Year 8 Scheme of Learning

MODULE 2

Bishop Chadwick
Catholic Education Trust

Bespoke revision

Perimeter, area & volume

Bounce back: Constructions & Loci

Quadratic equations

Compound measures

Percentages, including interest

Year 11

Indices & standard form

Bounce back: Quadratic equations

Construction s & Loci

Probability & diagrams

Perimeter, area & volume

Averages

Angles & Transformation s

Straight line & other graphs

Expressions & equations

Graphs

Year 10

Fractions & percentages

Sequences

Pythagoras & Trigonometry

Ratio & proportion

Pythagoras & Trigonometry

Handling data & measures of location

Angles in parallel lines, lines & polygons

Fractions & percentages

Data handling

Year 9

Algebra: including substituting & brackets

Sequences & Indices

Number; including index laws

Area of trapezia & circles; Line symmetry & reflections

Standard form & number sense

Brackets, equations & inequalities

Sets & probability

Proof

Multiplicative reasoning

Working in Cartesian plane

Ratio & proportion

Year 8

Fraction arithmetic

Geometric reasoning

Prime numbers

Ratio & scale

Multiplying & dividing fractions

Representing data, tables & probability

Operations with equations & directed numbers

Fraction & % of amounts

Fractions, decimals & percentages

Use and understand algebraic notation

Place value and ordering, including decimals

Year 7

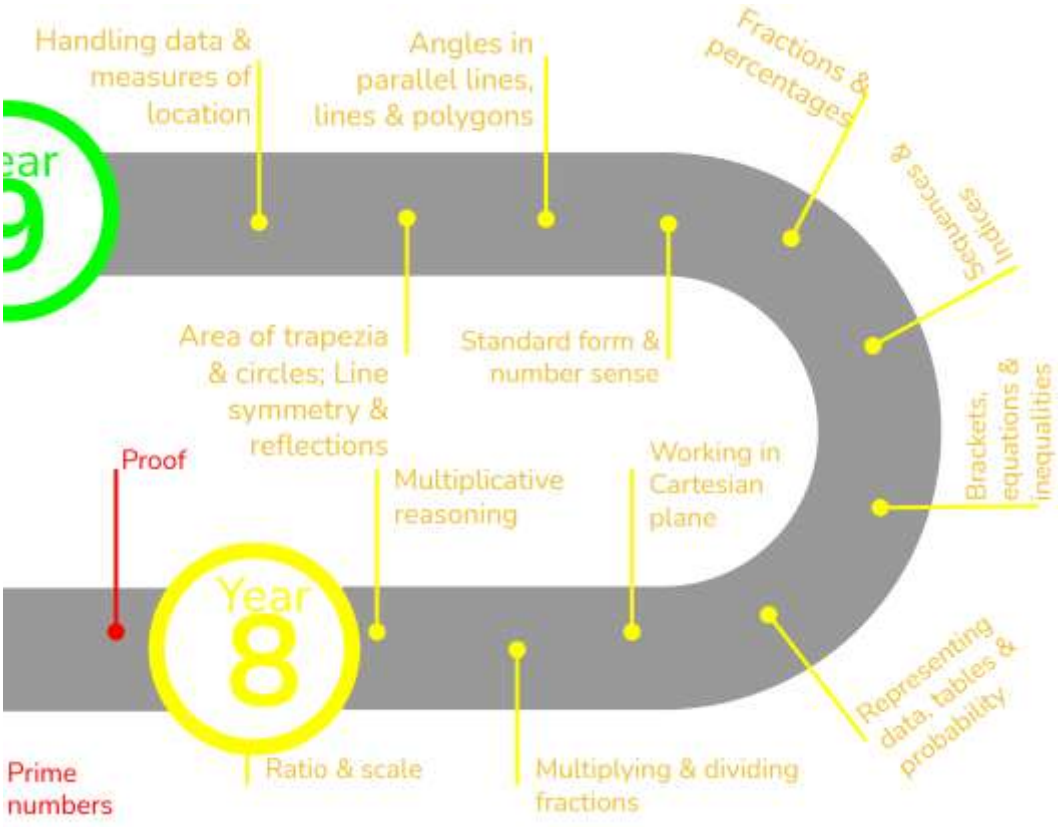
Problem solving with four main operations

