Welcome!!

- While you are waiting……..

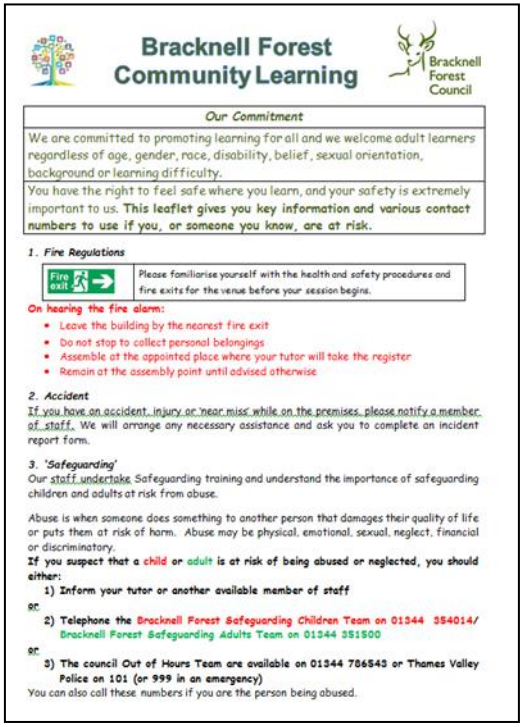
- Count out 150 matchsticks
- Use loom bands to make a few bundles of 10
- Don't bundle up all the matchsticks– you will need some loose ones as well

Bracknell Forest Community Learning Team

Bringing learning to life

Heather Williams

Heather-L.Williams@bracknell-forest.gov.uk



Bracknell Forest Community Learning

Bracknell Forest Council

Our Commitment
We are committed to promoting learning for all and we welcome adult learners regardless of age, gender, race, disability, belief, sexual orientation, background or learning difficulty.
You have the right to feel safe where you learn, and your safety is extremely important to us. **This leaflet gives you key information and various contact numbers to use if you, or someone you know, are at risk.**

1. Fire Regulations

Fire exit — Please familiarise yourself with the health and safety procedures and fire exits for the venue before your session begins.

On hearing the fire alarm:

- Leave the building by the nearest fire exit
- Do not stop to collect personal belongings
- Assemble at the appointed place where your tutor will take the register
- Remain at the assembly point until advised otherwise

2. Accident

If you have an accident, injury or 'near miss' while on the premises, please notify a member of staff. We will arrange any necessary assistance and ask you to complete an incident report form.

3. 'Safeguarding'

Our staff undertake Safeguarding training and understand the importance of safeguarding children and adults at risk from abuse.

Abuse is when someone does something to another person that damages their quality of life or puts them at risk of harm. Abuse may be physical, emotional, sexual, neglect, financial or discriminatory.

If you suspect that a child or adult is at risk of being abused or neglected, you should either:

1) Inform your tutor or another available member of staff

or

2) Telephone the Bracknell Forest Safeguarding Children Team on 01344 354014/ Bracknell Forest Safeguarding Adults Team on 01344 351500

or

3) The council Out of Hours Team are available on 01344 786543 or Thames Valley Police on 101 (or 999 in an emergency)

You can also call these numbers if you are the person being abused.

Session outline

Parent prep:

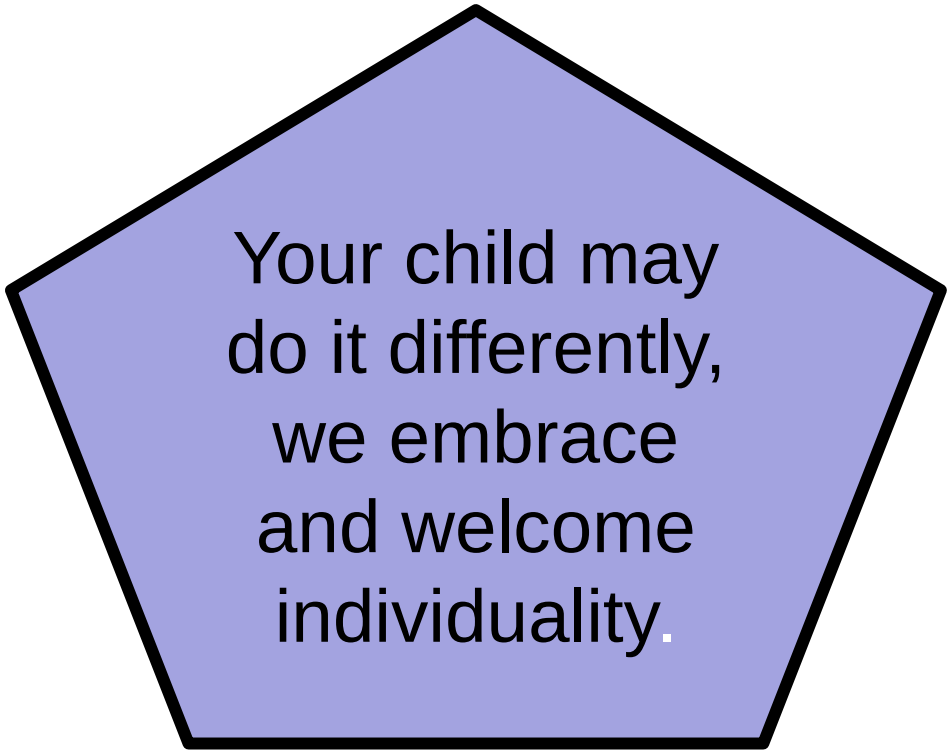
- to know why using real objects ('concrete') in maths is vital
- addition with matchsticks – learn how to do the partitioning method with your child
- using games for Mastery: Criss-cross addition /Double digit dabble

Activities with the children (30-40 mins, which is the length of an average lesson)

The children return to class

Summary and evaluation

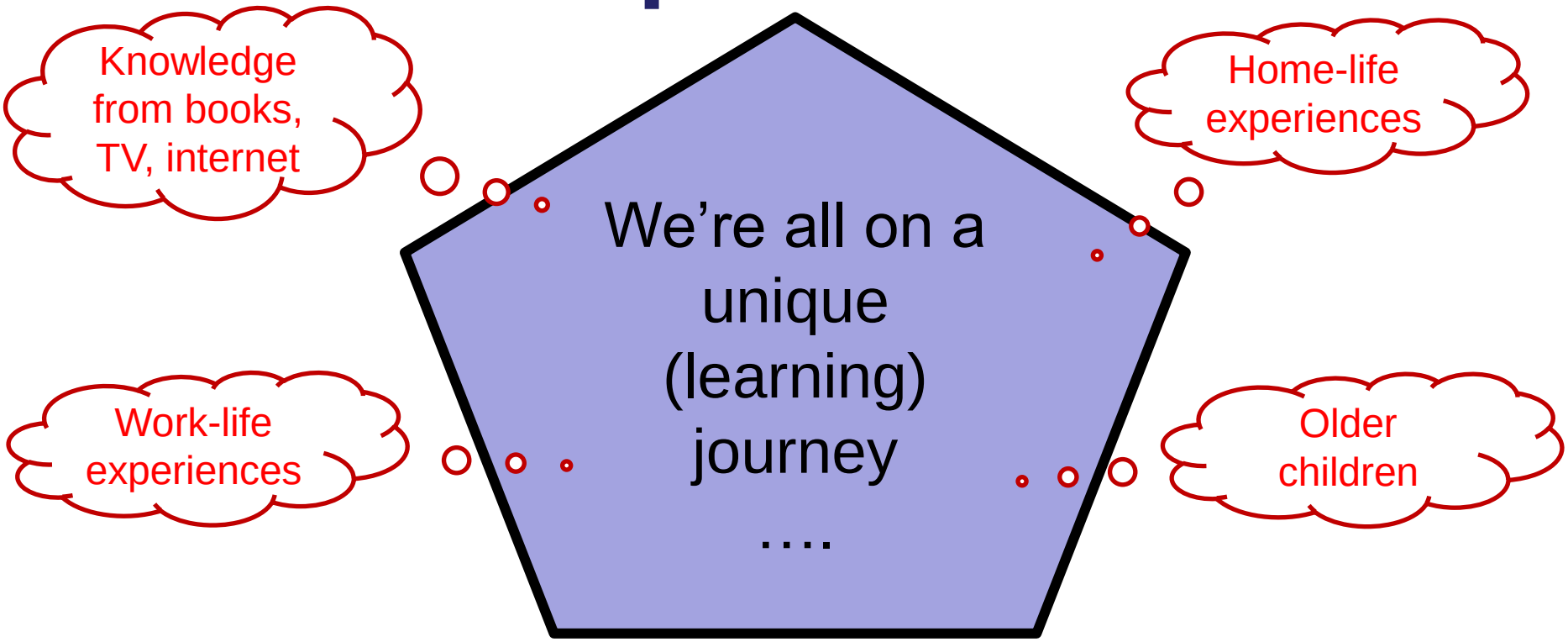
Unique Child



“ No brain is the same; no brain is the best. Each brain finds its own special way”

Psychiatrist Edward Hallowell.

