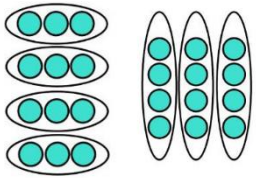
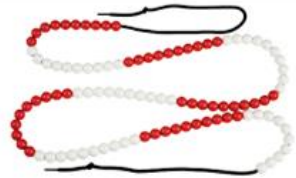
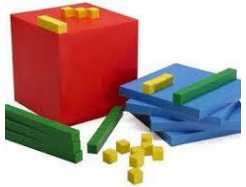
St Joseph's Calculation Policy (Simplified)





CONCRETE
PICTORIAL
ABSTRACT



Our Calculation Policy

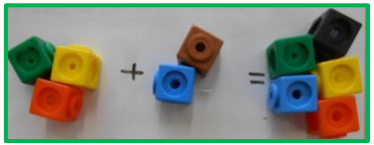
Become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately. In order to achieve this, we need to provide opportunities for children to investigate numbers by counting, cardinality (how many there are in the group), comparison and composition. They need to practise decomposing and recomposing numbers, recalling number bonds and multiplication tables to improve mathematical fluency.

Reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language. The conversations we have and questions we ask are key to developing reasoning skills. We can ask children to describe, explain, convince others, justify and prove to promote their reasoning skills. Adults can support children to develop reasoning by modelling, using mathematical language, using sentence stems, group work, Cooperative learning, understanding how others work and making personal notes and recordings.

Can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions. Activities should be provided where children can solve number problems, practical problems and missing number problems. Problem solving is not just about solving the problem, it is about how they solved the problem. What strategies and mathematical concepts did they use? All pupils should have the opportunity to apply their mathematics to solve problems. The use of mathematical language, modelling and the bar model can all help support children to develop their problem solving skills. Higher attaining children need to solve problems that require more demanding reasoning and problem solving skills rather than harder numbers.

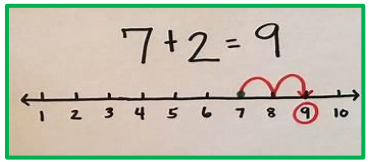
Addition

Addition starts by adding objects

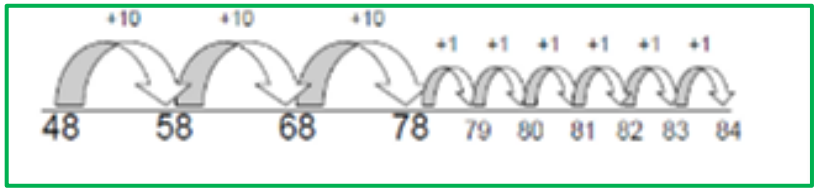


Bead string

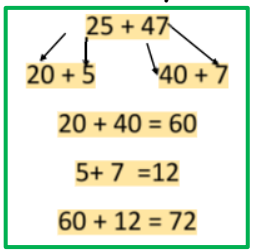
Number line (Manipulatives and then onto jottings)



Empty number line (jottings)

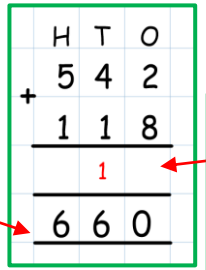


For larger numbers we regroup horizontally (Partitioning) Y2 and beyond



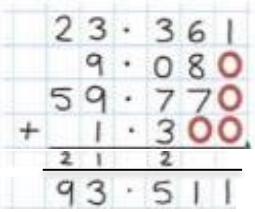
	200	+	60	+	3
+	100	+	10	+	9
	300	+	70	+	12
	300	+	80	+	2

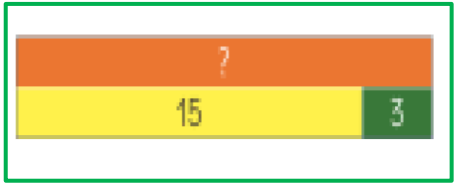
Column addition with exchange box Y3 and beyond.



