

What is Mental Maths?

At Samson PS our whole school focus is Mental Maths. When we solve maths problems using our knowledge of numbers and how they work together. We think of the numbers in our minds and use different strategies to calculate the answers. Try these at home with your child. Most of these strategies can be used from Pre-Primary to Year 6.

Mental maths is not always quick. It can take a long time to work out the answer.

There are different mental maths strategies.

Basic Facts

$$5+5=10 \quad 17+3=20 \quad 10+3=13 \quad 16+4=20$$

Skip Counting

$$2,4,6,8,10 \quad 5,10,15,20,25 \quad 10,20,30,40,50$$

Counting On

$$45 \ 46 \ 47 \ 48 \ 49 \ 50 \ 51 \ 52 \ 53 \ 54 \ 55 \ 56 \ \dots$$

Counting Back

$$34 \ 33 \ 32 \ 31 \ 30 \ 29 \ 28 \ 27 \ 26 \ 25 \ 24 \ 23 \ 22\dots$$

Doubling/Halving This helps us to work with Compatible Numbers

Front Loading Partition numbers into different parts.

Compensating Give some from one number to another to make numbers easier to work with.

Imagine a Number Line Imagine a Number Line and count on or back.

Use Compatible Numbers Use number bonds for 5, 10, 20, 50 and 100

Bridge to 10 Change numbers into multiples of tens.

Partitioning Numbers: Part Part Whole Numbers are made up of parts. Knowing the different parts of numbers helps us to work with Compatible Numbers, Compensate, Front Load and Bridge to 10.

Factors Use what you know about the factors of numbers.

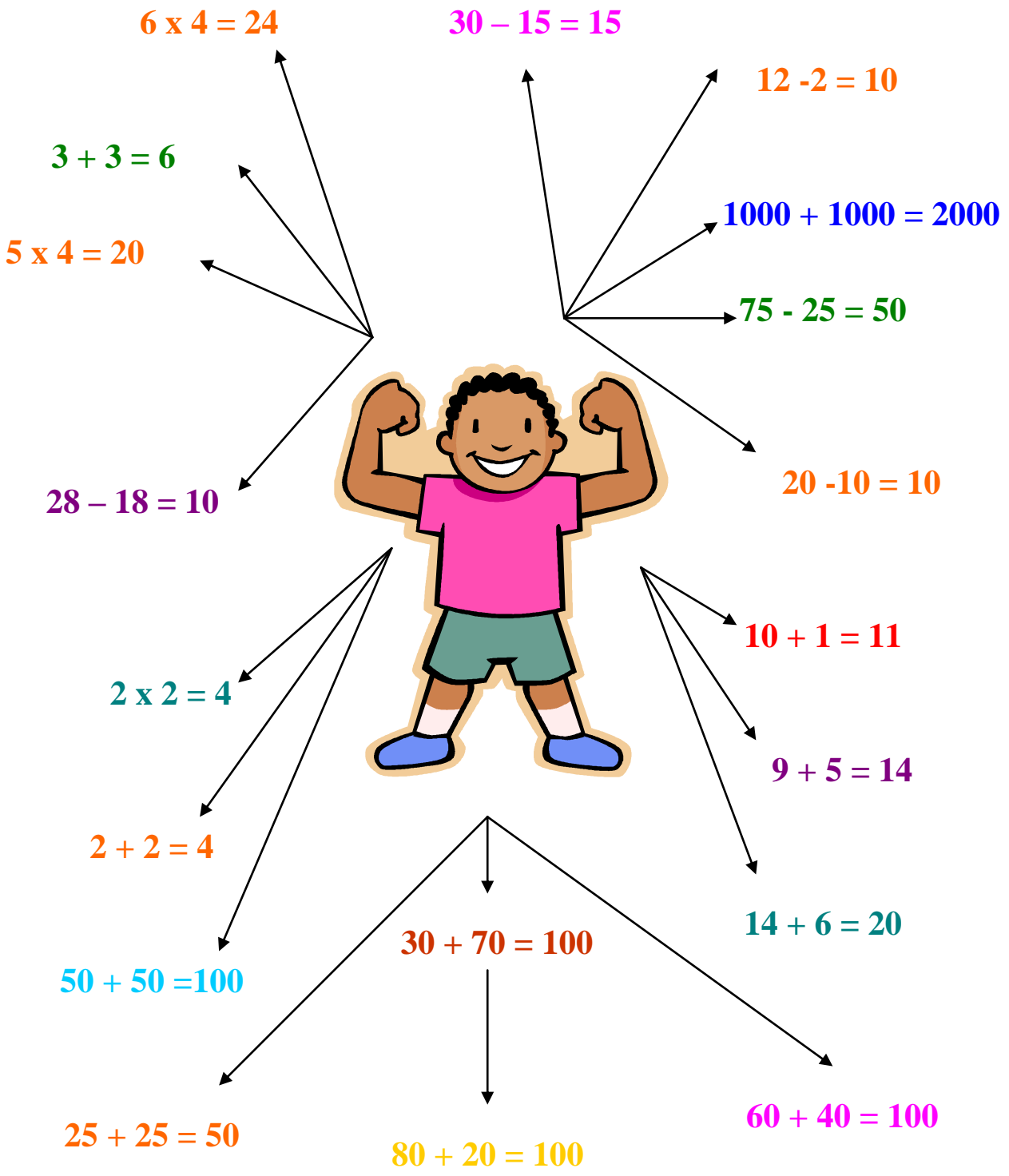
$$4 \times 14 = 2 \times 2 \times 14 = 2 \times 28 = 56 \quad 3 \times 18 = 3 \times 3 \times 6 = 9 \times 6 = 54$$

