Declarative Knowledge

15.10.25

An AI Overview

Declarative knowledge is the knowledge of facts, information, and concepts that can be consciously recalled and expressed, essentially "knowing that" something is true.

Automaticity

Automaticity refers to knowing something without having to think about it.

Most commonly, automaticity refers to automaticity of maths facts. Successful maths students should know sums like 10 + 10 or products like 4 × 2 without having to spend time thinking about them.

Automaticity vs Fluency

Automaticity essentially refers to how fast students can recall a maths fact, whereas fluency requires understanding the meaning of the maths fact and being able to apply it flexibly.

As an example, a student might know instantly that 3×4 is 12 (i.e., have automaticity with that maths fact) but not yet be fluent because they don't understand how to apply that maths fact to a situation like finding the area of a playground that is 30m wide and 40m long.

3 Elements of Maths Fluency

- Recall and automaticity: the effortless recall of facts, such as number bonds within 10 and times tables facts, and understanding the relationship between these facts.
- Procedural fluency: being confident and accurate with using procedures and being able to select the most appropriate method for the task at hand.
- Flexibility and adaptability: the skill of moving between different contexts and recognising connections between them.

Ofsted Findings

- Schools need to build a curriculum to help younger pupils to learn their addition facts by heart and regularly check their recall of this knowledge.
- Schools need to provide pre-teaching, additional teaching, and extra practice for most pupils with special educational needs and/or disabilities (SEND)
- There is an emphasis on developing conceptual understanding of number facts and using representations however there needs to be more emphasis on learning core facts ‘by heart’.
- Pupils need to practice subitising which aids the recall of addition and subtraction facts as weaknesses often remain into KS2.
- Pupils that know core facts by heart, have fewer issues with cognitive load and therefore can apply declarative knowledge quickly and efficiently to procedural and condition knowledge (Strategies, methods and using these to solve problems).

- It is often effective to do retrieval practice ‘little and often’. This helps pupils to review and practise facts regularly and commit them to their longer-term memory over time.

Mastery in Number (FS & KS1)

- 4th year of programme

Number Facts for Y1 & Y2

Set A	Set B	Set C	Set D	Set E	Set F	Set G
Number bonds within 10 (include revision of Y1 facts) **5 + 3 = 8** **3 + 5 = 8** **3 + 4 = 7** **4 + 3 = 7** 7 – 4 = 3 7 – 3 = 4 8 – 5 = 3 8 – 3 = 5	Doubles to 10 (Building on doubles to 5 from Year 1) **6 + 6 = 12** **7 = 7 = 14** **8 + 8 = 16** **9 + 9 = 18** **10 + 10 = 20** 20 – 10 = 10 18 – 9 = 9 16 – 8 = 8 14 – 7 = 7 12 – 6 = 6	Near Doubles **5 + 6 = 11** **6 + 7 = 13** **7 + 8 = 15** **8 + 9 = 17** 6 + 5 = 11 7 + 6 = 13 8 + 7 = 15 9 + 8 = 17	Adding 1 digit to 10 ('teen' Numbers) **10 + 1= 11** **10 + 2 = 12** **10 + 3 = 13** **10 + 4= 14** **10 + 5 = 15** **10 + 6 = 16** **10 + 7 = 17** **10 + 8 = 18** **10 + 9 = 19** 19 – 9 = 10 18 – 8 = 10 17 – 7 = 10 16 – 6 = 10 15 – 5 = 10 14 – 4 = 10 13 – 3 = 10 12 – 2 = 10 11 – 1 = 10 19 – 10 = 9 18 – 10 = 8 17 – 10 = 7 16 – 10 = 6	Using number bonds to 10 (bonds to 20) **1 + 19 = 20** **2 + 18 = 20** **3 + 17 = 20** **4 + 16 = 20** **5 + 15 = 20** 19 + 1 = 20 18 + 2 = 20 17 + 3 = 20 16 + 4 = 20 15 + 5 = 20 20 – 19= 1 20 – 1 = 19 20 – 2 = 18 20 – 18 = 2 20 – 3 = 17 20 – 17 = 3 20 – 4 = 16 20 – 16 = 4 20 – 5 = 15 20 – 15 = 5	Number bonds to and within 20 (including those already covered) **7 + 4 = 11** **7 + 5 = 12** **8 + 3 = 11** **8 + 4 = 12** **8 + 5 = 13** **8 + 6 = 14** Talk about those that are near a ten. 4 + 7 = 11 5 + 7 = 12 3 + 8 = 11 4 + 8 = 12 5 + 8 = 13 6 + 8 = 14 Use the facts to solve corresponding subtraction facts.	Adding near 10 (9 or 11) **9 + 3 = 12** **9 + 4 = 13** **9 + 5= 14** **9 + 6 = 15** **9 + 7= 16** 3 + 9 = 12 4 + 9 = 13 5 + 9 = 14 6 + 9 = 15 7 + 9 = 16 16 – 9 = 7 15 – 9 = 6 14 – 9 = 5 13 – 9 = 4 12 – 9 = 3 Pupils should also be able to use knowledge of adding 10 to add 10 and 1 more for 11. This requires strong place value knowledge.