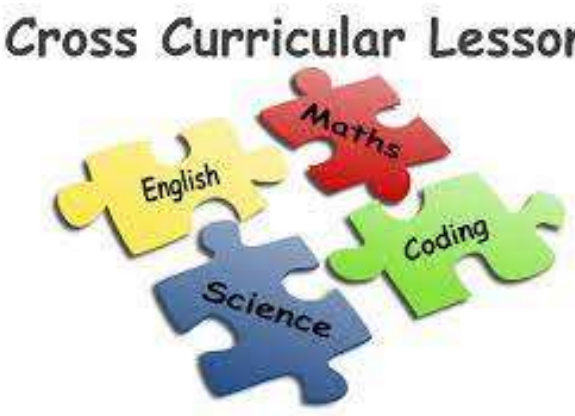
Equality & Equivalence - solving equations

Sequences

Core/Foundation 2021/22 *(includes Y11 bounce back)*

This is what your child will be taught in Year 8 in MATHS

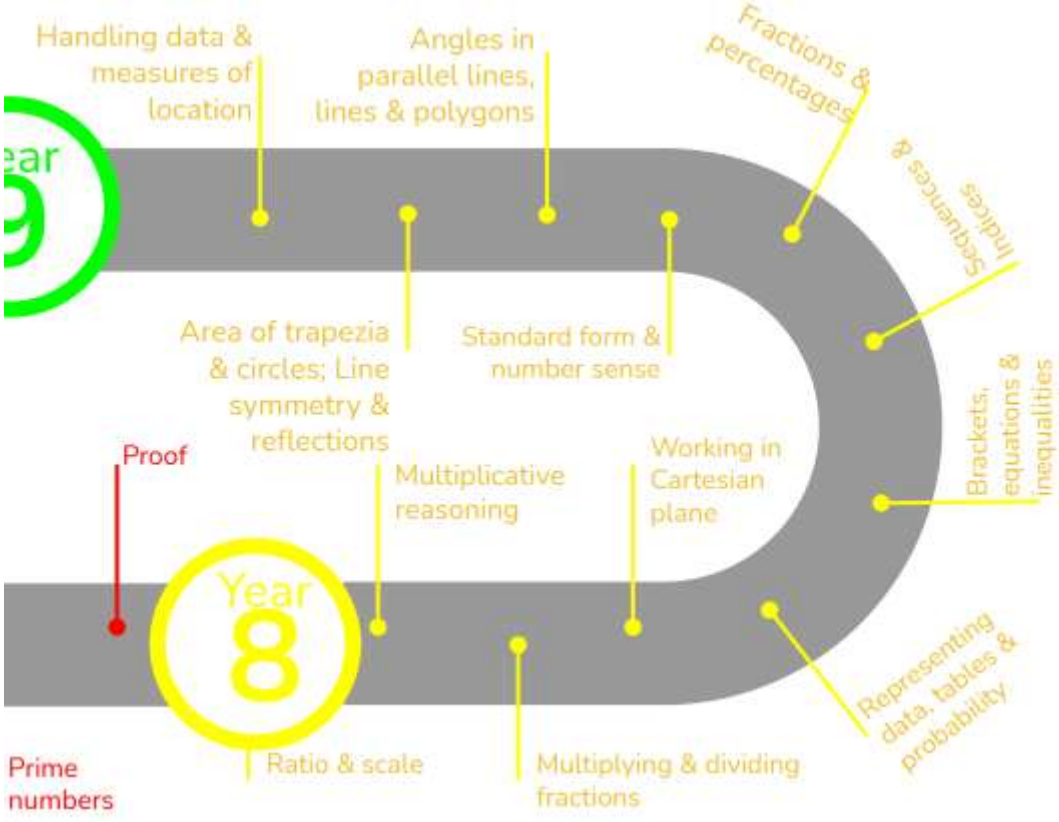




They will have also have specific lessons linked to other subjects and a diet of retrieval built into their lessons