Unique Adult

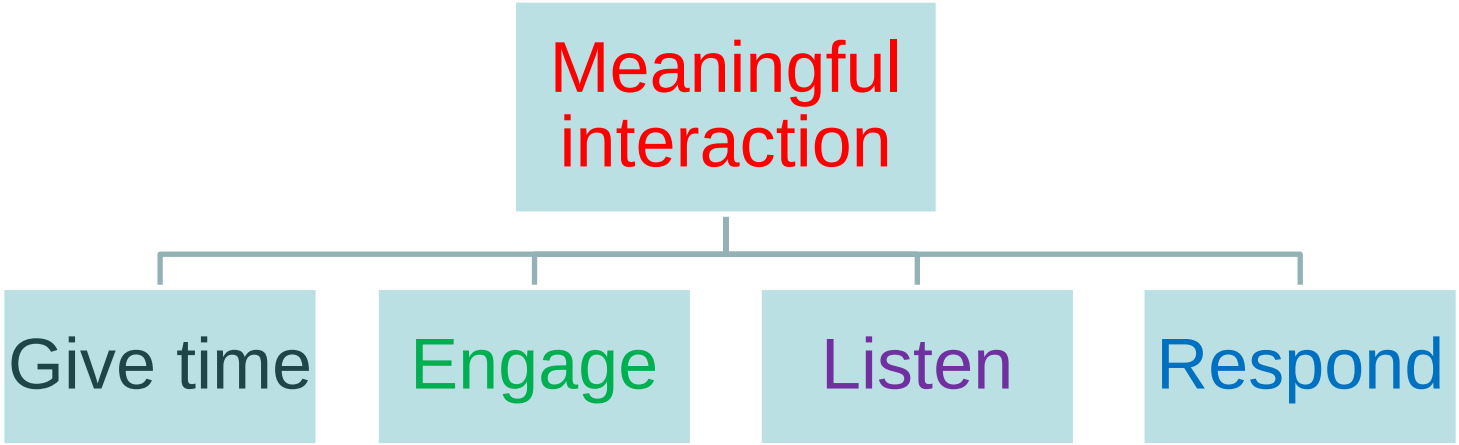


It's good to share

Your well-being matters too

"Nothing matters more than stopping, listening and responding positively to young children"

Julie Fisher, Education Adviser, Oxford Brookes University



Interactions are profoundly important for supporting and extending children's learning. Regular meaningful interactions can help develop children's skills in thinking, reasoning, explaining, persuading and language development.

Your mission, should you choose to accept it, is to be a coach, not an instructor:

- Use open questions/make supportive suggestions for your child to consider
- Encourage your child to tell you/show you how they would do it.
- Allow them to explore and try out their ideas

How would you……..?

What do you think about ……..?

Can you show me……?

So what problem/sum are you trying to solve?

How can we check that……?

What can we use to help us?

How about trying……..

Curriculum overview

Addition & Subtraction elements for Year 2 & Year 3

Year 2

Number – addition and subtraction

Statutory requirements

Pupils should be taught to:

- solve problems with addition and subtraction:
  - using concrete objects and pictorial representations, including those involving numbers, quantities and measures
  - applying their increasing knowledge of mental and written methods
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and ones
  - a two-digit number and tens
  - two two-digit numbers
  - adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Year 3

Number – addition and subtraction

Statutory requirements

Pupils should be taught to:

- add and subtract numbers mentally, including:
  - a three-digit number and ones
  - a three-digit number and tens
  - a three-digit number and hundreds
- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

More curriculum information?

https://primarysite-prod.s3.amazonaws.com/uploads/d66d612d6ee34712bc6f6572b0787afb/6edc/Parents_Complete_Guide.pdf

https://www.schoolguide.co.uk/blog/the-new-primary-national-curriculum-a-parents-guide

Maths Mastery

- Emphasis on depth and breadth, not speed and acceleration.

"Children should be challenged with reasoning and problem solving activities that apply knowledge and make connections, before moving on to new content"

(e.g. Criss-Cross/Do-or-Die games)

- Children's learning experiences are deep and rich

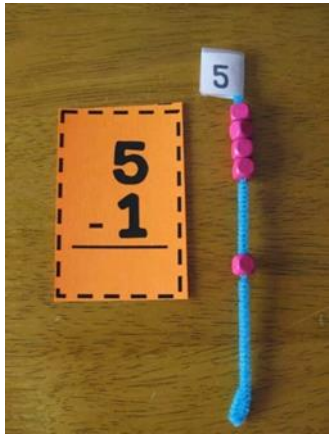
- Develops confident & competent mathematicians

(Find out more about maths mastery here)

Using concrete (real objects) helps children's mastery of maths

Practical experience with real objects is essential:

- **Thorough understanding** of calculation processes
- **Visual representations** support recall of number facts



Why practical means progress

“The importance of concrete”

(NCETM video ‘Using resources to improve fluency and understanding’)

https://www.youtube.com/watch?v=HGk8F6rRpPg

Today, concrete = matchsticks ☺

Addition (small numbers)

e.g. **9 + 8 =**

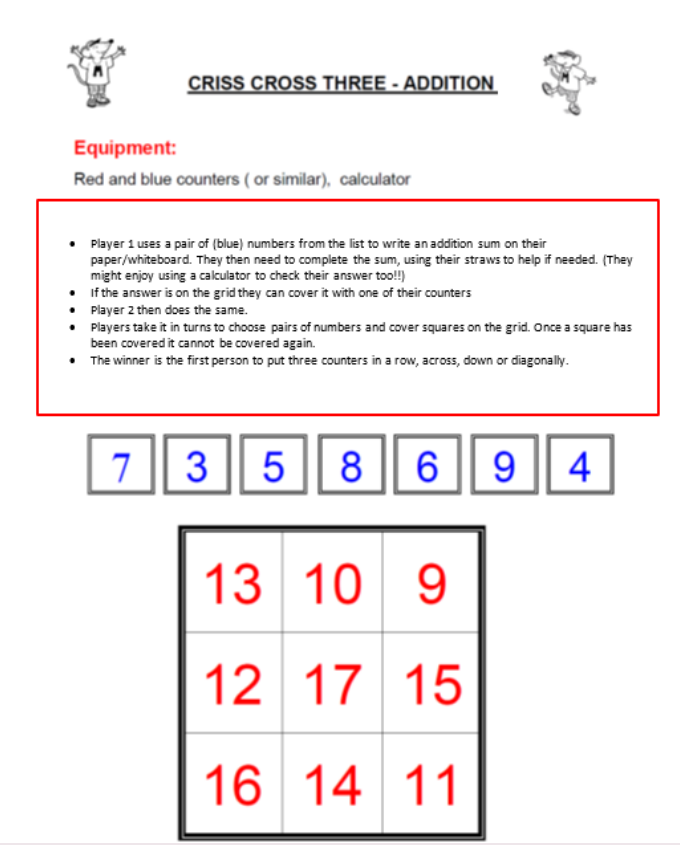
9 + 8 + 4 =

Children may be able to complete these sums in their heads but checking/confirming answers using the matchsticks is never a bad thing.

Game 1:

Criss cross addition – 3 in a row

** recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100



CRISS CROSS THREE - ADDITION

Equipment:

Red and blue counters (or similar), calculator

- Player 1 uses a pair of (blue) numbers from the list to write an addition sum on their paper/whiteboard. They then need to complete the sum, using their straws to help if needed. (They might enjoy using a calculator to check their answer too!!)
- If the answer is on the grid they can cover it with one of their counters
- Player 2 then does the same.
- Players take it in turns to choose pairs of numbers and cover squares on the grid. Once a square has been covered it cannot be covered again.
- The winner is the first person to put three counters in a row, across, down or diagonally.

