



*Alexandra Park Junior School*

# MATHEMATICS

2022



# INTENT

- **Our shared Vision**
- At Alexandra Park Junior School, we hope to instill a self-confidence, enthusiasm and fascination of mathematics. We will achieve this through a **mastery** approach of developing a deep understanding. This means:
- The large majority of pupils' progress through the curriculum content **at the same pace**. This is achieved through adaptation of activities, scaffolding resources and or individual support and intervention so that all children can access year group objectives. This will allow all children to achieve and master concepts so they are ready to progress to the next part of the curriculum sequence.
- Teaching is underpinned by accurate assessment and lessons matched to pupils' needs to foster deep conceptual and procedural knowledge.
- Practice, variation and consolidation in different subject areas - application of skills via cross-curricular links, real life contexts and the wider world. It is especially important that children understand how maths relates to their economic-well being
- Time is spent on topics embedding learning and developing a deep conceptual understanding - allowing children to move on to applying their mathematical skills through varied fluency, problem solving and reasoning tasks

# IMPLEMENTATION

- **Lesson structure**
- From the start of the lesson, children are sat in mixed ability groups to encourage children to become fluent, mathematical thinkers through the use of reasoning and questioning their peers. Mixed ability pairs allows peer support so that everybody progresses at the same pace.
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- **Starters**
- Intent
- Children to regularly revisit previously taught content so that skills and knowledge is embedded and gaps are addressed.
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- Implementation
- White Rose Flashback four is used every day as a starter. This should take up no longer than 10 minutes to allow time to address misconceptions and gaps.
- An additional 2-minute starter activity to improve children's fluency of number facts and times tables should also be used daily.

# IMPLEMENTATION

- **Main Teaching**
- Intent
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- There should be a clear progression to the lessons and cohesive objectives should be planned so that skills build on skills. Teaching objectives mainly follow the White Rose blocks. For the current academic year (2021/2022) key objectives in each block from the previous year will be revisited as a class before new related objectives need to be taught. These include daily formative assessment carried by teachers which is followed by same day interventions to address misconceptions; and termly summative assessments.
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- Implementation
- All main teaching sessions should start with an introduction to the TLC, steps to success and key vocabulary for the day (the vocabulary must then be added to working wall).
- Following this, 'ping-pong' approach paired tasks are completed with valuable paired discussion throughout (taken from the White Rose PowerPoints). These tasks use a ping-pong approach to encourage short bursts of pupils practicing together interspersed with short bursts of teacher input and discussion.
- Following the ping-pong activities, children progress to independently work on questions. Each week should consist of 3 lessons which are evidenced within books, and 2 lessons which are practical. Practical sessions are recorded in Class Books.

# IMPLEMENTATION

- Maths Books Expectations:
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- All books must have the TLC with the steps to success on the left hand page. On the right hand page, the short date should be written and underlined with a 3-squared margin. The left hand side is used as a page to work out sums in any way the children choose to represent their thinking. The right hand page is where children answer their questions and answers should be presented clearly. All children use pencil in their maths books. An ideal maths book will show answers that are highlighted pink and green – to ensure the right level of challenge is being provided to all children. Green highlighted questions are addressed by the children in purple pen.

# IMPLEMENTATION

- When planning, teachers will follow the Five Big Ideas for teaching for Mastery: Cohesion, Representation and structure, variation, mathematical thinking and fluency. Here are some questions to consider when planning:
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- Cohesion
- What do I want the students to achieve? What steps must I take to get there?
- What could go wrong and how can I pre-empt this?
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- Representation & Structure
- Which concrete resource will expose the structure for this concept?
- How can I use CPA effectively to support understanding?
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- Variation
- How can I represent this concept differently so I can prepare students for recognising it in unfamiliar contexts?
- Are my tasks mechanical or do they encourage students to spot corrections?
- Do the steps in my lesson connect, building on what is already known to new contexts?

# IMPLEMENTATION

- Mathematical Thinking
- What questions might I pose to deepen understanding?
- How have I explored the answer as a starting point?
- Do **all** students have access to reasoning and problem solving opportunities?
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- Fluency
- Have I provided adequate opportunities for fluency in relation to reasoning and problem solving?
- Do my fluency tasks promote mathematical thinking without abandoning procedural fluency?
- How will I continue to develop fluency outside of the lesson?

