Mathematical Language

Words linked to +

add, addition, and, count on, plus, sum, more, altogether, increase

Words linked to -

take away, subtract, subtraction, count back, minus, less, decrease, difference between

Words linked to x

multiply, multiplication, multiple, double, array, times, lots of

Words linked to ÷

group, divide, division, divided by, divisible, factor, share, half, halve, remainder, quotient

Words linked to =

equals, makes, same as

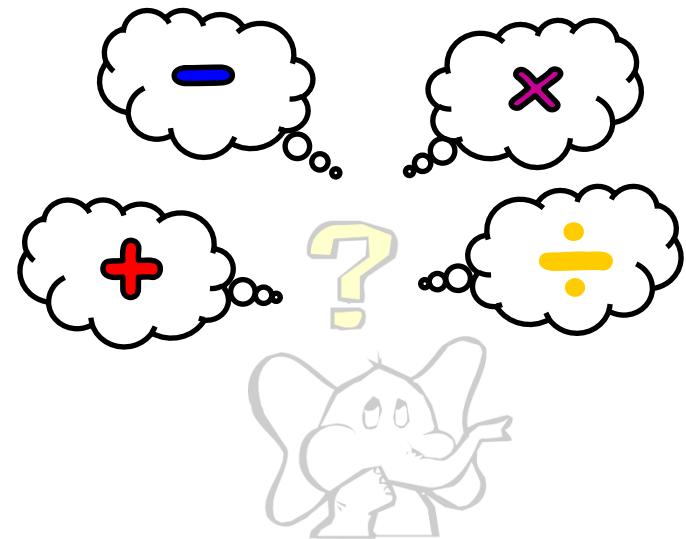|	
Number sentence	e.g. 2 + 4, 5 – 3, 6 x 3, 12 ÷ 3
Partition	splitting a number up e.g. 123 … 100 + 20 + 3
Recombine	putting a number back together e.g. 100 + 20 + 3 … 123
Bridging	crossing over 10/100 etc
Exchanging	e.g. swapping a 10 for 10 ones
Place value	the value of each digit in a number e.g. hundreds, tens and ones (units)

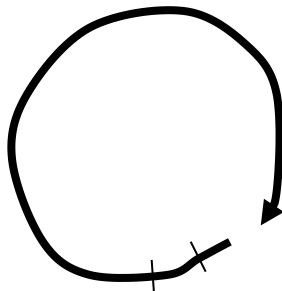# Progression in Calculations

A Learning Guide

All children will develop efficient methods of calculation with all four operations choosing an appropriate method (mental, mental with jottings, written, calculator) to solve a range of different problems.

Children develop at different rates. It is important that they develop a mathematical understanding, a feel for number, NOT just learn a mechanical method that is prone to error.

Did you know that if you bend a number line around it could make the face of a clock or the dial on a pair of scales?

three 3

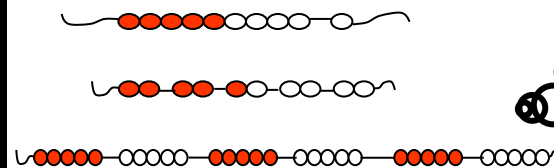Recognise, read and write numbers

1 ten   3 ones

13 thirteen

Know what numbers mean. Understand place value

Count on and back in steps of the same size

Put numbers in order

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

40   8
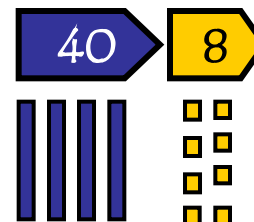
Partition a number and recombine it

Addition

HEADS first!
Estimate.
Don't move on until you understand.

Go back if you need to.

Know your number bonds.
Pairs of numbers that make 10 or 20

1 9   2 8   3 7   4 6   5 5
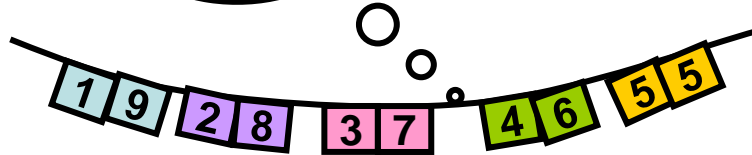
Number Bonds

