Meadowhead Infant School

Fluency Policy

Date adopted: September 2020

Date of review: Annually

Fluency Policy

Fluency involves;

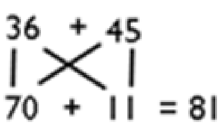
- Quick recall of facts and procedures
- The flexibility and fluidity to move between different contexts and representations of mathematics.
- The ability to recognise relationships and make connections in mathematics

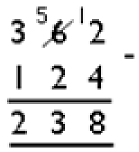
At Meadowhead Infants we are placing an emphasis on the importance of developing fluency with mathematical facts. There is a daily 10 minute fluency session on timetables and each maths lesson begin with a fluency activity. Children are also given regular opportunities within maths lessons to practise basic facts and develop flexibility with these facts.

A CPA (concrete – pictorial – abstract) approach is followed which supports the development of fluency with key concepts. A number of concrete, pictorial and other resources are used at Meadowhead to develop the understanding of basic facts and help children to become fluent in basic maths facts. Children may use the following resources to help secure fluency with number facts: songs, Numicon, ten frames, bar models, part whole models, counters, number lines and Dienes apparatus. Children develop their understanding of basic facts with concrete resources first before moving on to representing numbers and facts pictorially and then abstractly. When fluency with a fact develops children will no longer need resources and will be able to automatically recall that fact within **three seconds**.

1. **Developing fluency in addition and subtraction facts –** *Why focus on fluency in addition and subtraction facts?*

- A defined set of addition and subtraction facts build the basis of all additive calculation, just as times tables are the building blocks for all multiplicative calcul





Informal/mental addition by partitioning:

Root addition facts

3 + 4, 6 + 5

Formal subtraction with column method

Root subtraction facts

12 – 4, 5 – 2, 3 -1

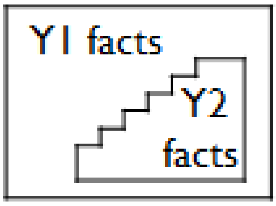
- If children are not fluent in these facts, then when they are solving more complex problems the working memory is taken up by calculating basic facts, and children have less working memory to focus on solving the actual problem so fluency in basic facts allows children to tackle more complex maths more effectively.
- Fluency is one of the 3 aims of the national curriculum, and external tests focus heavily on fluency.
- Children need to be taught strategies to solve these facts. If children aren't explicitly taught to solve e.g. 6+7 by thinking 'double 6 and one more' or to solve 12 – 8

by thinking '2 more and 2 more again' then most children will use inefficient counting based approaches.

What facts do children need to be fluent in?

Children need to be fluent in the following addition facts:

+	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 + 0	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



These are the corresponding subtraction facts:

-	0	1	2	3	4	5	6	7	8	9	10
1	1 – 0	1 – 1									
2	2 – 0	2 - 1	2 – 2								
3	3 – 0	3 - 1	3 - 2	3 – 3							
4	4 – 0	4 – 1	4 – 2	4 – 3	4 – 4						
5	5 – 0	5 - 1	5 – 2	5- 3	5 – 4	5 – 5					
6	6 – 0	6–1	6 – 2	6 - 3	6 – 4	6 – 5	6 – 6				
7	7 – 0	7 - 1	7 – 2	7 - 3	7 – 4	7- 5	7 – 6	7 – 7			
8	8 – 0	8 - 1	8 – 2	8 - 3	8 – 4	8-5	8 - 6	8 - 7	8 - 8		
9	9 – 0	9 - 1	9 – 2	9 - 3	9 – 4	9 - 5	9 - 6	9 - 7	9 - 8	9 – 9	
10	10 – 0	10 - 1	10 - 2	10 - 3	10 - 4	10 - 5	10 - 6	10 - 7	10 - 8	10 - 9	10 – 10
11		11 - 1	11 - 2	11 - 3	11- 4	11 - 5	11 - 6	11 - 7	11 - 8	11 - 9	11 – 10
12			12 – 2	12 - 3	12 - 4	12 - 5	12 - 6	12 - 7	12 - 8	12 - 9	12 – 10
13				13 – 3	13 - 4	13 - 5	13 - 6	13 - 7	13 - 8	13 - 9	13 – 10
14					14 - 4	14 - 5	14 - 6	14 - 7	14 - 8	14 - 9	14 – 10
15						15 – 5	15 - 6	15 - 7	15 - 8	15 - 9	15 – 10
16							16 – 6	16 - 7	16 - 8	16 - 9	16 – 10
17								17 - 7	17 - 8	17 - 9	17 – 10
18									18 - 8	18 – 9	18 – 10
19										19 – 9	19 – 10
20											20 - 10

