



# THAMES VIEW JUNIOR SCHOOL MATHS POLICY AND GUIDANCE

Updated September 2022

## Intent

At Thames View Junior School, we believe that children from all backgrounds can succeed in Mathematics. Our focus is on raising standards – working together to show what pupils are capable of and to find effective ways to enable every child to succeed. At Thames View Junior School, we want our children to be confident mathematicians, fluent mathematicians, and able to solve problems.

At Thames View Junior School, we teach maths for mastery. This means that we are teaching children to have a deep conceptual understanding rather than teaching so that children can get a correct answer. Being able to explain how they got an answer, why that answer is right, and what might happen if a particular variable was changed are the hallmarks of a mathematician – simply getting the answer right ought to be a given.

At Thames View Junior School, we believe that all children are able to succeed mathematically, and that one of our primary tasks as maths teachers is to find ways of presenting, scaffolding, and teaching concepts in such a way that everyone will achieve. Staff receive regular CPD on the teaching and planning of maths within school, as well as regular support, help or advice on the teaching and planning of Maths.

In line with the 2014 National Curriculum, we aim to ensure that all children

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that they have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems
- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

## Implementation

The content and principles underpinning the 2014 Mathematics curriculum and the Maths curriculum at Thames View Junior School reflect those found in high-performing education systems internationally, particularly those of east and south-east Asian countries such as Singapore, Japan, South Korea and China. These principles and features characterise this approach and convey how our curriculum is implemented:

- Teachers reinforce an expectation that all children are capable of achieving high standards in Mathematics.
- The large majority of children progress through the curriculum content at the same pace; Significant time is spent developing deep knowledge of the key ideas that are needed to underpin future learning. This ensures that all can master concepts before moving to the next part of the curriculum sequence, allowing no pupil to be left behind.
- If a pupil fails to grasp a concept or procedure, this is identified quickly and early intervention ensures the pupil is ready to move forward with the whole class in the next lesson.
- The structure and connections within the mathematics are emphasised, so that pupils develop deep learning that can be sustained.
- Lesson design identifies the new mathematics that is to be taught, the key points, the difficult points and a carefully sequenced journey through the learning. In a typical lesson pupils sit facing the teacher and the teacher leads back and forth interaction, including questioning, short tasks, explanation, demonstration, and discussion.
- Practice and consolidation play a central role. Carefully designed variation within this builds fluency and understanding of underlying mathematical concepts.
- Teachers use precise questioning in class to test conceptual and procedural knowledge and assess children regularly to identify those requiring intervention, so that all children keep up.
- Children's explanations and their proficiency in articulating mathematical reasoning, with the precise use of mathematical vocabulary, are supported through the use of stem sentences provided by the teacher.
- Key facts such as multiplication tables and addition facts within 10 are learnt to automaticity to avoid cognitive overload in the working memory and enable pupils to focus on new concepts.

<https://www.ncetm.org.uk/media/uhjhtxy1/the-essence-of-maths-teaching-for-mastery-june-2016.pdf>

To ensure whole school consistency and progression, the school follows the National Curriculum and uses White Rose Maths to tailor the curriculum to Thames View Junior School. The curriculum is a cumulative curriculum, so that once a topic is covered, it is met many times again in other contexts. For example, place value is revisited in addition and subtraction and multiplication and division. The curriculum is designed to have an emphasis on number, with a large proportion of time spent reinforcing number to build competency.

Lessons are planned to provide plenty of opportunities to build reasoning and problem solving elements into the curriculum. When introduced to a new concept, children have the opportunity to use concrete objects and manipulatives to help them understand what they are doing. Alongside this, children are encouraged to use pictorial representations. These representations can then be used to help reason and solve problems. Both concrete and pictorial representations support children's understanding of abstract methods.

Mathematical topics are taught in blocks, to enable the achievement of 'mastery' over time. These teaching blocks are broken down into smaller steps, to help children understand concepts better. This approach means that children do not cover too many concepts at once which can lead to cognitive overload. Each lesson phase provides the means for children to achieve greater depth, with children who are quick to grasp new content, being offered rich and sophisticated problems, within the lesson as appropriate.