Multiply in Parts Partition numbers and multiply in parts.

Use Relationships Use the inverse relationship between addition, subtraction; multiplication and division.

Basic Facts

Remembering **Basic Number Facts** helps us to work with numbers quicker and with ease. Different people remember different number facts. How many number facts can you remember?



Skip Counting

Let's skip
count by 2's!

2 4 6 8 10 12
14 16 18...

We can skip
count lots of
things...like our
pencils, Lego,
counters...



Count forwards and backwards in 2s

2 4 6 8 10 12 14 16 18 20 22

Count forwards and backwards in 5s

5 10 15 20 25 30 35 40 45 50 55 60 65 70
75 80 85 90 95 100 105 110

**Count forwards and backwards in 10s starting from
different points**

10 20 30 40 50 60 70 80 90 100
8 18 28 38 48 58 68 78 88 98 108

Count forwards and backwards in 100s

100 200 300 400 500 600 700 800

Try skip counting by any number starting from different places on the number line!

Counting On

Count on in ones from the **biggest number** to calculate an addition number sentence.

$$34+9=$$

34 35 36 37 38 39 40 41 42 43

$$8+57=$$

57 58 59 60 61 62 63 64 65

$$67+13=$$

67 68 69 70 71 72 73 74 75 76 77 78 79 80

$$8+7=$$

8 9 10 11 12 13 14 15

Remember to keep the **biggest number** in your memory and then to carefully count along the number line to stop at the second number.

$$15 + 6$$

Keep the first number in your memory

Count along the number line 6 spaces and then stop

15 16 17 18 19 20 21

Counting Back

Count back in ones from the biggest number to calculate a subtraction number sentence.

$$23 - 8 =$$

23 22 21 20 19 18 17 16 15

$$57 - 6 =$$

57 56 55 54 53 52 51

$$68 - 12 =$$

68 67 66 65 64 63 62 61 60 59 58 57 56

$$121 - 12 =$$

121 120 119 118 117 116 115 114 113 112 111 110 109

Remember to keep the biggest number in your memory and then to carefully **count back** along the number line to stop at the second number.

