St Mary's Catholic School
Department Curriculum Planning
Department: **Mathematics**

Year Group: **Year 9**

This is the plan for the taught curriculum during achievement period: **Two (Jan-Apr)**

Brief summary of the topic/work being covered during this period

Students at this stage of year 9 are beginning preparations for Key Stage 4, and move to a linear scheme of work, with differentiated objectives that allow teachers to tailor learning to the abilities of their class, rather than labelling classes as "higher" or "foundation" from the outset.

This section gives a brief overview of work covered, with each point being given support/challenge as required for the particular group.

Substantive knowledge

- Sequences of triangular, square and cube numbers, and simple arithmetic progressions
- Fibonacci and quadratic sequences, and simple geometric progressions
- Appropriate terminology with algebraic manipulation
- Kinematics Formulae

Disciplinary knowledge

- Add, subtract, multiply and divide integers and decimals (both positive and negative)
- Multiply and divide by powers of ten
- Know the conventional order for performing calculations involving brackets, four rules and powers, roots and reciprocals
- Generate terms of a sequence using term-to-term and position-to-term definitions of the sequence
- Find the nth term of a sequence
- Find the ratio of quantities in the form a:b and simplify or write as fractions; Find the ratio of quantities in the form 1:n
- Divide a quantity in a given ratio
- Solve direct and inverse proportion problems using informal and algebraic methods
- Collect like terms and simplify expressions by multiplying and dividing – application of basic index rules
- Multiply a single term over a bracket and collect like terms after multiplying out two individual brackets
- Factorise expressions using common factors
- Substitute numbers into formulae, including kinematics formulae

Prior knowledge needed for this unit/topic from previous teaching

Different students will have different starting points, depending on their understanding of mathematics in previous years. However, the list below outlines the basics that all students need to know before starting. Teachers will assess their own classes at the start of each topic to determine the group starting point.

- It is expected students are able to use formal written methods of carrying out the four operations, so that time can be given over to problem solving and application, as well as work with decimals.
- Understand place value in base 10.
- Understand that there is a specified order of mathematical operations and apply this to basic problems.
- Understand the concept of and be able to identify a developing pattern or sequence of numbers.
- Multiplication facts and recognising sequences of numbers.
- Understand terminology associated with ratio; simplification of ratios and fractions.
- Division and multiplication with and without a calculator.
- Able to write expressions in algebra, understand "like terms".
- Understand that a number outside a bracket means everything inside the bracket is multiplied by that number.
- Know how to identify the highest common factor of two terms.
- Fluency in multiplication, division, addition, subtraction, powers and roots; Knowledge of order of operations.

Rationale for students studying this unit/topic

The topics covered during this part of year 9 are the most basic skills that need to be mastered in order to be effectively applied to future, more complex topics. Where students have remembered skills well from previous years, they will be stretched and challenged to apply their knowledge to open-ended problem solving in order to ensure fluency and mastery before moving onto the more challenging Key Stage 4 topics in preparation for their GCSE exams in the following two years.

Key concepts/ideas that are taught to students in this unit/topic, including any anticipated gaps in knowledge and plan to overcome these

- Students should be taught to apply their skills to open-ended and problem-solving situations to ensure they have fully mastered a skill. This applies to students at all levels, and for all topic areas.
- Students also need to be able to use their calculators effectively – it is widely acknowledged that students do not fully appreciate the functions that calculators have and how to use these efficiently. Students will be encouraged to use non-calculator and calculator methods at all parts of their learning to ensure they are confident in their use of calculators prior to moving onto skills that are more complex later.
- Students will need to be able to recognise key patterns and sequences for the more complex sequence questions, e.g. square numbers and cube numbers that have been "shifted" to create a new sequence. Time must be given to students at all levels to work on problems like these.
- Students often do not fully expand a bracket – they may forget to multiply the second term inside the bracket. Adequate time and thought-provoking questions should be given to this area.
- Students often grasp the idea of factorising, but regularly do not fully factorise. Emphasis should be placed on language when teaching and referring to the Highest Common Factor of the terms.

New key terminology students will be taught during this topic/unit

Some students will need to be taught to distinguish between "expression", "equation", "formula" and "identity".

Tier 3

Terminology of special sequences; Fibonacci; Arithmetic progression; Geometric progression; Subscript notation for some students.

"Kinematics" formulae.

Plan for Assessment

- Informal assessment is ongoing through class work, contributions to class discussion, teacher assessment during lessons.
- Teachers record homework marks each week on a centrally held department tracker; the homework tasks are detailed on the schemes of work and outlined centrally within the department to ensure consistency across all classes. Teachers will take in and formally mark a written piece of homework once every two weeks. Students will then have time during a subsequent lesson to review their work and make any corrections. **These homework tasks are now slightly different in order to begin to prepare students for the additional challenge at Key Stage 4.**
- Formal assessment will take place once during this achievement period; after February half term. This synoptic paper aims to assess students' progress in mathematics generally and covers questions from all topics that have been covered at any point in the students' mathematical history (not just this academic year). Again, this assessment is different, in order to prepare students for the style of paper and questioning at Key Stage 4.
- Mini start-of-topic tests will provide information for teachers regarding prior knowledge and existing misconceptions and mini end-of-topic tests will help students and teachers see the progress that has been made over the course of the teaching of the topic.