$1 + 9 = 10$

$9 + 1 = 10$

$2 + 8 = 10$

$8 + 2 = 10$

$3 + 7 = 10$

$7 + 3 = 10$

$4 + 6 = 10$

$6 + 4 = 10$

$5 + 5 = 10$

Know that addition is counting on and that it can be done in any order

$1 + 2 = 3$ $2 + 1 = 3$

$2 + 5 = 7$ 2 count on 5

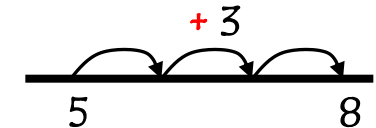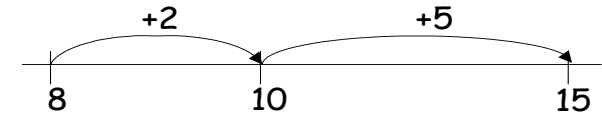$5 + 2 = 7$ 5 count on 2

Add single digit numbers
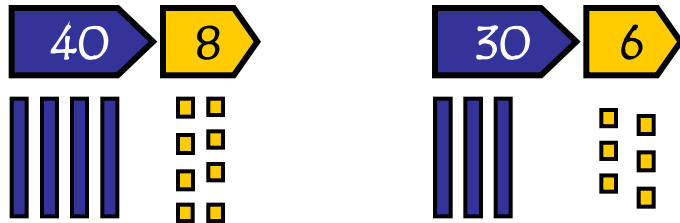• below 10
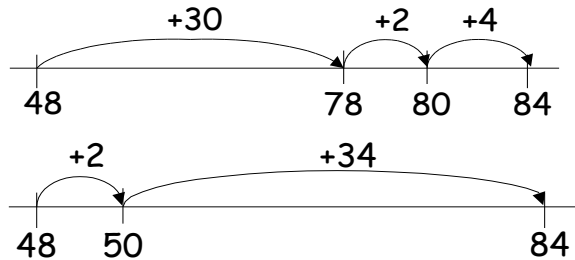• then crossing over (bridging) 10

$3 + 5$

+ 3

5   8

$8 + 7 = 15$

+2   +5

8   10   15

BIGGEST number first

Add two two-digit numbers
a) using a numberline

b) by partitioning & recombining

+30   +2   +4

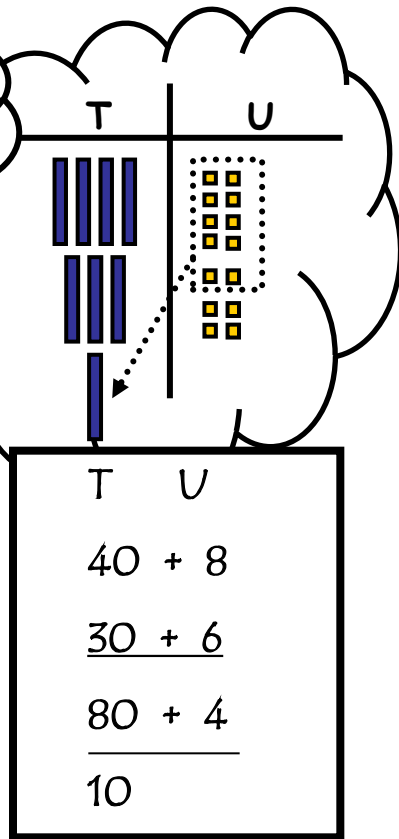48   78   80   84

+2   +34

48   50   84

40   8   30   6

40 + 30 + 8 + 6

40 + 30 = 70

8 + 6 = 14

70 + 14 = 84

Expanded Method
(A stepping stone
to the column
method)

T   U

48 + 36

48
+ 36

T   U

40 + 8

30 + 6

80 + 4

10

Column
Method

THINK!
Is the
answer
sensible?

4 8
+ 3 6

8 4
1

Subtraction

HEADS first! Estimate. Don't move on until you understand.

Go back if you need to.

Know subtraction facts for numbers up to 10 and 20

Number Bonds

$10 - 1 = 9$

$10 - 9 = 1$

$10 - 2 = 8$
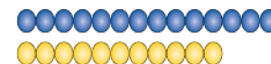
$10 - 8 = 2$

$10 - 3 = 7$

$10 - 7 = 3$

$10 - 4 = 6$

$10 - 6 = 4$

$10 - 5 = 5$
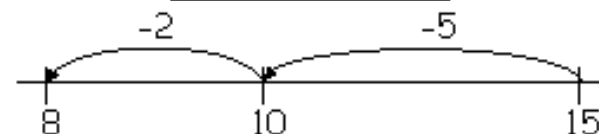
Find the difference between numbers

The difference is?