7	3	5	8	6	9	4

13	10	9
12	17	15
16	14	11

A chance to get your child familiar with how to play the game

A chance to build confidence, speed and fluency with addition facts to 20 (use the matchsticks to check answers)

A chance to have fun and be competitive

A chance to explore game strategy and use ‘HOTS’ (higher order thinking skills**)

Children like to win……

- Once they know the game they will work strategically – *"Which number do I need to find to complete my row of 3?"*

❖ The first time you play, follow the game instructions as written down, choosing pairs of numbers randomly

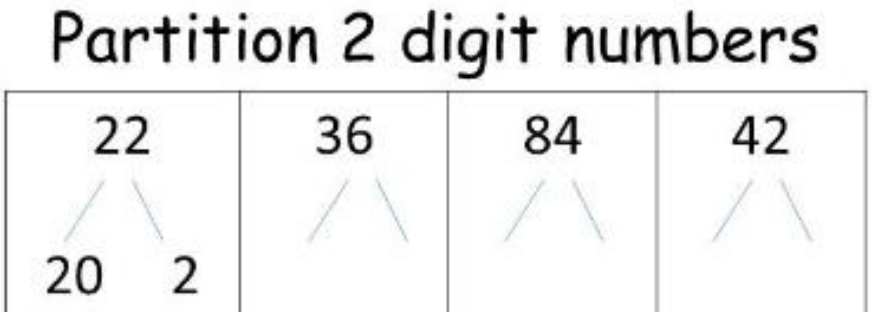
❖ The second time you play, if your child starts to plan ahead, go with it

Today, concrete = matchsticks ☺

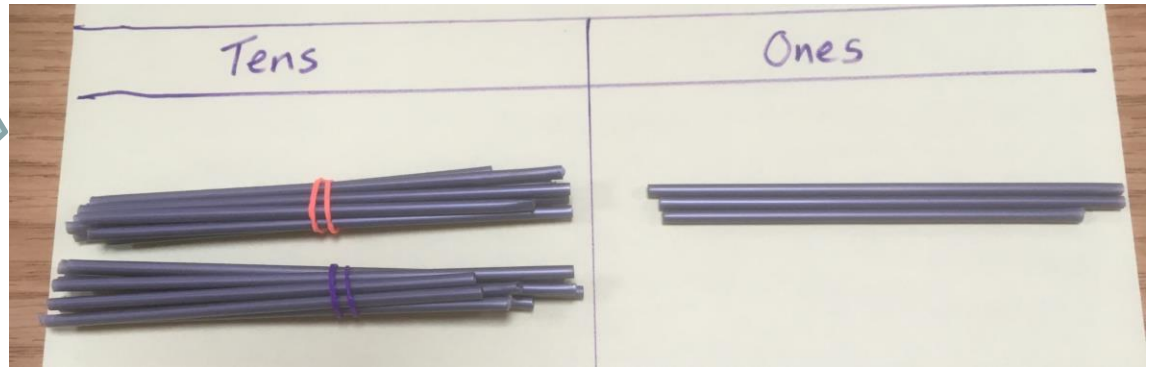
Addition with larger (double digit) numbers

e.g. **23 + 18 = ?**

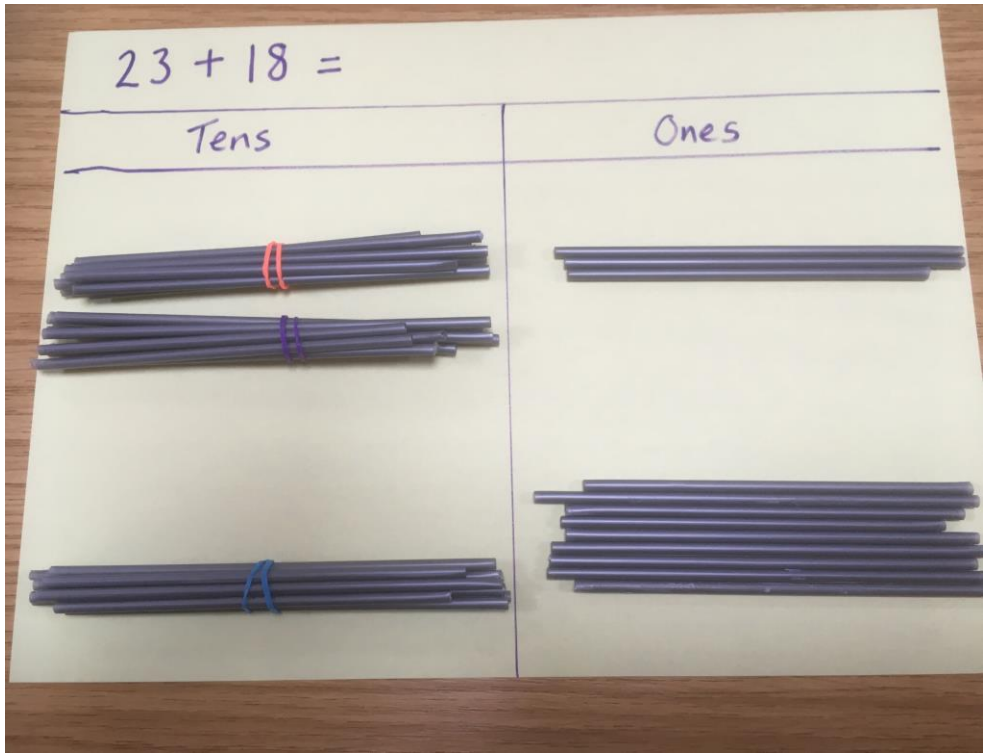
Partitioning method – use matchsticks to model **place value**



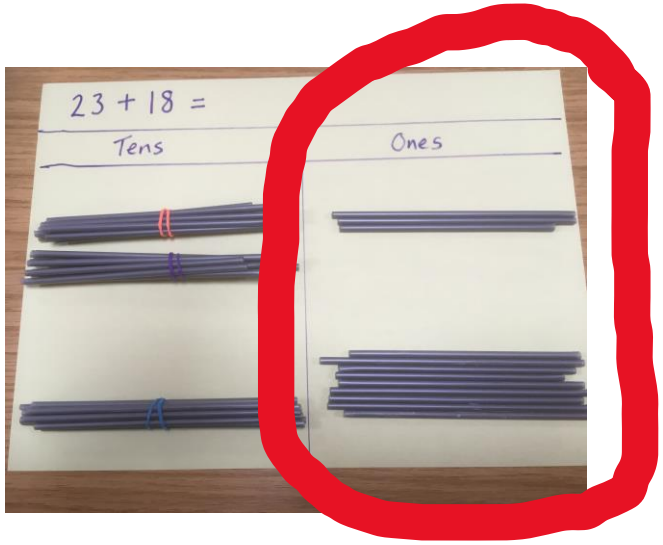
Partitioning 23 into 2 ‘tens’ and 3 ‘ones’