$$13 \quad - \quad 6$$

Keep the first
number in your
memory

Count back along
the number line 6
spaces and then
stop



13 12 11 10 9 8 7

Front Loading

+ Addition +

Partition numbers into thousands, hundreds, tens and ones and then calculate the answer

$$\begin{array}{r} 23+24= \\ \swarrow \downarrow \downarrow \searrow \\ 20+3+20+4= \\ 40+7= \\ 47 \end{array}$$

$$\begin{array}{r} 145+52= \\ \swarrow \downarrow \downarrow \downarrow \searrow \\ 100+40+5+50+2= \\ 100+90+7= \\ 197 \end{array}$$

$$\begin{array}{r} 128+145= \\ \swarrow \downarrow \downarrow \downarrow \searrow \\ 100+20+8+100+40+5= \\ 200+60+13= \\ 273 \end{array}$$



Remember to add the hundreds, the tens and the ones together. Don't forget any of the numbers! **Front Loading** can be used as a mental maths strategy by itself and when using other strategies like **counting on**.



Front Loading



- Subtraction -

Partition numbers in hundreds, tens and ones and then calculate the answer.

$$\begin{array}{r} 45 - 32 = \\ \swarrow \quad \searrow \quad \downarrow \quad \downarrow \\ 40 \quad 5 \quad 30 \quad 2 \end{array}$$

$$\begin{array}{r} 40 - 30 = 10 \\ 5 - 2 = 3 \end{array}$$

$$10 + 3 = 13$$

$$45 - 32 = 13$$

$$\begin{array}{r} 96 - 43 = \\ \swarrow \quad \downarrow \quad \downarrow \quad \searrow \\ 90 \quad 6 \quad 40 \quad 3 \end{array}$$

$$\begin{array}{r} 90 - 40 = 50 \\ 6 - 3 = 3 \end{array}$$

$$50 + 3 = 53$$

$$96 - 43 = 53$$

$$\begin{array}{r} 237 - 112 = \\ \swarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \searrow \quad \searrow \\ 200 \quad 30 \quad 7 \quad 100 \quad 10 \quad 2 \end{array}$$

$$\begin{array}{r} 200 - 100 = 100 \\ 30 - 10 = 20 \\ 7 - 2 = 5 \end{array}$$

$$100 + 20 + 5 = 125$$

$$237 - 112 = 125$$

$$\begin{array}{r} 1534 - 1321 = \\ \swarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \searrow \quad \searrow \\ 1000 \quad 500 \quad 30 \quad 4 \quad 1000 \quad 300 \quad 20 \quad 1 \end{array}$$