### **Impact**

The school has a supportive ethos and our approaches support the children in developing their collaborative and independent skills, as well as empathy and the need to recognise the achievement of others. Students can underperform in Mathematics because they think they cannot do it or are not naturally good at it. The school's use of White Rose Maths addresses these preconceptions by ensuring that all children experience challenge and success in Mathematics by developing a growth mind-set.

Regular and ongoing assessment informs teaching, as well as intervention, to support and enable the success of each child. These factors allow us to set high expectations and maintain them across the school.

### **Teaching and Learning**

Effective teaching for mastery is underpinned by five big ideas, first published by the National Centre for Excellence (NCETM) in mathematics in 2017 -

#### **Coherence**

Lessons are broken down into small connected steps that gradually unfold the concept, providing access for all children and leading to a generalisation of the concept and the ability to apply the concept to a range of contexts.

#### **Representation and Structure**

Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation

#### **Mathematical Thinking**

If taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student: thought about, reasoned with and discussed with others

#### **Fluency**

Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics

#### **Variation**

Variation is twofold. It is firstly about how the teacher represents the concept being taught, often in more than one way, to draw attention to critical aspects, and to develop deep and holistic understanding. It is also about the

sequencing of the episodes, activities and exercises used within a lesson and follow up practice, paying attention to what is kept the same and what changes, to connect the mathematics and draw attention to mathematical relationships and structure.

Source: <https://www.ncetm.org.uk/teaching-for-mastery/mastery-explained/five-big-ideas-in-teaching-for-mastery/>

Maths is taught five times a week – four topic lessons and one arithmetic lesson. Before each Maths lesson, consolidation time is allocated on the school timetable to enable a teacher to work with a group of students who showed misconceptions on the previous lesson. During this time, children that showed good understanding of the concept are challenged through reasoning and problem solving questions.

A typical maths topic lesson lasts approximately 1 hour and begins with a short number fluency activity. This is informed by the data analysed during the pre-test, an assessment completed by the children before starting the topic to inform the teacher of gaps in knowledge or areas of weakness. As a child's subject knowledge increases, number fluency activities focus more on rapid recall.

The small step for the lesson is then shared with the children and they revisit key concepts from previous learning that support the key learning of the lesson. Children then solve contextual problems as a class, with the teacher that expose the structure of the mathematical concept. In this part of the lesson, teachers use careful questions to draw out children's discussions and their reasoning and the children learn from misconceptions through whole class reasoning. To support this, the teacher will often use a stem sentence to scaffold children's articulation of mathematical ideas and reasoning, and/or a generalisation that supports application of the concept. The variation in this part of the lesson enables a deeper understanding of the concept and may include the use of related concrete resources, as well as representations of the problem to provide a secure base of understanding. Children will then complete the start of their practice task. The teacher will review responses and then share answers and strategies, addressing any misconceptions, before children continue with their practice. This practice uses conceptual and procedural variation to build fluency and develop greater understanding of underlying mathematical concepts. This 'intelligent practice' supports mathematical thinking and enables children to:

*'Recognise and use connections among mathematical ideas; understand how mathematical ideas interconnect and build on one another to produce a coherent whole; recognise and apply mathematics in contexts outside of mathematics'.*

*(Annenberg Foundation, 2017)*

Where appropriate, and depending on the topic, children will continue to have access to concrete resources which they can use to complete the practice task. Some children might be supported through additional scaffolding provided by the teacher. This may include provided models of the calculation method that the children will need to use, or copies of the worded question, with key aspects and key vocabulary highlighted.

Children who complete this are provided with further 'rich and sophisticated' problems from the White Rose Maths Small Steps guidance, which they complete in their own maths book.

The final part of the sequence is a plenary, which requires the children to use mathematical reasoning to prove or disprove a related statement or mathematical problem related to the key learning.