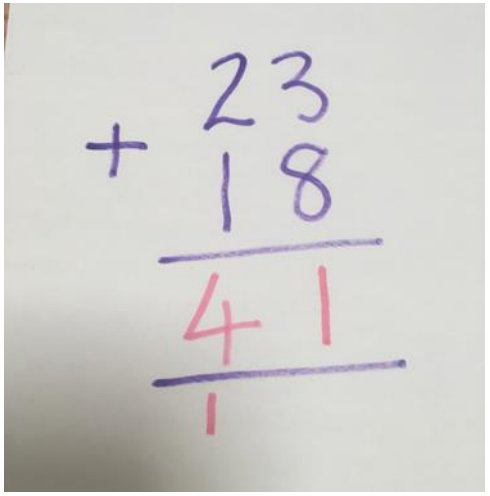
Partitioning method: 23 + 18=

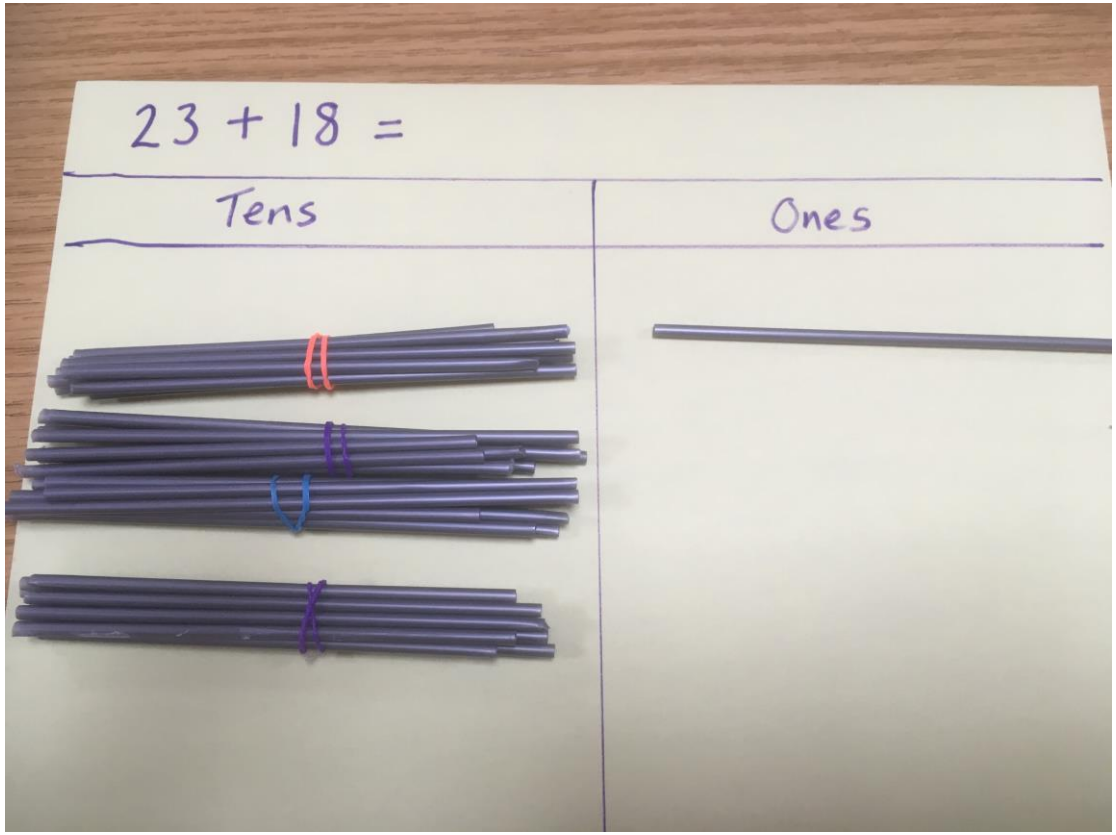


- Partition 23 into tens and 'ones' (2 bundles of 10 and 3 'ones')
- Partition 18 into tens and 'ones' (1 bundle of 10 and 8 'ones')
- Put the tens together
- Put the ones together (what do you notice about the 'ones'?)



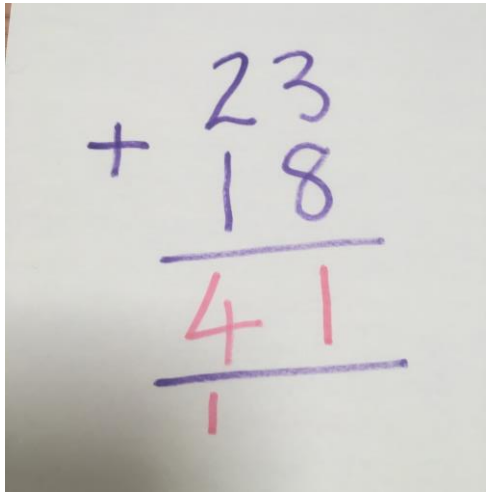
There are 11 ones, so these can be 're-partitioned' into 1 'ten' and 1 'one' – the ten is moved into the tens column

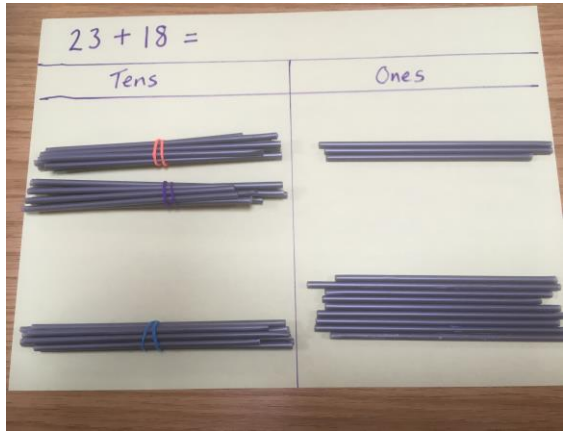


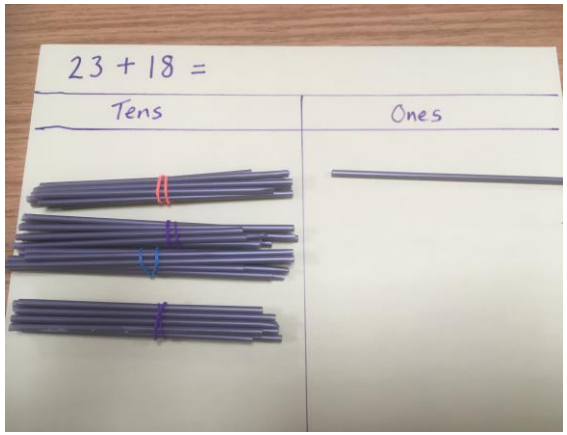


Standard written method (column addition)

Matchsticks give a vital CONCRETE picture of why standard written methods work.





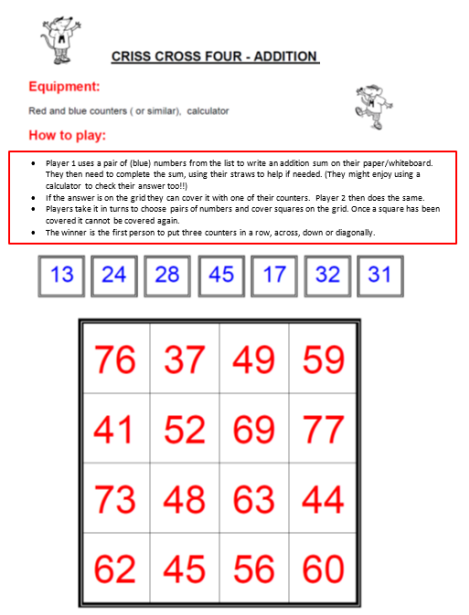


Game 2:

Criss cross addition – 4 in a row

**add and subtract numbers using concrete objects, pictorial representations and mentally, including:

- a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers



CRISS CROSS FOUR - ADDITION

Equipment:

Red and blue counters (or similar), calculator

How to play:

- Player 1 uses a pair of (blue) numbers from the list to write an addition sum on their paper/whiteboard. They then need to complete the sum, using their straws to help if needed. (They might enjoy using a calculator to check their answer too!!)
- If the answer is on the grid they can cover it with one of their counters. Player 2 then does the same.
- Players take it in turns to choose pairs of numbers and cover squares on the grid. Once a square has been covered it cannot be covered again.
- The winner is the first person to put three counters in a row, across, down or diagonally.

13	24	28	45	17	32	31

76	37	49	59
41	52	69	77
73	48	63	44
62	45	56	60

A chance to use the matchstick partitioning method to tackle harder additions

A chance to build confidence and understanding of the addition process using double digit numbers

A chance to have fun and be competitive

A chance to explore game strategy and use some higher order thinking skills**

Step 5 – invent your own version of Criss Cross

Use the blank templates provided – can you make a 'Criss Cross' game of your own?

How about practising subtraction facts?

(e.g. choose pairs of numbers to make a subtraction sum)

How about practising multiplication facts?

(e.g. use a selection of single digit numbers to make double digit products.)

**I have examples, please ask*

Step 6 – Try other games and investigations to build mastery

Number Detective

Follow the clues to find the mystery number from the list below.

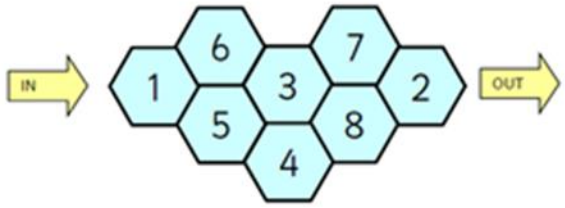
- The number has two digits.
- Both digits are even.
- The digit in the tens place is greater that the digit in the ones place.
- The ones digit is not in the three times table.
- The tens digit is not double the ones digit.
- The sum of the two digits is a multiple of five.