$$1000 - 1000 = 0$$

$$500 - 300 = 200$$

$$30 - 20 = 10$$

$$4 - 1 = 3$$

$$200 + 10 + 3 = 213$$

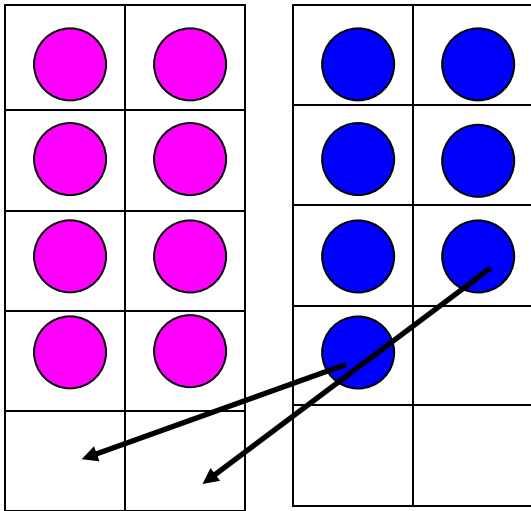
$$1534 - 1321 = 213$$



Compensate

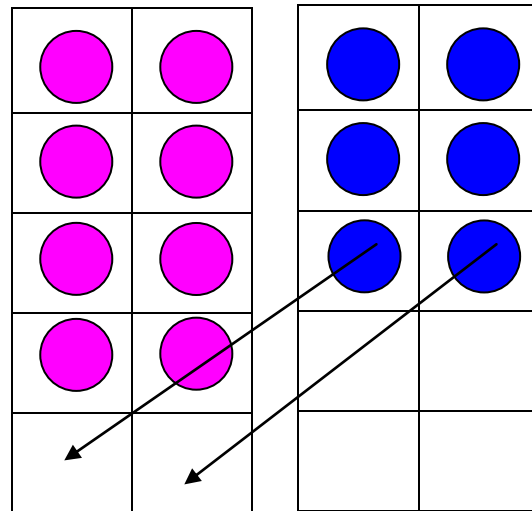
Give some from 1 number to another to make multiples of 10 and 5 because these numbers are easier to work with.

$$8 + 7 \text{ is } 10 + 5$$



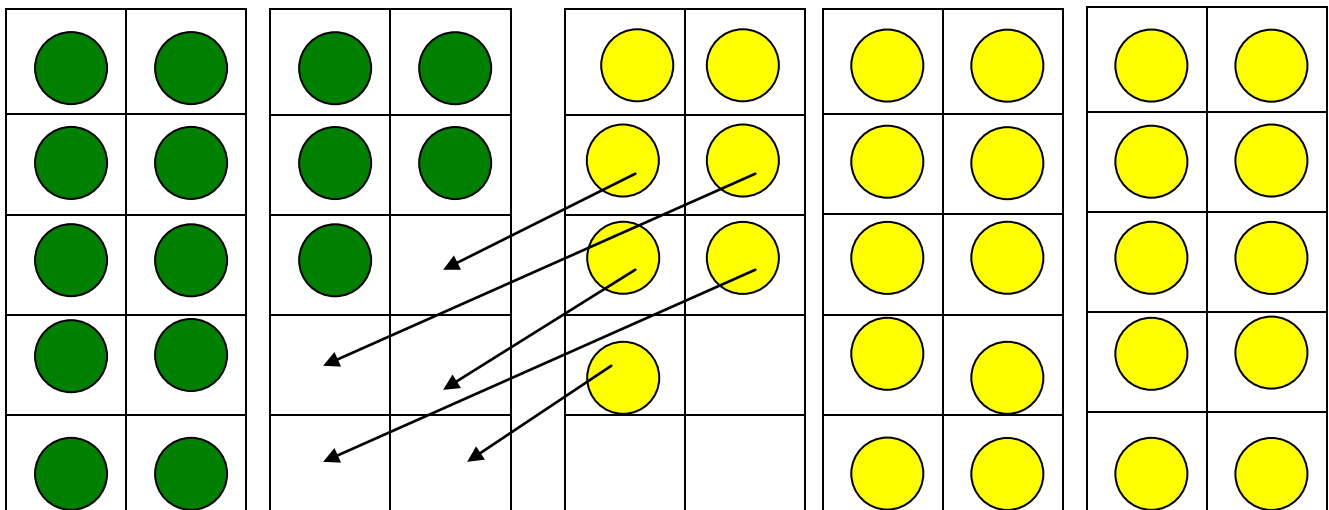
Move 2 from 7 to the 8.
This will make 10.

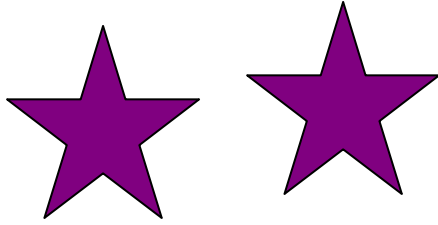
$$6 + 8 \text{ is } 10 + 4$$



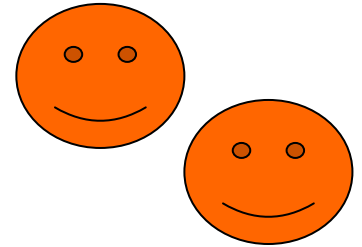
Move 2 from the 6 to the 8.
This will make ten

$$15 + 27 \text{ is the same as } 20 + 22 = 42$$





Doubling



When you double a number you add it together.