### **Assessment**

Assessment for Learning:

Children receive effective feedback through teacher assessment and assessment for learning strategies are integral to the design of each lesson.

The structure of the teaching sequence ensures that children know how to be successful in their independent work.

- A daily fluency activity supports children's recall of key number facts, which frees working memory. Teachers will make informed choices as to when they should progress to new content according to the degree of fluency that children are able to demonstrate.

- Teach and Talk input (I do, we do, you do) is where the teacher gives a whole-class input, with lots of opportunities for children to talk to their partner about particular questions, apply their learning to mini-tasks, and clarify misconceptions. Guided practice ensures children are well prepared to be able to apply the skills, knowledge and strategies taught they have learnt for the 'independent questions' task (which is often the first two questions of the practice task).
- Students should be given ample opportunity throughout the lesson to be stretched and challenged.
- Common misconceptions are identified and addressed within the teaching sequence and key understanding within each 'small step' is reviewed and checked by the teacher and the children before progression to further depth.
- The final phase of the lesson is a whole class plenary. Teachers use the children's responses as a means to assess the depth of their understanding.
- Opportunities for additional practice and correction are provided by the teacher, as appropriate, during marking, with a focus on promoting and achieving a growth mindset approach in the subject.

### **Formative Assessment**

Short term assessment is a feature of each lesson. Observations and careful questioning enable teachers to adjust lessons and brief other adults in the class if necessary.

The lesson structure of a White Rose Maths lesson is designed to support this process and the plenary at the end of each lesson also allows for misconceptions to be addressed.

At the start of each blocked unit of work, the children complete the carefully aligned White Rose Maths 'End of Unit Assessment' as a 'Pre-test'. The outcome of this is used by the teacher to ensure planning is effective in meeting the needs of the children. Any identified gaps in understanding can be addressed while teaching the unit. A similar 'End of Unit Assessment' is then completed by the children at the end of the unit to show whether progress has been made. The outcome of this is also then used by the teacher to address any further gaps or misconceptions. Each child's scores are also inputted onto a class spreadsheet, which provides an overview of achievement in each specific area within the programme of study. This also informs dialogue with parents and carers during open evenings, as well as the judgements made at the end of the term as to the extent that each child has achieved the expectation for their year group.

### **Summative Assessment:**

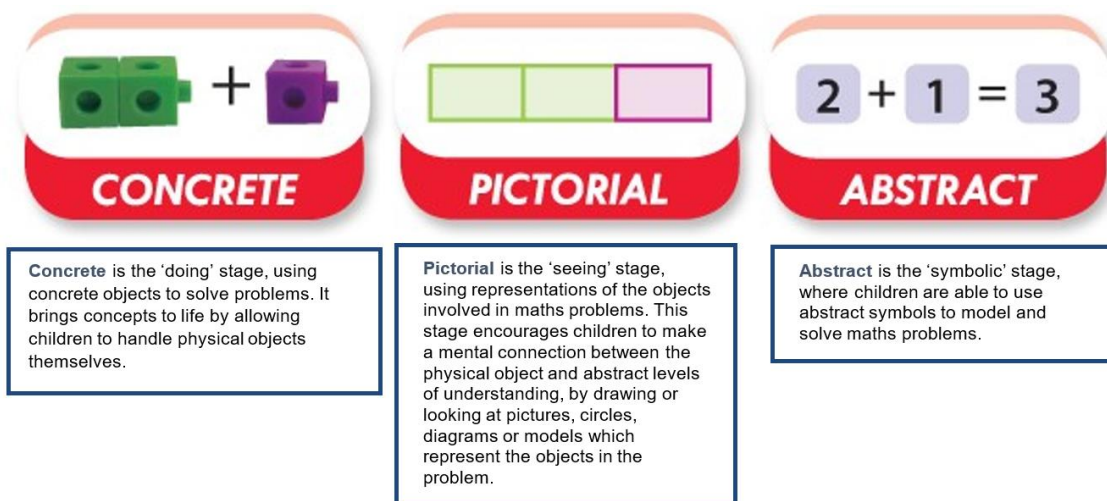
Teachers administer a weekly arithmetic paper. The results of these papers are used to identify children's ongoing target areas, which are communicated to the children, as well as to parents and carers at Parents Evening. They are also used alongside the end of unit assessments and outcomes of work, to inform the whole school tracking of attainment and progress of each child.