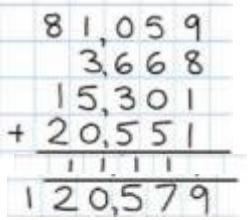
Answer box

Exchange box/row for exchanges/ regrouping



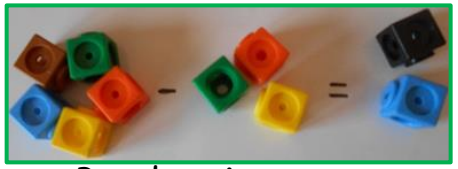


Bar model representative

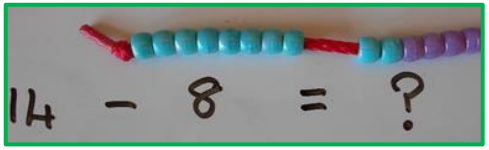


Subtraction

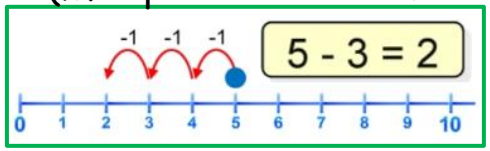
Subtraction starts with taking away objects



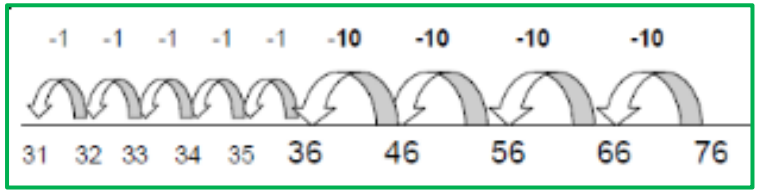
Bead string



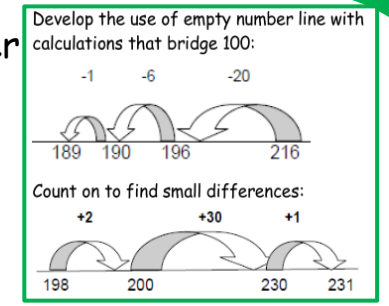
Number line (Manipulatives and then onto jottings)



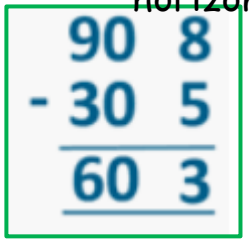
Empty number line (jottings)

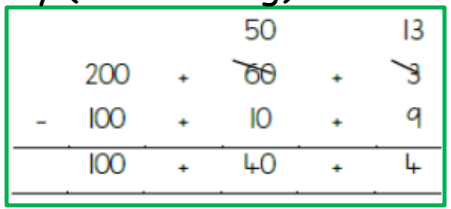


Empty number lines that bridge 100

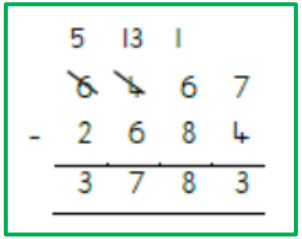


For larger numbers regroup horizontally (Partitioning)





Then vertically until we eventually progress to exchanging (Column method for exchanging) Y3 and beyond

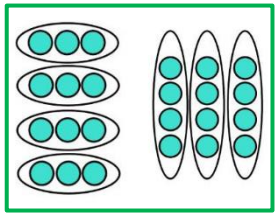


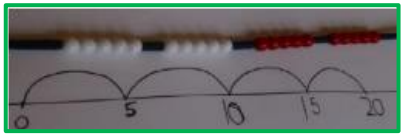
Multiplication

First, we group objects as a representation

Bead string

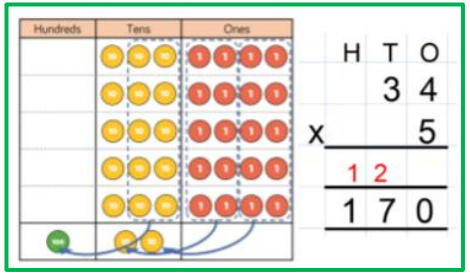
Arrays





Number line and onto an empty number line to show as repeated addition (manipulatives and jottings)

Place value chart alongside short multiplication (Y3-4)

