

Year 7 - Maths

Areas of Learning

- **Working Mathematically:** Develop fluency through varied and frequent practice using increasingly complex problems. Develop mathematical reasoning and solve problems, applying maths skills to routine and non-routine problems of increasing sophistication, breaking down problems into simpler steps.
- **Number:** Consolidate numerical and mathematical capability of KS2, extending understanding of the number system and place value to decimals, fractions, powers and roots. Use the concepts and vocabulary associated to number topics, i.e. common factors, multiples, etc. Use operations on numbers and understand the priority of operations, including brackets and powers. Recognise the equivalence of percentages, decimals and fractions. Use standard units of mass, length, time, money and other measures, including with decimal quantities.
- **Algebra:** Use algebra to generalise the structure of arithmetic, including to formulate mathematical linear relationships. Substitute values in linear expressions, rearrange and simplify linear expressions and solve linear equations. Generate terms of a linear integer sequence from a term-to-term rule and find the term-to-term rule of a linear integer sequence. Appreciate that other sequences than arithmetic linear sequences exist. Recognise straight-line graphs parallel to the x-axis and y-axis. Generate coordinate pairs that satisfy linear equations.
- **Ratio, Proportion and Rates of Change:** Develop knowledge of ratio and proportion in working with measures. Use ratio notation, simplify ratios and divide a quantity into two parts in a given ratio. Solve simple problems involving ratio and direct proportion. Draw and interpret graphs in real-life context.
- **Geometry and Measures:** Change freely between related standard units [for example time, length, area, volume/capacity, mass]. Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders). Solve simple geometrical problems by using side and angle properties to identify equal lengths or calculate unknown angles and explain reasoning.
- **Probability:** Use the language of probability to describe and interpret results involving likelihood and chance. Understand and use the probability scale. Find probabilities based on equally likely outcomes in simple contexts. Identify all the possible mutually exclusive outcomes of a single event. Use experimental data to estimate probabilities. Compare experimental and theoretical probabilities in simple contexts.
- **Statistics:** Determine the mode (or modal class), median, mean and range of data presented in lists and in frequency tables. Draw and interpret pictograms, bar-line graphs and bar charts, frequency diagrams for grouped discrete data and simple pie charts. Determine relevant data to collect when designing a simple survey. Design the data collection sheet, organise the data and plot it using the relevant technique.

Approaches to learning

- Problems are attempted and pupils write their answers on the whiteboards that they then show to the teacher.
- For more challenging problems, pupils given thinking time and are then chosen or volunteer to describe their solution on the whiteboard, whilst the teacher encourages them to use the correct mathematical vocabulary.
- Pupils work in groups to solve problems.
- Quizzes used to promote a moderate amount of competition and encourage engagement.
- Online activities to build mastery on topics.
- Pupils work on puzzling problems that they must interpret and determine a strategy to develop their solution.
- Pupils undertake a survey which is then used as the basis of further analysis.
- Pupils investigate the probability of events occurring and consider how these probabilities relate to the experiment they conducted.
- Pupils undertake cross-curricular projects, such as with Computing, to show they can think mathematically and logically to develop analyses that will allow them to derive certain conclusions.

Examples of learning

- Pupils create a computer program that draws geometric shapes which requires that they consider the mathematical foundations of the operation of the drawing algorithm and a mathematical analysis of properties of the number of lines drawn to achieve increasingly complex shapes.
- Pupils undertake a survey of the student body in order to collect data regarding the amount of money pupils spent on food and drink outside of their homes over one week.
- Pupils undertake a survey of their own habits of spending time studying and spending time being entertained, such as watching the television. The data is grouped together anonymously and analysed. This form of survey could be attempted again for a wider set of the student body, split by year group.

References

- UK Department of Education, (2013), National Curriculum Documents available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/239058/SECONDARY_national_curriculum_-_Mathematics.pdf , web-document published on 11 September 2013.