In Year 8 Module 2 your child will study the following topics:

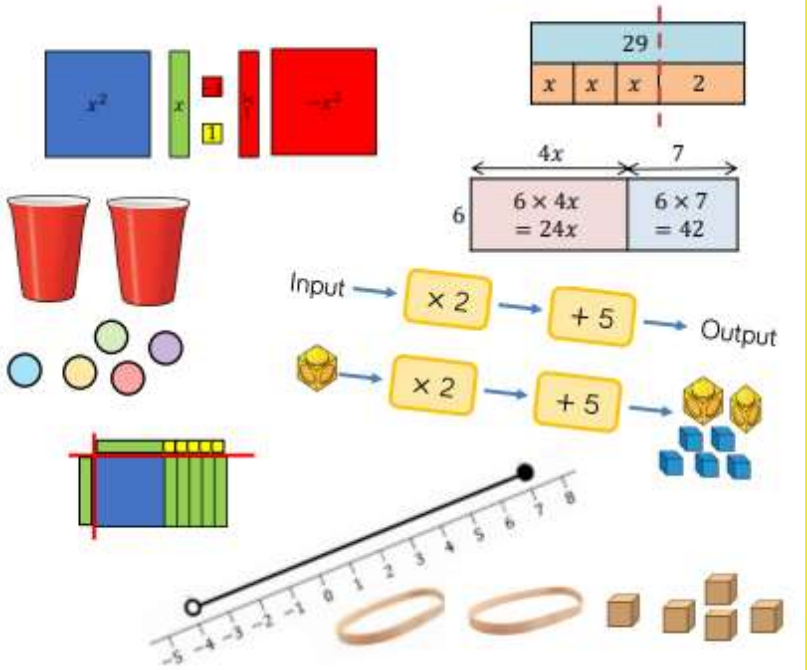
- Brackets, equations and inequalities
- Sequences
- Indices
- Fractions and Percentages
- Standard Form
- Number Sense



We use the White Rose Maths scheme of learning in Year 8 as our feeder primary schools follow this scheme. It also helps with the transition to secondary school as pupils are familiar with the resources.

Unit 7: Brackets, Equations and Inequalities

Key Representations



Algebraic constructs

Expression
A sentence with a minimum of two numbers and one maths operation

Equation
A statement that two things are equal

Term
A single number or variable

Identity
An equation where both sides have variables that cause the same answer includes ≡

Formula
A rule written with all mathematical symbols
e.g. area of a rectangle A = b x h

Brackets, Equations & Inequalities

Small Steps

- Form algebraic expressions
- Use directed number with algebra
- Multiply out a single bracket
- Factorise into a single bracket
- Expand multiple single brackets and simplify
- **Expand a pair of binomials** (H)
- Solve equations, including with brackets
- Form and solve equations with brackets
- Understand and solve simple inequalities

(H) denotes higher strand and not necessarily content for Higher Tier GCSE

Sequences

Small Steps

- Generate sequences given a rule in words
- Generate sequences given a simple algebraic rule
- Generate sequences given a complex algebraic rule
- **Find the rule for the n^{th} term of a linear sequence** (H)

Linear and Non Linear Sequences

Linear Sequences – increase by addition or subtraction and the same amount each time

Non-linear Sequences – do not increase by a constant amount – quadratic, geometric and Fibonacci

- Do not plot as straight lines when modelled graphically
- The differences between terms can be found by addition, subtraction, multiplication or division

Fibonacci Sequence – look out for this type of sequence

0 1 1 2 3 5 8 ...

Each term is the sum of the previous two terms

Sequences from algebraic rules

This is substitution!

$3n + 7$ — This will be linear - note the single power of n. The values increase at a constant rate

$3n^2 + 7$ — This is not linear as there is a power for n

$2n - 5$ → Substitute the number of the term you are looking for in place of 'n'

e.g.

