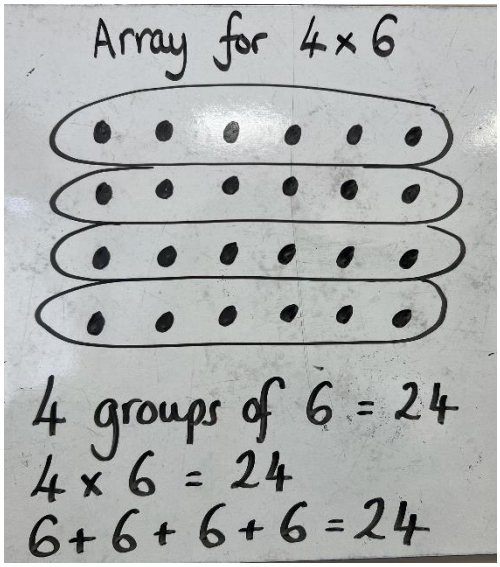
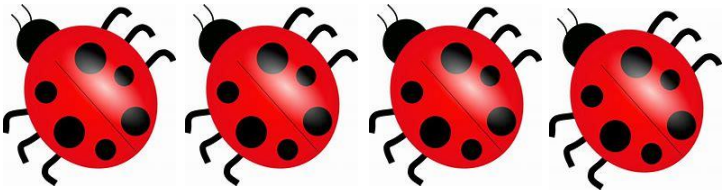
Times tables and mental maths

When teaching times tables (and any mathematical concept), we teach the children to first develop a deep understanding of what they are learning. Learning facts by heart is essential, but first we need children to understand what that maths really 'means'. Yes we want children to be able to quickly recall that 4 x 6 = 24, but first we teach them what 4 x 6 means using representations. For example:

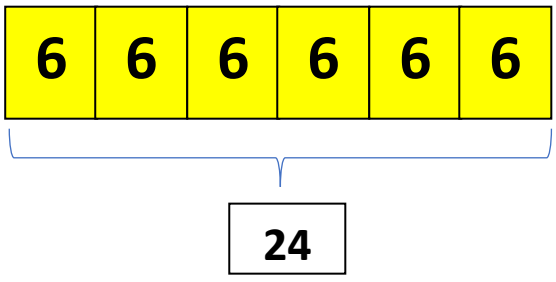


The children may also see times tables represented through **pictures**:



4 lots of 6 legs 4 x 6 = 24

Or bar models:



4 x 6 = 24

The calculation is always shown along-side the visual so children make a connection between the pictorial and the abstract calculation.

Children are also taught that multiplication is **commutative**. This means that it doesn't matter which order the numbers are in, the product is the same. Eg

4 x 6 = 24

6 x 4 = 24

Related facts: the children also learn the related facts. Eg

24 ÷ 4 = 6

24 ÷ 6 = 4

What times tables are children expected to know?

The national curriculum sets out that children should know all of their multiplication facts up to 12 x 12 by the end of year 4.

	Counting	**Multiplication facts**
Year 2	Count in multiples of 2, 3 and 5 from 0 and in tens from any number forward and backward	recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables
Year 3	count from 0 in **multiples** of 4, 8, 50 and 100	recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
Year 4	count in **multiples** of 6, 7, 9, 25 and 1000	recall multiplication and division facts for multiplication tables up to 12 × 12

Times tables tests/ mental maths tests

At Woodside, the children will take a times table test each week in years 3 and 4. The children work their way through a series of levels, receiving a certificate after completing a whole level. The expectation is that the children can answer each question in around 6 seconds (or a whole test in around 2 ½ minutes)- which is the amount of time given in the end of year 4 national multiplication check.

Once the children have completed the multiplication levels, they move onto mental maths tests in years 4 and 5. These mental maths tests comprise some of the key facts that we would like children to know by heart, or those that we would like them to be able to work out quickly. We would like them to have **'automaticity'** of these key facts. In year 6, the children continue to focus on their automatic recall of key facts as well as arithmetic.

