

Q1. Write these in order of size, starting with the smallest.

$$\frac{2}{3} \quad 0.5 \quad \frac{3}{5} \quad 0.65$$

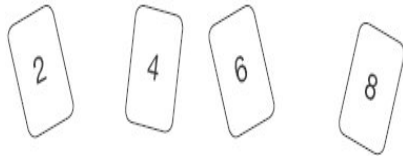
Q2. Calculate $\frac{7}{16}$ of 288

Q3. Write the two missing digits in this multiplication.

$$\begin{array}{|c|c|} \hline \square & 9 \\ \hline \end{array} \times \begin{array}{|c|c|} \hline \square & 9 \\ \hline \end{array} = 2001$$

Q4. Find the multiple of 45 that is closest to 8000

Q5. Use all four digit cards to make this number sentence correct.



$$\begin{array}{|c|c|} \hline \square & \square \\ \hline \end{array} \times \begin{array}{|c|c|} \hline \square & \square \\ \hline \end{array} > 5000$$

Q6. Calculate 602×57

Q7. 17 multiplied by itself gives a **3-digit** answer.

$$\begin{array}{|c|c|} \hline 1 & 7 \\ \hline \end{array} \times \begin{array}{|c|c|} \hline 1 & 7 \\ \hline \end{array} = \begin{array}{|c|c|c|} \hline 2 & 8 & 9 \\ \hline \end{array}$$

What is the **smallest** 2-digit number that can be multiplied by itself to give a **4-digit** answer?

$$\begin{array}{|c|c|} \hline \square & \square \\ \hline \end{array} \times \begin{array}{|c|c|} \hline \square & \square \\ \hline \end{array} = \begin{array}{|c|c|c|c|} \hline \square & \square & \square & \square \\ \hline \end{array}$$

Q8. Calculate $942 \div 6$

Multiplication & Division

Years 5 & 6



A booklet for parents

Help your child with
mathematics

Multiplication & Division Year 5 - Current Objectives

Pupils should be taught to:

Recall quickly multiplication facts up to 10 x10 and use them to multiply pairs of multiples of 10 and 100; derive quickly corresponding division facts.

Identify pairs of factors of two digit whole numbers and find common multiples (e.g. for 6 and 9).

Extend mental methods for whole-number calculations, e.g. to multiply a two digit by a one digit number (e.g. 12 x 9), to multiply by 25 (e.g. 16 x 25) to subtract one near multiple of 1000 from another (e.g. 6070 – 4097).

Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 or 1000.

Refine and use efficient written methods to multiply and divide HTU x U, TU xTU, U.t x U and HTU ÷ U.

Find fractions using division (e.g. 1/100 of 5kg), and percentages of numbers and quantities (e.g. 10%, 5% and 15% of £80).

Use a calculator to solve problems, including those involving decimals or fractions (e.g. find $\frac{3}{4}$ of 150g); interpret the display correctly in the context of measurement.

Notes

Useful Websites:

For children:

www.mymaths.co.uk

<http://nrich.maths.org>

www.bbc.co.uk/bitesize/ks2/maths/

www.coolmath-games.com/

[Www.mathsisfun.com](http://www.mathsisfun.com)

<http://resources.woodlands-junior.kent.sch.uk/maths/>

For parents:

<http://www.bbc.co.uk/skillswise/maths>

Multiplication & Division Year 5 -Objectives from February 2014

Pupils should be taught to:

Identify multiples and factors, including finding all fact pairs.
Solve problems involving multiplication and division where large numbers are used by decomposing them into their factors.
Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers.
Establish whether a number up to 100 is prime and recall prime numbers up to 19.
Multiply numbers up to 4 digits by a one or two digit number using an efficient written method, including long multiplication for two digit numbers.
Multiply and divide numbers mentally drawing upon know facts.
Divide numbers up to 4 digits by a one digit number using the efficient written method of short division and interpret remainders appropriately for the context.
Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
Recognise and use square numbers and cube numbers and the notation for squared (2) and cubed (3).
Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.
Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

Multiplication Strategies - Year 5

Grid method

HTU × U

(Short multiplication – multiplication by a single digit)

$$346 \times 9$$

Children will approximate first

346×9 is approximately $350 \times 10 = 3500$

$$\begin{array}{r} \times \quad 300 \quad 40 \quad 6 \\ 9 \quad 2700 \quad 360 \quad 54 \\ \hline \quad 2700 \\ \quad + \quad 360 \\ \quad + \quad \underline{54} \\ \hline \quad \underline{3114} \end{array}$$