# IMPLEMENTATION

- **Plenaries**
- Plenaries should be planned to either incorporate AfL or to extend children to look ahead to future learning. Any pupils who have not met the learning objective will be targeted for Rapid Response Intervention which takes place before the next lesson ensuring pupils keep up with the curriculum.



# IMPLEMENTATION

- Quality First teaching – key points
- Concrete-pictorial-abstract
- We believe that all students, when introduced to a key new concept, should have the opportunity to build competency in this topic by developing a progressive concrete-pictorial-abstract understanding.
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- Concrete- students should have the opportunity to use concrete objects and manipulatives to help them understand what they are doing. **These should be used when introducing a new concept to enable children to deepen their understanding (longer if required).**
- Pictorial – students should then build on this concrete approach by using pictorial representations. These representations, including bar modelling, can then be used to reason and problem solve.
- Abstract – with the foundations firmly laid, students should be able to move to an abstract approach using numbers and key concepts with confidence.
- Clear links should be made between each of these steps.

# IMPLEMENTATION

- **Feedback**
- All children need feedback in class (by teacher and TA) to celebrate the successes and for them to know their next steps. This information is used for future planning and for effective and prompt interventions to be delivered where required. Self and peer assessment should be an integral part of feedback.

# IMPACT

- Impact may be measured in a variety of ways, including:-
  - book scrutiny
  - planning scrutiny
  - learning walks
  - lesson observations and pop-ins
  - staff and pupil voice questionnaires
  - data analysis

# LONG TERM PLANS

- Year 3 Curriculum
- This is using the White Rose curriculum which we will supplement using the NCETM resources.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number Place value  											

# LONG TERM PLANS

- Year 4 Curriculum
- This is using the White Rose curriculum which we will supplement using the NCETM resources.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	<div>Number</div> <div>Place value</div> <div>VIEW</div>			<div>Number</div> <div>Addition and subtraction</div> <div>VIEW</div>			<div>Measurement Area</div> <div>VIEW</div>	<div>Number</div> <div>Multiplication and division A</div> <div>VIEW</div>			<div>Consolidation</div>	
Spring term	<div>Number</div> <div>Multiplication and division B</div> <div>VIEW</div>			<div>Measurement</div> <div>Length and perimeter</div> <div>VIEW</div>		<div>Number</div> <div>Fractions</div> <div>VIEW</div>			<div>Number</div> <div>Decimals A</div> <div>VIEW</div>			
Summer term	<div>Number</div> <div>Decimals B</div> <div>VIEW</div>		<div>Measurement</div> <div>Money</div> <div>VIEW</div>		<div>Measurement</div> <div>Time</div> <div>VIEW</div>		<div>Consolidation</div>	<div>Geometry</div> <div>Shape</div> <div>VIEW</div>		<div>Statistics</div> <div>VIEW</div>	<div>Geometry</div> <div>Position and direction</div> <div>VIEW</div>	

# LONG TERM PLANS

- Year 5 Curriculum
- This is using the White Rose curriculum which we will supplement using the NCETM resources.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number <b>Place value</b> <a href="#">VIEW</a>		Number <b>Addition and subtraction</b> <a href="#">VIEW</a>		Number <b>Multiplication and division A</b> <a href="#">VIEW</a>		Number <b>Fractions A</b> <a href="#">VIEW</a>					
Spring term	Number <b>Multiplication and division B</b> <a href="#">VIEW</a>		Number <b>Fractions B</b> <a href="#">VIEW</a>		Number <b>Decimals and percentages</b> <a href="#">VIEW</a>		Measurement <b>Perimeter and area</b> <a href="#">VIEW</a>		<b>Statistics</b> <a href="#">VIEW</a>			
Summer term	Geometry <b>Shape</b> <a href="#">VIEW</a>		Geometry <b>Position and direction</b> <a href="#">VIEW</a>		Number <b>Decimals</b> <a href="#">VIEW</a>		Number <b>Negative numbers</b> <a href="#">VIEW</a>	Measurement <b>Converting units</b> <a href="#">VIEW</a>		Measurement <b>Volume</b> <a href="#">VIEW</a>		