The difference between 11 and 14 is 3.
$14 - 11 = 3$
$11 + \square = 14$

Subtract single digit numbers
• below 10
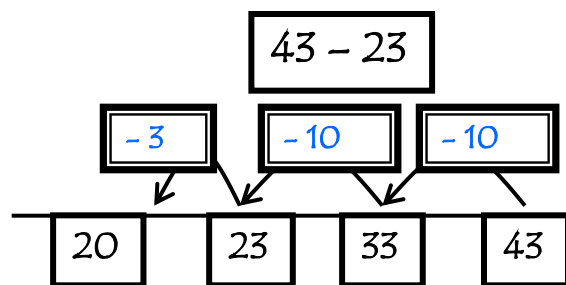• then crossing through (bridging) 10

$15 - 7 = 8$

-2 -5
8   10   15

Biggest number FIRST

Subtracting two-digit numbers
a) taking away on a numberline

b) by partitioning the number to be taken away

$43 - 23$

-3 -10 -10

20 23 33 43

$43 - 27 = 16$

4 3   20 7

$43 -$ 20 7
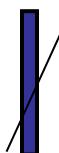
$43 - 20 = 23$
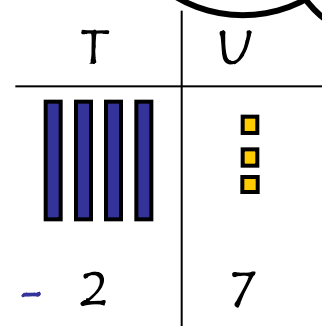
$23 - 7 = 16$

Expanded Method
(A stepping stone to the column method)

$43 - 27 = 16$

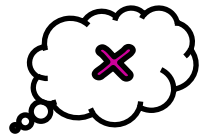to subtract 7 units
we need to exchange
a ten for ten units

T | U

$-$ 2 | 7

$^{30}4̶0̶$ $+$ $^{10}+3$

$-$ 20 $+$ 7

10   $+$ 6

Column Method

$^3 4̶ {}^1 3$

$-$ 2 7

1 6

Multiplication

HEADS first! Estimate. Don't move on until you understand.

Go back if you need to.

Do you know your times-tables to 10 x 10? Learn them they're really useful!

x 5

2 x 5 = 10

6 x 5 = 30

4 x 5 = 20

3 x 5 = 15

10 x 5 = 50

8 x 5 = 40

5 x 5 = 25

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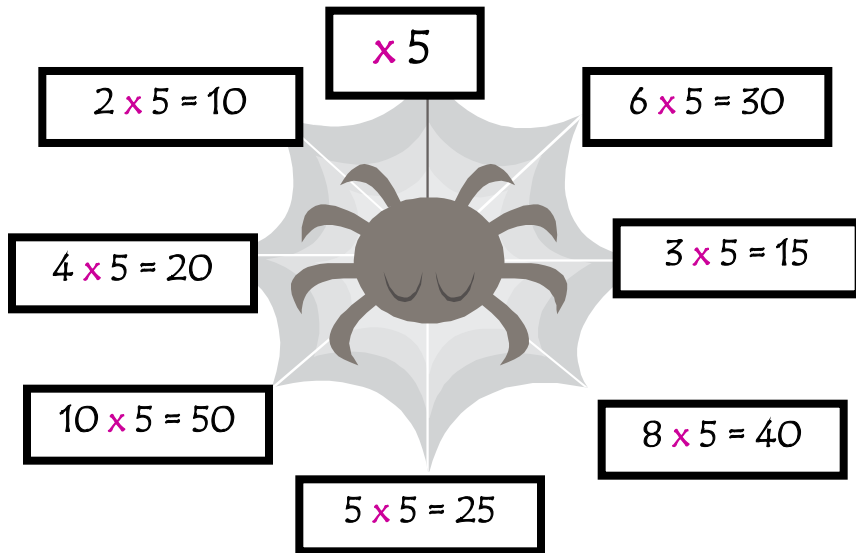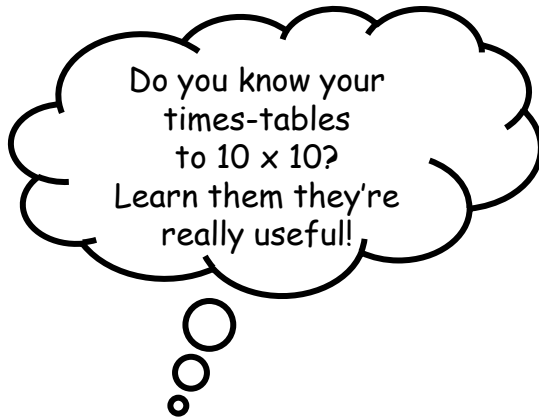
2 + 2 + 2 + 2 = 8