These tests comprise a very small fraction of our weekly maths lessons and are often used as a 'starter' to a lesson once per week.

Woodside multiplication levels

Level	Content on the test			
Orange	Levels 1, 2 and 3. The children are given pictorial representations to support them.			
Green	Levels 1, 2 and 3. The children answer multiplication questions on the 2, 5 and 10 x tables.			
Blue	Levels 1, 2 and 3. Divide by 2, 10 and 5. The children are given pictorial representations to support them.			
Purple	Levels 1, 2, 3. The children answer division questions using the 2, 5 and 10 times tables.			
Bronze	Level 1	2 x tables	X and ÷	24 questions
	Level 2	10 x tables ÷	X and	24 questions
	Level 3	5 x tables	X and ÷	24 questions
	Level 4	Mixed 2, 5 and 10 times tables	X and ÷	24 questions
Silver	Level 1	3 x tables	X and ÷	24 questions
	Level 2	4 x tables	X and ÷	24 questions
	Level 3	8 x tables	X and ÷	24 questions
	Level 4	Mixed 3 and 4 times tables	X and ÷	24 questions
	Level 5	Mixed 4 and 8 times tables	X and ÷	24 questions
	Level 6	Mixed 3 and 4 and 8 X tables	X and ÷	24 questions
Gold	Level 1	6 x tables	X and ÷	24 questions
	Level 2	7 x tables	X and ÷	24 questions
	Level 3	9 x tables	X and ÷	24 questions
	Level 4	11 x tables	X and ÷	24 questions
	Level 5	12 x tables	X and ÷	24 questions
Platinum	Level 1	Mixed 6, 7, 9, 11, 12 x tables	X only	24 questions
	Level 2	Mixed 6, 7, 9, 12	÷ only	24 questions
	Level 3	Mixed ALL	X only	24 questions
	Level 4	Mixed ALL	÷ only	24 questions
	Level 5	Mixed ALL	x and ÷	24 questions
Speedy	Level 6	Mixed ALL	x and ÷	40 questions
Super sonic	Level 7	Mixed ALL	x and ÷	50 questions

An example orange level test.

		Answer	
1	5 x 5= 5 lots of 5 		
2	8 x 5= 8 lots of 5 		
3	3 x 5= 3 lots of 5 		
4	7 x 5= 7 lots of 5 		
5	11 x 5= 11 lots of 5 		
6	4 x 5 = 4 lots of 5 		
7	6 x 5 = 6 lots of 5 		

An example green level test.

1	7 x 2 =		
2	2 x 2 =		
3	6 x 2 =		
4	10 x 2 =		
5	1 x 2 =		
6	9 x 2 =		
7	5 x 2 =		
8	11 x 2 =		
9	3 x 2 =		
10	8 x 2 =		
11	12 x 2 =		
12	4 x 2 =		

An example blue level test.

		Answer	
1	8 ÷ 2 = How many groups of 2 are there in 8? 		
2	12 ÷ 2 = How many groups of 2 are there in 12? 		
3	6 ÷ 2 = How many groups of 2 are there in 6? 		
4	18 ÷ 2 = How many groups of 2 are there in 18? 		
5	16 ÷ 2 = How many groups of 2 are there in 16? 		
6	4 ÷ 2 = How many groups of 2 are there in 4? 		
7	14 ÷ 2 = How many groups of 2 are there in 14? 		

An example purple level test.

1	50 ÷ 5 =		
2	25 ÷ 5 =		
3	5 ÷ 5 =		
4	45 ÷ 5 =		
5	20 ÷ 5 =		
6	40 ÷ 5 =		
7	10 ÷ 5 =		
8	55 ÷ 5 =		
9	35 ÷ 5 =		
10	15 ÷ 5 =		
11	60 ÷ 5 =		
12	30 ÷ 5 =		

An example bronze level test.

