Bitterne C of E Primary School

Maths: Number Bonds Policy

Headteacher

Andy Peterson

Last review - March 2022

Next review – March 2025

Signed by Chairs of Governors

Amanda Humby on behalf of Bitterne CE Primary School

Purpose of number bonds policy

Number bond knowledge to at least 20 is an incredibly important facet of mental arithmetic and is vital to delivering a maths mastery curriculum. Fluency of known number bond facts form the basis of a child's understanding and ability when working with number. With fluent understanding of number bonds to 20 and related facts derived from this knowledge, children are able to work efficiently and more confidently through a wider range of calculations. Confidence in their knowledge of number bonds to 20 reduces cognitive load and ensures that children can focus on more complex mathematical challenges and deeper conceptual understanding.

At Bitterne Church of England Primary School, we believe that through a variety of concrete, representational, abstract, engaging and rote learning techniques, most children can achieve the appropriate number bond knowledge required to support successful access to the national curriculum.

Aims

1. To explain the expected practices across the school, and to ensure that children learn their number bonds to 20.
2. To raise the profile of the teaching of number bonds, and to raise overall knowledge of the number bonds and derived facts.
3. To ensure continuity in practices and progression in number bonds.
4. To ensure there is consistent teaching and learning of number bonds to 20 and derived facts within the school.
5. To develop the vocabulary associated with number bonds: 'add', 'more than', 'sum', 'commutative', 'addend', 'subtrahend', 'minuend', 'difference', 'part', 'whole', 'less than'

Progression of number bonds throughout the school

On the following page, the expected outcomes through the early years foundation stage (EYFS) and key stage 1 can be found. In line with the national curriculum for key stage 1 and complementary documentation from the National Centre for Excellence in the Teaching of Mathematics (NCETM), children should be able to recall number bonds to 20 by the end of year 2. Ensuring pupil's fluent recall of these number bonds supports the teaching of key algorithms in lower key stage 2 and is essential in developing number fluency as curriculum expectations for place value, addition and subtraction widen in key stage 2. Due to the flexible nature of the long-term overviews for the teaching of maths from year to year, there may be changes to when the number bonds are taught across a typical academic year. However, the expectations at the end of each year group will remain in-line with this document.

In both the statutory framework for the early years foundation stage (SFEYFS) and the national curriculum, the expectations for number bond knowledge are clearly signposted. The expectations for recall of number bonds facts develop from EYFS through to year 2, with a clear progression stated through SFEYFS and the national curriculum. From these sources, Bitterne Church of England Primary School has defined the expectations for children at the end of each year group, including 'year R', and adapted this alongside the national curriculum expectations.

There are no further requirements for number bonds to 20 in key stage 2; however, there are many elements of the curriculum that build upon the secure foundation of number that is secured in key stage 1.

End of year group expectations:

For both the SFEYFS and national curriculum, children are required to meet the expectations laid out below in order to meet the age-related expectations.

Stage of education	Expectation (taken from SFEYFS and national curriculum)
End of EYFS	Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.
End of year 1	Represent and use number bonds and related subtraction facts within 20.
End of year 2	Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.

In order to ensure that children can be appropriately assessed at meeting the expectations of their year group, the following fact grid states the number bond facts that children should be able to recall.

+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
5	5+	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9	5+10
6	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9	6+10
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7+10
8	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9	8+10
9	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9	9+10
10	10+0	10+1	10+2	10+3	10+4	10+5	10+6	10+7	10+8	10+9	10+10

End of EYFS	
End of year 1	
End of year 2	

Only an addition fact grid is shown as children should be encouraged to use known addition facts to quickly derive subtraction facts. The aim is for all children to either have memorised, or be able to derive quickly, each fact, such that they no longer rely on counting-based approaches for calculation

Teaching of numbers bonds in EYFS and key stage 1

As the children begin to learn number bonds, they will become increasingly familiar with the concept and composition of number. It is important that children are able to make an explicit link between the composition of numbers and number bonds. This should also allow children to see the relevance of number bonds in everyday contexts.