1st term = $2(1) - 5 = -3$

2nd term = $2(2) - 5 = -1$

100th term = $2(100) - 5 = 195$

Checking for a term in a sequence

Form an equation

Is 201 in the sequence $3n - 4$?

$3n - 4 = 201$ ← Term to check

Algebraic rule

Solving this will find the position of the term in the sequence. ONLY an integer solution can be in the sequence.

Unit 8: Sequences

Keywords

Sequence: items or numbers put in a pre-decided order

Term: a single number or variable

Position: the place something is located

Linear: the difference between terms increases or decreases (+ or -) by a constant value each time

Non-linear: the difference between terms increases or decreases in different amounts, or by x or ÷

Difference: the gap between two terms

Arithmetic: a sequence where the difference between the terms is constant

Geometric: a sequence where each term is found by multiplying the previous one by a fixed non zero number

Addition/ Subtraction laws for indices

$3^5 \times 3^2 = (3 \times 3 \times 3 \times 3 \times 3) \times (3 \times 3) \longrightarrow 3^7$

The base number is all the same so the terms can be simplified

Addition law for indices

$$a^m \times a^n = a^{m+n}$$

$3^5 \div 3^2 \longrightarrow 3^3$

$\frac{3 \times 3 \times 3 \times \cancel{3} \times \cancel{3}}{\cancel{3} \times \cancel{3}} \longrightarrow \frac{3^5}{3^2} \longrightarrow \frac{3^5}{1}$

Subtraction law for indices

$$a^m \div a^n = a^{m-n}$$

Multiply expressions with indices

$4b \times 3a$
$\equiv 4 \times b \times 3 \times a$
$\equiv 4 \times 3 \times b \times a$
$\equiv 12ab$

$5t \times 9t$
$\equiv 5 \times t \times 9 \times t$
$\equiv 5 \times 9 \times t \times t$
$\equiv 45t^2$

$2b^4 \times 3b^2$
$\equiv 2 \times b \times b \times b \times b \times 3 \times b \times b$
$\equiv 2 \times 3 \times b \times b \times b \times b \times b \times b$
$\equiv 6b^6$

There are often misconceptions with this calculation but break down the powers

Indices

Small Steps

- Adding and subtracting expressions with indices
- Simplifying algebraic expressions by multiplying indices
- Simplifying algebraic expressions by dividing indices
- Using the addition law for indices
- Using the addition and subtraction law for indices
- **Exploring powers of powers** (H)

Unit 9: Indices

Keywords

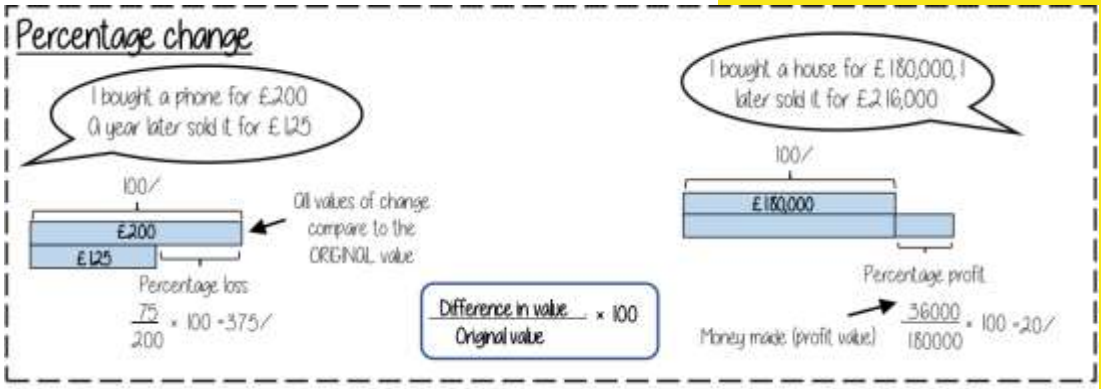
Base: The number that gets multiplied by a power
Power: The exponent – or the number that tells you how many times to use the number in multiplication
Exponent: The power – or the number that tells you how many times to use the number in multiplication
Indices: The power or the exponent
Coefficient: The number used to multiply a variable
Simplify: To reduce a power to its lowest term
Product: Multiply