1	3 x 5 =		
2	9 x 5 =		
3	4 x 5 =		
4	2 x 5 =		
5	10 x 5 =		
6	8 x 5 =		
7	1 x 5 =		
8	11 x 5 =		
9	7 x 5 =		
10	5 x 5 =		
11	12 x 5 =		
12	6 x 5 =		

13	20 ÷ 5=		
14	15 ÷ 5=		
15	5 ÷ 5=		
16	50 ÷ 5=		
17	45 ÷ 5=		
18	10 ÷ 5=		
19	55 ÷ 5=		
20	40 ÷ 5=		
21	25 ÷ 5=		
22	35 ÷ 5=		
23	60 ÷ 5=		
24	30 ÷ 5=		

An example silver level test

1	4 x 4 =		
2	24 ÷ 4 =		
3	3 x 3 =		
4	27 ÷ 3 =		
5	6 x 4 =		
6	16 ÷ 4 =		
7	3 x 4 =		
8	5 x 3 =		
9	21 ÷ 3 =		
10	15 ÷ 3 =		
11	12 x 3 =		
12	36 ÷ 3 =		

13	33 ÷ 3 =		
14	8 x 3 =		
15	44 ÷ 4 =		
16	7 x 4 =		
17	12 x 4 =		
18	6 x 3 =		
19	32 ÷ 4 =		
20	8 x 4 =		
21	18 ÷ 3 =		
22	7 x 3 =		
23	9 x 4 =		
24	9 x 3 =		

An example gold level test

1	9 x 9 =		
2	1 x 9 =		
3	8 x 9 =		
4	7 x 9 =		
5	3 x 9 =		
6	6 x 9 =		
7	4 x 9 =		
8	2 x 9 =		
9	10 x 9 =		
10	5 x 9 =		
11	12 x 9 =		
12	11 x 9 =		

13	108 ÷ 9 =		
14	45 ÷ 9 =		
15	9 ÷ 9 =		
16	99 ÷ 9 =		
17	36 ÷ 9 =		
18	18 ÷ 9 =		
19	54 ÷ 9 =		
20	27 ÷ 9 =		
21	63 ÷ 9 =		
22	90 ÷ 9 =		
23	72 ÷ 9 =		
24	81 ÷ 9 =		

An example platinum level test

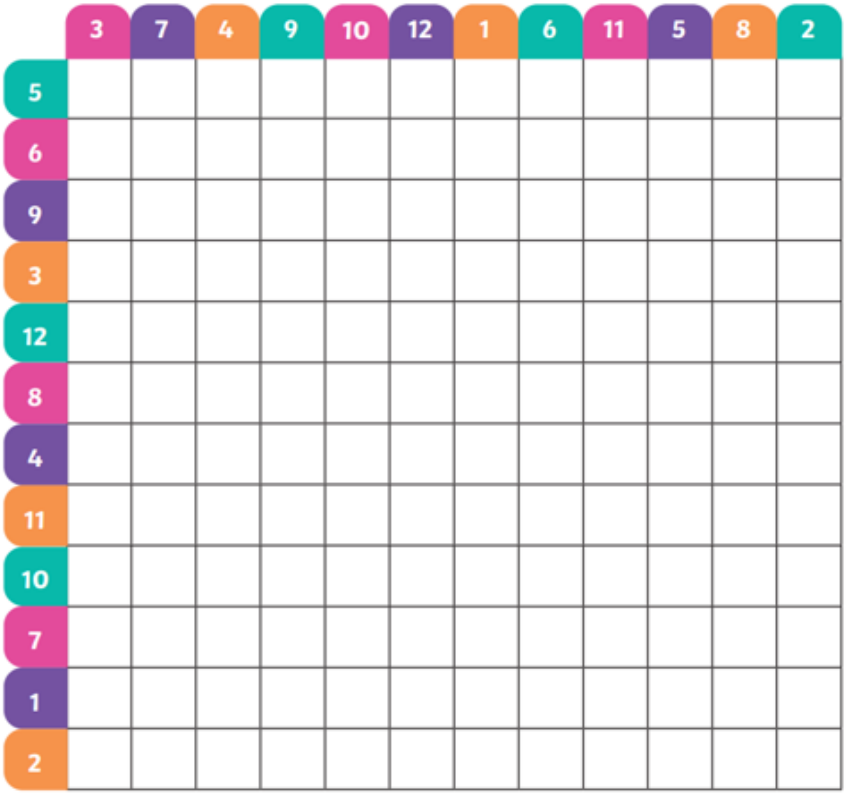
1	7 x 6 =		
2	30 ÷ 6 =		
3	7 x 8 =		
4	35 ÷7 =		
5	9 x 3 =		
6	48 ÷ 6 =		
7	4 x 9 =		
8	7 x 9 =		
9	24 ÷ 3 =		
10	9 x 6 =		
11	6 x 8 =		
12	42 ÷ 7 =		