Note that not all subtractions within 20 are root facts, e.g. 17-5 is not considered a root fact (7-5 is the root fact for this).

The majority of these facts will be learnt in Yr1&2. In **Reception**, children become fluent in working with totals to 5 (though not recording as equations), e.g. "Show me 5 on your hands. Now show me 5 in a different way." Year 3 will need to focus on securing fluency in subtraction facts which bridge 10. Although this is a Year 2 objective, aiming for real fluency in subtraction facts such as 14 – 9 and 13 – 5 (where fluency is an answer in 3 seconds) requires securing in Yr 3.

Does fluency just mean memorisation?

Not necessarily – most rely on very quick use of strategies to solve some of them. Fluency can mean getting an answer quickly and with limited demands on working memory.

Most facts which don't bridge 10 are memorised, 4 + 5 = 9 or 2 + 6 = 8 for example.

For facts which bridge 10, the picture is more complex and many of the facts which bridge 10 are quickly derived using strategies (but still in less than 3 seconds).

- Double 6, 7 8 and 9 can be memorised in fluent children.
- Many fluent children may 'just know' that 9 + 3 = 12 and 8 + 4 = 12 and relate this to their times table/skip counting knowledge.
- Fluent children use strategies for many of the other facts. Eg 9 + 8 –with fluency this can be solved through very quickly applying a strategy: bridging, near doubles or compensating.

How do children become fluent?

Children need to be **taught** strategies to derive the facts. Teaching strategies is more effective in securing fluency in addition and subtraction facts than taking a rote memorisation approach.

MEADOWHEAD PROGRESSION

Reception:

- totals to 5 (though not recording as equations)

Year 1 (Within 10)

1. Adding 1 (e.g. 7 + 1 *and* 1 + 7)
2. Doubles of numbers to 5 (e.g. 4 + 4)
3. Adding 2 (e.g. 4 + 2 *and* 2 + 4)
4. Number bonds to 10 (e.g. 8 + 2 *and* 2 + 8)
5. Adding 10 to a number (e.g. 5 + 10 *and* 10 + 5)
6. Adding 0 to a number(e.g. 3 + 0 *and* 0 + 3)
7. The ones without a family! 5 + 3, 3 + 5, 6 + 3, 3 + 6

Knowing these facts by the end of Year 1 will mean children will know 87 of the 121 addition facts in the grid.

Year 2 (Bridging 10)

Children have 34 addition facts left to learn - they are the ones which bridge 10. While a few adults have instant recall of all of these, most rely on strategies for some. Our aim for children is that they use known facts or derived fact strategies to quickly recall or derive each fact. We need to ensure that all children move beyond counting based strategies. This will require careful teaching of the strategies combined with plenty of practice.

8. Doubles of numbers to 10 (e.g. 7 + 7)
9. Near doubles (e.g. 5 + 6 *and* 6 + 5)
10. Bridging (e.g. 8 + 4 *and* 4 + 8)
11. Compensating

Note that these 3 strategies can often be used interchangeably, e.g. for 8 + 9, some people will use near doubles (e.g. 8 + 8 + 1), some will use bridging (e.g. 8 + 2 + 7) and some will use compensating (8 + 10 – 1)

N.B. Before the children are ready to learn bridging as a strategy, they need to be able to partition all single digit numbers, therefore the following facts need to be taught alongside the above facts:

- Partitioning 2, 3, 4, 5, 6 and 10
- Partitioning 7, 8 and 9
- Partitioning 11 – 20 into single digit addends

How do we plan to develop children's fluency at Meadowhead?

