



**Newton British Academy  
Barwa City**

**Primary Mental Mathematics Policy**

**Policy Date:** May 2022 – June 2025

**Reviewed:** June 2022

*"An international community of learners striving for  
excellence and celebrating success"*

## **Aim**

The purpose of this policy is to give teachers guidance when developing Mental Mathematics tests, conducting these tests, marking and providing feedback, and developing links with the Mathematics schemes of work. Additionally, we aim to develop bespoke tests which link to strands taught in class. By developing bespoke Mental Mathematics tests, teachers will obtain formal feedback on students' progress, highlighting common errors and misconceptions in Mental Mathematics.

## **Resources**

Key Stage Coordinators will develop weekly Mental Mathematics tests using a variety of Mental Mathematics resources.

The Independent Schools' Portal provides users with useful resources and tests:

<https://www.independentschoolsportal.org/mental-addition.html>

NBA's Mathematics Calculation Policy provides clear guidance on which mental strategies must be taught in each Year. It is essential that these strategies are taught both implicitly and explicitly, are revisited regularly and practiced regularly.

## **Can mental calculations involve concrete resources?**

Hands-on learning is important; however, during formal Mental Mathematics tests, no concrete resources are allowed.

Mental calculations involve visualising, imagining and working things out in your head. In German there is a word for it (but there is no direct equivalent in English): *Gedankenexperimente*, thought experiments, which involve exploring ideas in one's imagination/mind.

But students will not be able to visualise and 'see' how something works if they have not had any practical experiences to draw on or been shown any models, concrete resources and images that support the approaches taught.

The underlying teaching principle here is to:

Provide suitable equipment for students to manipulate and explore how and why a calculation strategy works, and that helps them to describe and visualise or 'see' the method working. The equipment can include objects like counters, interlocking cubes, coins, counting sticks, bead strings, number lines, 100-squares, place-value cards, structural apparatus like base 10 blocks, diagrams of shapes divided into fractional parts, and so on. An interactive whiteboard is also a powerful tool for manipulating images.

## **Visualisation**

Visualisation is important in Mathematics. The ability to visualise representations, pictures or images and then adapt or change them is an important tool for example when problem solving, pattern spotting and reasoning in Mathematics. Like everything else it is a skill that can be acquired through practise and this involves the use of concrete resources. Giving students carefully structured learning experiences with supporting discussion to describe and refine ideas and thinking will help them develop these visualisation skills.

Visualisation takes place at all stages and ages. Young students recognise pictures and representations of objects or people; they learn to describe something they have seen but cannot see at that time; they associate an image with an object, stimulus or emotion. In Mathematics we need to focus and develop these skills. This usually takes place after students have some tactile/concrete experiences to draw upon. Practising visualisation helps to develop the brain's capacity to 'see' and to 'draw pictures' in the same way that we need to practise doing so on paper.

### **Can mental calculations involve pencil and paper?**

Whilst practising mental calculations using different strategies, students can use jottings. During formal Mental Mathematics students can also use 'mark making' involving drawings, writing, tally-type marks and invented and standard symbols including numerals. This 'informal' recording helps us all to represent our ideas as we go along.

Teachers must make a note of which students are using pencil and paper and support them in an effort to provide them with skills and strategies to reduce their dependence on pencil and paper.

### **Is speed important?**

Once a mental strategy has been introduced to students, there comes a time to encourage them to speed up their responses and either use more efficient strategies or expand their repertoire.

The underlying teaching principle here is:

Encourage students to compete against themselves, aiming to better their previous performance. Mental Mathematics tests help students monitor their performance over time.

## **Procedure**

### **Conducting the Mental Mathematics Test**

Mental Mathematics tests must be conducted biweekly. Year 1 will start with Mental Mathematics tests in Term 2.

### **Equipment Required**

- *Printed question and answer sheet for the reader*
- *Printed blank answer page/answer sheet each student*
- *Stopwatch or timer*
- *Pencil*

No other equipment is required to complete the test. No rulers, protractors or calculators should be used.

Inform students of how much time they will have to answer each block of questions.