13	12 x 8 =		
14	120 ÷ 12 =		
15	56 ÷7 =		
16	12 x 4 =		
17	9 x 8 =		
18	72 ÷ 12 =		
19	6 x 9 =		
20	12 x 11 =		
21	108 ÷ 12 =		
22	9 x 9 =		
23	63 ÷ 7 =		
24	7 x 8 =		

After finishing the multiplication levels, the children will move onto the following mental maths tests. They are **year group specific**, which means we don't expect the children to answer anything that is beyond the objectives for their year group.

Year 4	
Emerald	Levels 1-6 Children will complete multiplication squares each week. 5 minutes
Sapphire	Levels 1-5 Children complete mental maths tests in 'automaticity' or questions they can work out quickly. 30 questions 5 minutes
Ruby	Levels 1-5 Children complete mental maths tests in 'automaticity' or questions they can work out quickly. 38 questions 5 minutes
Diamond	Levels 1-5 Includes word problems 15 questions 5 minutes
Year 5	
Pythagoras	Levels 1-6 Children will complete multiplication squares each week. 5 minutes
Archimedes	Levels 1-5 Children complete mental maths tests in 'automaticity' or questions they can work out quickly. 40 questions 5 minutes
Pascal	Levels 1-5 Includes word problems 15 questions 5 minutes
Turing	Levels 1-5 Children complete mental maths tests in 'automaticity' or questions they can work out quickly. 40 questions 5 minutes
Newton	Levels 1-5 Children complete mental maths tests in 'automaticity' or questions they can work out quickly. May involve 'quick' formal methods. 30 questions 5 minutes

An example Emerald level test



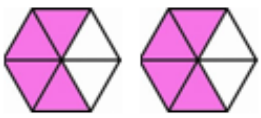
An example Sapphire level test

1	Number of seconds in a minute	_____seconds		16	Write $\frac{9}{10}$ as a decimal		
2	42 ÷ 6			17	1 ÷ 10		
3	$\frac{3}{4}$ of 40			18	$\frac{1}{8} + \frac{3}{8}$		
4	1, 210 + 8000			19	Write $\frac{40}{100}$ as a decimal		
5	4.2 + 1.6			20	4 = 40 ÷ ____		
6	7 x 7			21	Write 7:15pm as a 24-hour digital clock		
7	56 ÷ 8			22	18 ÷ 10		
8	817 rounded to the nearest 100			23	50 x 7		
9	398 rounded to the nearest 10			24	18 x 100		
10	4 kg = _____g	_____g		25	10 degrees colder than 5 ˚ C	_____ ˚ C	
11	70cm = _____m	_____m		26	57 x 100		
12	5 x 30			27	 Perimeter of this regular pentagon. Each side is 7cm.	_____ cm	
13	You spend £12.50. What change do you get from £20?	£		28	30 minutes after 4:10pm	_____pm	
14	5,817 - 200			29	1.5 litres = _____ml	_____ml	
15	$\frac{1}{3}$ *of* 27			30	54 ÷ 6		