Assessment data in maths is reviewed throughout the year to inform interventions and to also ensure that provision remains well-informed to enable optimum progress and achievement. End of year data is used to measure the extent to which attainment gaps for individuals and identified groups of learners are being closed. This data is used to inform whole school and subject development priorities for the next school year.

### **Planning and Resources**

The use of manipulatives objects is an integral part of the Thames View Junior curriculum which incorporates the concrete – pictorial – abstract pedagogy:

Each



classroom has its own supply of mathematical equipment, in line with the Thames View Junior School policy (this is also available on the school's website).

The school subscribes to the White Rose Maths Premium Resource Centre, Power Maths and NCETM. This provides access to visual resources (including lesson slides that teachers can adapt), as well as small steps planning guidance and reasoning and problem solving questions that accompany each small step, to inform and use in lessons. The resources also provide modelling strategies and demonstrate the use of concrete resources and allow teachers to improve their own subject knowledge.

The subject leader attends regular training through the North East London Maths Hub and Barking and Dagenham School Improvement Programme (BDSIP).

### Organisation

The school has implemented a blocked curriculum approach to the teaching of Mathematics. This ensures that children are able to focus for longer on each specific area of Maths and develop a more secure understanding over time. This approach is also designed to enable children to progress to a greater depth of understanding.

Subsequent blocks continue to consolidate previous learning so that the children continually practise key skills and are able to recognise how different aspects of Maths are linked. For example, when children have completed a block which has enabled them to master the multiplication of two-digit numbers, a subsequent block on area and shape might provide opportunities to use this understanding when calculating the area of shapes with 2-digit length and width dimensions.

### KS2

Through Years 3 to 6 we use a coherent programme of high-quality materials and exercises, which are structured with great care to build deep conceptual knowledge, alongside developing procedural fluency.

Our KS2 teachers use White Rose Maths resources and adapt accordingly in line with the schools expectations. Children record their work in their Maths books. They might also use their maths book to record key number facts and make representations of mathematical concepts.

Short term planning is done on a weekly basis. Teachers also plan, modify and source activities and additional tasks which offer support and scaffolding where appropriate, and provide further challenge for children who are able to progress further in their learning.

The White Rose Maths progression document, available on the school website, provides an overview of how the scheme covers the statutory requirements of the 2014 National Curriculum. It also shows how concepts build over time and how the teaching blocks are sequenced in each year group.

### Equal Opportunities

The school is committed to ensuring the active participation and progress of all children in their learning.

All children will be given equal opportunities to achieve their best possible standard, whatever their current attainment and irrespective of gender, ethnic, social or cultural background, home language or any other aspect that could affect their participation or the progress of which they are capable.

### **Inclusion**

Taking a mastery approach, differentiation occurs in the support and intervention provided to different children, not in the topics taught, particularly at earlier stages. The National Curriculum states:

‘Children who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.’

There is little differentiation in the content taught but the questioning and scaffolding individual children receive in class as they work through problems will differ, with higher attainers challenged through more demanding problems, which deepen their knowledge of the same content before acceleration onto new content. Children’s difficulties and misconceptions are identified through immediate formative assessment and addressed with rapid intervention – commonly through individual or small group support later the same day or within the lesson.

A range of inclusion strategies, disseminated by the SENDCO, are embedded in practice and teachers are aware of the special educational needs of the children in their Maths class, as well as those who have English as an additional language.

Although the expectation is that the majority of children will move through the programmes of study at broadly the same pace, the 2014 National Curriculum states:

‘Decisions about when to progress should always be based on the security of children’s understanding and their readiness to progress to the next stage.’