4 x 2 = 8

2 multiplied by 4

4 lots of 2

Know that multiplication is repeated addition

2 + 2 + 2 + 2

Set out multiplication as an array and show jumps on a number line

2×4

4×2

$2 \times 4 = 8$

$4 \times 2 = 8$

$2 \times 4 = 8$

$4 \times 2 = 8$

2 hops of 4

4 hops of 2

Division

Do you know your division facts? Learn them they're really useful!

HEADS first! Estimate. Don't move on until you understand. Go back if you need to.

÷ 5

$10 ÷ 5 = 2$

$30 ÷ 5 = 6$

$20 ÷ 5 = 4$

$15 ÷ 5 = 3$

$50 ÷ 5 = 10$

$40 ÷ 5 = 8$

$25 ÷ 5 = 5$
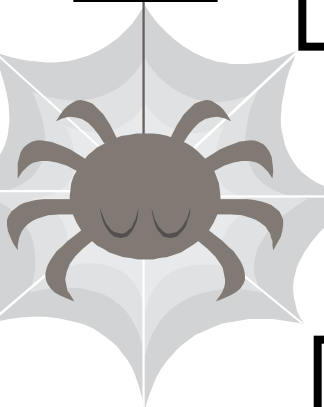
Share things out equally then begin to understand remainders

$15 ÷ 5 = 3$

15 shared between 5

Group objects to divide them and show this on a number line

18 divided into groups of 3

$18 ÷ 3 = 6$

0   3   6   9   12   15   18
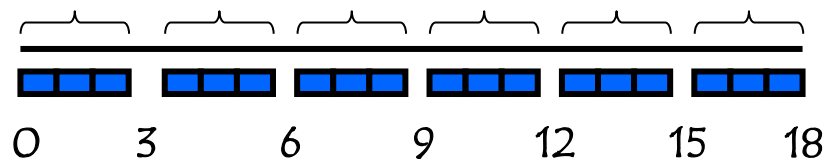
$18 ÷ 3 = 6$

$18 ÷ 6 = 3$

Understand division as repeated subtraction

18

– 3

15

– 3

12

– 3

9

– 3

6

– 3

3

– 3

0
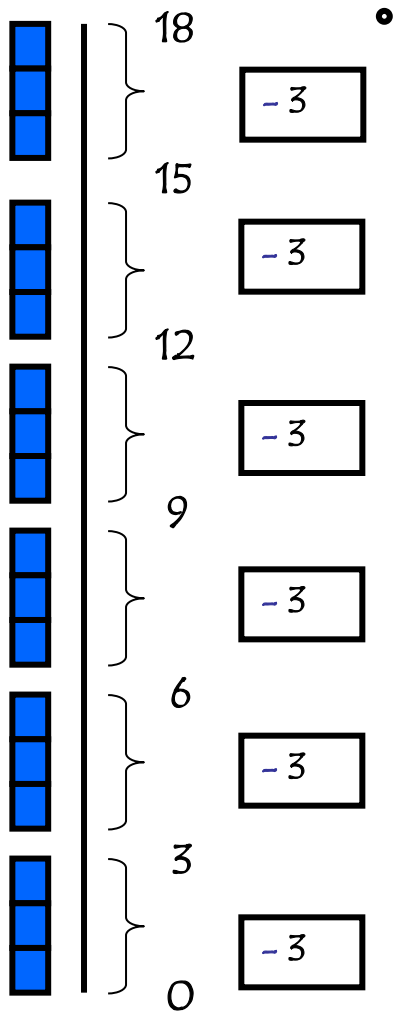
Fun activities to do at home for the Early Years
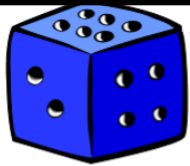
One more, one less