Core Additive Facts

Year 1 facts

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

Year 2 facts

Y1	Set A	Set B	Set C	Set D	Set E	Set F	Set G
Y2	Set A	Set B	Set C	Set D	Set E	Set F	Set G

Weekly Tests

Test A
Number Bonds to 5
A1
1+ 3 =
0 + 1=
4 + 1=
0 + 4=
4 + 1=
5 + 0=
2 + 2=
1 + 2=
2 + 3=
3 + 2 =
Score (10):
Time:

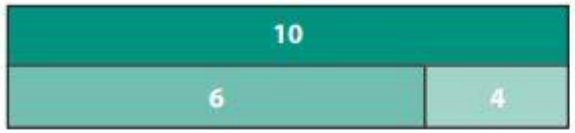
Test B
Adding and Subtracting 1
B2
5 – 1=
7 – 1=
3 – 1 =
4 – 1 =
1 – 1 =
1 – 1 =
6 – 1 =
4 - 1 =
3 – 1 =
6 – 1 =
Score (10):
Time:

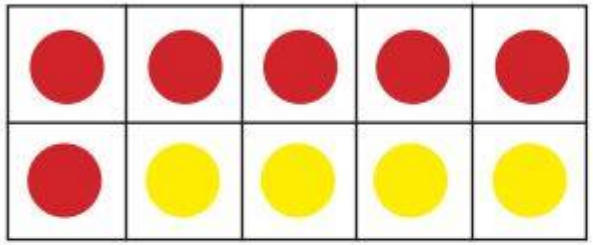
Test B
Doubles to 10
B3
18 – 9 =
2 + 2 =
4 + 4 =
8 + 8 =
12 – 6 =
18 – 9 =
6 + 6 =
16 – 8 =
5 + 5 =
20 – 10 =
Score (10):
Time:

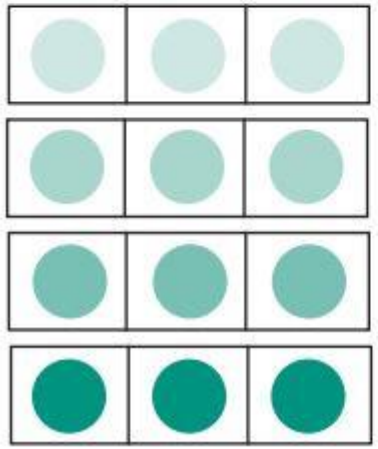
Test G
Adding near 10 (9 or 11)
G4
9 + 9 =
3 + 11 =
1 + 9 =
9 + 5=
9 + 1=
4 + 9 =
6 + 9 =
11 + 8 =
9 + 2=
7 + 9 =
Score (10):
Time:

