

Mathematics Statement of Intent.

At St Joseph the Worker Primary School we recognise that Mathematics is the foundation for understanding of God's world and we want our children to know the purpose behind their learning and to apply their knowledge to their everyday lives. Our aim is to provide a high-quality child-centred mathematics education with a mastery approach so that children become **fluent** in the fundamentals of mathematics, **reason** mathematically and **solve problems** by applying their mathematics. We want our children to develop:

- ✓ a positive attitude towards mathematics and an awareness of the fascination of mathematics
- ✓ a culture of deep understanding, competence and confidence in mathematical knowledge, concepts and skills
- ✓ initiative and an ability to work both independently and in co-operation with others
- ✓ an ability to communicate mathematics
- ✓ an ability to use and apply mathematics across the curriculum and in real life

We believe that all children, when introduced to a new concept, should have the opportunity to build a competency by taking this approach:

- **Concrete** – children have the opportunity to use concrete objects and manipulatives to help them understand what they are doing.
- **Pictorial** – alongside this children should use pictorial representations. These representations can then be used to help reason and solve problems.
- **Abstract** – both concrete and pictorial representations should support children's understanding of abstract methods.

We believe that when you teach for mastery, EVERYONE can do maths! We never accelerate through a topic but rather enable children to gain a clear, deep and broad understanding.

"Pupils 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."

National Curriculum: Mathematics programmes of study: KS1 & 2, 2013

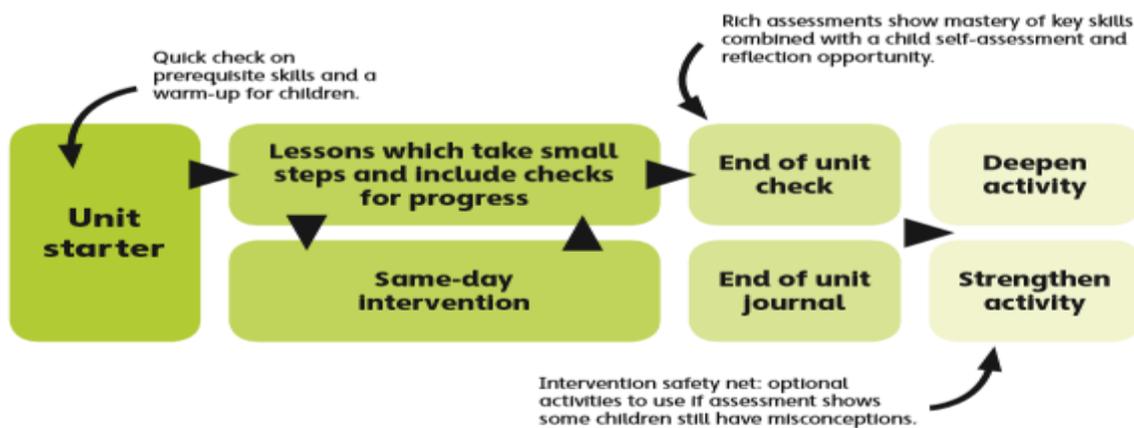
Our Maths scheme combines interactive teaching tools, high –quality textbooks and continuing CPD to help teachers equip children with a deep and long lasting understanding.

Implementation

- Power Maths is the scheme used in school. Power Maths is a whole class, textbook based mastery programme created in partnership with White Rose Maths.
- We encourage a growth mindset and inspire hard work, practice and a willingness to see mistakes as learning tools.
- Our Mastery approach values real understanding and richer, deeper learning above speed. All children learn the same concept in small, cumulative steps, each finding and mastering challenge at their own level.
- At the heart of our Maths teaching is a unique lesson sequence designed to empower children to understand core concepts and grow in confidence.
- The National Centre for Excellence in the Teaching of Mathematics' (NCETMS') definition of mastery, shapes every maths lesson.
- The whole class moves through the curriculum at broadly the same pace via individual learning journeys.
- In each year group, the curriculum is broken down into core concepts, taught in units. Each unit divides into smaller learning steps – lessons. Step by step, strong foundations of cumulative knowledge and understanding are built.
- Clear lesson structure that includes engaging problems, visual mathematical models and captivating characters build and deepen children's learning.
- Each step is taught separately, and teachers are able to spend more time on a particular step if they feel it is necessary. Flexibility is built into the Maths programme meaning you can pace teaching according to the class. While some children will need to spend longer on a particular concept (through interventions and additional lessons), others will reach deeper levels of understanding. Children who grasp a concept easily have time to explore and understand that concept at a deeper level.
- Practice books allow all children to practise each small step independently. Carefully varied questions move children on in their thinking and reveal misconceptions, while journaling activities encourage reflection.