For this game you need a dice, a coin and some building blocks or Lego bricks

- Take turns to roll the dice.
- Build a tower with that number of blocks or bricks.
- Then toss the coin. Heads means take one brick off. Tails means add one on,
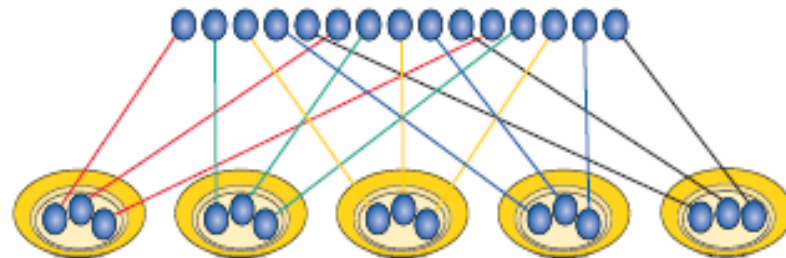- If you can guess how many bricks there will be after this, you keep them!
- The first to collect 20 bricks or more wins!

Counting

Practise counting. Start at 5, and count on from there to 11.

Start at 9, and count back from there to zero.

Choose a different starting number each time.

Roll a shape

Cut out 12 shapes.

Make 3 triangles, 3 squares 3 rectangles and 3 circles.

- Take turns to roll a dice and collect a shape that has that number of sides, e.g. roll a 4, collect a square.
- The first to have four different shapes wins.
- If you can name each shape you go first next time!

Cupboard maths

Ask your child to help you sort a food cupboard out, putting heavier items on a lower shelf and lighter items on an upper shelf.

Counting and putting numbers in order

Use old magazines, comics or greetings cards. Cut out pictures of animals, or anything else your child is interested in. Label the animals 1 to 5.

•Shuffle the animals. Put them in order from 1. to 5.
•Remove one animal. Ask your child which number is missing. Repeat with other numbers and more than one missing number.
•Ask your child to say what number comes before or after a number you choose.
When your child can do this, repeat with numbers 1 to 10.

Collections

You need something to collect, e.g. sticky shapes, dried beans.
• In turn, one player claps 1,2,3, or 4 times while the other player closes his eyes and listens.
• How many claps did you hear? Take that number of shapes.
• The first to make a pattern with 12 sticky shapes wins.

Spot the difference

Draw a row of six big coloured spots.
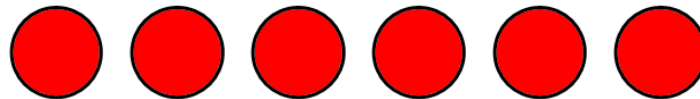
•In turn, one player closes his or her eyes.
•The other player hides some of the spots with a sheet of paper.
•The first player looks and says how many spots are hidden.
•Try with other numbers of spots, e.g. five or seven.

Rhymes

Teach your child any number rhymes or songs that you know, particularly ones that involve holding up a number of fingers, like Five little speckled frogs. Practise them regularly, with actions.

Recognising numbers

Choose a number for the week, eg. 2.
Encourage your child to look out for this number
all the time.
• Can your child see the number 2 anywhere?

at home	- in the kitchen
	- on pages in a book
in the street	- on doors
	- on car number plates
	- on buses
while out shopping	-on the shop till .
	- on shelves
	- in shop windows

• Find two apples, toys, spoons, straws, sweets, etc.
• Make patterns, such as two knives, two forks, two spoons, two knives, two forks, two spoons
• Practise writing the number 2. . . .
Choose a different number each week.

Dice game

Use a 'dotted' dice and write the numbers 1 to 6 on a sheet of paper (or use the numbered animals).
• Throw the dice. Can your child guess how many dots there are? Check by counting.
• Ask your child which number on the paper matches the dots on the dice.
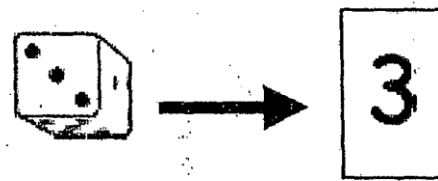
Fun activities to do at home for Year One

Secret numbers

0123458789

• Write the numbers 0 to 20 on a sheet of paper.
• Ask your child secretly to choose a number on the paper.
Then ask him /her some questions to find out what the secret
number is, e.g.
Is it less than '10?
Is it between 10 and 20?
Does it have a 5 in it?
He / she may answer only Yes or No.
• Once you have guessed the number, it is your turn to choose a number. Your child asks the questions.
For an easier game, use numbers up to 10. For a harder game, use only 5 questions, or use bigger numbers.

