



# Mathematics Approach

## Angel Oak Academy

At Angel Oak Academy, we believe that all children can and must be successful in the study of mathematics. We do not accept that “some people cannot do maths”; we do not accept that mathematical study is boring or unnecessary; we do not accept that prior attainment should limit what a child is capable of learning. Mathematics is for everyone at Angel Oak Academy.

We take a mastery approach to the teaching and learning of mathematics. We use a range of concrete, pictorial and abstract representations when teaching new learning, and lessons include fluency, problem solving and reasoning opportunities.

### Concrete, Pictorial and Abstract

To support our pupils' learning in maths, you will often see a combination of representations: concrete (manipulatives as physical representation that can be handled), pictorial (pictures, diagrams or models which represent the objects in a problem), and abstract (the use of mathematical symbols). The use of concrete objects, such as Dienes and counters, bring concepts to life. The physical handling of resources helps our pupils to build a conceptual understanding. Pictorial representations, such as bar modelling to represent objects, encourage pupils to make mental connections between the concrete stage and abstract stage. Pictures help pupils visualise the problem they are solving, making it more accessible. The proportion of abstract representations, such as numbers and symbols like  $+$ ,  $-$ ,  $\times$  and  $\div$ , will increase as pupils become less dependent on concrete and pictorial representations. The use of all three representations help pupils understand the relationship between numbers and the real world; this helps secure their understanding of the mathematical concept they are learning.

### Fluency

Fluency is the ability to solve mathematical problems accurately and efficiently. We place a high importance on quick factual recall, such as number bonds and multiplication facts, which plays a key part in developing fluency. Mental and written strategies of addition, subtraction, multiplication and division are taught while discussing the most efficient method; the teaching of the four operations are constantly built upon throughout our pupils' journey at Angel Oak. Being proficient in fluency is key to problem solving and reasoning. This proficiency reduces the cognitive load on working memory and allows our pupils to concentrate on the problem itself.

### Problem Solving and Reasoning

Pupils are taught how to solve mathematical problems by understanding the question first, then choosing the best method(s) of calculation. Giving pupils a wide range of problems will allow them to develop their expertise in selecting the best method, while strengthening their fluency skills. Mathematical reasoning is the ability to understand how a problem was solved and explain why that particular method was effective or ineffective. While problem solving has a finite answer, reasoning challenges pupils to consider a number of possible avenues and articulate their deduction clearly. Reasoning is central to truly mastering mathematics, which is why we take every opportunity to include reasoning discussions in class.

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