Unit 10: Fractions and Percentages

Fractions and Percentages

Small Steps

- Convert fluently between key fractions, decimals and percentages (R)
- Calculate key fractions, decimals and percentages of an amount without a calculator (R)
- Calculate fractions, decimals and percentages of an amount using calculator methods (R)
- Convert between decimals and percentages greater than 100%
- Percentage decrease with a multiplier
- Calculate percentage increase and decrease using a multiplier
- Express one number as a fraction or a percentage of another without a calculator
- Express one number as a fraction or a percentage of another using calculator methods



Keywords

Percent: parts per 100 – written using the / symbol

Decimal: a number in our base 10 number system. Numbers to the right of the decimal place are called decimals.

Fraction: a fraction represents how many parts of a whole value you have.

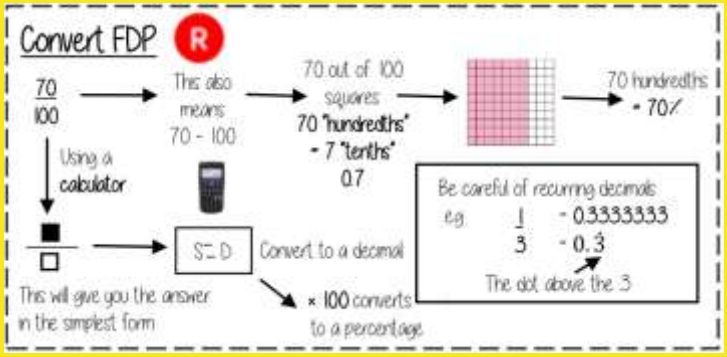
Equivalent: of equal value.

Reduce: to make smaller in value.

Growth: to increase/ to grow.

Integer: whole number, can be positive, negative or zero.

Invest: use money with the goal of it increasing in value over time (usually in a bank).



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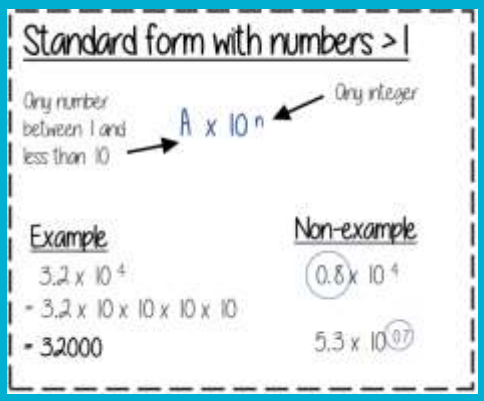
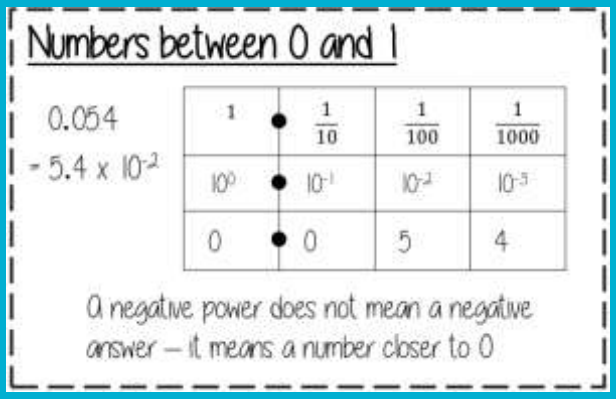
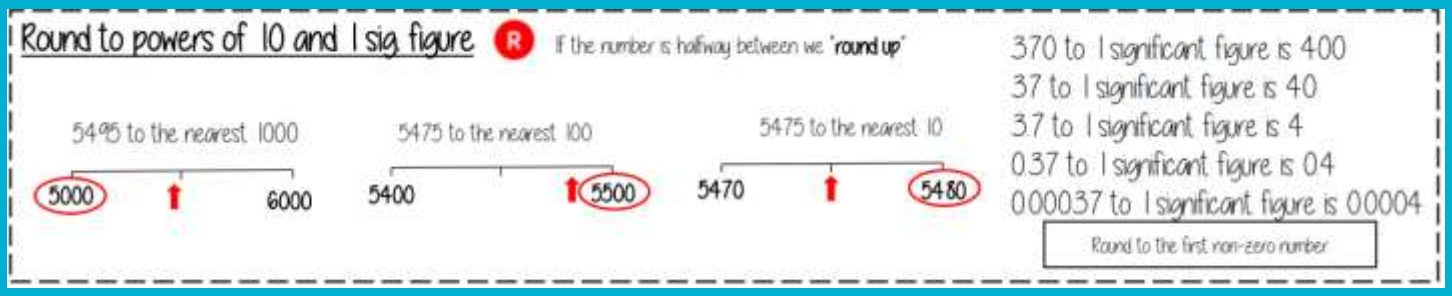
Standard Form