18	86

Hexagon addition

Maths worksheets from urbrainy.com

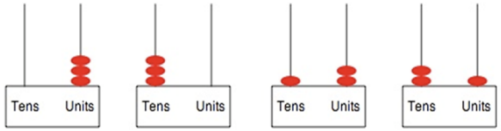
Starter



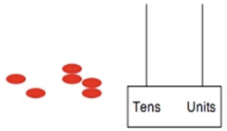
Find a route through the maze from the IN to the OUT without going through any hexagon twice.

6 Beads

If you put three beads onto a tens/units abacus you could make the numbers 3, 30, 12 or 21



Explore the numbers you can make using six beads.



This may seem a very simple activity – but children need to use logic and work systematically to complete it (very important skills in maths)

Stretch & Challenge?

Introduce further place value columns

Use more than 6 beads (but not too many or you'll be here all day….. ;-)

Handy help sheet

Step 1- Play Criss Cross three-

building speed and fluency with addition facts to 20

- Read the game instructions with your child
- Get 5 counters each & decide who will go first
- Choose a pair of blue numbers (you may use the blue numbers more than once)
- Add the 2 numbers together* – if the answer is on the board you can cover it up!
- Winner is the first person to get 3 in a row
- The aim is to get used to playing the game and have fun building addition fact fluency

*your child may well be able to add the numbers in their head, but the matchsticks can be used to support/check the answer

7 mins

Step 2- Play Criss Cross three again but encourage them to be strategic...

7 mins

As your child gets used to playing the 'Criss-Cross' game, they may begin to think ahead.....you can prompt them by asking:

'Which number on the grid do you think you want to make next?' (this could be a number that enables them to complete a row of 3 or one that blocks you from doing the same)

'Which 2 numbers might you be able to use to get there?' (child may need support at this point):

'Choose a number that is lower than the target number (why?)'

'How many (matchsticks) do you need to add to reach the target?'

'Is that number available? (check the blues)'

Step 3- Play Criss Cross four-

double digit addition using place value and partitioning

- Get 8 counters each
- Take it in turns to choose pairs of blue numbers
- Add the 2 numbers using the matchstick partitioning method –if the answer is on the board you can cover it up!
- Winner is the first person to get 4 in a row

7 mins

Step 4- Play Criss Cross four again but encourage them to be strategic.....

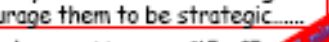
7 mins

- 'Which number do you want to cover up?' E.g. 37
- 'Which 2 numbers might you be able to use to get there?'

Offer further support:

- 'Choose a blue number that's less than 37' (why?)

** higher level thinking – are there any blue numbers that we can discount straight away because they are more than, or very close to, the target number?



- Child counts out their chosen number of matchsticks
- 'How many more (matchsticks) do you need to reach the target of 37?
- 'Is that number available? (check the blues)

Step 5 – invent your own version of Criss Cross

Use the blank templates provided – can you make a 'Criss Cross' game of your own?

How about practising subtraction facts?

(e.g. choose pairs of numbers to make a subtraction sum)

How about practising multiplication facts?

(e.g. use a selection of single digit numbers to make double digit products.)

*I have examples, please ask

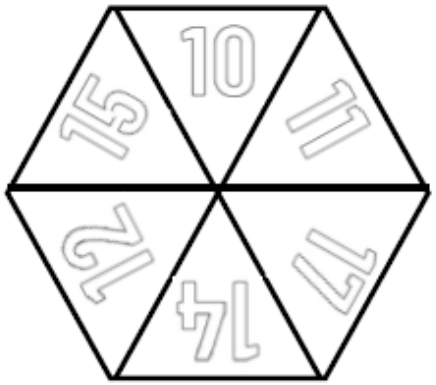
Step 6 – Try other games and investigations to build mastery

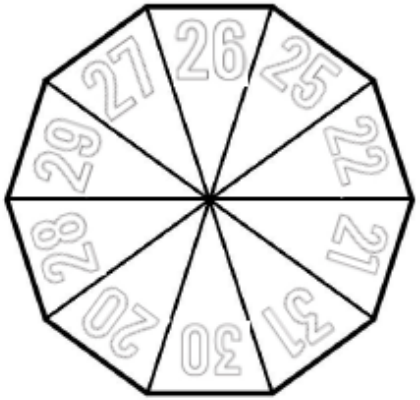
Alternative game:

"Double Digit Dabble"

PLEASE READ THE INSTRUCTIONS TO MAKE & PLAY

'DOUBLE DIGIT DABBLE' GAME





MAKE THE SPINNERS

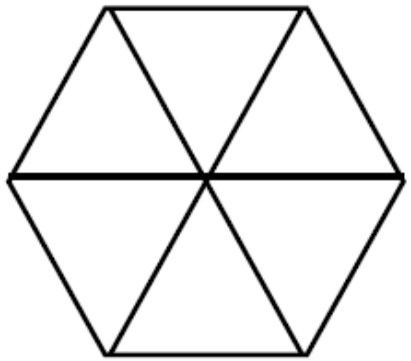
1. Write a selection of double digit numbers on both of the spinners
2. Decorate your spinners to make them look fabulous.
3. Use a ballpoint pen/sharp pencil to make a SMALL hole in the centre of each spinner.
4. CAREFULLY cut out each spinner – it works best if the edges are flat and smooth.
5. Push a straw/matchstick through the hole you have made.
6. Use a SMALL PIECE of blue tack around the straw/matchstick to hold it in place.

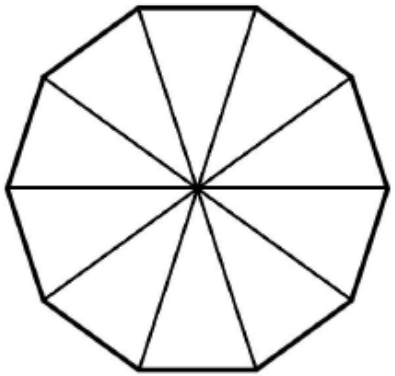
HOW TO PLAY

7. Spin both spinners and watch which numbers they land on
8. Now you have two double digit numbers to 'dabble' with – use them to make your own addition or subtraction sums and use your matchsticks to work out the answer.

OPTION 1 – NUMBERS GIVEN

'DOUBLE DIGIT DABBLE' GAME





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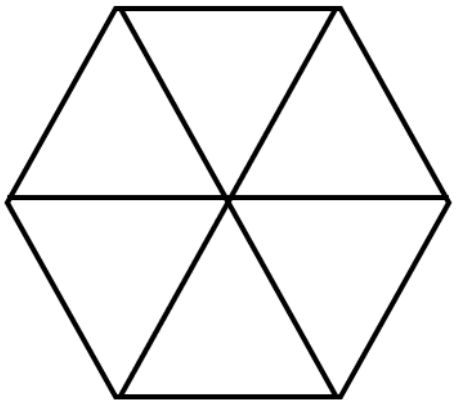
6. Use a SMALL PIECE of blue tack around the straw/matchstick to hold it in place.

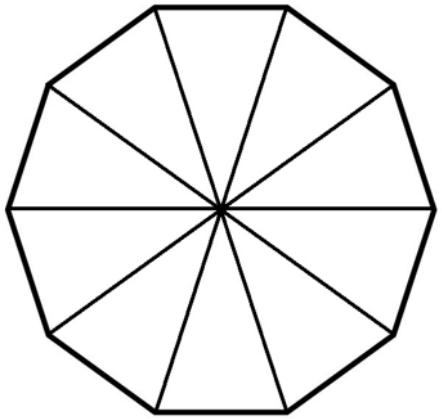
HOW TO PLAY

7. Spin both spinners and watch which numbers they land on
8. Now you have two double digit numbers to 'dabble' with – use them to make your own addition or subtraction sums and use your matchsticks to work out the answer.

OPTION 2 – ADD YOUR OWN NUMBERS

Fancy a challenge?-try the *"Do or Die"* game….





1. Use a ballpoint pen/sharp pencil to make a SMALL hole in the centre of your spinner
2. CAREFULLY cut out your spinner – it works best if the edges are flat and smooth
3. Add your choice of numbers and decorate your spinner to make it look fabulous.
4. Push a straw/matchstick through the hole you have made
5. Use a SMALL PIECE of blue tack around the straw/matchstick to hold it in place
6. Get spinning!!!