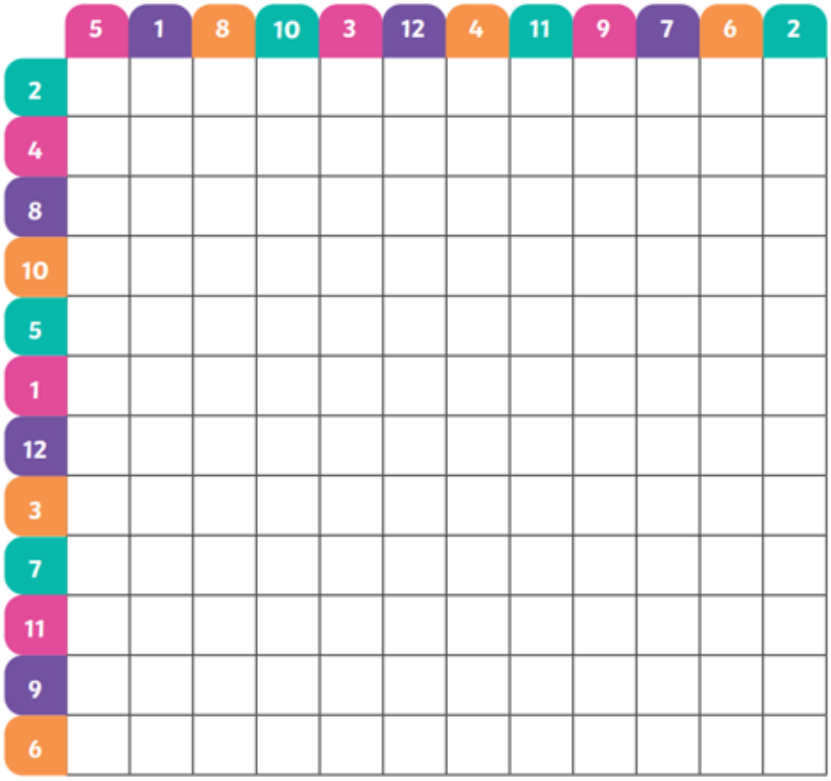
An example Ruby level test

1	Number of days in December	_____ days		20	6 x 9		
2	£1.20 ÷ 3	_____p		21	3 ÷ 10		
3	$\frac{3}{4}$ of 24			22	$\frac{1}{7} + \frac{4}{7} =$		
4	2,312 + 500			23	Write $\frac{3}{10}$ as a decimal		
5	3.7 + 0.3			24	4 = 28 ÷ ____		
6	12 x 9			25	Write 5:20pm as a 24-hour digital clock		
7	48 ÷ 6			26	67 ÷ 10		
8	4.8 rounded to the nearest whole number			27	1,245 rounded to the nearest 100		
9	$\frac{1}{4}$ of 48			28	41 x 100		
10	What is $\frac{1}{2}$ km in metres?	_____m		29	4 degrees colder than 1 degree		
11	12mm = _____cm	_____cm		30	39 x 10		
12	3 x 2 x 7			31	Your shopping costs £4.21. How much change do you get from £5? Write your answer in £.	£	
13	You spend 56p. What change do you get from £2?	£		32	1 x 10 x 0		
14	4,601 + 20			33	Number of days in March		
15	$\frac{1}{5}$ of 10			34	32 ÷ 100		
16	Write $\frac{1}{2}$ as a decimal			35	3 x 8 then double the answer		
17	Number of right angles in a square			36	156 rounded to the nearest 10		
18	£5 ÷ 4 people. How much will each person get?	£		37	$\frac{3}{4}$ of 16		
19	0.4 litres = _____ml	_____ml		38	Number of seconds in $2\frac{1}{2}$ minutes	_____seconds	

