



Maths Processes

Pupils engage in the following processes as they learn and use maths throughout their time at Southbourne Juniors. These key processes are interconnected and apply across all mathematical topics and throughout every year group. To put them into practice, they are interpreted alongside the NC expectations for each year group and White Rose small steps document for each block. Children will use these processes when learning new concepts and procedures, developing fluency and solving problems. Pupils draw on these processes and make connections with the wider curriculum and real-life situations.

- Problem Solving & Applying
 - Reasoning & Proving
- Communicating & Reflecting
 - Connecting
 - Representing

Problem Solving & Applying

Children learn to:

- Tackle maths problems that are appropriately challenging
- Investigate problems to build their understanding of concepts
 - Explore many different approaches to solving problems
 - Apply skills to everyday situations

<u>Step 1</u>	<u>Step 2</u>	<u>Step 3</u>
<p><i>With support</i> select appropriate materials and processes for mathematical tasks</p> <p><i>With support</i> select and apply appropriate strategies for completing a task or solving a problem</p> <p><i>With support</i> recognise solutions to problems</p>	<p>Select appropriate materials and processes for mathematical tasks</p> <p>Select and apply appropriate strategies for completing a task or solving a problem</p> <p>Recognise solutions to problems</p> <p>Begin to apply concepts and processes in a variety of contexts</p>	<p>Select and apply concepts, processes and a <i>variety</i> of strategies to solve problems and complete projects</p> <p>Evaluate solutions to problems</p> <p>Analyse problems and plan an approach to solving them</p>
<p><u>Questions that support the development of this process:</u></p> <p><i>What is happening in this problem?</i></p> <p><i>What am I asked to find?</i></p> <p><i>What do I know that I can use to solve this?</i></p>		

Reasoning & Proving

Children learn to:

- Make predictions
- Test hypotheses
- Explain their thinking behind a solution or choice of strategy

<u>Step 1</u>	<u>Step 2</u>	<u>Step 3</u>
Classify objects into logical categories	Make hypotheses and carry out experiments to test them	Search for and investigate mathematical patterns and relationships
Recognise and create mathematical patterns and relationships	Explore and investigate mathematical patterns and relationships	Justify processes and results of mathematical activities, problems and projects
Make guesses and carry out experiments to test them	Justify the processes and results of mathematical activities	Reason systematically in a mathematical context
Justify the processes or results of activities	Make informal deductions involving a small number of steps	
	With support reason systematically in a mathematical context	
<u>Questions that support the development of this process:</u> <i>Why does this make sense?</i> <i>How do I know my solution is right?</i> <i>How do you know...?</i>		

Communicating & Reflecting

Children learn to:

- Participate in many conversations with the teacher and with other pupils, in which they ask questions, share and clarify ideas, compare strategies, draw conclusions and explain their reasoning.
 - Communicate their maths orally and in writing.
- Reflect on their choices and results to improve their approaches and discover new possibilities

<u>Step 1</u>	<u>Step 2</u>	<u>Step 3</u>
Discuss and explain mathematical activities Record the results of mathematical activities concretely and using diagrams, pictures and numbers Discuss problems presented concretely, pictorially or orally Assess the reasonableness of an answer Reflect on their own thinking	Listen to and discuss other children's mathematical descriptions and explanations Discuss and record the results of mathematical activities using diagrams, pictures and symbols Mind map other possible strategies Reflect on their own thinking and the thinking of others	Discuss and record the processes and results of work using a variety of methods in an organised way. Discuss problems sharing aspects that were challenging and suggesting improvements to approaches
<u>Questions that support the development of this process:</u> <i>How can I explain my strategy?</i> <i>Here is how I worked this out...</i> <i>How else could I have solved this problem?</i> <i>What did I learn from doing this work?</i>		

Connecting

Children learn to:

- Connect new concepts with what they already know, and connect mathematical ideas to real-world situations.
 - Make connections between maths and other subjects

<u>Step 1</u>	<u>Step 2</u>	<u>Step 3</u>
Connect informally acquired mathematical ideas with formal mathematical ideas Recognise mathematics in the environment Recognise the relationship between verbal, concrete, pictorial and abstract modes of representing numbers	Understand the connections between mathematical procedures and the concepts he/she uses Carry out mathematical activities that involve other areas of the curriculum Represent mathematical ideas and processes in different modes: verbal, concrete, pictorial and abstract	Recognise and apply mathematical ideas and processes confidently in other areas of the curriculum and real life activities
<u>Questions that support the development of this process:</u> <i>This concept reminds me of...</i> <i>This problem is similar to...</i>		

Representing

Children learn to:

- Use a wide variety of learning tools from concrete to abstract to investigate, explore and represent maths concepts
- Use graphs, tables, words, physical and digital models, drawings, numeric and algebraic expressions when solving problems
 - Use calculators for some tasks depending on the goal of the lesson

<u>Step 1</u>	<u>Step 2</u>	<u>Step 3</u>
With support select concrete manipulatives to carry out mathematical tasks and procedures Works mainly with concrete apparatus	Confidently select appropriate concrete manipulatives to solve problems and represent their thinking Chooses between concrete and visual methods depending on confidence in order to achieve an accurate result	Use a variety of ways to represent a concept or strategy leading to deep understanding Evaluate the effectiveness of tools and strategies Works mainly with visual and abstract methods
<u>Questions that support the development of this process:</u> <i>This concept reminds me of...</i> <i>This problem is similar to...</i> <i>What does this diagram tell me?</i> <i>What equation can I use to show this?</i>		