Mathematics Scheme of Learning

Year 7 – Term 1: Number skills-written methods, Polygons, Area and perimeter and <u>Coding</u>

| Intent – Rationale Year 7 begins with a baseline assessment focussing on key topics from the KS2 National Curriculum. Following this classes work towards securing number and geometry skills in order to progress with strands of Mathematics through KS3 and beyond. To end the term, pupils study the topic of 'Coding' which helps to build curiosity for Mathematics through a historical context (Ada Lovelace and Alan Turing are prominent figures in the Coding history) as well as bridging knowledge with the introduction of Algebraic expressions in term 2. | | | | |
|---|--|--|--|--|
| Sequencing – what prior learning does this topic build upon? | Sequencing – what subsequent learning does this topic feed into? | | | |
| KS2 number work; students may know a variety of approaches to written methods and common techniques are encouraged upon commencing KS3 KS2 geometry – seems less secure since the introduction of the Numeracy strategy. Most pupils can confidently name and have some understanding of angles. Most know how to find the area of rectangle, many of a triangle, few of a circle. Many have heard of pi. KS2 many study WW1&2 and may have heard of enigma, some look at binary. Most pupils understand concept of replacing letters with symbols or scrambling. | Y7 Term 2 Algebraic expressions Y7 Term 2 Number properties Y7 Term 2 Fractions Y7 Term 2 Maths in the world Y7 Term 3 Unit Conversion Y7 Term 3 Calculations Y7 Term 3 Circles Y7 Term 4 Angles Y7 Term 5 FDP | | | |
| What are the links with other subjects in the curriculum? | What are the links to SMSC, British Values and Careers? | | | |
| English – etymology of word structure. Ada Lovelace specific comprehension task Languages – etymology of word structure, in particular Latin/Greek for polygons Computing and History – Ada Lovelace and Alan Turing | Coding – M3/C1/BV2/GB4aceghi (discuss the morality of 'breaking' enigma and how in spite of this success the WWII government had to be careful with what information they could use and how loss of life was still allowed to occur) Ada Lovelace day – 11th October C1/GBcefi | | | |

| Music – rhythm and counting | • SP234 |
|---|---|
| What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading? | What are the opportunities for developing mathematical skills? |
| 'Computer Coding Python Projects for Kids: A Step-by-Step Visual – Carol Vorderman and Craig Steele 'Ada Lovelace Cracks the Code' – Jestine Ware 'Alex's Adventure in Numberland' - Alex Bellows | Encouraging use of column multiplication (rather than grid) and securing knowledge of this method Establishing confidence in long division (A level polynomial division) and short division for efficient calculations |

Mathematics Scheme of Learning

Year 7 – Term 1: Number skills-written methods, Polygons, Area and perimeter and Coding

Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic? KS2 National Curriculum References

Number Skills

- Multiply multi digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context

- Perform mental calculations, including with mixed operations and large numbers
- Solve addition and subtraction multi step problems in contexts, deciding which operations and methods to use and why
- Solve problems involving addition, subtraction, multiplication and division
- Multiply one-digit numbers with up to two decimal places by whole numbers
- Use written division methods in cases where the answer has up to two decimal places
- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero

Polygons

- Use the properties of rectangles to deduce related facts and find missing lengths and angles
- Distinguish between regular and irregular polygons based on reasoning about equal sides and angles
- Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangle, quadrilateral and regular polygons
- Identify lines of symmetry in 2D shapes presented in different orientations

Area and perimeter

- Measure and calculate the perimeter of composite rectilinear shapes in cm and m
- Calculate and compare the area of rectangles using standard units and estimate the area of irregular shapes
- Recognise that shapes with the same areas can have different perimeters and vice versa
- Recognise when it is possible to use formulae for area and volume of shapes
- Calculate the area of parallelograms and triangles

In addition to retrieving knowledge of the above, the following objectives which cover KS3 National Curriculum will be taught:

<u>Know</u>

- How to use place value for decimals, measures and integers of any size
- The relationships between operations including inverse operations
- How to use a calculator and other technologies to calculate results accurately and then interpret them appropriately
- How to identify the order of rotational symmetry.
- How to derive and illustrate properties of triangles, quadrilateral and other plane figures (eg equal lengths and angles) using appropriate language and technologies
- How to find the area and perimeter of compound polygons (L-shape only).
- The difference between a code and a cipher.
- Encode and decode a code or cipher.