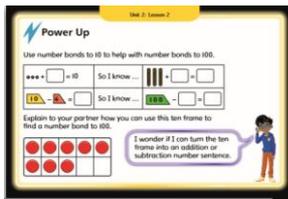
Prerequisite skills – Before starting to teach each new unit, it's important to make sure that children have secured the prerequisite skills and vocabulary.

- Each unit begins with a start of unit check designed to resurface the skills and vocabulary that children will need to build on in the upcoming unit.
- As a whole class, children discuss the vocabulary they already know, and review prior learning through mathematical representations.
- Teachers are able to look out for any continued misconceptions or gaps in understanding and plan to deliver interventions before teaching the unit.
- The teacher guides give rich and relevant support and guidance for every lesson, from organising activities and using effective question to supporting struggling learners and achieving deeper learning.



The Lesson – Once a unit has been introduced, the teachers begin teaching the series of lessons. Each lesson is scaffolded with Textbook and Practice book activities and always begins with a

Power up activity –



Each lesson begins with a Power up activity which support fluency in key number facts. (If the class is struggling with the task, the teacher will revisit it later and check understanding.) Power ups reinforce key skills such as times-tables, number bonds and working with place value.

Discover –



To arouse the children’s curiosity children are given a real-life problem to solve. (Teachers can use the scenario provided or use their own examples which may be more relevant to their class.) Children work in pairs with concrete objects. The first part of the question tackle the key concept and the second part of the questions digs a little bit deeper. Children are given time to explore, play and discuss possible strategies.

Share –

Share

10 Your kelpop sticks make two squares. We call the amount left over the remainder.

They can make 3 squares with 1 kelpop stick left over.

I talk by organizing my work in a table.

Number of sticks	Working	Number of squares	Number of sticks left over
14		3	2
15		3	3
16		4	0
17		4	1

This is teacher led and highlights the variety of methods that can be used to solve a single problem. Teachers use targeted questions and interactive structures and representations to link concrete and pictorial to abstract concepts. Children are able to discuss their methods and share and celebrate their solutions and strategies.

Think together –

Think together

1 Leel and Zac use seven kelpop sticks. How would you complete this table?

Number of sticks	Working	Number of squares	Number of sticks left over
18		4	
19			
20			

2 all Describe the pattern that Leel can see.

Leel: I can see a pattern in the number of kelpop sticks left over.

3 Is Zac correct?

Zac: I don't think you can have more than 3 kelpop sticks left over.

The teacher will model the first question. Children then work in groups to discuss the second questions and then as a class. In question 3 and 4 the children work independently and then discuss as a class. The openness of the challenge question enables the teacher to check depth of understanding. (Groups are not set and can be mixed up to widen children's opportunities for exploring, discussing and sharing their understanding with others.)

Practice –

Understanding divisibility

Laila has 8 lollipop sticks.

She makes squares, like this.

a) Draw the squares that Laila makes.

b) How many complete squares can Laila make?
Laila can make complete squares.

c) What is the remainder?
The remainder is lollipop sticks.

d) What if Laila makes triangles with the sticks?
How many complete triangles can she make?
What is the remainder?
There are complete triangles and the remainder is .

Children then work independently in the practice book. The class teacher circulates to check on progress. The questions follow small steps of progression to deepen learning. During this part of the lesson some children may also work separately with a teacher or teaching assistant. Through observation the teacher can work with any children who are struggling in a small group using mathematical structures and representations.

Reflect –

Mia makes square blocks from cubes, like this.

She makes 5 square blocks and has a remainder of 3 cubes.

How many cubes did Mia start with?
Mia started with cubes.

Reflect

Explain why Ali is correct.

When you divide by 5, the greatest remainder is 4.

This part of the lesson is an opportunity to check how deeply children understand the target concept. Various approaches are used to check the children have fully understood each concept. 'Spot the mistake' is great for checking misconceptions.

Same-day intervention – is vital in order to keep the class progressing together.

- Intervention is focused on keeping up now, not catching up later, so interventions happen as soon as they are needed.
- **Within- lesson intervention** can take place during the Practice part of the lesson. Teachers identify children during the Think together part of the lesson therefore the teacher brings these children together to work with them during the first Practice question using questions and concrete models.
- **After-lesson intervention** Think together questions are used to recap and expand for children who have not grasped the concept.