Doubling 1 $1+1=2$

Doubling 3 $3+3=6$

Doubling 5 $5+5=10$

Doubling 7 $7+7=14$

Doubling 9 $9+9=18$

Doubling 11 $11+11=22$

Doubling 2 $2+2=4$

Doubling 4 $4+4=8$

Doubling 6 $6+6=12$

Doubling 8 $8+8=16$

Doubling 10 $10+10=20$

Doubling 12 $12+12=24$

Halving

When you half a number you break it into 2 equal parts.
It is helpful to half even numbers.

Half of 2 = 1

Half of 6 = 3

Half of 10 = 5

Half of 14 = 7

Half of 18 = 9

Half of 4 = 2

Half of 8 = 4

Half of 12 = 6

Half of 16 = 8

Half of 20 = 10

Knowing the doubles of numbers helps you to half them as well.

Doubling and **Halving** helps us to calculate maths problems quicker by using different mental maths strategies like **compensate** and **bridging**!

Imagine a Number Line

Imagine a number line and make jumps along it in nice numbers to solve the problem.

$$45-34= \quad \begin{array}{c} 6 \quad 5 \\ 34 \longrightarrow 40 \longrightarrow 45 \end{array} \quad 6+5=11$$

$$89-32 \quad \begin{array}{c} 8 \quad 10 \quad 10 \quad 10 \quad 10 \quad 9 \\ 32 \longrightarrow 40 \longrightarrow 50 \longrightarrow 60 \longrightarrow 70 \longrightarrow 80 \longrightarrow 89 \end{array}$$
$$10+10+10+10+8+9=57$$

$$75-54 \quad \begin{array}{c} 6 \quad 10 \quad 5 \\ 54 \longrightarrow 60 \longrightarrow 70 \longrightarrow 75 \end{array} \quad 10+6+5=21$$

We can use Imagine a Number Line with other maths strategies like Compensate and Use Relationships.

$$23+35= \quad \begin{array}{c} 3 \\ \text{is the same as } 20 + 38 \end{array}$$

Give the 3 from 23 to the 35 to make 38 and then **imagine a number line** by adding on the 20.

$$\begin{array}{c} 10 \quad 20 \\ 38 \longrightarrow 48 \longrightarrow 58 \end{array}$$

$$46+13= \quad \begin{array}{c} 3 \\ \text{is the same as } 49 + 10 \end{array}$$

Give the 3 from 13 to 46 to make 49 and then **imagine a number line** by adding on the 10

$$\begin{array}{c} 10 \\ 49 \longrightarrow 59 \end{array}$$

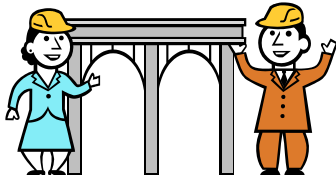
Compatible Numbers

Compatible Numbers work together to make maths problems easier.
Compatible numbers make number bonds to 10, 20, 50 and 100

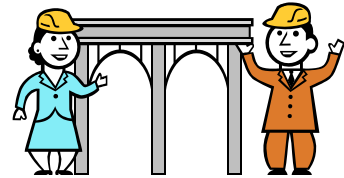
$$5+5=10 \quad 7+3=10 \quad 8+2=10 \quad 9+1=10 \quad 4+6=10$$

$$19+1=20 \quad 13+7=20 \quad 12+8=20 \quad 11+9=20 \quad 15+5=20$$

$$25+25=50 \quad 35+15=50 \quad 45+5=50 \quad 20+30=50$$



Bridging



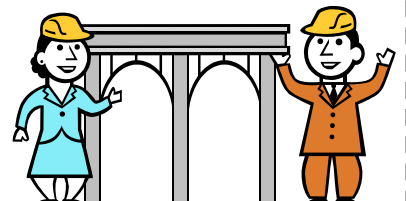
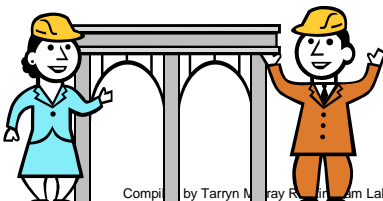
When **bridging** numbers you add or subtract from the numbers in a problem to make it easier to solve. **Bridging** to multiples of 10 helps to make maths problems easier to solve mentally.