Visual representations

e.g., 4 + 6 = 10 so 10-6 = 4 and 10-4 = 6





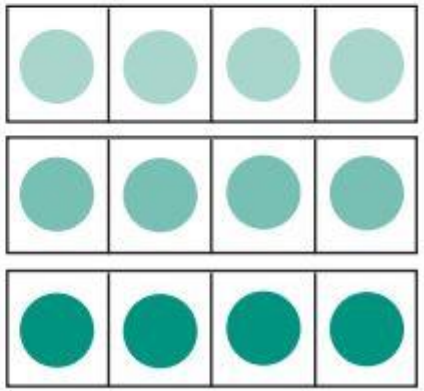


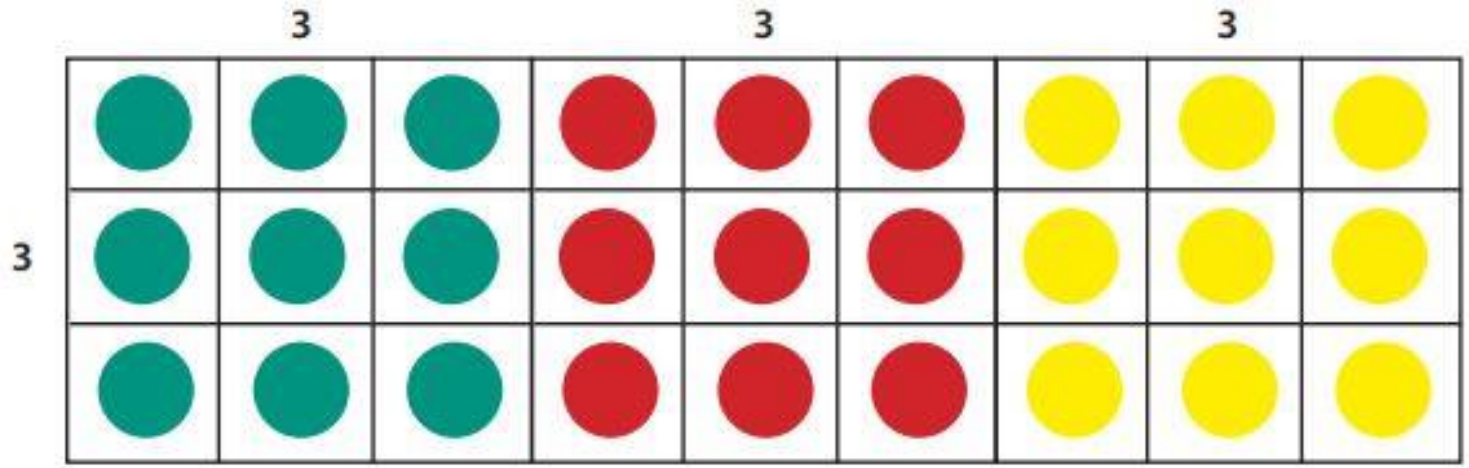
3 x 4 = 12

4 x 3 =12

12 ÷ 4 = 3