- Fluency practise will be on each classrooms timetable for 15 minutes a day- this can be when best suits the classroom teacher.
- Each step of the progression ladder will be taught for a number of lessons/weeks (depending on the children in your class), with a weekly test on a Friday (How many questions can the children answer in 3 minutes?) There are 3 different tests for each step so children don't become familiar with order and layout of questioning.
- It is up to the teacher to decide when to move onto the next step (this should be when most children are fluent).
- We need to emphasis over teaching as some children will naturally find it easy whilst others will need more support.
- If a child in particularly stuck on a step, then this child may need additional support; 1:1 or in a small group in order to keep up.

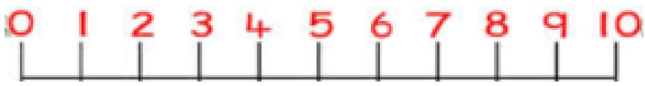
- It would be a good idea for teachers to create an active inspire for each step so teachers can constantly revisit and review each step.

For each of these 11 steps, a suggested teaching approach is laid out below, including manipulatives/images, key teaching points and a suggested teaching progression. There is also a weekly mad minute test for each child to complete on a Friday. Children are to try and beat their previous score.

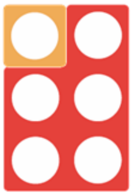
Step 1: Adding 1 to a number

Images/manipulatives

A numbered number line



Numicon pieces



Key teaching points

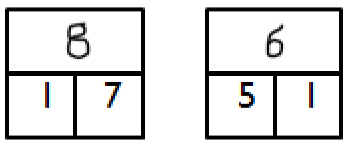
1st key point: Adding 1 to a number is the same as '1 more than' that number

2nd key point: Commutativity 7 + 1 = 1 + 7

Teaching progression:

Concrete: Use equipment and a numbered number line to be able to say what is 1 more than any number to 10.

Pictorial: Represent this knowledge in part-part-whole diagrams



Abstract: Record this knowledge using number sentences;
Model that these can be expressed **commutatively** 1 + 7 = 8 *or* 7 + 1 = 8

Model that these can also be expressed as **partitioning** the whole 8 = 1 + 7 *or* 8 = 7 + 1

Weekly Mad Minutes Test- How many can the children answer in 3 minutes?

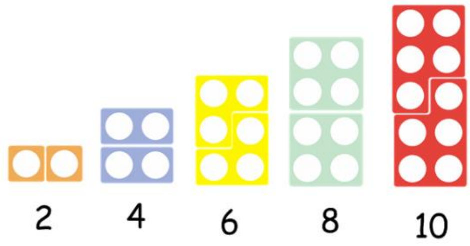
Name ___________________________________

= 1 + 10	8 + 1=	= 9 + 1	10 + 1=	1 + 1=
= 3 + 1	1 + 6 =	1 + 0 =	= 4 + 1	= 5 + 1
10 + 1=	= 4 + 1	= 1 + 10	= 5 + 1	= 3 + 1
1 + 0 =	= 9 + 1	1 + 1=	1 + 6 =	8 + 1=
= 4 + 1	8 + 1=	1 + 1=	1 + 0 =	= 9 + 1
10 + 1=	1 + 6 =	= 4 + 1	= 1 + 10	= 3 + 1
1 + 0 =	10 + 1=	= 5 + 1	8 + 1=	1 + 1=
1 + 6 =	= 1 + 10	= 9 + 1	= 4 + 1	= 3 + 1

Step 2: Doubles of numbers to 5

Images/manipulatives

Numicon pieces



Doubles written up

1 + 1 = 2

2 + 2 = 4

3 + 3 = 6

4 + 4 = 8

5 + 5 = 10

Key teaching points

1st key point: Our doubles of numbers to 5 are all even numbers [as appropriate you can lead children to the idea that doubling a whole number always gives us as even number]

2nd key point: We need to learn our doubles off by heart!

