Pedagogy helping to inform our decisions in Maths

At St Levan School we recognise that mixed-age teaching is a challenge and this means we need to constantly adapt our approach. This is especially pertinent in mathematics. A high level of flexibility and organisation in lesson planning is required to ensure that our teaching caters to both age groups, and all abilities within the class. The small size of the school means that teachers stay with pupils for up to 4 years which is of enormous value when supporting a pupil on their journey is maths.

After reviewing various reports and case studies focussing on good practice in mixed age mathematics teaching, here is what we have taken into our own practice as a school.

In Dr Naomi Norma's ***Efficacy Research*** paper (Abacus 2014) which was also reiterated by Dr Ruth Merttens at Mastery training attended by the KS1 and 2 teachers, focuses on the *4 pillars of mathematics* as being fundamental to ensuring children can achieve deep understanding in maths. As we follow a mastery approach in our lessons, we feel these are pertinent to our setting.

4 pillars of mathematics	
Pillars	**How we allow pupils to develop their understanding in these areas**
1) Place Value	• White Rose planning visits place value first for each year as a foundation to build new learning from. • Place value misconceptions form the basis of interventions as a starting point until children are more confident in these areas.
2) Number facts	• We use 99 Club to help children build fluency in times tables. We combine this with our own system of times fluency sheets which help us assess how well a child can recall both multiplication and division facts. • We play games which focus on number fluency (e.g. compliments to 100, around the world), provide support for pupils who have yet to memorise key facts (e.g. times table grids in books) and work on strategies children can use to help them retrieve these facts. • Children are set Key Instant Recall Facts to learn half termly, many of which are linked to the memorisation of number facts.
3) Models and Images	• White Rose uses the concrete, pictorial, abstract (CPA) approach to help pupils understand mathematics and to make connections between different representations using a variety of mathematical equipment. • Our progression document outlines the models and images used at St Levan for the four operations plus fractions
4) Doubling and Halving	• Daily practise in Morning Maths which builds skills and enables pupils to make links. E.g. Halving can be used to divide by 4 etc.

In the **NCETM** (2016) small school study focussing on a mastery model in a Year 2 – 6 class, teachers marked maths learning from the morning at lunchtime with interventions happening after lunch with a TA where children have misunderstandings or require more explanation or practise. Where possible, we employ this method at St Levan. Where this is not possible, the class teacher is able to work with identified children as they arrive at school the next morning prior to maths lessons.

In the same study, teaching year groups individually and utilising TAs effectively to support children not currently learning with the class teacher is endorsed. By using White Rose Maths planning and resources as the basis for our learning, and interspersing this with additional material planned specifically for our pupils, we are able to teach by year group but also reap the benefits of collaborative work across mixed ages which is noted as being supportive in North Yorkshire County Council's ***Mixed Age Planning Project***.

In ***Teaching for Mastery in Mathematics in Mixed-age classes*** (Babcock 2016) the value of children working independently is also noted as there will be times when they may not have immediate access to an adult for support. The ethos of St Levan, and the collaborative nature of our school, enables pupils to feel they can also ask each other for support which we know in turn supports the pupils giving support to fully deepen their own understanding of a

subject. It also highlights pre teaching for certain pupils as being of benefit. This happens on an individual basis at St Levan for some children but also as a whole class 'hands on' activities exploring a new concept at times as well.

Modelling the use of correct mathematical language is also noted as important in helping children explain what they have achieved or are finding more challenging. To support children responding to marking, we display these response starters:

- To improve my work I need to…
- Next time I will…
- I am ready to move on to…
- I wonder why…
- Can you help me...?
- Today I learned…
- Today I got better at…
- I remembered…

We also include sentence starters which they can use when discussing maths with peers and adults.

- I know that
- I notice that
- I think that
- I wonder if

When adults are working with children they model the language 'I agree/I disagree'.

We are able to be flexible in our timings for the day and, where necessary, can give more time to maths learning if we feel this would be beneficial. We allow longer for our maths lessons as we have a lot to get through: this is typically around 1 hour 20 minutes. We also spend 5 minutes each day focusing on rapid and efficient number manipulation skills in *Morning Maths*. We have 99 club times table challenges weekly and times table sheets which test pupil fluency on a given times table regularly.

Where a pupil is exceptionally able, extending them deeper into their own year group's objectives has been explored and they still require further opportunity for making new connections with engaging material, we occasionally have them learn with another year group. We feel that this is more beneficial to them as it allows collaborative working and conversation to continue (such an important mathematical skill) which may otherwise be reduced if they are always learning independently of their year group peers. We ensure full coverage of their year group objectives is also observed.