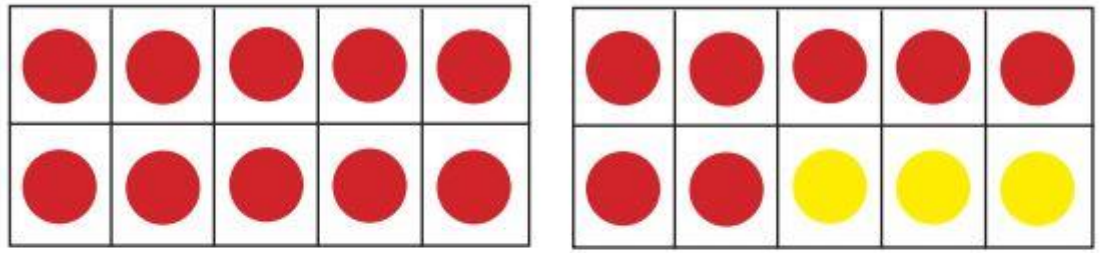
12 ÷ 3 = 4



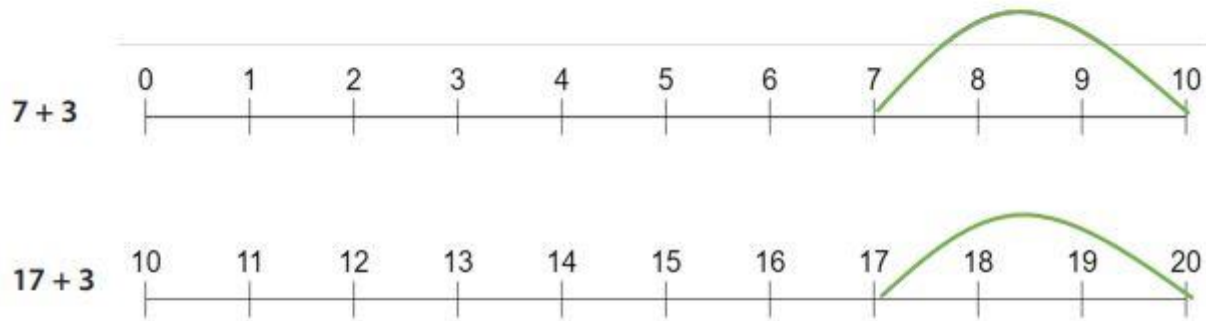


The 6 x table is the 3 x tables doubled.

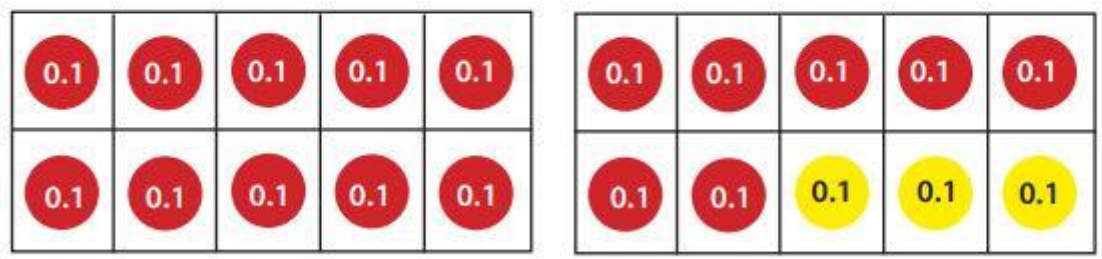
The 9 x table is 3 times the 3 times table.