Teaching progression:

Awareness of odd and even: Be able to identify numbers as odd or even, using Numicon as a visual image

Fluency in odds and evens counting: Practice counting in even numbers

Understanding of what doubles is: "Double 5" = "Two lots of 5" [spoken] = 5 + 5. Can the children show you these with Numicon pieces or fingers on each hand?

Noticing patterns: Look as a class at the doubles pattern and relate to even numbers

PRACTICE: Now you need to play LOTS of doubles games until the children all know their doubles of numbers to 5 off by heart. This is one of the sets which the children just need to memorise.

Represent in part-part whole models and in number sentences

Weekly Mad Minutes Test- How many can the children answer in 3 minutes?

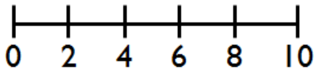
Name ___________________________________

5 + 5 =	= 1 + 1	= 3 + 3	4 + 4 =	= 2 + 2
= 1 + 1	4 + 4 =	= 2 + 2	= 3 + 3	5 + 5 =
= 3 + 3	= 2 + 2	= 1 + 1	5 + 5 =	4 + 4 =
= 1 + 1	5 + 5 =	4 + 4 =	= 2 + 2	= 3 + 3
4 + 4 =	= 3 + 3	5 + 5 =	= 1 + 1	= 2 + 2
5 + 5 =	= 2 + 2	4 + 4 =	= 3 + 3	= 1 + 1
= 2 + 2	5 + 5 =	= 3 + 3	= 1 + 1	4 + 4 =
= 1 + 1	4 + 4 =	= 3 + 3	5 + 5 =	= 2 + 2

Step 3: Adding 2 to a number

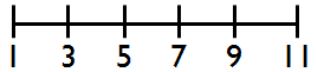
Images/manipulatives

An evens number line



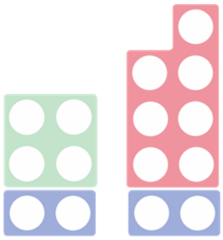
etc

An odds number line



etc

Numicon pieces



Key teaching points

1st key point: When we add 2 to a number, we are working within our odds and evens counting pattern

2nd key point: Commutativity $7 + 2 = 2 + 7$

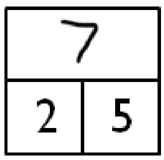
Possible teaching progression:

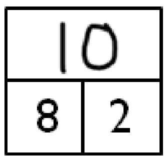
Awareness of odd and even: Be able to identify numbers as odd or even, using Numicon as a visual image

Fluency in odds and evens counting: Practice counting in odds and evens to 20, forwards and backwards until fluent. Use odd and even number lines for support.

Concrete: Use Numicon to see that when we add 2 to a number (or when we add a number to 2) we are just making the next odd/even number.

Pictorial: Represent this knowledge in part-part-whole diagrams





Abstract: Record this knowledge using number sentences; Model that these can be expressed commutatively and by partitioning the whole

Weekly Mad Minutes Test- How many can the children answer in 3 minutes?

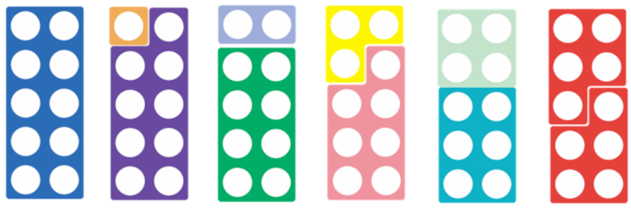
Name ___________________________________

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

Step 4: Number bonds to 10

Images/manipulatives

Numicon pieces



Number bonds to 10 written up

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

Key teaching points

1st key point: Our number bonds to 10 are always odd + odd OR even + even

2nd key point:Commutativity 6 + 4 = 4 + 6

3rd key point: We need to learn our number bonds to 10 off by heart!

