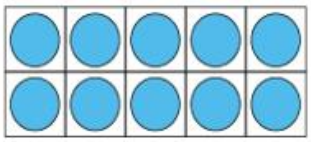
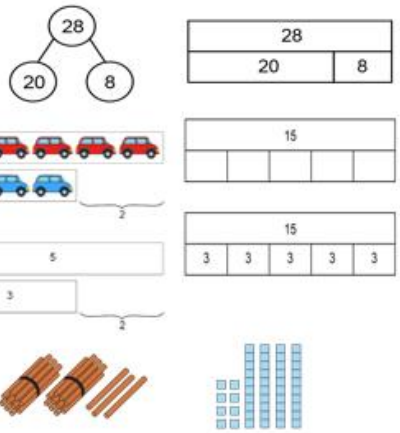
Heath Primary School Calculation Guidance

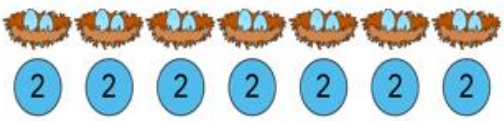
At Heath Primary School, we use the NCETM Curriculum Prioritisation Documents as a tool to plan maths lessons from Year 1 to Year 6. Our EYFS team plan their maths opportunities around the Five Big Ideas of Teaching for Mastery, with Reception basing their input around the NCETM's Mastering Number Programme.

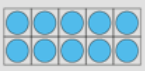
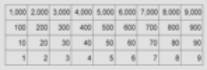
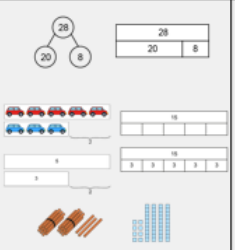
Although we do not have a 'calculation policy', we do have key principles which underpin calculation across school and a set of representations, which are met regularly throughout a child's school journey.



1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9





Representation		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Tens frame	1NPV-1 1AS-1 1 NF-1	2AS-1 2AS-3	3NPV-1 3NF-1 3NF-3	4NPV-1 4NF-3	5NPV-1 5NF-2 5MD-1	6NPV-1
	Number line	1NPV-1 1NPV-2 1NF-2	2NPV-2 2AS-2	3NPV-3 3F-3 3F-4	4NPV-3 4F-1 4F-2 4F-3	5NPV-3 5F-2 5F-3	6NPV-3 6F-1
	Gattegno chart	1NPV-1 1NF-2			4MD-1	5NPV-2 5MD-1	6NPV-1
	Partitioning diagrams including bar models	1AS-1 1AS-2 1NF-1	2NPV-1 2AS-1 2AS-3 2AS-4	3NPV-2 3NPV4 3AS-1 3AS-2 3AS-3 3F-2 3F-4	4NPV-2 4NPV-4 4MD-2 4F-3	5NPV-2 5NPV-4 5F-1	6NPV-4 6AS/MD-4 6F-3
	Groups of units in addition to ones such as Dienes, PV counters		2NPV-1 2AS-3 2AS-4 2MD-1 2MD-2	3AS-2 3MD-1	4MD-2 4F-2	5 NPV-1 5MD-3 5MD-4	6NPV-2

The key principles which underpin calculation at Heath Primary School are listed and detailed below. Throughout the curriculum, children are taught different methods to calculate and encouraged to be fluent mathematicians, regular opportunities are planned to explore and evaluate strategies to find the most efficient.

Develop children's fluency with basic number facts:

Fluent computational skills are dependent on accurate and rapid recall of basic number bonds to 20 and times tables facts.

We achieve this through:

- Mastering number sessions in Reception – Year 2
- Teachers explicitly making connections to basic facts throughout teaching
- Chanting stem sentences
- Exploring relationships between number facts

Develop children's fluency in mental calculation:

To be efficient in calculation, children require a range of mental strategies.

We achieve this through:

- Mastering number sessions in Reception – Year 2
- Explicitly teaching a range of strategies throughout the curriculum
- Exposing mathematical structure by teaching conceptual understanding alongside facts and choosing representations carefully, allowing children to visualise the structures.

Develop children's understanding of the = symbol:

Children must understand that the = sign is a sign of equivalence, rather than, this is the answer.

We achieve this by:

- Exploring equivalence from Nursery through to Y6
- Teaching equality alongside inequality
- Changing the position of the = sign in equations and calculations
- Providing an opportunity for reasoning around equivalence (which in turn, develops fluency)

Don't count, calculate:

Children should be encouraged, from an early age to subitise and use knowledge to calculate, rather than relying on counting.

We achieve this by:

- Practising subitising from Nursery through Key Stage 1
- Teaching children to use knowledge of number facts they already know to base reasoning upon

Look for pattern and make connections:

Children must learn to 'notice' and spot patterns in order to make connections and develop reasoning within their mathematics. This can also help them to become more fluent mathematicians.

We achieve this by:

- Asking questions such as, 'What is the same? What is different?'
- Modelling the language, 'I notice that..' and expecting that the children use this language too
- Designing tasks to allow for intelligent practice and 'avoid mechanical repetition' (Gu, 1991)
- Exposing children to empty box problems, allowing opportunity for reasoning and finding easy ways to calculate
- Teaching children to work systematically and allowing opportunity to practise this
- Use questioning to promote mathematical reasoning and further challenge or support children.
- Providing stem sentences for children to refer to, throughout the lesson

Contextualise the mathematics:

Providing a context makes the mathematics easier to relate to and helps with estimation and checking for accuracy.

We achieve this by:

- Providing real life contexts as often as possible
- Ensuring that problems are 'realistic' and not far-fetched.

Expect that children use correct mathematical terminology and express their reasoning in complete sentences:

The quality of children's mathematical reasoning and conceptual understanding is significantly enhanced if they are consistently expected to use correct mathematical terminology.

We achieve this through:

- Teaching and modelling precise mathematical vocabulary in all year groups
- Using chanting and stem sentences to internalise key vocabulary and mathematical language
- Making explicit references to mathematical vocabulary on working walls and in journals (sometimes using colour-coding to enhance the connections between the language and the examples)

Identify difficult points:

Difficult points and possible misconceptions should be anticipated during lesson design, rather than the teacher responding to these as they arise.

We achieve this by:

- Carefully designing lessons with possible misconceptions in mind
- Providing opportunity within lessons to explore potential misconceptions
- Providing the children with non-examples to explain where 'someone' has gone wrong