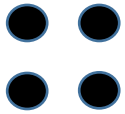
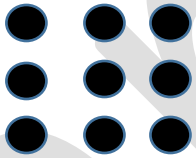
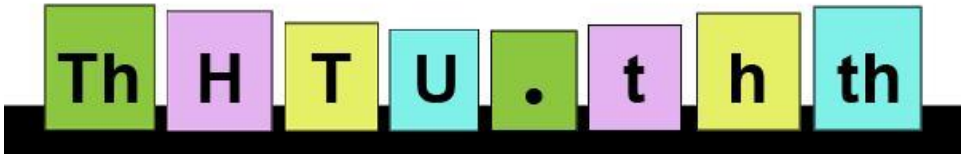
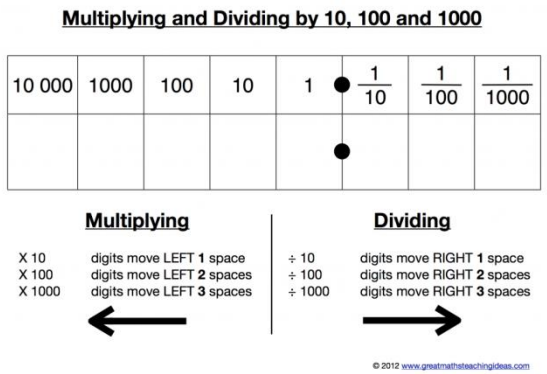
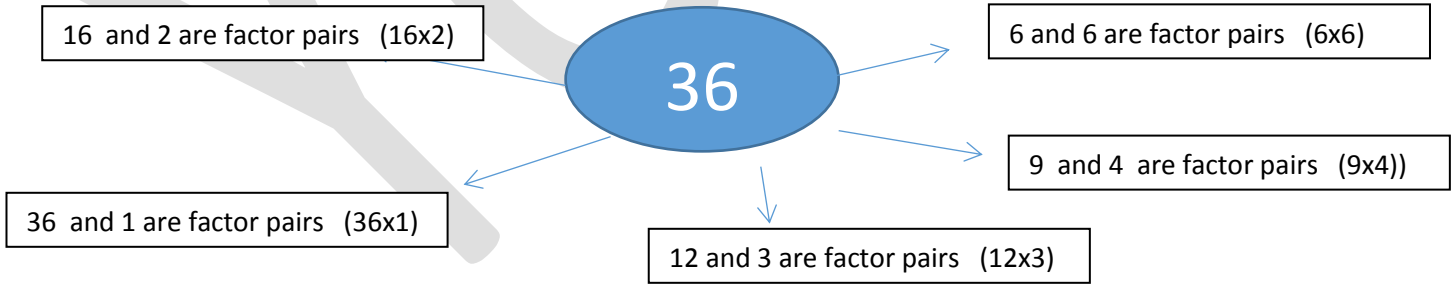
All Saints C of E Primary School

Year 5 Multiplication and Division

By the end of Year Five, children have been taught to:

Objective	Why is it important? Things to watch out for! Taught strategies
recognise and use square numbers and the notation for **squared (^{2})**	Square numbers are created when we multiply a number by itself. In practical terms, we will create a square when resources are used for example: 1x1=1 2x2=4 3x3=9 4x4=16 5x5=25 so 1, 4, 9,16, 25……100….. are all square numbers.  $2^2 = 4$  $3^2 = 9$ The smaller 2 (in red) shows that the number is multiplied by itself.
know and use the vocabulary of **prime numbers** and **composite numbers**	A prime number is a number that only has two factors which are one and itself. Composite numbers are basically numbers that are not prime numbers. Mathematics really does have a language all of its own. Not being able to recall the vocabulary can hinder children's ability to access questions or tasks. 2, 3, 5, 7, 11, 13, 17, 19, 23…….. Common misconceptions • That one is a prime number! (It does not satisfy the rule of having two factors because it only has one.)
multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	

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	Multiplying and dividing values focusses on children's knowledge of place value and their understanding of the effect of multiplying or dividing by 10, 100 and 1000. Initially, we focus on using equipment to help children understand the effect and then we move onto looking at place value grids and the direction and movement of digits.  **An example of what a child may say** – ' you add a zero when you multiply by 10, you add two zeros when multiplying by 100' on one level that is what is visually happening to the number. However, it is not taught like this because that does not reinforce the value of the number and the effect the operation has had.
identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers	Multiples are 'lots of' multiplication facts, therefore the **product** (answer) of a multiplication calculation, whereas a **factor** is linked to division. The key to identifying multiplies and factors is being able to recall all multiplication and division facts up to the 12 times tables. For example: 8 is a multiple of 4 and a factor of 16 6 is a multiple of 3 and a factor of 36 The term 'factor pairs' refers to the two values multiplied together to create an specific answer. For example the factor pairs for 36 are: 

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multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers	By Year 5 children are expected to know their times tables up to the 12x, which enables them to calculate efficiently with larger values.