17 + 3 = 10 + 7 + 3 = 20



Deriving Facts



1.7 + 0.3 = 2.0

Times Tables

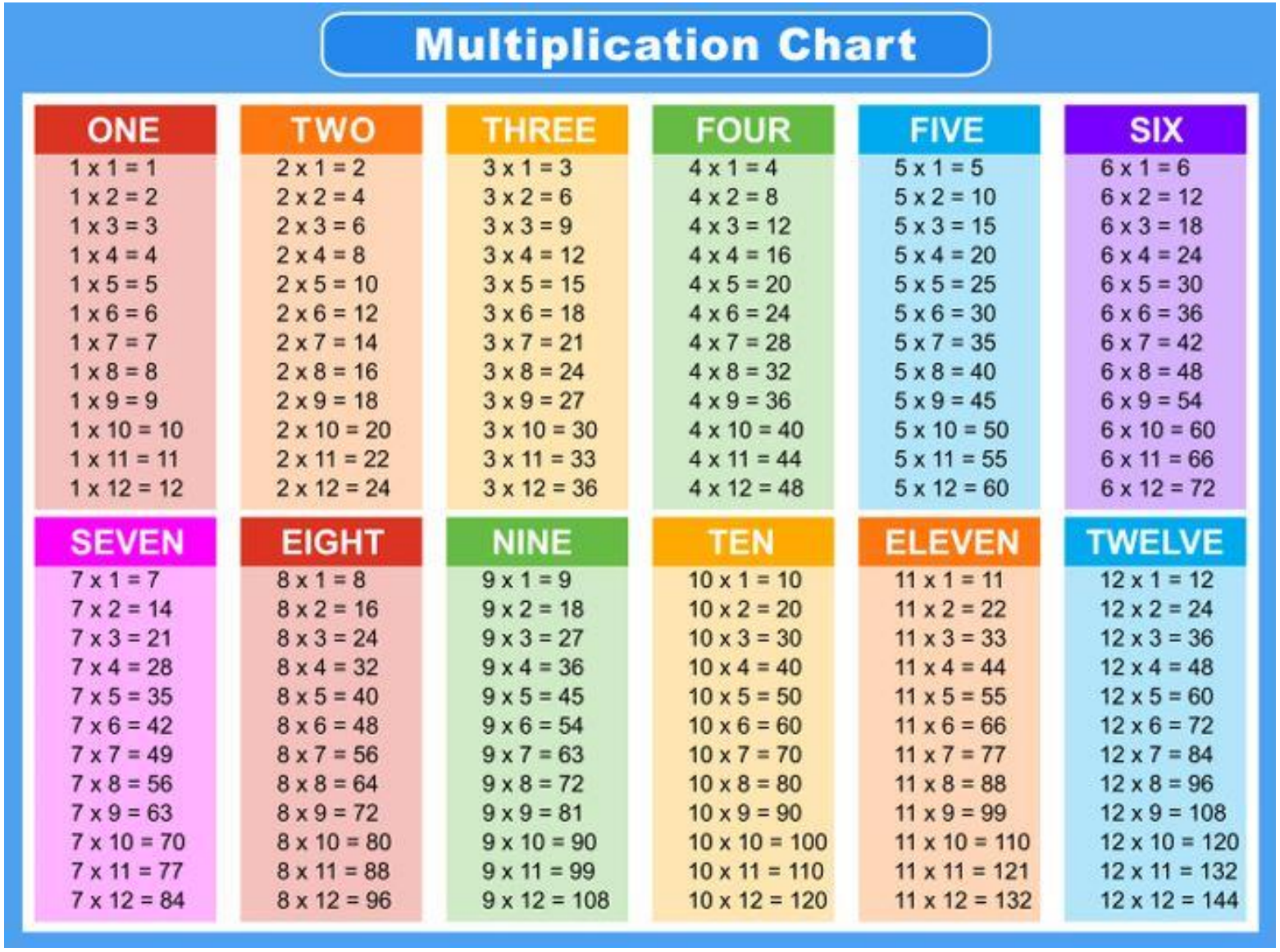
Year Group Expectations

- Year Two- 2, 5 & 10
- Year Three- 3, 4 & 8
- Year Four- all facts up to 12 x 12

Multiplication Tables Check (MTC) in the summer term Year 4

6 seconds to answer a times table fact

There aren’t as many facts as you think!



Multiplication Chart

ONE	TWO	THREE	FOUR	FIVE	SIX
1 x 1 = 1	2 x 1 = 2	3 x 1 = 3	4 x 1 = 4	5 x 1 = 5	6 x 1 = 6
1 x 2 = 2	2 x 2 = 4	3 x 2 = 6	4 x 2 = 8	5 x 2 = 10	6 x 2 = 12
1 x 3 = 3	2 x 3 = 6	3 x 3 = 9	4 x 3 = 12	5 x 3 = 15	6 x 3 = 18
1 x 4 = 4	2 x 4 = 8	3 x 4 = 12	4 x 4 = 16	5 x 4 = 20	6 x 4 = 24
1 x 5 = 5	2 x 5 = 10	3 x 5 = 15	4 x 5 = 20	5 x 5 = 25	6 x 5 = 30
1 x 6 = 6	2 x 6 = 12	3 x 6 = 18	4 x 6 = 24	5 x 6 = 30	6 x 6 = 36
1 x 7 = 7	2 x 7 = 14	3 x 7 = 21	4 x 7 = 28	5 x 7 = 35	6 x 7 = 42
1 x 8 = 8	2 x 8 = 16	3 x 8 = 24	4 x 8 = 32	5 x 8 = 40	6 x 8 = 48
1 x 9 = 9	2 x 9 = 18	3 x 9 = 27	4 x 9 = 36	5 x 9 = 45	6 x 9 = 54
1 x 10 = 10	2 x 10 = 20	3 x 10 = 30	4 x 10 = 40	5 x 10 = 50	6 x 10 = 60
1 x 11 = 11	2 x 11 = 22	3 x 11 = 33	4 x 11 = 44	5 x 11 = 55	6 x 11 = 66
1 x 12 = 12	2 x 12 = 24	3 x 12 = 36	4 x 12 = 48	5 x 12 = 60	6 x 12 = 72