Shape activity

At home, or when you are out, look at the surface of shapes.
• Ask your child — what shape is this plate, this mirror, the bath mat, the tea towel, the window, the door, the red traffic light, and so on.
•Choose a shape for the week, e.g. a square.

How many of these shapes can your child spot during the week, at home and when you are out?

Dice game

You need a l—6 dice, paper and pencil,
• Take turns.
• Choose a number between 1 and 10 and write it down.
• Throw the dice and say the dice number.
•Workout the difference between the chosen number and the dice number, e.g. if you wrote down a 2 and the dice shows 5, the difference is 3.
You could also draw a number line to help your child to see the difference between the two numbers.
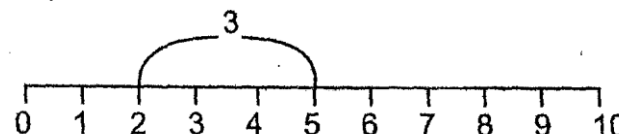
How old?

Start with your child's age. Ask your child:

How old will you be when you are 1 year older?

How old were you last year?

How old will you be 10 years from now? and so on.

Track games

Make a number track to 20, or longer. Make it relevant to your child's interests — sea World, space, monsters ... Then play games on it.

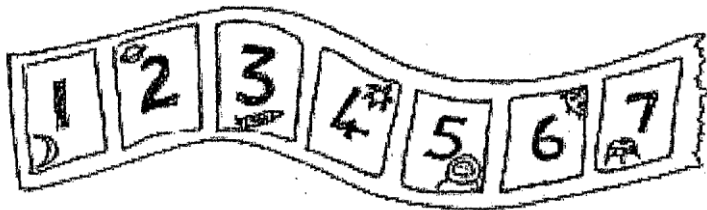• Throw a dice. Move along that number of spaces. BUT before you move, you must work out what number you will land on. If you are wrong, you don't move! The winner is the first to land exactly on 20. Now play going backwards to 1.

• Throw a dice. Find a number on the track that goes with the number thrown to make either 10 or 20. Put a counter on it, e.g. you throw a '4' and put a counter on either 6 or 16. If someone else's counter is there already, you may replace it with yours! The winner is the first person to have a counter on 8 different numbers.

Cupboard maths

• Choose two tins or packets from your food cupboard.

• Ask your child to hold one in each hand and tell you which is heavier, and which is -lighter. (Check by reading the weight on each tin or packet.)

• If he / she is right, they keep the lighter one. Then choose another item from the cupboard, trying to find one that is lighter still.

•Carry on until your child has found the lightest item in the - cupboard. It might be suitable to eat as a prize!

Takings

For this game you need a dice, and a collection of small things such as Lego bricks, sticky shapes or dried beans. You will also need a pencil and paper:.

•Take turns.

• Roll a dice. Take that number of beans. Write down the number.

• Keep rolling the dice and taking that number of beans. BUT, before you take them, you must write down your new total. For example, Sally has 7. She throws 4. She has to work out how many she will have now. She starts counting from seven:

eight, nine, ten, eleven. She writes 11.

• You can only take your beans if you are right.

• The first person to collect 20 beans win

Dicey coins

For this game you need a dice and about twenty l0p coins.

• Take turns to roll the dice and take that number of 10p coins.

• Guess how much money this is. Then count aloud in tens to check, e.g. saying ten, twenty, thirty, forty .

• If you do this correctly you keep one of the 10p pieces.

• The first person to collect £1 wins.

• *Don't forget to give the coins back!*

Car number bingo

• Each person chooses a target number, e.g. 10. Think about which pairs of numbers add to make your target.

• You have to see a car that has two numbers that add up to your target number.
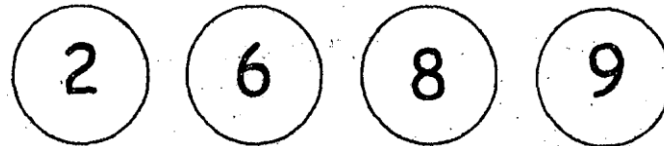
K456 XWL

•Say: 4 + 6 = 10 bingo! '

• Change the target number each week.

You can extend this activity by looking for three numbers which add up to your target number.

Adding circles

For this game, you need a dice and pencil and paper.

• Each of you should draw four circles on your piece of paper. Write a different number between 2 and 12 in each circle.

(2) (6) (8) (9)

• Roll the dice twice. Add the two numbers.