Bridge to 30
Take 2 from 34 and
give it to 28

$$34 + 28 = 32 + (28+2) = 32+30= 62$$

Bridge to 40
Take 3 from 55 and
give it to 37

$$37 + 55 = (3+37) +52 = 40+52=92$$



Multiply in Parts

Multiplying in parts helps us to work with smaller numbers. It helps us to use **basic number facts** and **compatible numbers** to solve multiplication problems mentally.

$$32 \times 6 = \quad 30 \times 6 = \underline{180} \text{ and } 2 \times 6 = \underline{12} \quad 180 + 12 = 192$$

$$5 \times 63 = \quad 60 \times 5 = \underline{300} \text{ and } 3 \times 5 = \underline{15} \quad 300 + 15 = 315$$

$$\begin{aligned} 23 \times 18 = \quad 20 \times 10 = \underline{200} \text{ and } 20 \times 8 = \underline{160} \quad 200 + 160 = 360 \\ 3 \times 10 = \underline{30} \text{ and } 3 \times 8 = \underline{24} \quad 30 + 24 = 54 \\ 360 + 54 = 414 \end{aligned}$$

Multiplying in parts means we can also **half and double** numbers to make multiplication easier.

$$24 \times 6 \quad \text{half of 24 is 12} \quad 12 \times 6 = 72 \quad 72 + 72 = 144$$

$$18 \times 7 \quad \text{half of 18 is 9} \quad 9 \times 7 = 63 \quad 63 + 63 = 126$$

$$14 \times 8 \quad \text{half of 14 is 7} \quad 7 \times 8 = 56 \quad 56 + 56 = 112$$

$$16 \times 5 \quad \text{half of 16 is 8} \quad 8 \times 5 = 40 \quad 40 + 40 = 80$$

Use Relationships

Number Families

Knowing the **relationship** between addition and subtraction; division and multiplication helps us to work with numbers when we solve number stories and number sentences.

