{1}{4}$). - To add and subtract fractions to 1 (e.g. $\frac{10}{10} - \frac{7}{10}$).	NPC 5, Numbers and the Number System 6, Activities 1 and 2; Calculating 1, Activity 4; Calculating 15, Activity 4.		5.3 Addition and Subtraction of Fractions and Mixed Numbers: p.124		4c Addition and subtraction of fractions: p.68	1017
	2: Calculating with fractions and mixed numbers	- To add and subtract mixed numbers (e.g. $5\frac{1}{2} + 4\frac{3}{10}$). - To multiply a mixed number (e.g. $1\frac{3}{4} \times 4$). - To recognize improper fractions (e.g. $\frac{12}{4}$ as 12 quarters, equal to 3).	NPC 5, Numbers and the Number System 2, Activity 4; Calculating 15, Activities 1, 2 and 6.		5.3 Addition and Subtraction of Fractions and Mixed Numbers: p.124, 5.4 Multiplication of Fractions: p.128			1017, 1019, 1768, 1074
	3: Fraction, percentage and decimal equivalents	To recognize the percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$ and $\frac{1}{10}$.	NPC 5, Numbers and the Number System 3, Activities 2 and 3; Numbers and the Number System 7, Activities 1 and 4.			4h Fractions, decimals and percentages: p.80	4h Fractions, decimals and percentages: p.78	1016, 1029, 5687, 1962
	4: Multiplying fractions, decimals and percentages	- To calculate percentage/fraction/decimal $\times$ whole number (e.g. 40%, $\frac{4}{10}$, 0.4×80). - To understand and compare the similarities and differences of the three procedures. - To be able to appraise answers for accuracy (e.g. 40% should be less than half).	NPC 5, Numbers and the Number System 7, Activities 3 and 5; Calculating 11, Activity 5.				4g Percentage of an amount p.78	1030, 1031, 1010
12	1: Using place value	- To review understanding of place value from thousands to thousandths. - To multiply and divide numbers by 10, 100, 1000.	NPC 5, Calculating 7, Activities 1–4.					1076, 1027, 1392, 1013
	2: Adding and subtracting	- To review understanding and accuracy in adding and subtracting problems, with both whole numbers and decimal numbers. - To use and understand the procedure for exchanging in both adding and subtracting.	NPC 5, Calculating 3, Activities 4–6.					1014, 1377, 1007
	3: Multiplying and dividing	To calculate the answer to problems, including 2-digit $\times$ 1-digit, 3-digit $\times$ 1-digit, 3-digit $\times$ 2-digit (including decimals), 3-digit $\div$ 1-digit, 3-digit $\div$ 1-digit and 4-digit $\div$ 1-digit.	NPC 5, Calculating 4, Activity 3.	Integrated Examples and Review Exercise 1: p.104				1904, 1905
	4: Fractions, decimals, percentages	- To secure an understanding of the equivalence of fractions, decimals and percentages. - To be able to convert between the three ways of writing numbers that are less than one (and equal to and more than one.) - To work out: percentage of a quantity, decimal $\times$ quantity and fraction $\times$ quantity.	NPC 5, Numbers and the Number System Activities 2 and 3; Numbers and the Number System 7, Activity 4; Calculating 11, Activity 6.	Integrated Examples and Review Exercise 2: p.203	Integrated Examples and Review Exercise 2: p.191			1016, 1029, 1030