<u>Apply</u>

- Basic number skills knowledge to contextual problems
- Basic area & perimeter knowledge to contextual problems
- Knowledge of ciphers and ciphers to decrypt a given code

Extend

- Multiply & divide with decimals of different decimal places (greater than two decimal places)
- Identify lines of symmetry in unfamiliar shapes.
- Estimate the area of complex irregular shapes on a grid (part squares)
- Research skills to find out about historic codes and ciphers
- Create own ciphers and codes

| What subject specific language will be used and developed in this topic? | What opportunities are available for assessing the progress of students? |
|--|---|
| Integer, multiply, divide, subtract, add, sum, calculate, work out, column multiplication, place value, long division, short division, decimal, multiple, decimal point, negative number, positive, directed numbers, number line, product, commutative Square, rectangle, parallelogram, rhombus, kite, quadrilateral, triangle, angle, side, vertices, vertex, edge, polygon, symmetry, line symmetry, order, rotational symmetry, reflection, regular, irregular Area, perimeter, units, regular, irregular, compound Code, cipher, substitute, shift, decipher, encipher | Lesson Formative assessment occurs throughout lessons and will address common misconceptions as well as help to inform pace and depth of lesson delivery. Formative assessment will be conducted using a variety of methods as prescribed in the Mathematics Teaching and Learning Protocol. Homework Retrieval homework issued termly followed by teacher www/ebi comments with a week built in for pupils to digest and follow up on feedback in preparation for retrieval/termly test. Y7 Homework booklet which contains a mixture of retrieval questions, current topic questions and extension tasks via Junior Maths Challenge questions Mathswatch assignments Mathswatch assignments Pupils are to self-mark classwork as directed by the teacher. The use of a green marking triangle is encouraged to allow efficient monitoring of pupil progress during book and pupil folder checks which occur termly for each class. Common errors and |
| | misconceptions should be addressed as a class. |

| Accomment |
|--|
| Assessment |
| Baseline assessment at the beginning of the term allows staff to |
| identify pupils who may require additional support with key |
| number and geometry skills |
| A termly assessment will follow on from this with year group |
| 'topic top up' identified in preparation for next term's teaching. |
| - |
| |

<u>Intent – Concepts</u>

| Lesson title | Learning challenge | Higher level challenge | Suggested activities and resources |
|---|---|---|---|
| Number skills – written methods Approx. 12 lessons | Key Knowledge Use written methods to multiply integers Use written methods to divide integers Understand how to calculate with directed numbers Be able to order, add and subtract decimals Understand how to multiply decimals | Multiply & divide with decimals of different decimal places (greater than two decimal places) | Department powerpoint and folder resources (to be adapted to reflect class requirements) Directed numbers investigation Calculated story Use of a calculator treasure hunt Column multiplication is the taught method |
| | Understand how to divide decimals Know how to use a calculator <u>Common Misconceptions</u> Forgetting to use 0 place holders in column multiplication | | Useful websites: Mathsbox Goteachmaths AccessMaths CorbettMaths MWB |

| Confusion in what to write on 'top of the bus stop' and deciding which number is being divided and which number is the divisor Forgetting to bring down the next digit in long division Pupils using correct terminology e.g. 'times' as opposed to multiply which teachers should address and correct | |
|--|--|
| address and correct | |