2 4 x 6 2 4 (4x6) + 1 2 0(20x6) 1 4 4 3 7 2 X 6 1 2 (2x6) 4 2 0 (70x6) + 1 8 0 0 (300x6) 2 2 3 2	Children are taught this vertical strategy at first to ensure that they understand that they are multiplying by twenty and then four, rather than just multiplying 2x6 and then 4x6. This is all part of developing understanding of place value and being able to recognise the reasonableness of an answer. This strategy also enables children to practise scaling up with multiplication of known facts, for example 7x6=42 so 70x6=420. 70 is ten times bigger than 7, so the answer of 7x6=42 is multiplied by 10.
2 4 x 6 2 4 (4x6) + 1 2 0(20x6) 1 4 4 2 4 x 6 1 4 4 2	Once children demonstrate understanding of the above strategy, we move to teaching compact strategies. Initially, we compare the strategies and discuss what is the same and what is different. Often when we teach children compact multiplication, they say it is easier and why didn't we teach it to them sooner. Yes, it appears simpler on the face of it because all they are doing is multiplying single digits. However, the process has to be gone through to ensure understanding and the ability to recognise the reasonableness of an answer. **Errors which can occur** • Not adding the carried value into the answer • Writing the wrong digit in the answer box, for example, 6x4=24, some children tend to write the 2 in the answer box and carry the 4, rather than the other way round.
2 4 6 x 6 1 4 7 6 2 3	When children are secure in multiplying 2 digits by a single digit using the compact strategy, we move to 3 digits and 4 digits.
2 4 x 1 6 2 1 4 4 + 2 4 **0** 3 8 4	Once children are secure multiplying by a single digit, we move onto multiplying by a 2 digit number. When introducing any new strategy, the values are reduced to enable children to focus on learning how to use a new strategy. 144 This is the answer to 24x6 of the calculation. The order of the calculations is 6x4, then 6x2. 240 Is the answer to 24 x10. On this row, we firstly add a 0 (zero) to hold the place value then 1x4 then 1x2. **Errors which can occur**

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<table>
<tr><td></td><td>
<pre>
   5 4 3 2
x   2 4
     1 1
   2 1 7 2 8
+1 0 8 6 4 0
 1 3 0 3 6 8
</pre>
</td><td>

The zero is not put on the second row in the answer box, which would lead to the wrong answer.
When values are carried, they can become mixed up with other digits or not added back in. If this causes a problem, using a different colour pencil for the carried values makes it clear.

</td></tr>
<tr><td>divide numbers up to 4 digits by a one-digit number using the formal written method of short division</td><td colspan="2">
<table>
<tr><td>
<pre>
   32 r 4   3 2 r 4
6) 1 9 6   6) 1 9 16
 - 1 8 0 (30x6)
    16
 - 1 2 (2x6)
     4
</pre>
</td><td>The move from long division to compact (short) division is compared. However, this is only possible if children are able to discuss the strategy and discuss the relative values. When we teach compact division, we compare what is the same and what is different. Often when we teach children compact division, they often say it is easier and why didn't we teach it to them sooner. Yes, it appears simpler on the face of it because all they are doing is dividing known smaller values by a single digit. However, the process has to be gone through to ensure understanding and ability to recognise the reasonableness of an answer.
The main difference between long division and short division (compact), is that the whole number is considered in long division opposed to short division, where smaller chunks of values are considered.

For example 196 divided by 6. The process being 6 will not go into 1, so we look at how many times will 6 go into 19, which is 3 remainder 1. The 1 is carried over to the 6 and then we consider how many times 6 goes into 16.</td></tr>
<tr><td>Once children have secured the strategy we move onto dividing larger values by a single digit.</td><td></td></tr>
</table>
</td></tr>
<tr><td>Solve problems involving multiplication and division</td><td colspan="2">Children often have the mathematical skills and knowledge to solve problems. However, how it is worded can often cause confusion and make children doubt their mathematical ability. Problem solving is a complex skill and requires children to think more and often do more. Children begin to realise that the answer or operation to apply to the problem may not jump out at them. Children have to understand the context of the problem, the vocabulary within the problem and from that make decisions as to what they actually have to do to solve the problem. From the problems below, children need to firstly recall their knowledge of money, fractions, decimals and time, then children have to read and understand what the problem is asking them to do and then recall how to use an efficient strategy for adding, subtracting, multiplying or dividing.
<table>
<tr><td>A shop sells candles.

plain candles 35p each
star candles 60p each
stripe candles 85p each</td><td>Mr Singh buys paving slabs to go around his pond.</td></tr>
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</table>

Sapna buys **4** star candles and **2** stripe candles.

How much does she pay **altogether**?

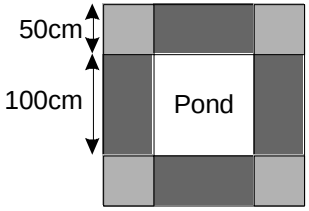
PAVING SLABS

£1.95 each — Square slabs 50cm by 50cm



£3.50 each — Rectangular slabs 100cm by 50cm





He buys 4 rectangular slabs and 4 square slabs. What is the total cost of the slabs he buys?

Jason bought some bags of green apples and some bags of red apples. He spent **£4.20**



6 green apples for 75p



10 red apples for 90p

How many **bags** of each type of apples did he buy?

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