Disciplinary Knowledge in Mathematics

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|  | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 |
| Fluency  **AO1 Use and apply standard techniques** | Students will be able to recall and apply a range of mathematical facts and techniques. They will be able to use correct mathematical notation for the techniques learnt. | Students will be able to confidently recall and apply a range of mathematical facts and techniques. This will include being able to use these techniques “to work backwards” where appropriate. | Students will be able to recall and apply a range of mathematical facts and techniques efficiently. They will see connections between different areas of mathematics and make links. | Develop and extend their knowledge and understanding of mathematical techniques and facts.  Use correct mathematical notation.  Be able to do questions requiring several steps.  and working backwards | Confidently recall and apply all mathematical techniques efficiently and working backwards |
| Problem Solving  **AO2 Solve problems within mathematics and in other contexts** | Students should be  beginning to ask themselves what area of maths is this? what do I need to know? what do I need to find out? what do I need to do? and start solving problems | Students should be able to identify the area of maths required and begin steps to work out the problem. They should be able to recognise if their plan isn’t working and try another approach. | Students should be able to identify steps to solve the problem and start working on the problem. They should be able to communicate their solutions and/or identify the stumbling blocks to solving the problem. | Identify problem solving questions and which areas of maths are required. Recall the techniques needed and apply them correctly. Recognise when the chosen path is not reaching a solution and try another approach. | Be able to apply mathematical techniques to contextual problems e.g simultaneous equation. Solve multi-step problems involving several areas of mathematics correctly.  Identify assumptions  and comment on  whether they are valid. |

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| Mathematical Reasoning  **AO3 Reason, interpret and communicate mathematically** | Students need to be able to describe what they have done and why in a calculation. They should be able to identify an incorrect step in a solution. | Students need to be able to give reasons for s step in their calculation. They should be able to identify an incorrect step in a solution and communicate why it is wrong. | Students need to be able to write a convincing chain of reasoning, referring to mathematical facts, techniques and notation. | Develop their ability to write an explanation for why a solution is incorrect, referring to a mathematical fact/technique. Develop their written answers to angle questions requiring reasons and proofs for similar and congruent triangles. | Communicate well structured mathematical arguments to support/criticise a solution. Carry out algebraic proofs and proofs in vector questions. Understand the difference between verify, show and prove.  Present all multi-step  questions clearly for the examiner to follow and award marks easily. |