Mathematics Games

www.mathsphere.co.uk

Do or Die (addition)

Equipment:

A die or spinner

A scoring sheet is useful

Rules:

This is a game for two or more people, although usually played in pairs. It is good practice for mental addition skills up to 50 (especially adding 3 or more small numbers)

The first player rolls the die as many times as s/he likes, recording each score and adding up the total as s/he goes.

The player may stop at any time and put his/her score in the bank – the 'banked' score can then be added to the running total.

If, however, a 1 is thrown, all the score for that round is lost and the running total remains the same.

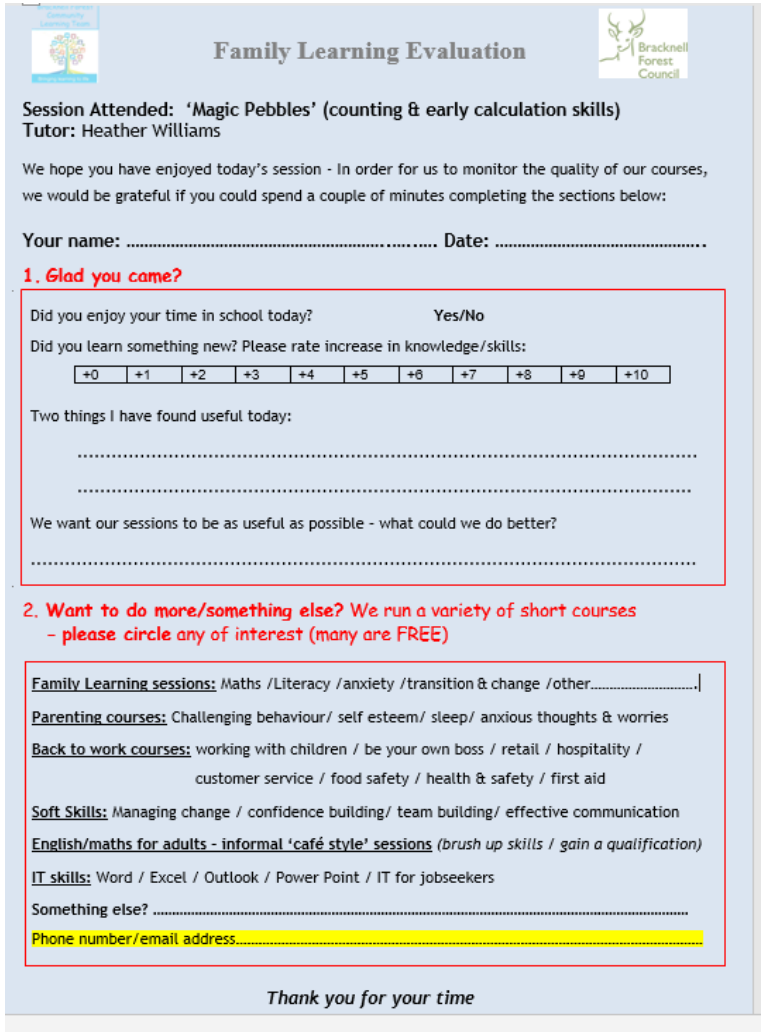
When a score has been 'banked' the die is passed to the next player who has her/his turn.

The winner is the first person to reach 50

Make it harder:

- Raise the winning score to 100 or more. To speed things up, you could double the score for each roll of the die. (throw a 4, double it to 8)
- Use a 0-9 die or spinner with 2 losing options (e.g. 1 & 9)
- *Killer version:* 0-9 die or spinner AND multiply each spin score by 10 (you will need to raise the winning score as well)

Tell us what you think ……☺



Family Learning Evaluation

Session Attended: 'Magic Pebbles' (counting & early calculation skills)
Tutor: Heather Williams

We hope you have enjoyed today's session - In order for us to monitor the quality of our courses, we would be grateful if you could spend a couple of minutes completing the sections below:

Your name: ..... **Date:** .....

1. Glad you came?

Did you enjoy your time in school today? **Yes/No**

Did you learn something new? Please rate increase in knowledge/skills:

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

Two things I have found useful today:

.....

.....

We want our sessions to be as useful as possible - what could we do better?

.....

2. Want to do more/something else? We run a variety of short courses – **please circle** any of interest (many are FREE)

Family Learning sessions: Maths /Literacy /anxiety /transition & change /other.....

Parenting courses: Challenging behaviour/ self esteem/ sleep/ anxious thoughts & worries

Back to work courses: working with children / be your own boss / retail / hospitality / customer service / food safety / health & safety / first aid

Soft Skills: Managing change / confidence building/ team building/ effective communication

English/maths for adults - informal 'café style' sessions *(brush up skills / gain a qualification)*

IT skills: Word / Excel / Outlook / Power Point / IT for jobseekers

Something else? .....

Phone number/email address.....

Thank you for your time

Time for the tiddly peeps……

Remember your mission 😋

How would you……..?

What do you think about ……..?

Can you show me……?

So what problem/sum are you trying to solve?

How can we check that……?

What can we use to help us?

How about trying…….

Don't struggle on if concentration is wearing thin – grab another game/activity to try

More ideas for later

- Take a look at the following slides at home, there's plenty more you can do with your matchsticks…….

CONCRETE
Multiplication and Division

Take groups of objects (matchsticks if you like!!) and……

- sort into pairs/groups of 5/groups of 10…… and use to practice counting in twos, fives, tens……
- arrange objects in rows and columns (arrays) to make counting in 2s, 5s….easier - lego is great for this
- start with a certain number of things and find out how many groups of 2/3…… you can get from it

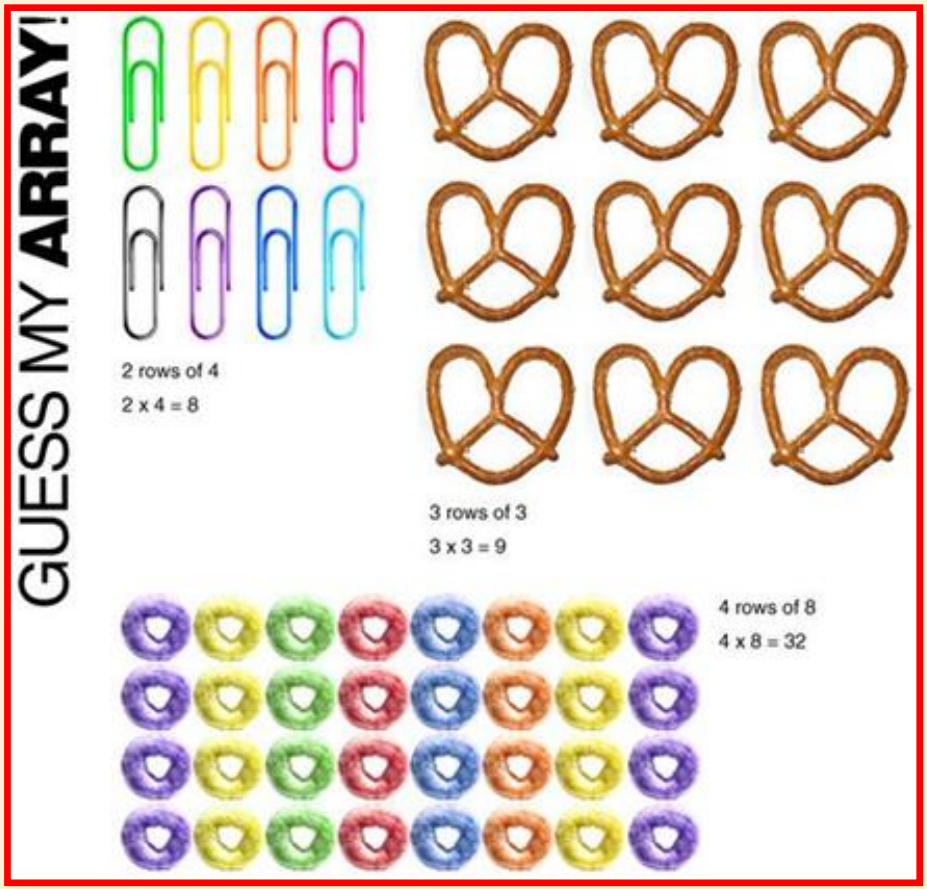
e.g. how many groups of 3 can you make with your 12 superhero figures…..?