•If the total is one of the numbers in your circles then you may cross it out.

• The first person to cross out all four circles wins.

Fun activities to do at home for Year Two

Car numbers
• Each person chooses a target number, e.g. 15.
• How many car numbers can you spot with 3 digits adding up to your target number,
e.g. K456 XWL.
• So 4 + 5 + 6 = 15, bingo!

Bean subtraction

For this game you
need a dice and some dried beans or buttons.
• Start with a pile of beans in the middle. Count them.
• Throw a dice. Say how many beans will be left if you subtract that number.
• Then take the beans away and check if you were right!
• Keep playing.
• The person to take the last bean wins!

Number facts

You need a 1—6 dice.
• Take turns. Roll the dice. See how quickly you can say the number to add to the number on the dice to make 10, e.g.

and 4

If you are right, you score a point.
• The first to get 10 points wins.
You can extend, this activity by making the two numbers add up to 20, or 50.

How heavy?
You will need some kitchen scales that can weigh things in kilograms.
• Ask your child to find something that weighs close to 1 kilogram.
• Can he / she find something that weighs exactly 1 kilogram?
• Find some things that weigh about half a kilogram.

Out and about
• During a week, look outside for 'thirties' numbers, such as 34 or 38, on house doors, number plates, bus stops, etc. How many can you spot? What is the biggest one you can find?

31 39 36 35 33

• Next week, look for 'fifties' numbers, or 'sixties'...
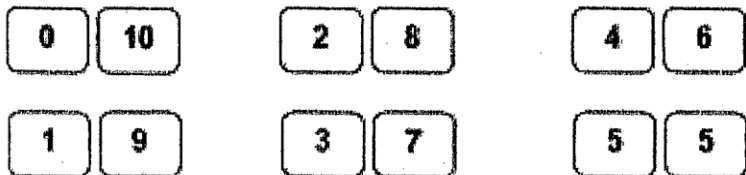
How much?
•Once a week,
tip out the small change from a purse. Count it up with your child.

Speedy pairs to 10

Make a set of 12 cards showing the numbers 0 to 10, but with two 5s.
If you wish, you could use playing cards.
• Shuffle the cards and give them to your child.
•Time how long it takes to find all the pairs to 10.

0	10		2	8		4	6
1	9		3	7		5	5

Repeat later in the week. See if your child can beat his / her time.

Guess my shape

• Think of a 2-D shape (triangle, circle, rectangle, square, pentagon or hexagon). Ask your child to ask questions to try to guess what it is..
• You can only answer Yes or No. For example, your child could ask: Does it have 3 sides? or: Are its sides straight?
• See if your child can guess your shape using fewer than five questions.
• Now ask them to choose a shape so you can ask questions.

Circle trios
Draw four circles each on your piece of paper. Write four numbers' between 3 and 18, one in each circle.

(12) (16) (8) (17)
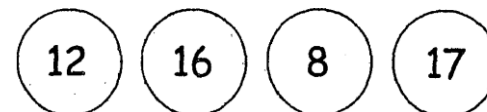
•Take turns to roll a dice three times and add the three numbers.
•If the total is one of the numbers in your circles then you may cross it out.'
•The first to cross out all four circles wins.

Shopping maths

68p
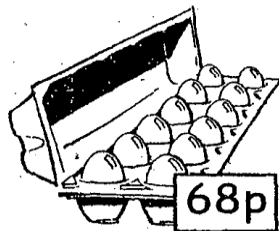
After you have been shopping, choose 6 different items each costing less than £1. Make a price label for each one, e.g. 39p, 78p. Shuffle the labels. Then ask your child to do one or more of these.
• Place the labels in order, starting with the lowest.
•Say which price is an odd number and which is an even number:
• Add 9p to each price in their head.
• Take 20p from each price in their head.
• Say which coins to use to pay exactly for each item.
• Choose any two of the items, and find their total cost.
• Work out the change from £1 for each item..

Board games

Make a board like this.
The numbers are arranged differently from usual, but the games will, still work if you use a normal snakes and ladders board.

• Roll a dice twice. Add the two numbers.
• Move along that number of spaces. Before you move, you must work out what number you will land on.
• If you are wrong, you don't move!
•The first to the end of the board wins.
For a change, you could roll the dice and move backwards. Or you could roll the dice once, then move the number that goes with your dice number to make 10, e.g. throw a 3, move 7.