An example Diamond level test

1	A farmer plants carrots in rows of 6. The farmer plants 24 rows. How many carrots does she plant in total?	_____ carrots	
2	Woodside's relay team has 4 members. Each runner takes 60 seconds to run a lap. How many seconds does it take all 4 members to run in total?	_____ seconds	
3	A playground is 320m long. It is divided into 4 equal sections. How long is each section?	_____ metres	
4	Gill buys a hot dog for £3.10, fries for £2.90 and a drink for £1.50. How much change does she get from £10?	£	
5	A bucket holds 7 litres of water. Jake pours 3.5 litres out. How much water is left in the bucket?	_____ litres	
6	Anvay reads $\frac{3}{4}$ of his book. There are 5 pages left to read. How many pages long is his book?	_____pages	
7	Nial is 28 months How old will he be on his next birthday?	_____years old	
8	The temperature is 10 degrees. The temperature drops by 12 degrees. What is the temperature now?	_____ ˚C	
9	 What fraction is shaded?		
10	Billy has 80 football stickers. Jessie has double this amount. Freya **ten times more** than Jessie. How many cards does Freya have?	_____ cards	
11	A toilet uses 8 litres of water per flush. By midday, the toilet has been flushed 20 times. How much water has been used?	_____ litres	
12	A crate holds 80 cans. There are 9 crates in the supermarket. 20 cans are damaged. How many undamaged cans are left?	_____cans	
13	A bottle holds 450ml of liquid. How many 25ml glasses will the bottle fill?	_____glasses	
14	Jennifer is using a recipe. For every 50g of pasta she uses, she must use 20g of onions. She uses 400g of pasta. How many grams of onions will she need?	_____ grams	
15	Find $\frac{3}{5}$ of 60		

An example Pythagoras level test



An example Archimedes level test

1	Draw 2 lines of symmetry 			21	9 x 9		
2	$\frac{5}{6} - \frac{1}{6}$			22	5 ÷ 10		
3	36 x 100			23	$\frac{1}{8} + \frac{5}{8}$		
4	11 x 12			24	Write 0.7 as a fraction		
5	6,789 - 4000			25	8 = 72 ÷ ____		
6	4,603 – 500			26	Write 2:28pm as a 24-hour digital clock		
7	38 + ____ = 100			27	56 ÷ 10		
8	11.2 rounded to the nearest whole number			28	1,315 rounded to the nearest 100		
9	2m 45 cm = _____ cm	_____cm		29	18 x 100		
10	3 ÷ 100			30	Number of days in April and May altogether		
11	2423 - 20			31	4 ÷ 10		
12	IX + V = Write the answer in Roman Numerals			32	Shopping costs £4.32. How much change from £10?	£	
13	Half of 50			33	3 x 3 x 3		
14	1000 less than 4,312			34	Write 52 in Roman Numerals		
15	$\frac{2}{3}$ of 33			35	31 ÷ 100		
16	$\frac{40}{100}$	_____ tenths		36	0.3 + 0.9		
17	What is the perimeter of a square with side lengths of 2.5cm?	_____cm		37	4500 mm = _____litres	_____ l	
18	70mm = ____cm	_____cm		38	$\frac{3}{4}$ of 48		
19	Double 36			39	Number of hours in a day and a half		
20	75 - 27			40	5,139 rounded to the nearest 10		

An example Pascal level test

1	A shop sells oranges in boxes of 12. There are 20 boxes How many oranges are there in total?		
2	 Survey of favourite television programmes Programme / Tally / Total Dr Who / 23 Tracey Beaker / 15 Blue Peter / 17 Newsround / 5 How many children were surveyed in total?	_____ children	
3	 What 3D shape is this a net of?		
4	Mike buys a hot dog for £3.15, fries for £2.90 and a drink for £0.70. How much change does he get from £10?	£	
5	A tank holds 1000 ml of water. Jake pours $\frac{3}{4}$ of the water out. How much water is left in the tank?	_____ ml	
6	Gerry collects 184 conkers. He divides them equally into 4 groups. How many conkers are in each group?	_____conkers	
7	Louise is $6\frac{1}{2}$ years old. How many months is that?	_____ months	
8	Gia has read0020$\frac{1}{4}$ of her book. There are 36 pages left to read. How many pages has she read?	_____ pages	
9	A cafe used 152 cups per day. How many cups does the café use in a week?	_____ cups	
10	If 4 tomatoes cost 60p. How much do 6 tomatoes cost?	_____p	
11	Robert's watch says 9:10am but the time is actually 10:15am. By how many minutes is Robert's watch slow?	_____ minutes	
12	Pens cost 37p each. What is the total cost of 100 pens?	£	
13	How many days are there in 52 weeks?	_____ days	
14	In a row of 15 mugs 5 are blue and the rest are red. What fraction of the mugs are blue?		
15	In a money box there are five £2 coins; three £5 notes; two £10 notes. How much money is in the money box altogether?	£	