TU × TU

(Long multiplication – multiplication by more than a single digit)

$$72 \times 38$$

Children will approximate first

72×38 is approximately $70 \times 40 = 2800$

$$\begin{array}{r} \times \quad 70 \quad 2 \\ 30 \quad 2100 \quad 60 \\ 8 \quad 560 \quad 16 \\ \hline \quad 2100 \\ \quad + \quad 560 \\ \quad + \quad 60 \\ \quad + \quad \underline{16} \\ \hline \quad \underline{2736} \end{array}$$

Percentages

Finding percentages of amounts is also an key objective for children in Years 5 & 6. Strong timestable facts, as well as place value knowledge is essential.

Eg Find 45% of 72

Even converting 45% into a fraction such as $\frac{9}{20}$ would not lend itself to mental manipulation, as is not a factor of 72, however using partitioning and place value knowledge we can solve:

$$45\% =$$

$$10\% = 7.2$$

$$10\% = 7.2$$

$$10\% = 7.2$$

$$10\% = 7.2$$

$$5\% = 3.6$$

$$\text{Total} = 32.4$$

Secure understanding of the ‘commutative’ rule (order of multiplication does not matter) may also help.

Eg. Find 28% of 51

Since order does not matter, this may be more easily solved as 51% of 28

$$50\% = 14$$

$$1\% = 2.8$$

$$\text{Total} = 16.8$$

Multiplication & Division, fractions & percentages

Multiplication & Division are closely related to percentages and fractions, and secure calculation strategies are required to be able to tackle Year 5 & 6 problems.

Eg. Find $\frac{5}{7}$ of 42

X 6

5	<u>30</u>
7	42

X 6

Here we have used the 'model' of proportion window. We look to see how many times 6 goes into 42, then we use the same multiplier with the numerator to find the solution.

Another example:

Flights to America have been reduced by $\frac{3}{5}$, and are now only £240. What was the original price?

X 120

2	240
5	<u>600</u>

X 120

Since we know that the flight has been reduced by $\frac{3}{5}$, this means we pay for $\frac{2}{5}$. We then use the 'window' to find that 2 goes into 240 120 times, we then use this multiplier to find the original price of £600.

Using similar methods, they will be able to multiply decimals with one decimal place by a single digit number, approximating first. They should know that the decimal points line up under each other.

e.g. 4.9×3

Children will approximate first
 4.9×3 is approximately $5 \times 3 = 15$

x	4	0.9
3	12	2.7

$$\begin{array}{r} 12 \\ + 2.7 \\ \hline 14.7 \end{array}$$

Once grid method is mastered, the 'grid' can be removed to approach more formal methods eg

$$\begin{array}{r} 15 \\ \underline{27 \times} \\ 35 \\ 70 \\ 100 \\ \underline{200} \\ =405 \end{array}$$

Notice this is the same principle of the grid method, partitioning a 2 x 2 digit calculation into 4 separate calculations, re-combining for a final product.

Multiplication Strategies - Year 6

ThHTU x U

(Short multiplication – multiplication by a single digit)

$$4346 \times 8$$

Children will approximate first

$$4346 \times 8 \text{ is approximately } 4346 \times 10 = 43460$$

X	4000	300	40	6
8	32000	2400	320	48

$$\begin{array}{r}
 32000 \\
 + 2400 \\
 + 320 \\
 + 48 \\
 \hline
 34768
 \end{array}$$

HTU x TU

(Long multiplication – multiplication by more than a single digit)

$$372 \times 24$$

Children will approximate first

$$372 \times 24 \text{ is approximately } 400 \times 25 = 10000$$

x	300	70	2
20	6000	1400	40
4	1200	280	8

$$\begin{array}{r}
 6000 \\
 + 1400 \\
 + 1200 \\
 + 280 \\
 + 40 \\
 + 8 \\
 \hline
 8928
 \end{array}$$

Division Strategies - Year 6

Long division HTU ÷ TU

$$972 \div 36$$

$$\begin{array}{r}
 27 \\
 36 \overline{) 972} \\
 \underline{- 720} \quad 20 \times 36 \\
 252 \\
 \underline{- 252} \quad 7 \times 36 \\
 0
 \end{array}$$

Answer : 27

Any remainders should be shown as fractions, i.e. if the children were dividing 32 by 10, the answer should be shown as $3 \frac{2}{10}$ which could then be written as $3 \frac{1}{5}$ in it's lowest terms, again moving towards 3.2 in Year 6.