Teaching progression:

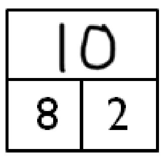
Awareness of odd and even: Be able to identify numbers as odd or even, using Numicon as a visual image

Exploring different ways of making up 10: Using the Numicon for support, notice that the number bonds to 10 are always odd + odd or even + even

PRACTICE: Now you need to play LOTS of games until the children all know their number bonds to 10 off by heart. This is one of the sets which the children just need to memorise.

Represent in part-part whole models and in number sentences.

Pictorial: Represent this knowledge in part-part-whole diagrams



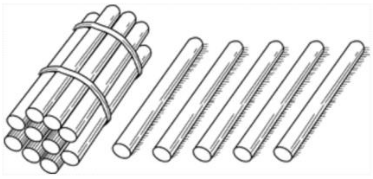
Abstract: Record this knowledge using number sentences; Model that these can be expressed commutatively and by paritioning the whole

Weekly Mad Minutes Test- How many can the children answer in 3 minutes?

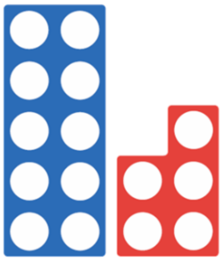
1+ ____ = 10	10 = 2 + ____	____ +8 = 10	10 = ____ +6	____ +7 = 10
____ +7 = 10	10 = 3 + ____	10 = 1 + ____	10 = ____ +5	10 = 6 + ____
10 = 8 + ____	10 = 10 + ____	____ + 10 = 10	1 + ____ = 10	10 = 5 + ____
10 = 4 + ____	4 + ____ = 10	10 = ____ + 2	1 + ____ = 10	7 + ____ = 10
10 = 6 + ____	____ +7 = 10	10 = 8 + ____	1 + ____ = 10	10 = 1+ ____
10 = 3 + ____	10 = 5 + ____	1 + ____ = 10	____ + 10 = 10	10 = ____ +6
10 = ____ +2	4 + ____ = 10	10 = ____ +5	10 = 4 + ____	____ +7 = 10
____ + 8 = 10	1 + ____ = 10	7 + ____ = 10	10 = 10 + ____	10 = 2 + ____

Step 5: Adding 10 to a number

Images/manipulatives



Base ten, e.g. straws, numicon



Key teaching points

1st key point: When we add 10 to a number we can use our place value knowledge to combine the numbers

2nd key point: Commutativity 10 + 5 = 5 + 10

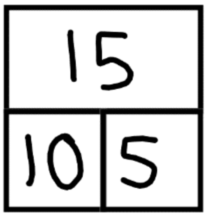
Teaching progression:

Place value experience: Make up 'teens' numbers with place value equipment e.g. straws (or Numicon/Dienes).

Relate place value representation to notation: *"This is the number fifteen. We write it 15 because there is one ten and five ones."*

Pictorial: Represent this knowledge in part-part-whole diagrams

Abstract: Record this knowledge using number sentences; these can be expressed commutatively and by partitioning the



Model that whole

Weekly Mad Minutes Test- How many can the children answer in 3 minutes?

Name_________________________________

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

Step 6: Adding 0 to a number

Images/manipulatives

Counters/straws/Numicon would all do here.

Key teaching points

1st key point: When we add 0 to a number we are adding nothing, and so our starting number remains the same. [Misconception here is that 7 + 0 = 0]

2nd key point: Commutativity 0 + 4 = 4 + 0

Teaching progression:

Practical experience of making up number sentences involving 0: Show me 0. Now add 4. How much do you have? Show me 4. Now add 0. How much do you have?

Stem sentence: *"When we add 0, we don't change the quantity."*

Pictorial: Represent this knowledge in part-part-whole diagrams

Abstract: Record this knowledge using number sentences; Model that these can be expressed commutatively and by partitioning the whole

Weekly Mad Minutes Test- How many can the children answer in 3 minutes?