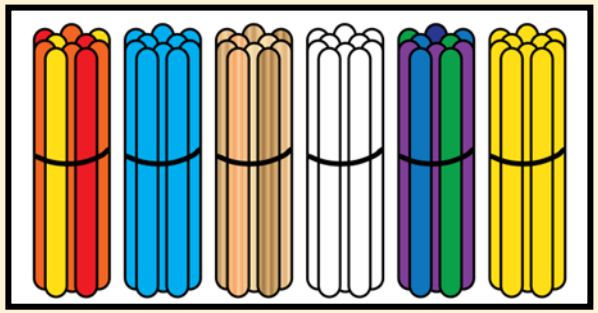
- start with a certain number of things and share them between 2, 5……

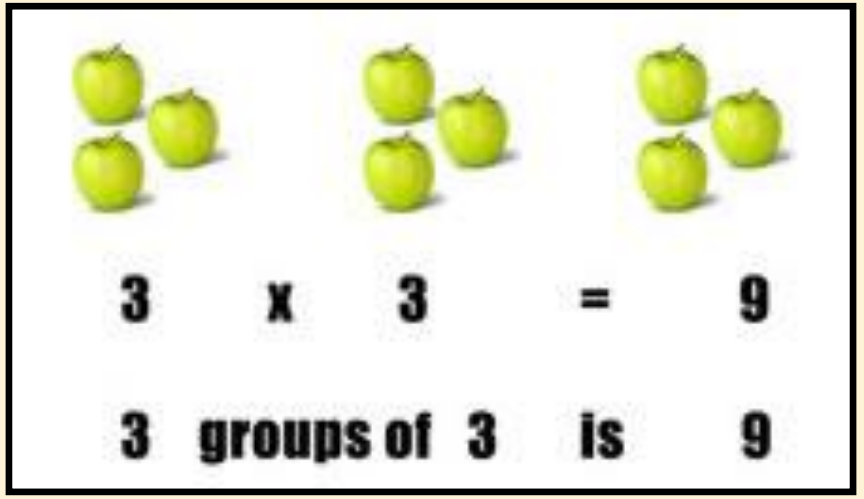
e.g. can you share your 12 superhero figures equally between 2 people…..?

Multiplication & times tables
-making arrays & counting in 'groups of'

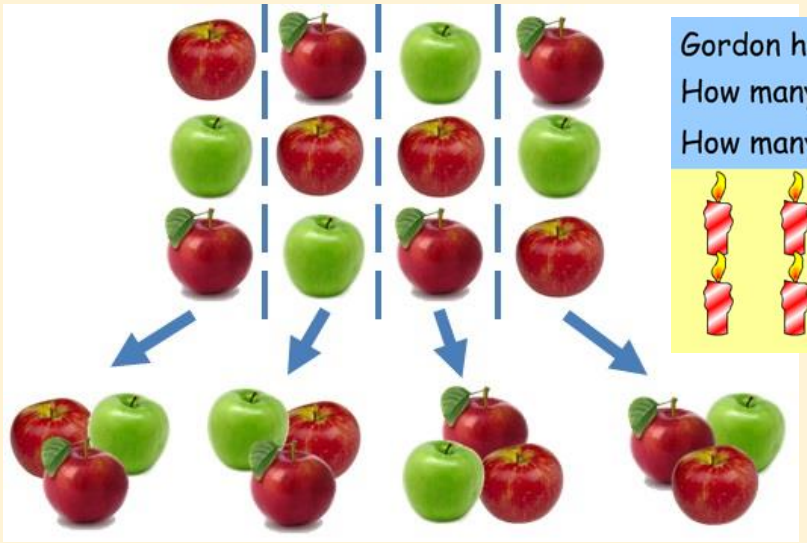
https://www.khanacademy.org/math/arithmetic/arith-review-multiply-divide/arith-review-mult-intro/v/multiplication-as-groups-of-objects







sharing

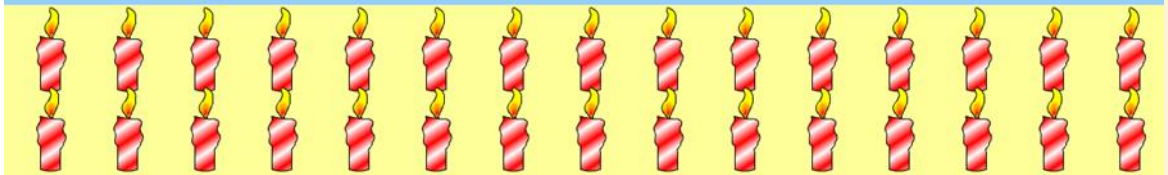


Gordon has 33 candles. He puts 5 on each cake.

How many cakes will have 5 candles on?

How many will be left?

$33 \div 5 = ?$



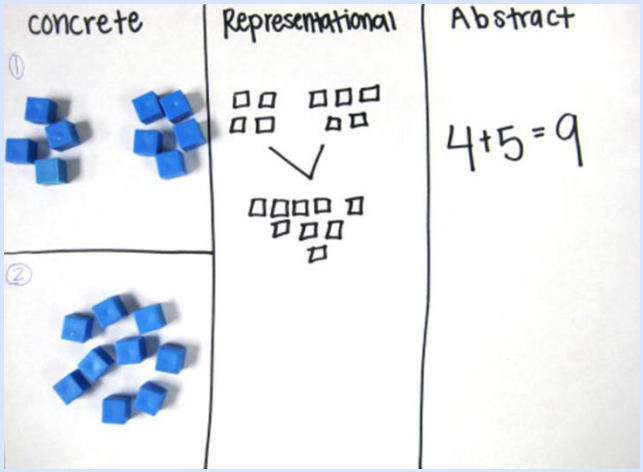
grouping

The road to understanding……

Concrete (real objects)

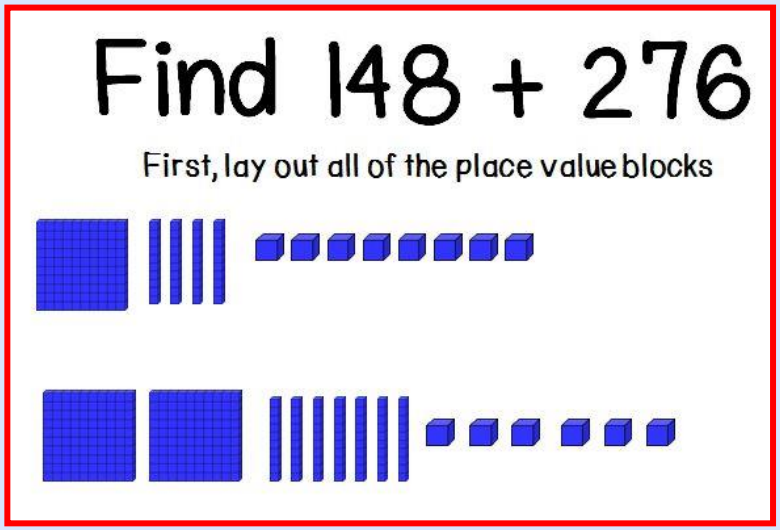
Models (pictorial representations)