The next lesson in a Power Maths sequence always revises and builds on the previous step to help embed learning. These provide opportunities for children to strengthen their learning with the support of teaching assistants.

Mathematical Language

In order to not place barriers between children and their understanding of mathematical concepts we feel that it is important that children from an early age are given the correct language so that we can build children's mathematical vocabulary, understanding and confidence. Therefore we use the following strategies suggested by the Power Maths scheme of work.

Precise and consistent

Everyone in the classroom should use the correct mathematical terms in full, every time. Used consistently, precise maths language will be a familiar and non-threatening part of children's everyday experience.

Full sentences

Teachers and children alike need to use full sentences to explain or respond. When children use complete sentences, it both reveals their understanding and embeds their knowledge.

Stem sentences

These important sentences help children express mathematical concepts accurately, and are used throughout the *Power Maths Reception* resources. Encourage children to repeat them frequently, whether working independently or with others. Examples of stem sentences are:

'4 is a part, 5 is a part, 9 is the whole.'

'There are ... groups. There are ... in each group.'

Key vocabulary

The unit starters highlight essential vocabulary for every lesson. New terminology is highlighted in bold on the **Online Flashcards** and the **Teacher Guide** lists important mathematical language for every unit and lesson, with new terms flagged in bold, and in the colour of the learning section in which they are introduced, once again.

Make maths part of everyday life

Use every opportunity to build mathematical vocabulary into everyday classroom life. For example, once Time has been introduced, ask children every day what they will do first, then and next today, and encourage them to use words such as *before* and *after*. The more normal you make mathematical language, the less intimidating it becomes.

Growth Mind-set

The characters we use in Maths, model the traits of growth mindset learners and encourage resilience by prompting and questioning children as they work. The characters are used to help model methods, alternative answers and misconceptions, and to prompt discussion. The characters encourage the children to be hardworking, enthusiastic and unafraid of making and talking about mistakes.

Meet the team!

Flexible Flo is open-minded and sometimes indecisive. She likes to think differently and come up with a variety of methods or ideas.



'Let's try again.'
'Mistakes are cool!'
'Have I found all of the solutions?'

'Let's try it this way ...'
'Can we do it differently?'
'I've got another way of doing this!'

Determined Dexter is resolute, resilient and systematic. He concentrates hard, always tries his best and he'll never give up – even though he doesn't always choose the most efficient methods!



'I'm going to try this!'
'I know how to do that!'
'Want to share my ideas?'



Curious Ash is eager, interested and inquisitive, and he loves solving puzzles and problems. Ash asks lots of questions but sometimes gets distracted.

'What if we tried this ...?'
'I wonder ...'
'Is there a pattern here?'



Brave Astrid is confident, willing to take risks and unafraid of failure. She is never scared to jump straight into a problem or question, and although she often makes simple mistakes she is happy to talk them through with others.

Miaow!

Sparks the Cat



Early Years Foundation Stage.

In the Early Years Foundation Stage (EYFS), we relate the mathematical aspects of the children's work to the Development Matters statements and the Early Learning Goals (ELG), as set out in the EYFS profile document. Mathematics development involves providing children with opportunities to practise and improve their skills in counting numbers, calculating simple addition and subtraction problems, and to describe shapes, spaces, and measures. The profile for Mathematics areas of learning are Number (ELG 11) and shape, space and measures (ELG 12). We continually observe and assess children against these areas using their age-related objectives and plan the next steps in their mathematical development through a topic-based curriculum.

There are opportunities for children to encounter Maths throughout the EYFS (both inside and outside) – through both planned activities and the self-selection of easily accessible quality maths resources. Whenever possible children's interests are used to support delivering the mathematics curriculum.

Nursery

In nursery the children follow a maths programme that as an EYFS unit we believe the children need to establish firm foundations. EYFS staff have developed a maths programme using ideas from White Rose Maths for Reception and using the DFE booklet 'numbers and patterns, laying foundations for mathematics.'

Reception

In Reception we follow the programme Power Maths to establish firm foundations for maths learning to enable children to succeed in KS1 and beyond. Power maths builds every concept in small, progressive steps and combines a mastery approach with Early Years best practice.