| Delvgens | Koy Knowledge | Create a chang corter/flowchart | • Department neuverneint |
|-------------------|-----------------------------------|----------------------------------|--|
| | | | Department powerpoint |
| Approx. 2 lessons | | for determining which polygon is | and folder resources (to |
| | Recognise and know the name of | present given its properties | be adapted to reflect class |
| | different types of quadrilaterals | | requirements) |
| | | Justifying how we know a | |
| | Recognise and know the name of | quadrilateral could be a | • Tarsia naming 2D Shapes |
| | different polygons | rectangle rather than a square | |
| | | through given properties | Quadrilateral and triangle |
| | Identify symmetry properties of | | 'wanted' noster |
| | nolvgons | Identify lines of symmetry in | Wanted poster |
| | polygons | unfamiliar shanos | Line ful |
| | Common Missonostions | umanninai shapes | Useful websites: |
| | <u>common Misconceptions</u> | | |
| | | | Mathsbox |
| | Referring to rotational symmetry | | Goteachmaths |
| | 0 as opposed to rotational | | AccessMaths |
| | symmetry 1 | | CorbettMaths |
| | | | MWB |
| | Teachers should ensure nunils | | |
| | are using correct names for | | |
| | are using correct names for | | |
| | polygons e.g. kite not diamond | | |
| | and rectangles rather than | | |
| | oblong | | |
| | | | |
| | | | |

| Area and perimeter Approx. 4 lessons | Key Knowledge | Area of trapeziums by dividing into triangle and | Department powerpoint and folder resources (to |
|---|---|---|--|
| | Understand how to find the perimeter of rectangles and | square/rectangle | be adapted to reflect class requirements) |
| | other quadrilaterals | Estimate the area of complex | , |
| | | irregular shapes on a grid (part | Area project – can be used |
| | Understand how to find the area | squares) | over a few lessons where |
| | shapes (L shapes only) | Calculate missing lengths given | pupils have to draft their work for checking and |
| | | area | then create a final copy |
| | Understand how to find the area | | . , |
| | of irregular shapes on a grid | Calculate missing lengths where | Useful websites: |
| | Solve area and perimeter | two polygons have equal areas | Mathshay |
| | problems | | Goteachmaths |
| | | | AccessMaths |
| | Common Misconceptions | | CorbettMaths |
| | Confusion between formulae | | MWB |
| | Forgetting to divide by two in | | |
| | finding area of a triangle | | |
| | | | |
| | Not using perpendicular height | | |
| | triangle or parallelogram | | |
| | | | |

| Coding Approx. 2 lessons | | Create own ciphers and codes Research historic codes and ciphers | Department powerpoint and folder resources (to be adapted to reflect class requirements) Caesar shift |
|-----------------------------|---|--|--|
| | Key KnowledgeKnow the difference between a code and cipherUnderstand how to decode and encode messages using different types of ciphersCommon Misconceptions Referring to ciphers as a code | | Pig pen cipher Coding booklet Useful websites: Mathsbox Goteachmaths AccessMaths CorbettMaths MWB |

| Number Skills - written methods | R | А | G |
|---|---|---|---|
| Use written methods to multiply integers | | | |
| Use written methods to divide integers | | | |
| Understand how to calculate with directed numbers | | | |
| Be able to order, add and subtract decimals | | | |

| Understand how to multiply decimals | | |
|-------------------------------------|--|--|
| Understand how to divide decimals | | |
| Know how to use a calculator | | |

| Polygons | R | А | G |
|--|---|---|---|
| Recognise and know the name of different types of quadrilaterals | | | |
| Recognise and know the name of different polygons | | | |
| Identify symmetry properties of polygons | | | |

| Area and Perimeter | R | А | G |
|---|---|---|---|
| Understand how to find the perimeter of rectangles and other quadrilaterals | | | |
| Understand how to find the area of rectangles and compound shapes (L-shapes only) | | | |
| Understand how to find the area of irregular shapes on a grid | | | |
| Solve area and perimeter problems | | | |

| Coding | R | А | G |
|--|---|---|---|
| Know the difference between a code and cipher | | | |
| Understand how to decode and encode messages using different types of cipher | | | |