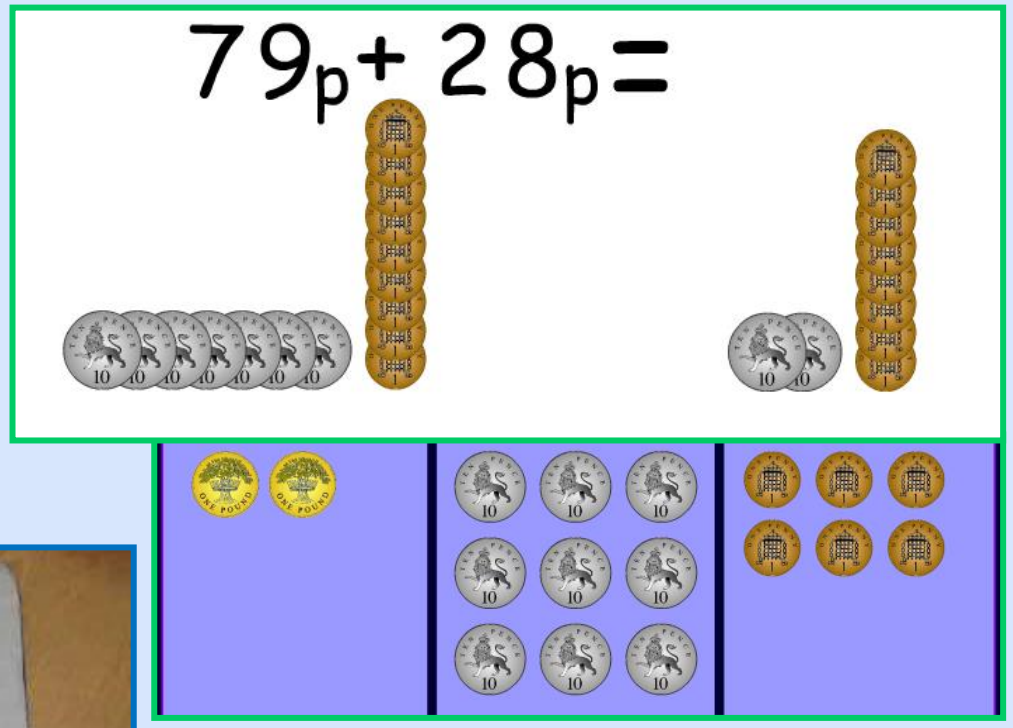
Abstract (written methods)

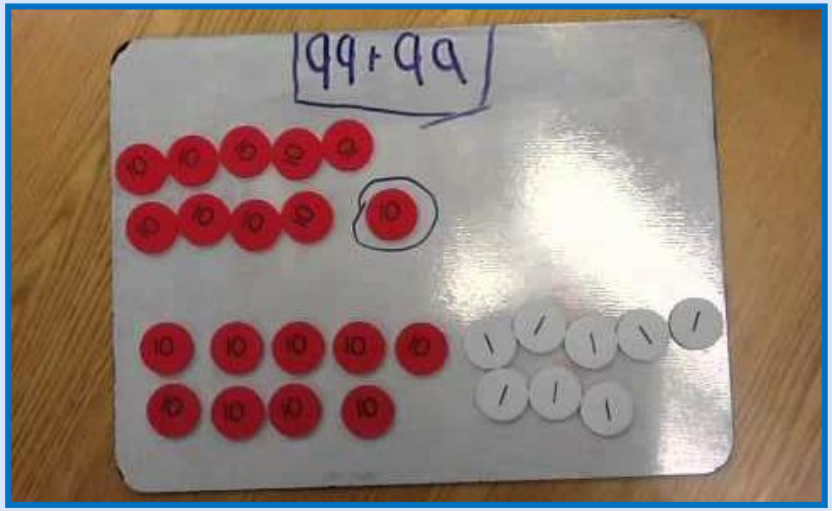


MODELS:

Add and subtract using 'base 10' images – Dienes, place value disks, coins……

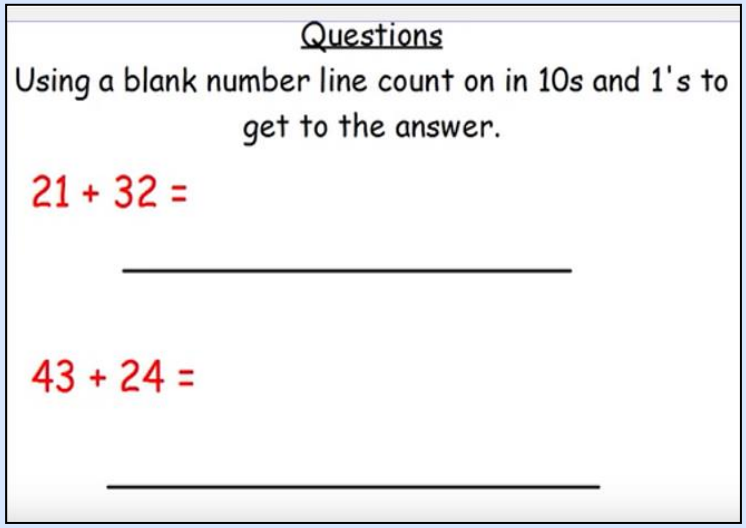


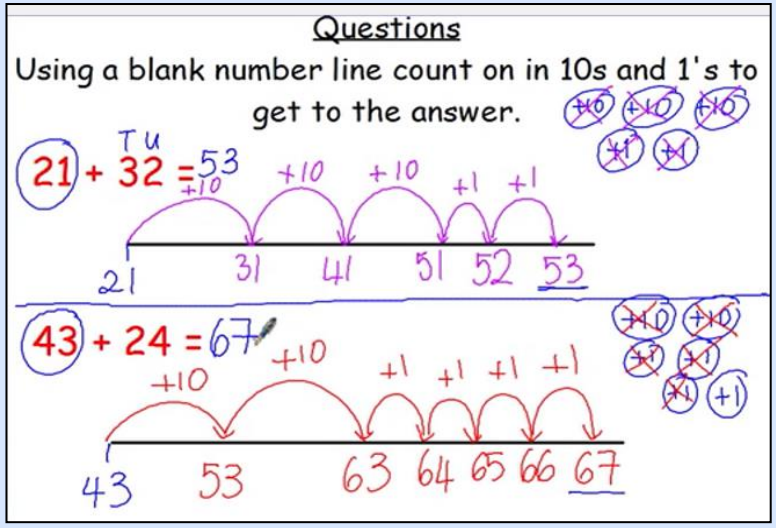




https://www.ictgames.com/mobilePage/addition.html
online game using a Dienes - style model.

Pictorial representations: e.g. empty number lines





- https://www.youtube.com/watch?v=zox5cJufy7o

Video link showing addition using an empty number line

- https://www.youtube.com/watch?v=WnIEZuKIN58

Video link showing subtraction using an empty number line

Looking ahead to Key Stage 2 – written methods for addition

https://www.youtube.com/watch?v=KVi3FFFGKKM

- Video link showing addition using partitioning

https://www.youtube.com/watch?v=gdT3v2PAo8I

- Video link showing column addition with partitioning

https://www.youtube.com/watch?v=vaxUcsDtV-Q

- Video link showing column addition, formal (standard) written method

Looking ahead to Key Stage 2….. subtraction methods

https://vimeo.com/70096846

- Video link showing partitioning methods for subtraction

https://vimeo.com/70316059

- Video link showing different subtraction strategies

https://vimeo.com/70316060

- Video link showing development of column subtraction

Here are some great online resources to try ……

1. Information about reading writing & saying big numbers
http://www.englishlessonsbrighton.co.uk/saying-large-numbers-english/

2. Comparing numbers – scroll down homepage until you see the 'Compare Numbers' activity
http://www.crickweb.co.uk/ks2numeracy-calculation.html

3. General calculation practice
http://www.bbc.co.uk/education/subjects/zjxhfg8
http://www.softschools.com/math/games/
https://www.coolmathgames.com/1-number-games

4. Word Problems/problem solving (mastery)
https://uk.ixl.com/math/year-2/addition-word-problems-up-to-two-digits
https://uk.ixl.com/math/year-2/subtraction-word-problems-up-to-two-digits
https://urbrainy.com/maths/year-2-age-6-7/challenges-for-year-2

4. Place value practice

http://www.softschools.com/math/place_value/teaching_place_value/

http://www.softschools.com/quizzes/math/place_value_and_expanded_notation/quiz677.html

http://www.ictgames.com/placeValue.htm

https://www.stem.org.uk/elibrary/resource/28180

https://nrich.maths.org/8940

……. and for Yr3 and beyond, try

https://nrich.maths.org/8958

Place value explained

https://www.theschoolrun.com/what-place-value

We count using a 'decimal' column system

[remember "hundreds, tens, units"?]

We use the same 10 digits but their value varies depending on which column they are in.

"place value" describes the value of any digit in a number – for example in 48, the 4 is worth 40 [4 tens]

Throughout Key Stage 1, children have been developing their understanding of the place value system

(*where the value of a digit depends upon its position in a number*)

Children learn to:

Identify tens and ones, (hundreds tens & ones), in a number

Recognise/state the value of any digit in a number

Partition numbers into tens and ones *(hundreds, tens, ones)*

- An understanding of place value is essential when learning to add and subtract bigger numbers
- Concrete experience of tens & ones (hundreds, tens & ones, and so on) is provided as they learn calculation processes
- Deep understanding of written methods is achieved by experiences with 'concrete'