If a child’s needs are best met by following an alternative plan, including coverage of the content from a previous year, this will be overseen by the SENDCO, in collaboration with the class teacher and with the knowledge of SMT. Specific arrangements for the provision of children with SEND will be communicated to parents and carers during SEND reviews.

### **Role of the Subject Leader**

- The subject leader will raise the profile of Maths at Thames View Junior School through best practice. They will model lessons, as appropriate to new staff, ECTs and peers to support continued professional development. They will ensure the high quality of Maths displays around the school and involve the school in ‘celebrations’ of Maths, including participation in events such as ‘World Maths Day’. The subject leader will support staff in providing opportunities for learning outside the classroom in Maths and will identify and organise opportunities which enable this, as appropriate.
- The subject leader will monitor progression and continuity of Maths throughout the school through lesson observations and regular monitoring of outcomes of work in Maths exercise books.
- The subject leader will ensure that all staff have access to year group plans and the relevant resources which accompany them.
- The subject leader will monitor children’s progress through the analysis of whole school data. They will use this data to inform the subject development plan which will detail how standards in the subject are to be maintained and developed further.
- The subject leader will, on a regular basis, organise, audit and purchase central and class-based Maths resources.
- Through ongoing involvement in the DfE funded Maths Hubs programme, the subject leader will keep up to date on current developments in Maths education and disseminate information to colleagues.
- The subject leader will extend relationships and make contacts beyond the school.
- The subject leader will develop opportunities for parents/carers to become more involved in Maths education.

- The subject leader will ensure that all staff have access to professional development including observations of outstanding practice in the subject.

### **Parents**

The school recognises that parents and carers have a valuable role to play in supporting their child's mathematical learning. An overview of the Maths curriculum is available on the school's website, as well as guidance in the progression in calculation methods used by the school. Paper copies of these documents are also available on request and the curriculum letter, sent home by each year group, also outlines the Maths topics to be covered.

Children are given Maths homework to complete each week on Maths Whizz (a minimum of three progressions per week).

Parents are informed of their child's progress at Parents Evenings and this is also communicated in written school reports. Parents and carers are encouraged to speak to their child's Maths teacher at any point during the year, either informally or by making a specific appointment. Information about their child's standards, achievements and future targets in Maths is shared during parent/carer meetings, as well as ways that parents/carers may be able to assist with their child's learning. The school also provides a number of opportunities for parents/carers to learn about what their child is learning and the way their child is being taught through parent workshops.