$13+7=20$

$7+13=20$

$20-7=13$

$20-13=7$

$5\times 3=15$

$3\times 5=15$

$15-3=5$

$15-5=3$

Number Families help us to solve hidden number problems

$28 - \square = 4$ is the same as $28 - 4 = \square$

$\square + 56 = 121$ is the same as $121 - 56 = \square$

$\square - 19 = 5$ is the same as $19 + 5 = \square$

$9 \times \square = 63$ is the same as $63 - 9 = \square$

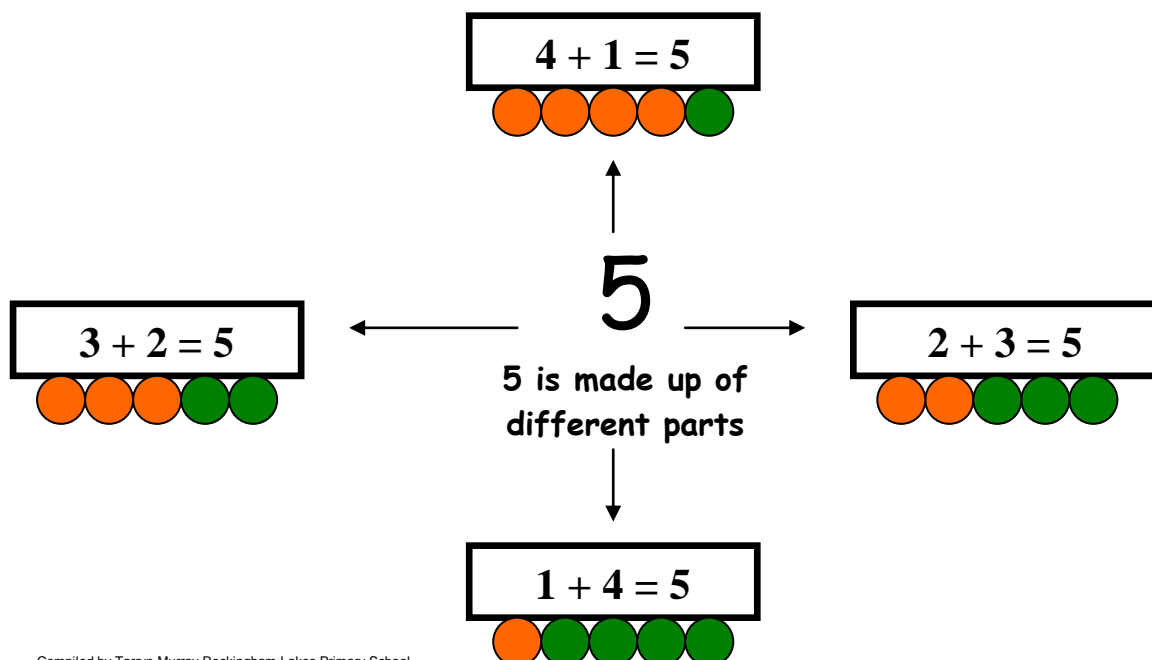
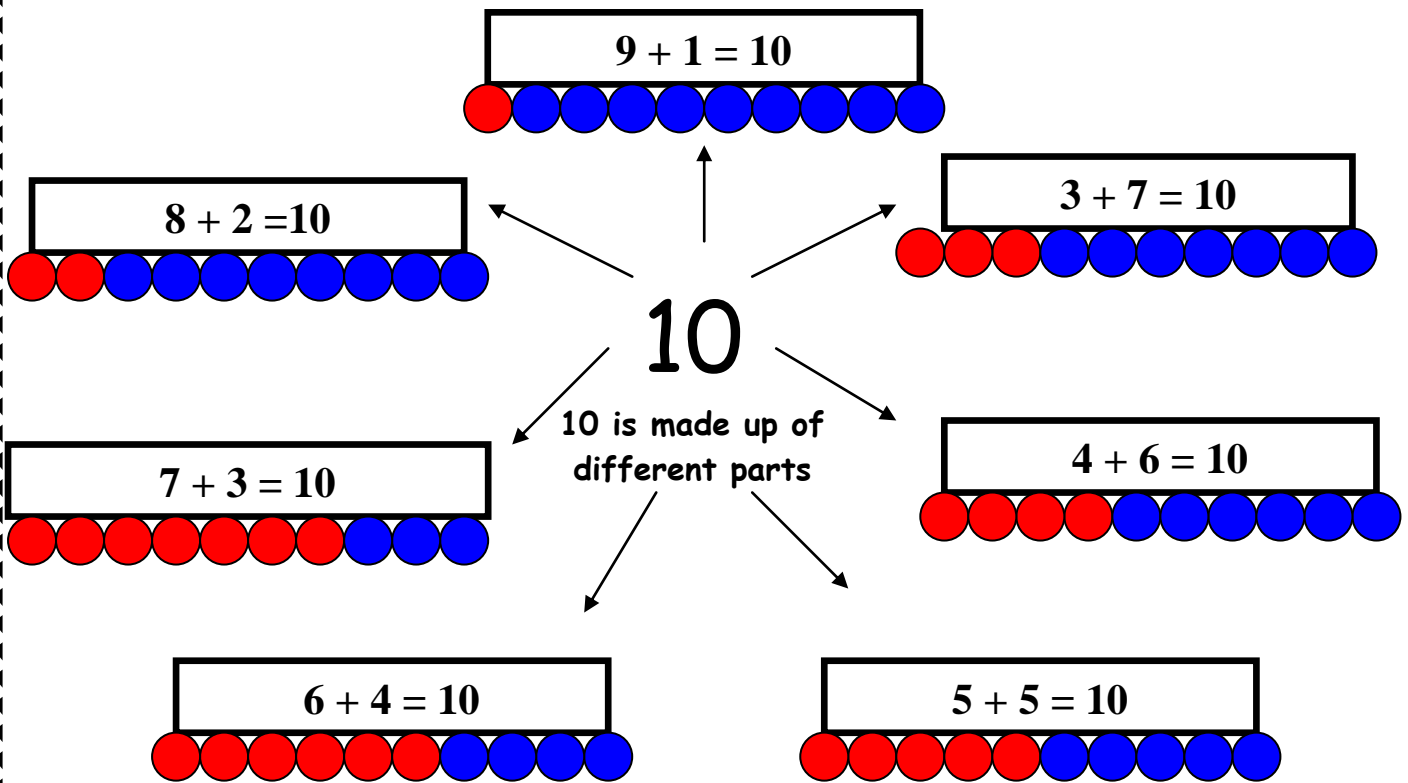
$\square \div 5 = 4$ is the same as $4 \times 5 = \square$

