Class Seven | Learning Journey & Curriculum Map

Class Seven | Child Development

In their thirteenth year, the children's thinking is developing rapidly. There is a hunger to find out for themselves. As a reflection of this, 'Discovery' is a strong, central theme in Class 7. It runs through the year as we examine the goings-on inside our own bodies, the chemical processes at work in everyday substances and phenomena, the origins of things we take for granted, and emerges explicitly as we follow the Portuguese and Spanish explorers of the so-called 'Great Age of Discovery', to Africa and America. Generally, this year we work on developing the students' independence in thinking and in their work and behaviour. They have more freedom in many ways, but also more guidance in how to make the right choices. For example, they are asked to include their own views in their writing, and to pick out aspects that appeal to them from what they hear or read, but only after we have had a comprehensive class discussion, so that they have a more rounded picture, made rich by a variety of different points of view. Without this, the strong wish to form judgments that began to develop in Class 6 can lead to prejudice and unconsidered opinions.

Class Seven | Numeracy | Number

Active Learning | Intention	Active Teaching | Implementation	Active Environments | Impact
• Understand and use negative and positive whole numbers • Use the four processes with negative numbers • Understand basic book-keeping	• Revise basic skills regularly with short regular exercises using calculations, fractions and decimals • Use regular problem solving exercises • Use a mix of individual, group and	• Record pupils' aptitudes and ensure graded work is set • Relate the use of calculation and mathematical skills to real life • Provide different examples of situations where they are used - positive and negative

• know how to work with square roots • Apply the Rule of Three (if, then, therefore) to practical problems • Develop flexibility with different perspectives (eg. multiply 25 by 15 in multiple ways). • Calculate percentages - including simple and compound interest • Convert between fractions and decimals and associating the fraction as a division problem • Understand and use basic statistics mean / median / mode averages • Use calculators • Understand recurring decimals and the value of π Algebra • Understand the origins of algebra • Understand the practical application of algebra to solving problems • Solve simple equations, including using	whole class work • Promote discussion and mistake making • Explore incorrect answers for strengthening logic • Demonstrate a range of methods for problem-solving • Teach the history of algebra • Use practical examples of problem-solving using algebra •	• Provide different graded worksheets for practice • Finding examples of practical applications and where they are used • Set regular homework • Encourage students to devise questions for each other

brackets, fractions and negative numbers ● Apply BIDMAS and BODMAS to algebraic problems ● Use algebra as a solution to specific problems ● Use algebraic graphs		

Class Seven | Numeracy | Space & Measure

Active Learning | Intention	Active Teaching | Implementation	Active Environments | Impact
● Draw translations, reflections, rotations ● Know properties of triangles, parallel lines and intersecting lines ● Apply Pythagoras' Theorem ● Understand the Golden Section ● Understand the Fibonacci sequence and find examples ● Know and can apply formulae for perimeter and area of regular geometric forms, including triangle, circle and parallelogram ● Finding the unknown lengths of shapes, using perimeter ● Calculate the area of irregular forms	● Use historical context and biographies to enliven curiosity in pupils ● Cross-reference to other relevant disciplines – development of perspective in Renaissance, circular dome, the arch, crystal formation, etc ● Break up lessons into individual, group and whole class workgroups ● Promote discussion and analyse mistakes and inaccuracies ● Use kinaesthetic methods, e.g. cutting	● Provide different graded worksheets for practice ● Work closely with SEND to accurately target, support and challenge all needs and abilities ● Find examples of practical applications and where they are used ● Display pictures of art, sculpture, architecture to extend knowledge of perspective, anatomy, engineering ● Draw attention to connection

• Make use of freehand perspective and use instruments to draw linear perspective • Work out ratio and scale • Makes time and speed calculations and know how speed, distance and time are related • Convert between different non-linear units of measurement • Calculate and recognise the volumes of simple shapes e.g. cubes and cuboids • Make precise use of compasses, ruler, set squares to draw detailed constructions • Divide circles into 6, 12, 16, 20 parts • Find area of a circle and use this to calculate value of π by cutting circle into pieces • Knows the correct terms for different parts of a circle • Understand and describe angles using terms: acute, obtuse, reflex • Use protractor to measure angles • That the interior angles of a triangle add up to 180 degrees • Know that the four interior angles of a quadrilateral add to 360 degrees • Draw translations, reflections, rotations of shapes	and arranging card and paper • Introduce and give practice in perspective drawing using a variety of media • Provide practical map-reading tasks in local environment and on class trips • Plan individual project on the Fibonacci Sequence, including drawn construction of spirals and actual, photographed and drawn examples from natural world	between anatomy, architecture, natural structures and physics •

• Read simple 4 figure co-ordinates (e.g. for map reading) • Experience and calculate perimeter and area of squares, rectangles, triangles, parallelograms • Calculate volume of cubes and cuboids • Make use of freehand perspective when drawing cubes, boxes, pyramids accurately •		

Class Seven | Numeracy | Curriculum Narrative

In Maths, we introduce negative numbers and how to work with them using the four processes. We look again at formula - for area, and volume of different forms for example. This is carried forward by looking at how certain formulae and algorithms came to be, including something about the people who first worked them out. Biographies are an important part of the curriculum in every subject in Class 7; there is a strong tendency at this age, when the faculty of judgment is developing, to argue with and refute other people's ideas, simply because they are 'someone else's' but a biography is what it is; this real person did these things in this real situation, because of who he was, with these real results. We can look with interest at how this particular person solved this problem and it's easy to imagine ourselves in that position and ask what we would have done. In this way, it becomes clear that human beings have always had to engage with problems - that we all have to engage with problems - in order to discover something new; that problems are not obstacles but opportunities for growth, and that there are still - always - new things to discover. The Maths Main Lessons should, as much as any other, bring these wider 'life questions' so that even children who are not particularly talented in maths can see that it is relevant to them and is connected with everything in their lives. The idea of discovery - finding 'x', the unknown element - appears again in algebra at this age. We work with algebraic equations and look at how they can be useful. We also re-examine some of the things learned in earlier classes in order to come to a deeper understanding of them. For example, what the Muslim world was doing with maths during the Middle Ages; where the so-called 'Arabic' numerals came from, what they made of the work of Archimedes, Euclid, Aristotle and Pythagoras, combining it with what they found in India and Persia before it came

back into Europe in the 13th century. We also look at other numerals and number systems used in different parts of the world, which leads to the question 'why do we count in tens?' and on to working with other number bases. The Maths of Al-Khwarizmi and others from the schools of the Middle East came to Europe through Venetian traders who found the Arabic system of accounting far simpler to use than the Greek and Roman, so that, even though the church forbade its use, it spread across the continent in a very short time. Perhaps the most important discovery brought to Europe via the Arab world, was the concept of zero and its counterpart, infinity. The imaginative connection between these, the first use of perspective in art and the question 'What lies beyond the horizon and behind the stars?' is obvious. In Maths, when you start to deal with vast numbers, you have to find new ways just to write them down. Assigning place value is the beginning of the process of 'number shorthand', and it is interesting to look at how the Mayans and the Persians did this in different ways. The words 'googol' and 'googolplex' come up; these are unimaginably large numbers. A googolplex is 10 to the power of 10 to the power of 100, which is so large there is not enough space in the known universe to write it down using only place value. Then we looked at powers, calculating, as far as we could, what relatively tiny numbers like 236 really are, (148035889) and how to begin to work with them.