Extend to decimals with up to two decimal places. Children should know that decimal points line up under each other.

$$87.5 \div 7$$

$$\begin{array}{r}
 12.5 \\
 7 \overline{) 87.5} \\
 \underline{- 70.0} \quad 10 \times \\
 17.5 \\
 \underline{- 14.0} \quad 2 \times \\
 3.5 \\
 \underline{- 3.5} \quad 0.5 \times \\
 0
 \end{array}$$

Answer : 12.5

Division Strategies - Year 5

('smart' chunking methods)

Short division HTU ÷ U

'Smart' chunking involves fewer steps, ideally two, to facilitate mental methods. In the following example, the largest 'chunk' of 6's that is still less than the total in the hundreds and tens columns is subtracted. i.e. 190-180

$$196 \div 6$$

$$\begin{array}{r}
 32 \text{ r } 4 \\
 6 \overline{) 196} \\
 \underline{- 180} \quad 30 \times 6 \\
 16 \\
 \underline{- 12} \quad 2 \times 6 \\
 4
 \end{array}$$

Answer : 32 remainder 4 *

* moving towards 32 4/6 then to 32.67 towards Year 6

Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. For example $240 \div 52$ is 4 remainder 32, but whether the answer should be rounded up to 5 or rounded down to 4 depends on the context. Eg.

240 children go on school journey, with 52 fitting on each coach-how many coaches are needed? In context, the solution is now 5 as we need to round the answer up so that all the children fit on the coaches!

From grid method, children can move towards standard methods, if they are ready eg

Moving towards a standard method	A standard method
$ \begin{array}{l} 35 \\ \underline{12 \times} \\ 10 \quad (2 \times 5) \\ 60 \quad (2 \times 30) \\ 50 \quad (10 \times 5) \\ \underline{300} \quad (10 \times 30) \\ 420 \end{array} $	$ \begin{array}{l} 35 \\ \underline{12 \times} \\ 70 \\ \underline{350} \\ 420 \end{array} $

Using similar methods, they will be able to multiply decimals with up to two decimal places by a single digit number and then two digit numbers, approximating first. They should know that the decimal points line up under each other.

For example:

$$4.92 \times 3$$

Children will approximate first

$$4.92 \times 3 \text{ is approximately } 5 \times 3 = 15$$

x	4	0.9	0.02	
3	12	2.7	0.06	
				12
				+ 0.7
				+ 0.06
				<u>12.76</u>

By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

Multiplication & Division Year 6 - Current Objectives

Pupils should be taught to:

Use knowledge of place value and multiplication facts to 10×10 to derive related multiplication and division facts involving decimals (e.g. 0.8×7 , $4.8 \div 6$).

Use knowledge of multiplication facts to derive quickly squares of numbers to 12×12 and the corresponding squares of multiples of 10.

Recognise that prime numbers have only two factors and identify prime numbers less than 100; find the prime factors of two digit numbers.

Use approximations, inverse operations and tests of divisibility to estimate and check results.

Calculate mentally with integers and decimals: $U.t \pm U.t$, $TU \times U$, $TU \div U$, $U.t \times U$, $U.t \div U$.

Use efficient written methods to add and subtract integers and decimals, to multiply and divide integers and decimals by a one digit integer and to multiply two digit and three digit integers by a two digit integer.

Relate fractions to multiplication and division

(e.g. $6 \div 2 = \frac{1}{2}$ of 6 = $6 \times \frac{1}{2}$); express a quotient as a fraction or decimal (e.g. $67 \div 5 = 13.4$ or $13 \frac{2}{5}$); find fractions and percentages of whole-number quantities (e.g. $\frac{5}{8}$ of 96, 65% of £260).

Use calculator to solve problems involving multi-step calculations.

Multiplication & Division Year 6 -Objectives from February 2014

Pupils should be taught to:

Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the efficient written method of long multiplication. Divide numbers up to 4 digits by a two-digit whole number using the efficient written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.

Perform mental calculations, including with mixed operations and large numbers.

Identify common factors, common multiples and prime numbers.

Use their knowledge of the order of operations to carry out calculations involving the four operations.

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Solve problems involving addition, subtraction, multiplication and division .

Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.