E.g. 5 seconds for the first 10 questions, 10 seconds for the next 5 questions and 15 seconds for the next 5 questions.

Read each question twice and then start the time.

Although this is a Mental Mathematics test and the students should be doing the majority of working out in their heads, it is sometimes useful to write jottings down to help work out the answer. This is more than acceptable and good practice in case they need to go back (if they have spare time on one question) to finish working it out.

### **Marking and Record Keeping**

Marking must be done by the class teacher as soon as possible after the test.

Test are to be sent home, with the answers, on Sundays for students to practise at home.

Weekly results are to be recorded as directed my Primary SMT.

### **Designing Mental Mathematics Tests**

#### **What are the different aspects of mental calculations?**

Mental calculation is more than just recalling number facts, but this is an important skill that helps students to concentrate on their calculations, the problems and the methods involved. Below are six aspects of Mathematics that involve mental calculation. They are supported with

questions to exemplify what might be asked of students to engage them in mental calculation activity and to stimulate discussion.

### Recalling facts

- What is 3 add 7?
- What is  $6 \times 9$ ?
- How many days are there in a week?... in four weeks? What fraction is equivalent to 0.25?
- How many minutes in an hour, in six hours?

### Applying facts

- Tell me two numbers that have a difference of 12.
- If  $3 \times 8$  is 24, what is  $6 \times 0.8$ ?
- What is 20% of £30?
- What are the factors of 42?
- What is the remainder when 31 is divided by 4?

### Hypothesising or predicting

- The number 6 is  $1 + 2 + 3$ , the number 13 is  $6 + 7$ .
- Which numbers to 20 are the sum of consecutive numbers?
- Roughly, what is 51 times 47?
- How many rectangles in the next diagram? ]And the next?
- On a 1 to 9 key pad, does each row, column and diagonal sum to a number that is a multiple of 3?

### Designing and comparing procedures

- How might we count a pile of sticks?
- How could you subtract 37 from 82?
- How could we test a number to see if it is divisible by 6?
- How could we find 20% of a quantity?
- Are these all equivalent calculations:  $34 - 19$ ;  $24 - 9$ ;  $45 - 30$ ;  $33 - 20$ ;  $30 - 15$ ?

### Interpreting results

- So what does that tell us about numbers that end in 5 or 0?
- Double 15 and double again; now divide your answer by 4. What do you notice? Will this always work? If  $6 \times 7 = 42$  is  $60 \times 0.7 = 42$ ?
- I know 5% of a length is 2 cm. What other percentages can we work out quickly?

### **Applying reasoning**

- The seven coins in my purse total 23p. What could they be?
- In how many different ways can four students sit at a round table?
- Why is the sum of two odd numbers always even?

### **Using NBA's Mathematics Calculation Policy and NBA's Mathematics Planning**

Key Stage Coordinators are to use the Long-Term and Medium-Term plans, NBA's Mathematics Calculation Policy and White Rose Scheme of Learning when compiling the Mental Mathematics tests.

- Tests should include consolidation of what students have learned
- Tests should link up with the topics/strands currently being taught
- Tests should challenge students to use the mental strategies as outlined in NBA's Mathematics Calculation Policy
- Tests should run as a cycle and include a progression of skills
- Tests should include topic and questions which need to be revisited

All Mental Mathematics tests will be compiled by the Key Stage Coordinators.

## Key Stage 1 Mental Mathematics Template

Listen carefully to each question. I will read each question twice before you write your answer.

1.		6.	
2.		7.	
3.		8.	
4.		9.	
5.		10.	
		Score	<b>/10</b>

## Lower Key Stage 2 Mental Mathematics Template

Listen carefully to each question. I will read each question twice before you write your answer.

1.		9.	
2.		10.	
3.		11.	
4.		12.	
5.		13.	
6.		14.	
7.		15.	
8.		Score	<b>/15</b>



## Lower Key Stage 2 Mental Mathematics Template

Listen carefully to each question. I will read each question twice before you write your answer.

1.		11.	
2.		12.	
3.		13.	
4.		14.	
5.		15.	
6.		16.	
7.		17.	
8.		18.	
9.		19.	
10.		20.	
		Score	<b>/20</b>