Name ___________________________________

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

Step 7: The ones without a family

The only remaining Y1 facts are 6 + 3 & 3 + 6 and 3 + 5 & 5 + 3. These just need to be learnt. Fluent children often relate 6 + 3 to the counting in 3s pattern.

For 5 + 3 and 3 + 5 (indeed for any addition fact involving 5) children can be taught to recognise the standard "finger pattern" for 8 of 5 fingers and 3 fingers fairly easyily, then this can be related to 5 + 3 and vice versa (incidentally it is worth getting all reception children to recognise 6, 7, 8, and 9 when presented in this way, then they already 'know' 5 + 1, 5 + 2, and 5 + 4 as well (they just need to be *taught* that they already know them!).

Weekly Mad Minutes Test- How many can the children answer in 3 minutes?

Name ___________________________________

6 + 3 =	3 + 5 =	5 + 3 =	= 3 + 6	3 + 5 =
5 + 3 =	6 + 3 =	= 3 + 6	6 + 3 =	= 3 + 6
3 + 5 =	5 + 3 =	6 + 3 =	= 3 + 6	3 + 5 =
5 + 3 =	= 3 + 6	5 + 3 =	3 + 5 =	6 + 3 =
6 + 3 =	5 + 3 =	3 + 5 =	= 3 + 6	5 + 3 =
3 + 5 =	= 3 + 6	6 + 3 =	3 + 5 =	5 + 3 =
= 3 + 6	5 + 3 =	3 + 5 =	6 + 3 =	= 3 + 6
3 + 5 =	= 3 + 6	5 + 3 =	6 + 3 =	3 + 5 =

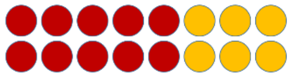
Year 1 Mixed Mad Minutes Test Steps 1 – 7 - How many can the children answer in 3 minutes?

Name ___________________________________

4 + 1 =	6 + 3 =	10 + 9 =	7 + ____ = 10	2 + 1 =
9 + 2 =	0 + 0 =	1 + 5 =	0 + 9 =	3 + 3 =
5 + _____ = 10	= 5 + 5	= 3 + 5	4 + 2 =	10 + 10 =
= 1 + 7	= 0 + 3	1 + 10 =	4 + ____ = 10	= 2 + 10
3 + 3 =	2 + 1 =	5 + _____ = 10	4 + ____ = 10	1 + 5 =
0 + 0 =	10 + 10 =	4 + 1 =	= 3 + 5	7 + ____ = 10
1 + 10 =	= 0 + 3	0 + 9 =	= 1 + 7	9 + 2 =
10 + 9 =	4 + 2 =	= 2 + 10	= 5 + 5	6 + 3 =

Step 8: Double 6, 7. 8 and 9

Images/manipulatives



Double sided counters can model double 6, 7, 8 and 9 as double "5 and a bit" (i.e. double 8 is double 5 add double 3)

Numicon will allow the children to see that doubles of whole numbers are always even numbers

Key teaching points

1st key point: Doubles of whole numbers are always even

2nd key point: We need to learn our doubles off by heart!

Teaching progression:

[From Y1, children should be able to identify even numbers and know that a double means two lots of]

Teach as follows:

Double 6: use the clock face. 6 at the bottom, 12 at the top.

Double 7: explain that two weeks is called a fortnight because it has 14 nights. There are 7 days in a week, so double 7 is 14.

Double 8 & double 9: for a few children, remembering which is 16 and which is 18 seems particularly hard. There isn't any substitute for practice here. Keep asking any target children this many times each day for a week, and keep a record of which children don't yet know it.

Relating to inverse. What is half of 14 etc.

Once the facts are learnt, represent in part-part whole and equations as before.

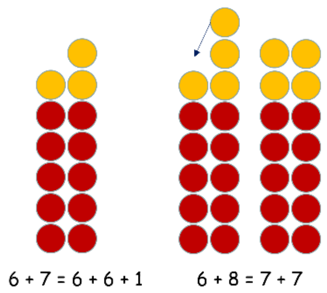
Weekly Mad Minutes Test- How many can the children answer in 3 minutes?