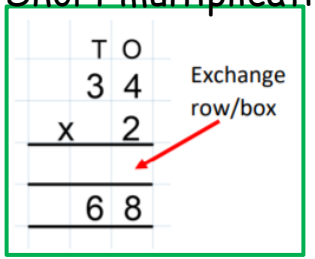


Grid method/Area model

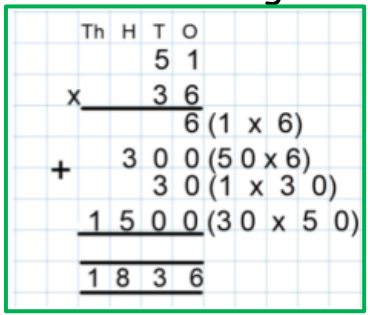
Grid method		
X	30	6
4	120	24

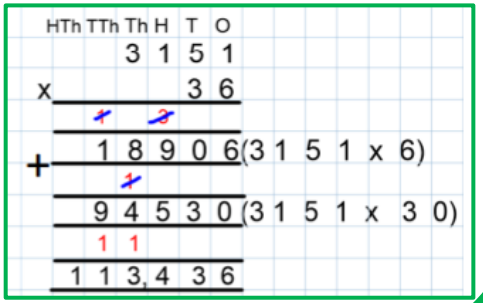
36
x 4
24 (6 x 4)
120 (30 x 4)
144

Short multiplication (Y3-4)



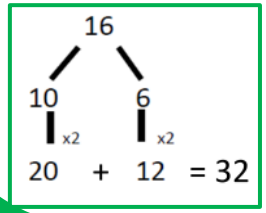
Long multiplication (Y5 and beyond)

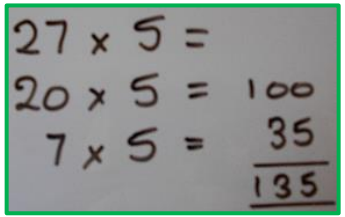




(Expanded version)

Partitioning method

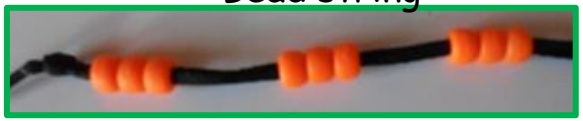




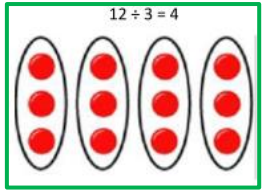
Division

Division begins with sharing

Bead string

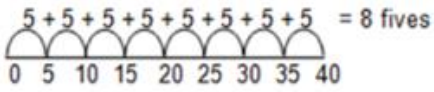


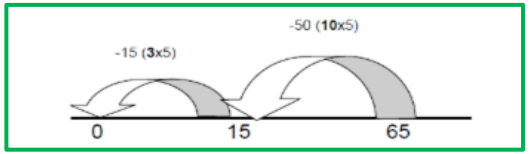
Sharing using arrays



Number line and onto an empty number line to show as repeated addition and subtraction (manipulatives and jottings)

Example without remainder:
40 ÷ 5
Ask "How many 5s in 40?"

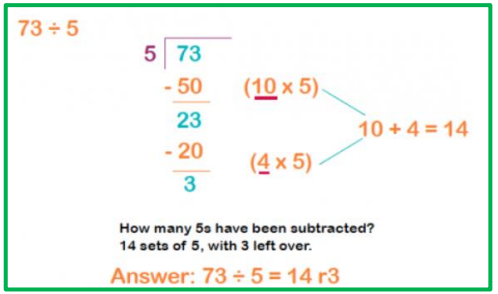


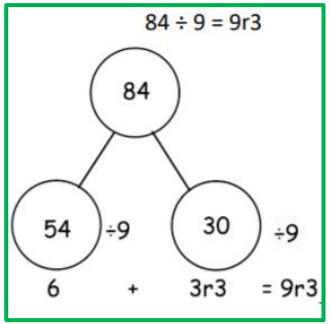


Division using bar models

8 ÷ 4 = 2

Chunking

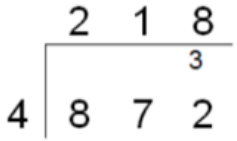




Partitioning to aid division Y3 and beyond

Short division Y4 and beyond

Begin with divisions that divide equally with no remainder.



Move onto divisions with a remainder.