

Mathematics at Bartley C of E Junior School

Our aim is to inspire enjoyment, confidence and a deeper understanding of the wonders of mathematics and its applications in everyday life and beyond. We strive to provide engaging and appropriately challenging tasks to develop their fluency, reasoning and problem solving skills through a variety of rich tasks whilst exposing learners to a variety of ways of thinking.

At Bartley C of E Junior School, we have been on a journey over the past few years to develop and improve the teaching and learning of mathematics. Developing a 'mastery approach' and 'growth mindset' are at the heart of our whole school curriculum. Within mathematics, there are many elements which we have embraced into our teaching and I would be happy to talk through these with you in person. If you are taking a look around the school, however, it may be useful for you to have a little advance notice of things you will see in lessons – things that may look different to other schools, or the way our lessons and books looked a few years ago.

Planning

- **Whole class together** – We teach mathematics to whole classes whilst being careful not to make assumptions of learners by 'ability' grouping them. Our philosophy is one of equity rather than equality, recognising that teaching for mastery is not a 'one size fits all' approach. As a result, we promote equal outcomes instead of equal treatment. At the planning stage, teachers consider modifications or adaptations which may be required should learners struggle to grasp concepts and, for those who grasp concepts quickly within a lesson, the teachers plan greater depth tasks to challenge and deepen the learners' understanding further rather than simply accelerating to new content. (*Further elaboration on this can be found in the 'Teaching' section.*)
- **Longer but deeper** – In order to address the aims of the NC, our long/medium term plans have been adjusted to allow longer on topics. We are very proud to be using the Singapore-style Maths No Problem materials to support this approach to the teaching and learning of mathematics (more information about this - including supporting videos - are available on our website). Each lesson develops the concept from the previous one in logically sequenced phases. To outsiders it may appear that the pace of the lesson is slower, but progress and understanding is enhanced. Our assessment procedures recognise that the aims of the curriculum cannot be assessed through coverage (ticking many objectives off a list) but through depth within a topic.

- **Key learning points** – These are identified during planning (collaboratively in year groups) and a clear journey through the maths should be shown on flipcharts (also reflected on working walls). **Questions** will probe learners’ understanding throughout and responses are expected in full sentences, using precise **mathematical vocabulary**.
- **Fluency** – We recognise that ‘fluency’ is not just about remembering facts and we develop all aspects of fluency through lessons, this is clear to see when looking at planning and flipcharts. We also plan for a daily ‘maths meeting’ where learners are given further opportunities to practise key mental skills (also identified on medium term plans – *examples in this pack*) through games and problem solving opportunities. Learners are provided with opportunities to develop their understanding of the relationships between numbers and properties of operations. They are also encouraged to develop and select efficient strategies for fact retrieval through regular practice. Reasoning is considered an important partner in developing and selecting efficient strategies.

Teaching

- **Lesson structure** – Lessons are broadly structured in 3 parts:
 1. **Anchor task** – This is a period of exploration. This time is for the entire class to work on one problem, guided by the teacher. It is an opportunity for learners to showcase what they already know and for the teacher to extend their understanding through careful questioning and examples. Often learners will be exploring a range of concrete resources to support their thinking, concept building and explanations. Lesson objectives may be, but are not necessarily always, shared with the learners at the beginning of the lesson as we often want them to reason what it is for themselves.
 2. **Guided practice** – In this part, learners practise the newly explored ideas and review them together as a class. This part is also characterised by lots of discussion!
 3. **Independent practice** – This is where learners will apply their learning. During this time, you may observe the teacher working with a group who have been identified as requiring further support or extension. When learners complete their task, there will usually be an ‘honesty card’ for them to use to review their task.
*At each stage of a lesson, additional **support** and **greater depth** opportunities are planned to meet the needs of individuals.*
- **Multiple models** – To help learners become better method creators, connection makers and critical thinkers, we believe it is essential that their experiences should not be limited to the simplest form of a concept. We encourage exploration and comparison of multiple models/examples and are now also beginning to introduce

the idea of identifying and comparing non-examples so that learners may better understand a concept through exploring *what it is* as well as *what it is not*. This approach encourages deeper understanding as well as the making of connections between concepts/disciplines.