Name ------------------------------------

7 + 7 =	6 + 6 =	9 + 9 =	7 + 7 =	= 9 + 9
= 6 + 6	= 8 + 8	= 8 + 8	= 6 + 6	9 + 9 =
6 + 6 =	= 9 + 9	= 8 + 8	7 + 7 =	= 8 + 8
7 + 7 =	9 + 9 =	= 8 + 8	= 6 + 6	6 + 6 =
7 + 7 =	7 + 7 =	= 8 + 8	= 9 + 9	= 8 + 8
9 + 9 =	= 9 + 9	7 + 7 =	= 8 + 8	6 + 6 =
= 6 + 6	7 + 7 =	= 9 + 9	= 8 + 8	6 + 6 =
= 8 + 8	9 + 9 =	= 6 + 6	7 + 7 =	7 + 7 =

Step 9: Near doubles

Images/manipulatives



Adjacent numbers well recognised as being 'near doubles' but 'one up one down' (i.e. second model shown here) is also a really nice efficient use of doubling.

Key teaching points

1st key point: I can add adjacent numbers by doing 'double and 1 more'

2nd key point: I can add number with a difference of 2 (e.g. 6 + 8) by doubling the number in between them (i.e. by doubling 7 in this case)

3rd key point: Commutativity: 5 + 6 = 6 + 5

Teaching progression:

Fluency in doubles: Will already have been secured

Adjacent numbers: Will be double the smaller number, add 1. OR double the larger number, subtract 1.

Difference of 2:5 + 7, 6 + 8, 7 + 9

Then part-part whole and practice with equations as before

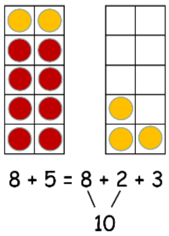
Weekly Mad Minutes Test- How many can the children answer in 3 minutes

Name ___________________________________

5 + 6 =	= 3 + 4	2 + 3 =	= 6 + 5	= 6 + 7
3 + 2 =	8 + 7 =	9 + 8 =	= 2 + 1	= 7 + 8
4 + 5 =	3 + 2 =	9 + 8=	= 4 + 5	= 8 + 7
9 + 8 =	= 7 + 6	2 + 3 =	9 + 8=	6 + 7
= 7 + 8	= 6 + 7	4 + 5 =	9 + 8=	9 + 8 =
8 + 7 =	= 8 + 7	5 + 6 =	9 + 8=	= 6 + 5
2 + 3 =	= 7 + 6	= 2 + 1	9 + 8 =	3 + 2 =
2 + 3 =	= 4 + 5	6 + 7	3 + 2 =	= 3 + 4

Step 10: Bridging

Images/manipulatives



Tens frames

Key teaching points

1st key point: Bridging through ten can help us to calculate additions with a 'teens' total

2nd key point: Commutativity: 5 + 8 = 8 + 5

Teaching progression:

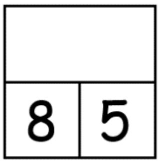
Partitioning single digit numbers: Children HAVE to be able to do this to bridge. Calculating e.g. 8 + 5 by bridging requires partitioning the 5 into 2 and 3

What makes ten?: Children need to be able to make ten from 7, 8 and 9 (which are most likely to be involved in bridging facts)

Tens frames (concrete): Make up the two quantities with couters on adjacent tens frames, then rearrange as shown above.