It is expected that number bonds are taught as an essential part of the maths curriculum throughout the year, with the above grid and year group expectations adhered to. Year groups are required to support children's number bond knowledge through teaching in a typical lesson-type format before then recapping and building on prior learning through further activities and well-sequenced lessons. Children will embed their knowledge through a variety of fluency and reasoning application tasks.
To assist with planning and implementation, EYFS uses the Numberblocks programme and the NCETM mastery materials. In year 1 and year 2, the NCETM mastery materials are used to support teaching and learning in maths.

A range of teaching and learning strategies are expected to be used to provide appropriate support for children. There is an expectation that the teaching of numbers bonds will embrace the school's concrete-representation-abstract approach to mathematics, and this will be accompanied with some activities that focus on rote learning of the key facts.
There are many strategies that teachers will use to support number bond learning, including many strategies from the 'mastery' approach to mathematics. These may include, but are not limited to:

- Number lines;
- Rekenreks;
- Counters;
- Mutli-link;
- Counting sticks;
- Chanting;
- Quick-fire questions;
- Dienes;
- Cuisenaire rods;
- Ten-frames;
- Bar models;
- STEM sentences;
- Reasoning and problem-solving rich activities, which allow children to make links and spot patterns.

Further to this, all pupils in EYFS and key stage 1 at Bitterne CE Primary have accounts for NumBots (numbots.com) in order to support their learning of number bonds and the composition of number, which can be accessed at both school and home.

Throughout number bond teaching, teachers will promote mathematical vocabulary and an awareness of the appropriate terminology associated with addition and subtraction. This will include key mathematical terms, such as: addend, subtrahend, minuend, sum and difference.

Differentiation

As some children may be at varying stages of number bond knowledge, there is an understanding that children may require different activities to deepen and enhance their knowledge.
It is expected that children will be at varying stages in their number bonds journey. In key stage 1, it is very important that less able children have extra support in developing an understanding of the concept of number and the composition of numbers to 20 to support their understanding. Moreover, it is essential that children exposed to mathematical structures, such as 'bar' or 'cherry tree' models, to embed the relationship between addition and subtraction.
If children are confident in the number bonds allocated for their year group, they must be exposed to deeper, problem-solving based activities to identify patterns and links, as well as securing related facts. If they have not yet achieved the targeted number bonds for their year groups, they must receive additional support with their number bond knowledge from the prior year group's curriculum until they are secure.

Assessment

To ensure that children are secure in the recall of number bond facts, the children need to be regularly assessed.
In EYFS and key stage 1, this knowledge can be assessed through pupil conferencing, evidence found in learning journeys, arithmetic-style recaps and carpet recall sessions.
At the end of each term, year groups should assess the children against curriculum coverage and prior attainment statements. There is no expectation that all number bonds will be assessed at one time, but instead an approach that assesses the majority of number bonds across an academic year should be utilised to provide a clear picture of children's understanding and retention of key facts.

Teachers can also use additional tools to support their assessments of children's number bond knowledge by using reports from interactive sources, including NumBots (numbots.com).

Displays

Any number bonds that are relevant to current units should be displayed in EYFS or key stage 1 classrooms. In addition, year groups should display the addition fact grid on page 3 of this policy. Displays must be available for children to consult for support and reference, although these should be taken down or covered during assessments. It is important that children are aware of the expectations for correctly using the displays to support their learning. If teachers desire, they can display additional related number bond facts that they feel will support or contribute to their pupil's learning and understanding.
In line with appropriate methods to support teaching and learning, teachers will have appropriate references and models available to assist children at their tables or on the carpet.

If teachers desire, they can use displays to record children's attainment and progress in their ability to recall specific number bonds; however, this is not a requisite.

Homework

In line with the school's policy, children will receive a minimum of fortnightly maths homework that may include number bond knowledge. Additionally, all children in EYFS and key stage 1 have access to a NumBots account which they can access at home to support their understanding of number and number bonds. In every year group, we promote the ease with which parents can support their children's number bond knowledge at home.

This policy will be reviewed every 3 years or sooner as appropriate.