LONG TERM PLANS

- Year 6 Curriculum
- This is using the White Rose curriculum which we will supplement using the NCETM resources.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number <b>Place value</b> <a href="#">VIEW</a>		Number <b>Addition, subtraction, multiplication and division</b> <a href="#">VIEW</a>				Number <b>Fractions A</b> <a href="#">VIEW</a>	Number <b>Fractions B</b> <a href="#">VIEW</a>	Measurement <b>Converting units</b> <a href="#">VIEW</a>			
Spring term	Number <b>Ratio</b> <a href="#">VIEW</a>	Number <b>Algebra</b> <a href="#">VIEW</a>	Number <b>Decimals</b> <a href="#">VIEW</a>	Number <b>Fractions decimals and percentages</b> <a href="#">VIEW</a>	Measurement <b>Area, perimeter and volume</b> <a href="#">VIEW</a>	<b>Statistics</b> <a href="#">VIEW</a>						
Summer term	Geometry <b>Shape</b> <a href="#">VIEW</a>		Position and direction <a href="#">VIEW</a>	Themed projects, consolidation and problem solving								

## OUR NEXT STEPS

- Ensure maths non negotiables are implemented consistently across all classes and all year groups.
- Develop challenge in conjunction with the School Partnership Programme
- Continue to work with the NCETM and maths hub to develop our mastery approach.
- Training for Teaching Assistants in use of manipulatives to support our CPA approach.
- Develop our use of pre assessments to enable us to accurately target pupils for pre teach intervention.



# RESOURCES



## RESOURCES

- Manipulatives are stored in labelled boxes in the classroom for the children to use. Children should be encouraged to use the manipulatives themselves when needed. This of course should be modelled by the class teachers and teaching assistants.

# EXAMPLES OF WORK

**Extra Problem solving for 3\*\*\***

A car is travelling from Halifax to Brighton. In the morning, it completes  $\frac{2}{3}$  of the journey. In the afternoon, it completes  $\frac{1}{3}$  of the journey. What fraction of the journey has been travelled altogether?  $\frac{2}{3} + \frac{1}{3} = 1$

How far does the car have left to travel? 0

If the journey is 270 miles, how far did the car travel in the morning?  $270 \times \frac{2}{3} = 180$  miles

How far did the car travel in the afternoon?  $270 \times \frac{1}{3} = 90$  miles

How far does the car have left to travel? 0

Mr and Mrs Rose and betting scarves. Mr Rose's scarf is  $\frac{1}{2}$  m long. Mrs Rose's scarf is  $\frac{1}{4}$  m longer than Mr Rose's scarf. How long is Mrs Rose's scarf?  $\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$  m

How long are both the scarves altogether?  $\frac{1}{2} + \frac{3}{4} = \frac{5}{4}$  m

Fill in the boxes to make the calculation correct.

$$\begin{array}{r} 3 \\ + 10 \\ \hline 13 \end{array}$$

**Common factors** 😊

1.  $8 \downarrow$   $10 \downarrow$  Common factors of 8 and 10 are 1, 2

2.  $8 \downarrow$   $16 \downarrow$  Common factors of 8 and 16 are 1, 2, 4, 8

**Common multiples** 😊

1.  $12 \downarrow$   $8 \downarrow$  Common multiples of 12 and 8 are 24, 48, 72

2.  $12 \downarrow$   $16 \downarrow$  Common multiples of 12 and 16 are 48, 96, 144

**Prime numbers** 😊

1. 2 is Prime

2. 4 is Composite

3. 6 is Composite

4. 8 is Composite

5. 10 is Composite

6. 12 is Composite

**Extra problem solving and reasoning**

Alex balances some scales.

Work out the mass of one of the cubes.

Amir has a box of counters. For every 5 red counters in the box there are 2 green counters. Amir removes 21 red counters. There are now the same number of red and green counters in the box. How many green counters are in the box? 40

Show all your workings.

The ratio of 20p coins to 5p coins in a money box is 5:2. There are fifteen 20p coins. How much money is in the box? 375

**True or False?** Ratio and proportion problems

To make brown paint Dora is mixing red, yellow and blue paint in the ratio of 2:3:1

**False** you need 6 red, 9 yellow and 3 blue

I need to mix 18 litres of paint so I will need 6 litres of each colour.

Dora

Prove or disprove it using working out!