Symbolic: Practice recording as number sentences (as shown above)

Part-Part Whole: Move to filling in PPW as shown here:



Number sentences (Abstract): Children in the end should be able to solve 8 + 5 (etc) presented as number sentences by thinking "8 + 2 + 3" in their heads

Comparison to other strategies: Highlight that we can also use e.g. near doubles to solve some bridging facts (e.g. 8 + 7)

Weekly Mad Minutes Test- How many can the children answer in 3 minutes

Name ___________________________________

7 + 5 =	9 + 3 =	5 + 7 =	9 + 7 =	5 + 8=
= 6 + 8	= 7 + 9	5 + 8=	8 + 5=	= 4 + 9
9 + 5=	= 4 + 7	= 7 + 9	= 4 + 7	7 + 5 =
5 + 7 =	= 6 + 8	9 + 5=	9 + 7 =	5 + 8=
5 + 8=	8 + 5=	9 + 3 =	= 4 + 9	= 7 + 9
= 4 + 9	9 + 7 =	= 4 + 7	5 + 8=	5 + 7 =
9 + 3 =	5 + 8=	9 + 5=	7 + 5 =	5 + 8=
8 + 5=	7 + 5 =	= 4 + 9	9 + 7 =	9 + 3 =

Step 11: Compensating/adjusting

Images/manipulatives

The children should already be fluent in e.g. 5 + 10 and 10 + 5

5 + 10 = 15 so

5 + 9 = 14

Key teaching points

1st key point: By subtracting one from 'add ten' I get 'add nine'

2nd key point: Commutativity (5 + 9 = 9 + 5)

Teaching progression

Fluency in adding ten: will already have been secured

Then PPW and practice with number sentences as before

Adding 8 and 7: Highlighting possibility of using compensating for adding numbers other than 9 (e.g. 8 and 7)

Comparison to other strategies: Highlight that we can also use near doubles and briding to solve some compensating facts, e.g. 8 + 9

Weekly Mad Minutes Test- How many can the children answer in 3 minutes?

Name ___________________________________

9 + 5 =	8 + 3 =	5 + 8 =	9 + 7 =	5 + 7=
= 6 + 9	= 7 + 4	5 + 9=	8 + 6=	= 4 + 8
9 + 6=	= 4 + 7	= 7 + 4	= 4 + 7	9 + 5 =
5 + 8 =	= 6 + 9	9 + 6=	9 + 7 =	5 + 9=
5 + 7=	8 + 6=	8 + 3 =	= 4 + 8	= 7 + 4
= 4 + 8	9 + 7 =	= 4 + 7	5 + 9=	5 + 8 =
8 + 3 =	5 + 9=	9 + 6=	9 + 5 =	5 + 7=
8 + 6=	9 + 5 =	= 4 + 8	9 + 7 =	8 + 3 =

Year 1 and 2 Mixed Mad Minutes Test Steps 1 – 11 - How many can the children answer in 3 minutes?

Name ___________________________________

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

2. Developing fluency in multiplication and division facts

Once the children have been taught multiplication and division through White Rose Hub (Year 2- spring 1)- Teachers are then to include this in their daily fluency practise.

Meadowhead Progression for Multiplication and Division facts

Step 12- 2 times tables

Mad Minute test- http://www.snappymaths.com/multdiv/2xtable/resources/2xtabmmmabb.pdf

Step 13- 5 times tables

Mad Minute test- http://www.snappymaths.com/multdiv/5xtable/resources/5xtablemmmabb.pdf

Step 14- 10 times tables

Mad Minute test-http://www.snappymaths.com/multdiv/10xtable/resources/newlook/10xtablemmm.pdf

Step 15- Dividing by 2

Mad Minute test -http://www.snappymaths.com/multdiv/2xtable/resources/divby2mmmabb.pdf

Step 16- Dividing by 5

Mad Minute test- http://www.snappymaths.com/multdiv/5xtable/resources/5xdivmmmcdb.pdf

Step 17- Dividing by 10

Mad Minute test- http://www.snappymaths.com/multdiv/10xtable/resources/newlook/divby10mmm.pdf

Mixture of 2, 5, 10 multiplication and division

Mad Minute test- Multiplication-
http://www.snappymaths.com/multdiv/12510xtab/resources/2510xmmmabb.pdf

Mad Minute test- Division-

http://www.snappymaths.com/multdiv/12510xtab/resources/2510divmmmabb.pdf