Multiplication and Division:
Multiplication Machines

Aim: To use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers. I can multiply three numbers.	**Success Criteria:** I can begin by multiplying two of the numbers together. I can multiply the product of these two numbers by the third number to find the answer. I can see that multiplication can be done in any order.	**Resources:** Lesson Pack
	Key/New Words: Multiply, product, times, groups of.	**Preparation:** Digit Cards 0–12 – as required Differentiated Multiplication Machines Activity Sheets – one per child

Prior Learning: It will be helpful if the children know the multiplication and division facts up to 12 × 12.

Learning Sequence

Missing Pieces: Children work in pairs to find the missing pieces on the multiplication square shown on the Lesson Presentation. As an extension activity, they could add some new rows and columns, for example for the 13 and 14 times tables.

Multiplication Machines: Explain how the number machine works. The number is tipped out of the bucket onto the conveyor belt. It then travels through each machine until it comes out at the far right hand side as the answer. Practise putting some numbers through the machine and writing the number sentences which go with it.

Inside the Machine: Look inside the machine to see the arrays being made. Explain to the children that the initial number must be multiplied by the second number in order to find the product. This product must then be multiplied by the third number in the multiplication sentence.

Multiplication Machines: Children complete differentiated Multiplication Machines Activity Sheets, multiplying together three numbers.

Children use the machines on their Multiplication Machines Activity Sheet and Digit Cards 0–12 to practise multiplying three numbers.

Children use Multiplication Machines Activity Sheet to practise multiplying three numbers. They switch the order of calculation to see if this affects the answer. They then try to work backwards to find the missing numbers (missing number problems).

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Diving into Mastery: Schools using a mastery approach may prefer to use the following as an alternative activity. These sheets might not necessarily be used in a linear way. Some children might begin at the 'Deeper' section and in fact, others may 'dive straight in' to the 'Deepest' section if they have already mastered the skill and are applying this to show their depth of understanding.

Fluency activities exploring the processes involved in multiplying 3 numbers using models and images to support understanding.

Questions that encourage the children to use their reasoning skills to spot and explain the odd one out or why a statement about multiplying 3 numbers maybe always, sometimes or never true.

Problem solving task that requires children to use and apply their knowledge of the associative law and the commutative nature of multiplication when multiplying 3 numbers.

	**The Wrong End:** Discuss the concept cartoon. One robot says that it doesn't matter which way round you do multiplication questions, you will still get the same answer. The other robot says that you have to work from the left to the right. Who is correct? Can the children see that multiplication can be done in any order?	

Exploreit

Makeit: Children design a build their own weird and wonderful Multiplication Machines from recycled materials. Can they make parts of it move? It could then be used as part of a maths display or working wall.

Investigateit: Children investigate what happens if you multiply more than three numbers together. Can multiplication be worked out in any order when multiplying more than three numbers?

Playit: The children play this **BBC Factors and Multiples** game to practise identifying factors and multiples of numbers.