Small Steps

- Investigate positive powers of 10
- Work with numbers greater than 1 in standard form
- Investigate negative powers of 10
- Work with numbers between 0 and 1 in standard form
- Compare and order numbers in standard form
- Mentally calculate with numbers in standard form
- Add and subtract numbers in standard form
- Multiply and divide numbers in standard form
- Use a calculator to work with numbers in standard form







Unit 11: Standard Form

Keywords

Standard (index) Form: A system of writing very big or very small numbers
Commutative: an operation is commutative if changing the order does not change the result
Base: The number that gets multiplied by a power
Power: The exponent – or the number that tells you how many times to use the number in multiplication
Exponent: The power – or the number that tells you how many times to use the number in multiplication
Indices: The power or the exponent
Negative: A value below zero

Number Sense

Small Steps

- Round numbers to powers of 10, and 1 significant figure (R)
- Round numbers to a given number of decimal places
- Estimate the answer to a calculation
- **Understand and use error interval notation** (H)
- Calculate using the order of operations (R)
- Calculate with money
- Covert metric measures of length
- Convert metric units of weight and capacity

Keywords

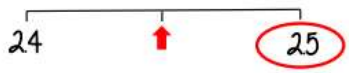
Significant: Place value of importance
Round: Making a number simpler but keeping its value close to what it was
Decimal: Place holders after the decimal point
Overestimate: Rounding up – gives a solution higher than the actual value
Underestimate: Rounding down – gives a solution lower than the actual value
Metric: A system of measurement
Balance: The amount of money in a bank account
Deposit: Putting money into a bank account

Round to decimal places

2.46192 ← Focus on the numbers **after** the decimal point

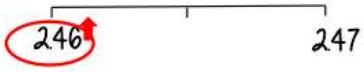
"To 1dp" – to one number after the decimal
"To 2dp" – to two numbers after the decimal

2.46192 (to 1dp) - Is this closer to 24 or 25



2.4 6192 This shows the number is closer to 25

2.46192 (to 2dp) - Is this closer to 246 or 247

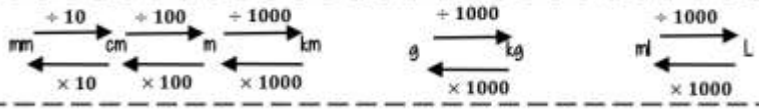


2.46 192 This shows the number is closer to 246

Order of operations (R)

Brackets Operations in brackets are calculated first
Other operations e.g. powers, roots,
Multiplication/ Division
They are carried out in the order from left to right in the question
Addition/ Subtraction
They are carried out in the order from left to right in the question

Units are important: Useful Conversions



Unit 12: Number Sense

We recommend pupils have a Casio scientific calculator.
The Casio featured is the one we use when demonstrating in lessons.

On our school website there is a calculation policy showing the methods we use for common operations. It can be found at: Our School > Policies