SEVEN	EIGHT	NINE	TEN	ELEVEN	TWELVE
7 x 1 = 7	8 x 1 = 8	9 x 1 = 9	10 x 1 = 10	11 x 1 = 11	12 x 1 = 12
7 x 2 = 14	8 x 2 = 16	9 x 2 = 18	10 x 2 = 20	11 x 2 = 22	12 x 2 = 24
7 x 3 = 21	8 x 3 = 24	9 x 3 = 27	10 x 3 = 30	11 x 3 = 33	12 x 3 = 36
7 x 4 = 28	8 x 4 = 32	9 x 4 = 36	10 x 4 = 40	11 x 4 = 44	12 x 4 = 48
7 x 5 = 35	8 x 5 = 40	9 x 5 = 45	10 x 5 = 50	11 x 5 = 55	12 x 5 = 60
7 x 6 = 42	8 x 6 = 48	9 x 6 = 54	10 x 6 = 60	11 x 6 = 66	12 x 6 = 72
7 x 7 = 49	8 x 7 = 56	9 x 7 = 63	10 x 7 = 70	11 x 7 = 77	12 x 7 = 84
7 x 8 = 56	8 x 8 = 64	9 x 8 = 72	10 x 8 = 80	11 x 8 = 88	12 x 8 = 96
7 x 9 = 63	8 x 9 = 72	9 x 9 = 81	10 x 9 = 90	11 x 9 = 99	12 x 9 = 108
7 x 10 = 70	8 x 10 = 80	9 x 10 = 90	10 x 10 = 100	11 x 10 = 110	12 x 10 = 120
7 x 11 = 77	8 x 11 = 88	9 x 11 = 99	10 x 11 = 110	11 x 11 = 121	12 x 11 = 132
7 x 12 = 84	8 x 12 = 96	9 x 12 = 108	10 x 12 = 120	11 x 12 = 132	12 x 12 = 144

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10		
2		4	6	8	10	12	14	16	18	20	22	24
3			9	12	15	18	21	24	27	30	33	36
4				16	20	24	28	32	36	40	44	48
5					25	30	35	40	45	50	55	60
6						36	42	48	54	60	66	72
7							49	56	63	70	77	84
8								64	72	80	88	96
9									81	90	99	108
10										100	110	120
11											121	132
12												144

	New Facts
Year 2	33
Year 3	24
Year 4	18
Total Core Facts	75

Year 4 Multiplication Tables Check (MTC)

Multiplication Timetable Check Over Time

Raw Score	2019 trial	2022	2023	2024
25	13%	27%	19%	27%
21+	37%	43%	31%	70%
16+	60%	63%	72%	97%
13+	93%	83%	88%	100%
<13	7%	17%	13%	0% *(lowest mark was 15)*

Learning & Practising Times Tables

- Counting activities
- Songs & Dances
- Times Table Rockstars (KS2)
- Practice Tests (from autumn term 2 in Y2)
- Downsway Times Table Award (2 seconds per question)
- Going beyond in Y6

How can you support your child's learning?

- Practise & play
- Little & often
- Counting in different contexts & 'real-life' examples
- Positivity
- Not going beyond the year group expectations