Date of Policy: September 2022

Policy Review Date: September 2023



**Appendices:**

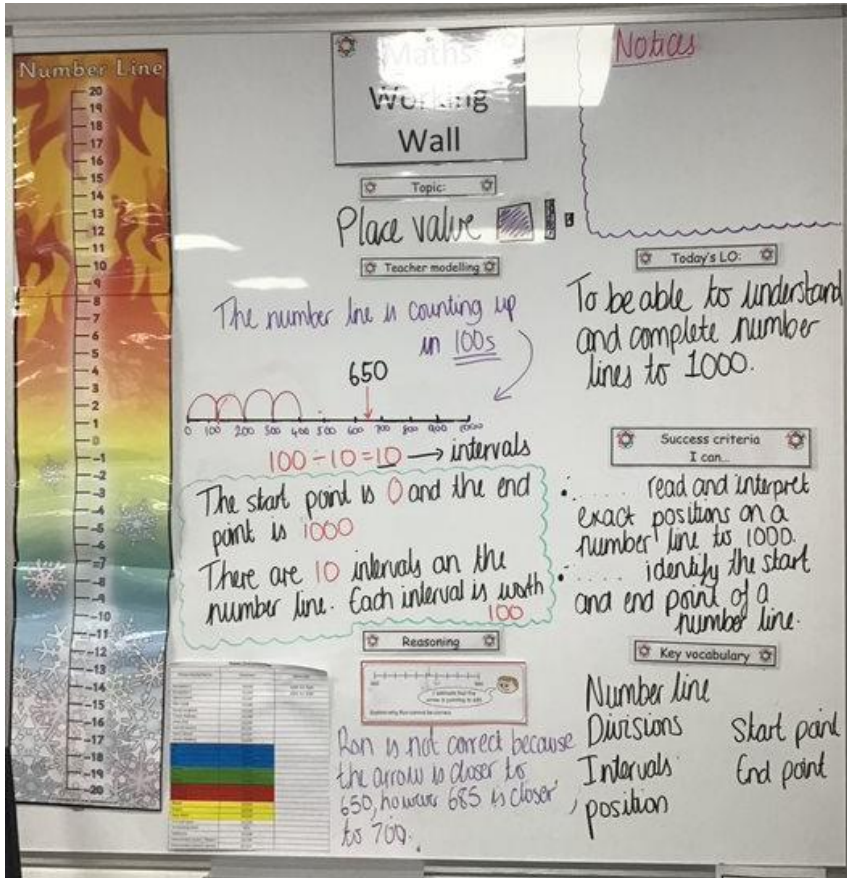
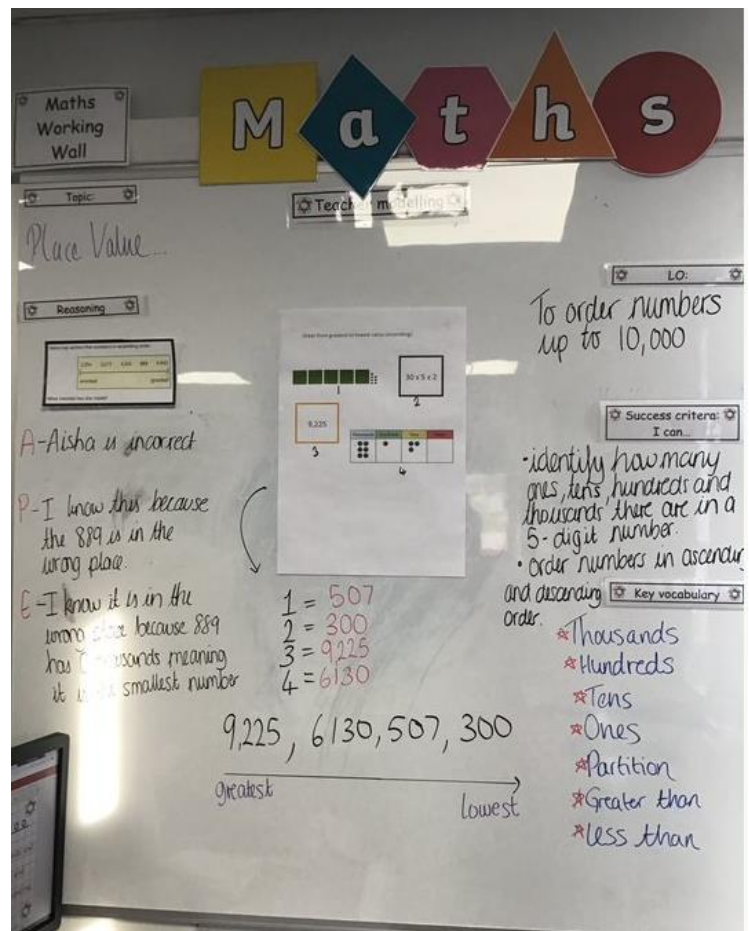


Figure 1: Working walls updated every day.