An example Turing level test

1	Perimeter of a regular pentagon with side lengths of 9cm	_____cm		21	720 ÷ 4		
2	Area of this rectangle in mm:  30mm 70mm	_____mm		22	$\frac{5}{25} = \frac{\square}{5}$	$\frac{\square}{5}$	
3	 What 3D shape is this a net of?			23	$\frac{6}{7} + \frac{3}{14}$		
4	8,912m in km	_____km		24	Write 0.27 as a fraction		
5	$\frac{1}{20}$ *of a kg* in grams	_____g		25	60 = 180 ÷ ____		
6	1250ml in litres	_____L		26	Write 11:16pm as a 24-hour digital clock		
7	Number of minutes in 8 hours	_____minutes		27	0.28 ÷ 10		
8	4 hours 30 minutes after 20:45			28	34,085 rounded to the nearest 1000		
9	Half of £5.60	£		29	7 x 600		
10	Continue the pattern: 2.4, 2.7, 3.0, ____, ____	_____, _____		30	16 degrees colder than 7 ˚C	_____ ˚C	
11	3.2m = _____cm	_____cm		31	89 x 100		
12	8^3			32	1.26 – 0.5		
13	2.09 x 1000			33	6 x 20 x 4		
14	10,261 + 1999			34	4.5 minutes in seconds	_____seconds	
15	322 ÷ 7			35	Shopping costs £8.09. How much change do you get from £10?	£	
16	Write $\frac{289}{1000}$ as a decimal			36	134 + 78		
17	48,271 – 33,000			37	16,782 – 2,431		
18	£18 ÷ 4 people. How much will each person get?	£		38	$\frac{3}{4}$ of 36		
19	3.5 litres = _____ml	_____ml		39	25% of 2000		
20	Half of 35			40	417 rounded to the nearest 10		

An example Newton level test

1	380 x 0			16	Round 6.25 to the nearest whole number		
2	16^2			17	$\frac{7}{12}+\frac{5}{6}$		
3	868 ÷ 7			18	500,000 – 5,000		
4	82% as a fraction			19	735 ÷ 5		
5	738 + _____ = 1000			20	Find the product of 5 and 18		
6	80 minutes + 1 hour 15 minutes	_____minutes		21	40 football cards were shared equally between 9 children. How many were left over?		
7	$\frac{2}{7}$ of 350			22	Round 4.44 to 1 decimal place		
8	90 minutes before 16:25			23	In the cinema there are rows of seats. Each row has 25 seats. There are 400 seats in total. How many rows are there?		
9	I think of a number. I multpliy it by 7. I add 8. My answer is 36. What is my number?			24	How many 750ml bottles can be filled from a container holding 3 litres?		
10	60% of 41			25	25% of 300		
11	¾ of 220g			26	4 boxes have a mass of 1 kilogram. What is the mass of 7 boxes?	_____g	
12	How many weeks in 60 days?	_____ weeks and _____ days		27	< > or = 4.3kg 4.33kg	4.3kg 4.33kg	
13	8.5 minutes = _____ seconds	_____seconds		28	$\frac{4}{5}$ of £2	£	
14	250m x 2m x _____ = 2km	_____m		29	7.55 + 6.8		
15	_____ = 60 x 90			30	6 + (35 ÷ 7)		