We can work out hidden numbers by using the **relationships** between number operations to rewrite number sentences into calculator number sentences.

Partitioning Numbers

Part Part Whole

Numbers are made up of **parts** to make a **whole**. Knowing the different **parts** of numbers helps us to use other mental maths strategies like **Compensate**, **Bridging** and **Use Relationships**. It is helpful to know the partitions for numbers 5, 10, 20, 50 and 100.



Use Counting On to Solve

Subtraction Sums

We can solve subtraction number sentences by Counting On instead of counting back. Sometimes Counting On makes it easier to solve a subtraction problem.

$$17 - 14 = 3$$

Instead of Counting Back

17 16 15 14 13 12 11 10 9 8 7 6 5 4 3

it is easier and quicker to Count On

Start at 14 and stop at 17

14 15 16 17



$$25 - 16 = 9$$

Instead of Counting Back

25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9

It is easier and quicker to Count On

Start at 16 and stop at 25

16 17 18 19 20 21 22 23 24 25



$$39 - 23 = 16$$

Instead of Counting Back

39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16

It is easier and quicker to Count On

Start at 23 and stop at 39

23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39



NO COUNTING BACK ZONE



Place Value

Addition & Subtraction



Partition numbers into different combinations of thousands, hundreds, tens and ones to make it easier and quicker to calculate number sentences

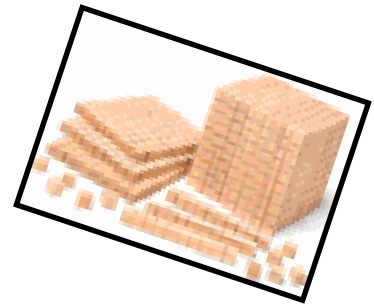
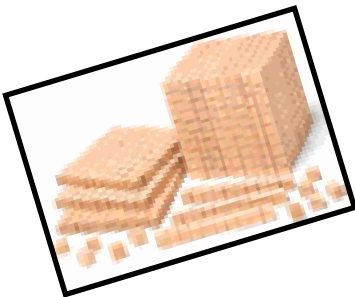
$$319 - 46$$

31 tens 9 ones 4 tens 6 ones

$$31 \text{ tens} - 4 \text{ tens} = 27 \text{ tens}$$

$$9 \text{ ones} - 6 \text{ ones} = 3 \text{ ones}$$

$$= 273$$



$$132 + 43 =$$

13 tens 2 ones 4 tens 3 ones

$$13 \text{ tens} + 4 \text{ tens} = 17 \text{ tens}$$

$$2 \text{ ones} + 3 \text{ ones} = 5 \text{ ones}$$

$$= 175$$

Place Value Addition and Subtraction is similar to **Frontloading** except the numbers are partitioned into different place value parts