



# Year 7 and 8

Scheme of work

This is a working document and will be reviewed on a regular basis

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# Year 7 & 8 – Unit 1 Number / Written & Mental Methods

## Programme of Study Reference:

KS3 No (b) Order positive and negative integers and decimals in order of size; use the number line as a model for ordering of the real numbers  
KS3 No (d) Use the four operations, including formal written methods, applied to integers and decimals

KS3 No (a) Understand and use place value for decimals, measures and integers of any size.

KS3 No (d) Use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative.

KS4 No (1) Order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥

KS3 No (a) Understand and use place value for decimals, measures and integers of any size

KS4 No (2) Apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative; understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals).

KS4 No (1) Order positive and negative integers, decimals and fractions; use the symbols =, ≠, <, >, ≤, ≥

KS3 No (a) Understand and use place value for decimals, measures and integers of any size.

KS4 No (2) Apply the four operations, including formal written methods, to integers, decimals and simple fractions (proper and improper), and mixed numbers – all both positive and negative; understand and use place value (e.g. when working with very large or very small numbers, and when calculating with decimals).

KS4 No (3) Recognise and use relationships between operations, including inverse operations (e.g. cancellation to simplify calculations and expressions; use conventional notation for priority of operations, including brackets, powers, roots and reciprocals.

## Learning Objectives

T/book

Order whole numbers using a number line. Place integers and decimals in order of size.

Multiply and divide integers and decimals by 10,100, 1000 and explain the effect.

Multiplying and dividing by a single-digit number using written methods.

Multiplying by two digit number using written methods.

Use standard column procedures to add and subtract integers and simple decimals.

Convert between decimals, fractions and integers

Order decimals and fractions using appropriate symbols.

Place integers, decimals and directed numbers in order of size.

Mental and written methods for all four operations with integers using a calculator where appropriate

Use of BIDMAS

Understand place value in big numbers and decimals.

Be able to put the symbols =, ≠, <, >, ≤, ≥ between pairs of numbers.

Be able to put two or more simple fractions in order by using equivalence

Strengthen mental and written methods working with squares/ cubes and roots.

Round whole numbers and to the nearest 10, 100, 1000

Check results by considering order of magnitude and use inverse operations

Division, multiplication, addition and subtraction of fractions.

Place integers, decimals, fractions and directed numbers in order of size including where fraction to decimal conversion needs to be done.

Use written methods for 4 rules of integers, decimals to 3 or 4 decimal places, directed numbers and fractions.

Be able to order fractions with different denominators and find a fraction bigger than  $\frac{7}{8}$  but less than one.

Be able to find a fraction half way between two others.

## Keywords

Fraction, decimal, integer, order, inequality, equality, place value, thousands, hundreds, tens, units, tenths, hundredths, thousandths, etc.

## Key Questions/ Criteria for success

A book of raffle tickets is numbered from 300 to 399. Some have been sold, in order, and the next available ticket is 343. How many have been sold? How many are there left? You have 44 eggs, and each egg-box can hold six eggs. How many boxes would you need? What would happen if you rounded to the nearest 10 in order to estimate a solution? Why do these calculations have the same answer?  $16 + 9$  and  $17 + 8$ ?  $17 - 9$  and  $16 - 8$ ? etc.

How many numbers are there between 1 and 2? Give me some numbers between 7.1 and 7.2  
 $1/8 = 0.125$ . What is  $3/8$ ? 80 pupils go on a trip. 25% are girls, how can you work out the number of boys?

Which is bigger 0.32 or 0.325? Put in order of size -4, -3, 9, -9, 0, -15. Convince me that  $1/3$  is bigger than  $1/4$ . Put an inequality symbol between -8 and -10. Place several fractions in order of size. What is the value of the 7 in 327654?

Can division ever make a number larger? Can multiplication ever make a number smaller? How can you check if your answer makes sense? [Last digits / estimating]

Be able to multiply by 0.2, 0.02, 3.2, divide by 0.2, 0.02, 5.2. Be able to put -8, -3,  $\pi$ ,  $\sqrt{7}$ , 3.5, 3.55 in order. Add together pairs of fractions with different denominators including mixed fractions. Find three pairs of decimals that add to 0.2. Convince me that  $7/8$  is bigger than  $7/9$ .

### Extension

Worded problems and functional problems.

Estimate answers to calculations involving the four rules of operation Directed number work with multi-step calculations. Encourage effective use of a calculator Try investigations with digits 3, 7, 5 and 2 and challenge students to find the biggest number, smallest odd number, the largest sum or product etc

Could extend to ordering sets of numbers including  $\sqrt{5}$ ,  $\pi$  and other irrationals.

### Misconceptions

$0.325 > 0.37$  because it has more numbers. Forgetting the meanings of the inequality symbols.  $1/7$  is bigger than  $1/3$  because  $7 > 3$ .

BIDMAS. Addition is before subtraction so that  $5 - 3 + 8 = -6$ .

### Real World/Problem Solving

$24 \times 21 = 42 \times 12$  Discuss.

$42 \times 14 = 84 \times 7$  but  $42 \div 14 \neq 84 \div 7$  - discuss.

Money, bank accounts, magnitude of debt.

### SMSC Links

Willingness to participate in, and respond to mathematical opportunities. Use of social skills in different contexts, including working and socialising with pupils from different religious, ethnic and socio-economic backgrounds.

### PLTS

Working in groups. Independent learning, Ask 3 before me. Build Learning Power - Resilience and resourcefulness.

### Resources

**Standards Unit:** N2 Evaluating statements about number operations NCETM

**NCETM Departmental Workshops** [Mathematical Processes and Applications](#)

**NRICH:** [How Do You Do It?](#) [Reach 100](#) [Counting Cards Up and Down Staircases](#) [Magic Vs](#) [Sealed Solution](#) [Prison Cells](#) [Money Bags](#) [Amy's Dominoes](#)

**NRICH:** [The Remainders Game](#) [Countdown](#) [Remainders](#) [Number Daisy](#) [Got It](#)

**NRICH:** [The Greedy Algorithm](#) [Thousands and Millions](#) [Keep it Simple](#) [Egyptian Fractions](#)