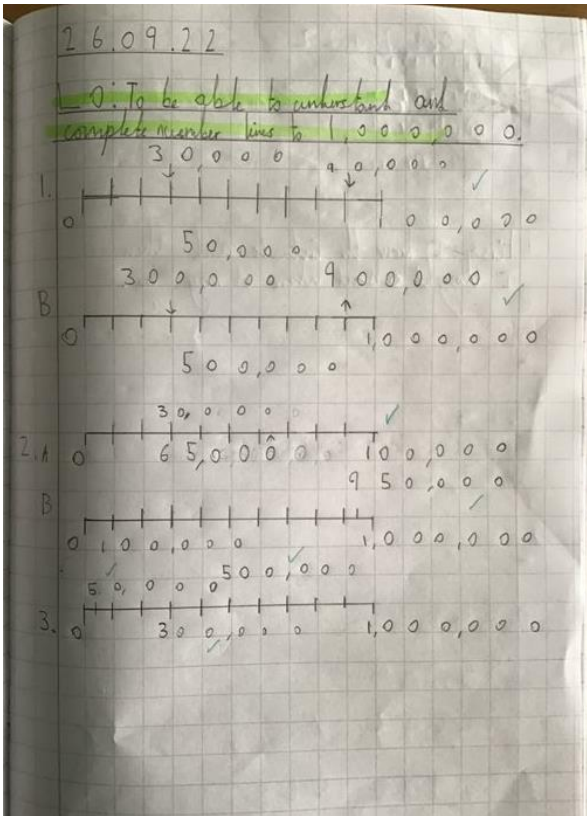


Figure 2: Presentations in books and worksheets.

**LO: To understand the place value of numbers to 10,000**

4 Complete the table.

Number	1 more	10 more	100 more	1,000 more
3,000	3,001	3,010	3,100	4,000
7,213	7,214	7,223	7,313	8,213
4,510	4,511	4,520	4,610	5,510
1,281	1,282	1,291	1,381	2,281
1,894	1,895	1,904	1,994	2,899
5454	5455	5464	5,059	6,454

5 What is the value of the 7 in each number?

a) 3,071  e) 73

b) 307  f) 2,007

c) 7,004  g) 6,074

d) 5,711  h) 7,999

6 Complete the part-whole models.

a)

b)

c)

d)

7 a) Alex makes a number on a place value chart.

- Her number has a digit total of 17
- There are two more counters in the hundreds column than the thousands column.

What numbers could Alex have made?

b) Make a number and write a list of clues to describe it.

The one is 2  
 The thousands has 5 more than the ones  
 The hundred is 2x more than tens  
 The tens are 8x4

Consolidation

What is 1,000 more than 45,342?  
 46,342

What is 100 more than 45,343?  
 45,443

What is 1 less than 45,343?  
 45,342

What is 10 more than 45,343?  
 45,353

Circle the greater number in each pair:

450      402  
 12      120  
 1,243      1,700  
 12,300      18,000

Write the numbers in order, starting from the smallest:

530    10    9    50,000    723    500,000  
 9, 10, 530, 723, 500,000, 500,000

Write the numbers in order, starting from the largest:

87    19    14,000    870    400,000    6  
 400,000, 14,000, 870, 87, 19, 6

Write <, > or = to compare the numbers:

140 > 10  
 16,821 > 12  
 34,000 > 100,000  
 10+10 = 19+1

Figure 3: Consolidation in books and worksheets.

PowerPoint Y4 WK3 Maths - Saved

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Slide 26: **Pick a challenge:**

1a. Eddie has represented 4,563 in different ways.

A

B 

4,563			
4,000	500	60	3

9a. Use the clues below to fill in the missing digits.

Th	H	T	O
			2

- The four digits total 13.
- The thousands digit is five more than the tens digit.
- $3,391 + 10$  has the same number of tens as this number.

a. Hugo says, "When I add 10 to 3,095 my answer is 3,015."

Explain his mistake.

26

Figure 2- During Consolidation time (for those marked orange) remaining children to complete a challenge on their WB.

### Challenge

If you did not select a challenge yesterday then please do so and complete it in your book.

Complete these challenges on your whiteboard.

27

### 4. Place the numbers in the correct position in the sequence.

1,000 less      1,000 less      1,000 more

A

B 

4,123
-------

C 

three thousand, one hundred and twenty-three
--

### 5. Match the pairs that have the same value.

A 

four thousand, two hundred and twenty-one.
--

B 

1,000 less than 3,221
-----------------------

C

D 

1,000 more than 3,221
-----------------------

E

F 

1,000 less than 4,221
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