Teaching sequences

Our Maths lessons is built around a weekly structure, with each new small step of learning introduced over five lessons following the Concrete, pictorial and abstract approach (C-P-A). Throughout the week the children are given opportunities to manipulate and handle objects to help them see, feel and manipulate the mathematical concept. (Concrete) The introduction of pictorial representations follow a carefully thought-out progression. For example children will begin counting with cubes, before learning to use the cubes to represent other things. (Pictorial) Children are then given opportunities to see numerals alongside pictorial representations and through practical activities so that children reduce their reliance on visual representation. These include the children being able to apply the maths concept to sound and movement. For example how many claps can you hear? (Abstract)

Day 1 – Weekly starter to check children are secure with the prerequisite skills before introducing a new concept. New concepts and language is introduced by using song, story, photograph, picture or game followed by a practical activity.

Day 2 – Discover and share

Children in either whole class or small groups discover the problem by a practical problem set in a real-life concept. Children share their ideas through a modelled answer that uses a C-P-A approach.

Day 3 - Think together and practice.

Think together is about a whole class or small group guided practice to move children on a step in their learning.

Children use the journal for independent practice by drawing, using concrete objects or talking through the problem to show their understanding.

Day 4 – challenge and strengthen

As a whole class or small group the children do a challenge to deepen their understanding. At this stage the teacher can use strengthen activities for any children who are not yet ready for the challenge.

Day 5 – Practical activities and reflect

Practical activities are used to move the children into more abstract maths for example activities that use sound and movement rather than visual cues.

Children then reflect on their learning to show the depth of their understanding in an open-ended Reflect activity in the Maths Journal. In these activities children can show whether they have mastered the concept, and also show whether they have mastered the concept with a greater depth.

Impact

- Assessment is integrated throughout our Maths lesson and unit structure. This enables the teachers to make regular assessments of the children's understanding to inform teaching and measure progress. Also the children are able to review key concepts and reflect on their learning. By asking the following questions... What have you learned? Why does it work? How do you know?

Opportunities for assessment

- **Formative assessment** within every lesson
- **Summative assessment** at the end of each unit, half-term and year.
- **Teacher notes** that help to identify and address misconceptions
- **Unit assessment grids** to track progress

Prerequisite skills – Before starting to teach each new unit, it's important to make sure that children have secured the prerequisite skills and vocabulary. Teachers are able to look out for any continued misconceptions or gaps in understanding and plan to deliver interventions before teaching the unit.

Formative assessment –guided practice gives teachers opportunities to assess children's understanding during the lesson.

- The Think together section of the lesson provides opportunities for guided practice.
- The practice is carefully scaffolded to support all children to consolidate their understanding.
- Teachers use children's responses to identify who has grasped the concept and who may still have areas of weakness in their understanding.
- Independent practice is a further opportunity to assess children's understanding. The independent practice in the Practice Books provides a written record of understanding. Exercises are built on the principles of varied and intelligent practice, so children can demonstrate the depth of their understanding. They provide opportunities for teachers to gather rapid feedback on areas of strength, weakness and misconceptions.
- At the end of each lesson there is a reflect question in the practice book.
- By reflecting on learning, teachers and children gain valuable information about whether children have mastered the concept and the depth of their understanding.
- Teachers use children's responses to gain an insight into the depth of their understanding and plan the next teaching steps.
- The teachers guides contain assessment points that enable teachers to maximise assessment opportunities in each lesson.

Strengthen –identifies common misconceptions and suggests how to address them.

Deepen – gives pedagogy pointers to support children who have grasped the concept quickly.

Summative assessments (built in)

Before children move on to the next unit, it's important to assess whether children have mastered the concepts they have been taught.

- Built into every Maths unit are end of unit checks, which provide an opportunity for you to identify the depth of children's understanding of the concepts taught in each unit.
- The questions are carefully structures to identify both understanding and misconceptions.
- Certain answers highlight particular misconceptions and you can use this information to plan individual or whole-class interventions before moving on to the next unit.
- Teacher guides support the teacher in recognising mastery of each concept, and in identifying and addressing misconceptions.
- Teacher guides explain the misconceptions revealed by children's answers.
- Provides advice on how to strengthen children's understanding of a topic, to make sure no child is left behind.
- Unit assessment grids provide a framework for recording the insight you've gained from formative and summative assessments.
- At the end of each unit the children have a My Journal task. (journalling is a technique commonly used in Singapore. It gives teachers the opportunity to assess the depth of children's understanding.)These give children the opportunity to review key learning and vocabulary, and to reason.
- Draws on children's reasoning to gauge the depth of their learning.
- The children complete a confidence indicator, so the children can communicate how confident they feel about the concept.