- **Step-by-step approach** – The journey through each lesson is built on logical steps (these steps may appear small, especially at the beginning of a lesson, there are points when suddenly a jump appears to have been made, or an extra challenge appears – this is normal). The flipcharts clearly show this step by step approach – we recommend you look through a flipchart with a teacher/maths leader to discuss this.
- **Resources and pictures** – As our curriculum is based upon the CPA (concrete-pictorial-abstract) model, a big investment in resources has been (and continues to be) made. These materials are used to support concept building and reasoning through ‘doing’. They then move to the ‘seeing’ stage, known as the pictorial stage which then encourages the learner to make a mental connection between the physical object and abstract levels of understanding by drawing or looking at pictures, circles, diagrams or models which represent the objects in the problem.
- **Questions** – To challenge thinking, teachers use questioning throughout every lesson to check understanding and prompt thinking. A variety of questions are used but you will hear some common ones being repeated e.g. *How do you know? Can you prove it? Are you sure? What’s the value? What’s the same/different about? Can you explain...? What does your partner think? Can you imagine...? My friend says...Do you agree?* More complex questions are also used to challenge learners who have grasped the concept earlier. Learners are expected to listen to each other’s responses and may be asked to explain someone else’s ideas in their own words, or if they agree/disagree etc.
- **Talk** – Discussion is a powerful and essential element of each lesson as it provides the testing ground for ideas to be more fully explored. Learners have frequent opportunities to talk to their partners so that they may explain/clarify their thinking throughout the lesson, but are expected to complete written work independently (unless working in a guided group with the teacher).
- **Failing intelligently** – In the words of Edison, *‘You must learn to fail intelligently. Failing is one of the greatest arts in the world. One fails forward towards success.’* The importance of the role of making mistakes and using them as opportunities for growth is one of our philosophical cornerstones. Mistakes are celebrated as important learning opportunities for all, encouraging a positive mindset and openness to new challenges and experiences.
- **Practising** – Opportunities to practise are characterised by systematic variation, as demonstrated in the Maths No Problem materials. This approach is also taken in our ‘maths meeting’ and transition time/morning tasks.
- **Reasoning** – We understand that developing strong reasoning skills is a complex but essential process. With the introduction of learning journals, we have recently

renewed our focus on teaching learners to become ever more systematic thinkers who can articulate their thinking in a clear, succinct and logical manner. In planning and assessing, teachers consider if it is the 'actual reasoning' or 'communication of reasoning' that needs developing. The modelling of verbal and written reasoning is essential and is a developing element of our practice. A progression of reasoning has been introduced (*see example in this pack*) and, in classrooms, you are likely to see reasoning checklists which also have suggested sentence starters.

- **Journals** – Journals were introduced in January 2017 as a result of identified needs from book monitoring. Where the Maths No Problem workbooks clearly evidence learner's journey through mathematical concepts, on their own they reveal very little about the children's thinking. With that in mind, journals were introduced as a place for learners to answer open-ended questions, investigate strategies and articulate their thinking (both written and pictorial), shifting the focus away from a record of computation. For teachers, they provide insight into learner's abilities, opinions, understandings and misconceptions. Whilst still an approach in its infancy at our school, the aim is for these journals to become a highly reliable portfolio-like record of learners' growth and progress (*some early examples of reasoning and CPA evidence can be found in this pack*).
- **Deep understanding** – Deep understanding is achieved through a combination of the above. Some learners may be identified as having grasped concepts quicker than others and will be given opportunities for further challenge through 'Going Deeper' tasks. These are opportunities to explore the same concept that the rest of the class are exploring but at a deeper level through more complex tasks, requiring learners to demonstrate greater creativity and imagination. They will also be given opportunities to independently explore and investigate mathematical contexts and structures, communicate results clearly and systematically explain and generalise the mathematics.
- **Marking** – The marking policy for mathematics acknowledges the different style of teaching in maths, and takes its cue from the NCETM guidelines published in April 2016. The policy requires that learning is ticked and a comment is only made if/when a teacher feels this is necessary to move learning forward. Gap tasks may appear for individuals within their maths journals but, usually, gaps are addressed through same day catch up and therefore will not necessarily be recorded in books. The most valuable feedback is given directly during a lesson. Learners are encouraged to use green pens for self/peer assessment.
- **Flexible grouping** – We do not group or set learners by ability. Instead, learners sit in mixed attainment groups for the majority of lessons. Our priority is to meet learners' needs within the lesson rather than after through timely intervention in the form of cutaways. However, sometimes learners may be reorganised into groups in response to assessment of the outcomes of a lesson where it is clear that they would benefit from further focussed intervention.

- **SEND provision** – Where appropriate, we involve SEND learners as much as possible in the whole class journey. However, we recognise that this is not always appropriate and, where they require a different or divergent journey and resources, this also planned within the main theme of learning. Often they will also complete additional activities outside of the mathematics lesson, including through pre-learning opportunities. These are organised and timetabled within year groups or in conjunction with the SENCo.

NB: We do not label our learners. We have high expectations of all our learners and strongly believe in not making assumptions of the ability of our learners. We recognise that some may take longer to grasp concepts and may need careful scaffolding or extra time/support (guided groups, same day catch-up, additional homework, pre-teaching, intervention group, morning/transition tasks, specific parent support). Please do not ask us about our 'more able' or 'less able' children as this does not fit our ethos.

Thank you for your interest in the mathematics at our school. We are proud of the journey we have started, but are still very conscious that we are still scratching the surface of it! We hope you find the visit useful and welcome any feedback you may have.

Mr Chris Baker
Mathematics Leader

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In this pack you will find our:

- **Progression in Reasoning document ✓**
- **Reasoning Checklist and Sentence Starter prompt ✓**
- **Long Term Plans ✓**
- **Medium Term Plans ✓**
- **Short Term Plan examples**
- **Examples of CPA and reasoning (from Mastery interview packs).**
- **Examples of greater depth tasks**
- **Results from our pupil survey ✓**
- **Current action plan**