

MENTAL MATHS STRATEGIES

Overview

Can I do it in my head? Can I use jottings? Can I use some equipment? Can I use a written method?

The aim of these guidelines, in line with the new National Curriculum (Sept 2014), is not to race to the end but to secure understanding at each stage. Children need to be able to explain the methods in terms of how and why not just what to do. Children need to manipulate objects, draw images or use concrete representation, even for mental maths. The imagery will stay in the pupils' heads, it's not just something to do during the first stages of learning a mental method.

Each time a new stage is introduced children should compared it to the stage before and identify similarities and differences. Children make use of diagrams and informal notes (jottings) to help record steps when using mental methods. This supports/extends the development of more fluent and sophisticated mental strategies.

These guidelines help ensure consistency and progression throughout the school whilst giving the children choices and ownership of mental strategies. It is important to recognise that the ability to calculate mentally lies at the heart of maths and everyday life. Mental calculation sits side by side with rapid recall of number facts. Teaching mental maths strategies must be a part of daily maths lessons.

Common Language

All language is to be used interchangeably across all years

- maths story, number sentence, calculation, real life story)
- same value different appearance, equals (with physical action of scales)
- Think about piles/groups of... , division, sharing, grouping (with physical action of scratching head)
- ...of those things we call

Counting forwards and backwards (finding the difference)

Calculation	Strategy	Suggested Year	Model or image
4+5	Count on in ones from 4 or 5	YR	
8-3	Count back in ones from 8	YR	
23+5	Count on in ones from 23	Y1	
57-3	Count back in ones from 57	Y1	
27+60	Count on in tens from 27	Y2	
72-50	Count back in tens from 72	Y2	
34+65	Count on in tens then ones from 34	Y3	
87-23	Count back in tens then ones from 87	Y3	
570+300	Count on in hundreds from 570	Y3	
960-500	Count back in hundreds from 960	Y3	
3.2+0.6	Count on in tenths	Y4	
1.7+0.55	Count on in tenths and hundredths	Y4	

Reordering (commutative law, special friends)

Calculation	Strategy	Suggested Year	Model or image
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5+13	13+5	Y1	
10+2+10	10+10+2	Y2	
12-7-2	12-2-7	Y3	
13+21+13	13+13+21	Y3	
17+9-7	17-7+9	Y3	
12+17+8+3	12+8+17+3	Y3	
25 +36+75	75+25+36	Y4	
58+47-38	58-38+47	Y4	
3+8+7+6+2	3+7+8+2+6	Y2	
34+27+46	34+46+27	Y4	
180+650	650+180 (thinking of 180 as 150 +30)	Y5	
1.7+2.8+0.3	1.7+0.3 + 2.8	Y5	
4.7+5.6-0.7	4.7-0.7+5.6 = 4+5.6	Y5	

Partition and recombine

Calculation	Strategy	Suggested Year	Model or image
30+47	30+40+7	Y2	
17+14	10+10+7+4	Y2	
23+45	20+40+3+5	Y2	
68-32	60-30+8-2	Y2	
55+37	55+30+7	Y2	
43+28+51	40+20+50+3+8+1	Y3	
5.6+3.7	5 + 3 + 0.6 + 0.7	Y4	
4.7-3.5	4.7-3-0.5	Y4	
540+280	540+200+80	Y5	
276-153	276-100-50-3	Y5	

Partitioning: Bridging a multiple of 10

Calculation	Strategy	Suggested Year	Model or image
5+8	5+5+3	Y1	
12-7	12-2-5	Y1	
49+32	49+1+30+1	Y2	
90-27	27+3+60	Y3	
92-25	92-2-20-3	Y3	
57+34	57+3+30+1	Y3	
1.4+1.7	1.4+0.6+1.1	Y4	

5.6-3.7	5.6-0.6-3-0.1	Y4	
0.8+0.35	0.8+0.2+0.15	Y5	
8.3-2.8	8.3-2.3-0.5	Y5	
Counting up the difference			
Calculation	Strategy	Suggested Year	Model or image
90-27	27+3+60	Y3	
607-288	288+12+300+7	Y4	
6070-4987	4987+13+1000+70	Y5	
8.3-2.8	2.8+0.2+5.3	Y5	
Compensation			
Calculation	Strategy	Suggested Year	Model or image
34+9 34+19 etc.	34+10-1 34+20 -1	Y4	
34+11 34+21 etc	34+10+1 34+20+1	Y4	
70-9	70-10+1	Y4	
53+12 53-12	53+10+2 53-10-2	Y4	
53+18 53-18	53+20-2 53-20+2	Y4	
38+68	38+70-2	Y5	
95-78	95-80+2	Y5	
64-32	64-30-2	Y5	
138+69	138+70-1	Y6	
405-399	405-400+1	Y6	
2 1/2 +1 3/4	2 ½ +2-1/4	Y6	
5.7+3.9	5.7+4.0-0.1	Y6	
6.8-4.9	6.8-5.0+0.1	Y6	
Near doubles			
Calculation	Strategy	Suggested Year	Model or image
6+7	Double 6 +1 or Double 7 -1	Y4	
13+14	Double 13 +1 or Double 14-1	Y4	
39+40	Double 40-1	Y4	
18+16	Double 18-2 or Double 16+2	Y4	
60+70	Double 60+10 or Double 70-10	Y4	
76+75	Double 76-1 or Double 75+1	Y4	
160+170	Double 160+10 or Double 170-10	Y5	
2.5+2.6	Double 2.5+0.1 or Double 2.6-0.1	Y5	
Multiplication and division			

Calculation	Strategy	Suggested Year	Model or image
$72 \div 4$	Half and half again: $72 \div 2 = 36$, $36 \div 2 = 18$	Y4	
32×4	Double and double again: $32 \times 2 = 64$, $64 \times 2 = 128$	Y4	
13×12	Factorisation: $13 \times (3 \times 4)$ or $13 \times (2 \times 6)$	Y6	
$432 \div 27$	Factorisation: $432 \div 3 = 144$, $144 \div 9 = 16$	Y6	

Additional multiplication and division strategies

Chunking on a line for multiplication and division. Uses known facts. ie. $75 \div 3$ ten lots, ten lots and 5 lots marked on a number line.

Partition and recombine ie 23×14 is 23×10 add 23×4)

Compensation 48×8 is 50×8 take off 2×8