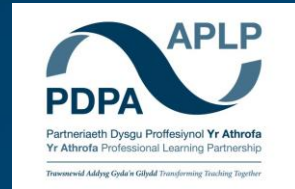




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ECAD4017 – Session 1

Mathematics and Numeracy

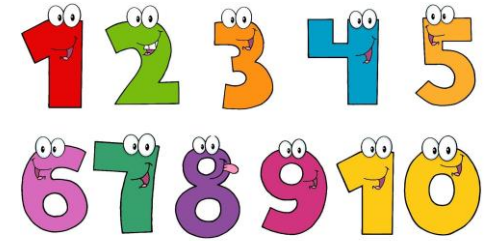
Bethan Sturrock

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Aims



- Understand number development in the Foundation Phase
- Develop an understanding of the Curriculum and understand the expectations
- Have some ideas on how you can develop number skills in the classroom



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Gwyliwch y fideo - Please watch the video

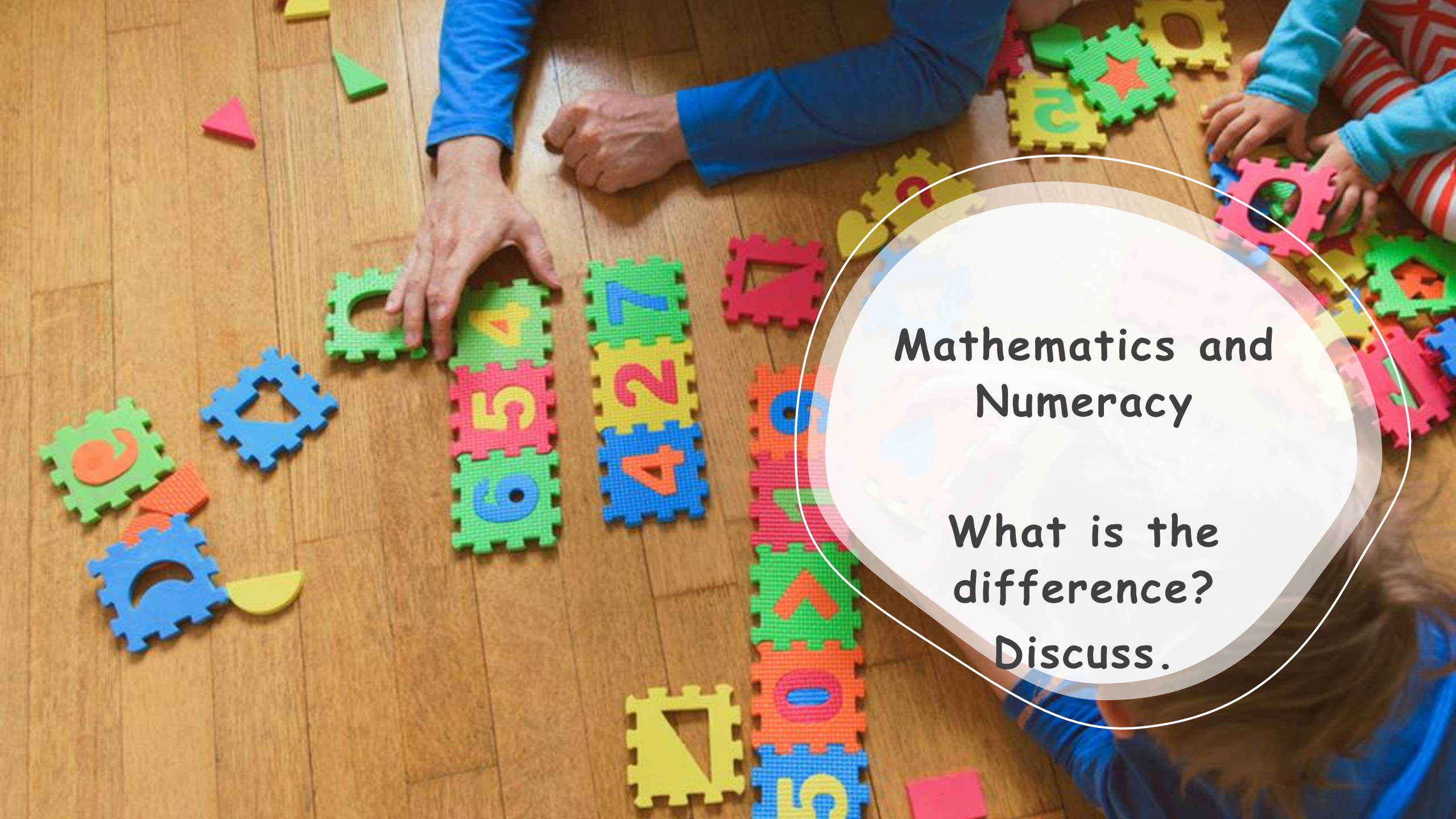


<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjiure04IT6AhWZi1wKHXEaCaIQtwJ6BAgZEAI&url=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DDM5XxudAA3q0&usg=AOvVaw0UKo4mbPY09vhZhZSpe69T>

Trawsnewid Addysg,
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A photograph of children playing with colorful geometric foam blocks on a wooden floor. The blocks are shaped like numbers (1, 2, 3, 4, 5, 6, 7, 8, 9, 10) and various geometric shapes (triangles, squares, circles, hexagons). The blocks are in various colors (red, yellow, green, blue, orange, pink). A child's hand is visible, placing a block. A large white circle with a thin black border is overlaid on the right side of the image, containing text.

Mathematics and Numeracy

What is the difference?
Discuss.

Mathematics and Numeracy

Guidance to help schools and settings develop their own curriculum, enabling learners to develop towards the four purposes.

Contents

1. Introduction
2. Statements of what matters
3. Principles of progression
4. Descriptions of learning
5. Designing your curriculum



Numeracy, which is the use of mathematics to solve problems in the real world, plays a key role in our everyday lives, and in the economic condition of the nation. It is therefore essential that maths and numeracy experiences are as exciting, interesting and accessible as possible for learners, and that these experiences are a means of ensuring that learners develop mathematical resilience.

[Mathemateg a Rhifedd: Cynllunio eich cwricwlwm - Hwb](#)

Cross-curricular skills and integral skills

A curriculum must embed the mandatory cross-curricular skills and the integral skills which underpin the four purposes of the curriculum. Below are some key principles which settings and schools should consider when designing learning and teaching in the Mathematics and Numeracy Area of Learning and Experience (Area).

Numeracy

This Area, by definition, has numeracy at its heart. The five mathematical proficiencies – Conceptual understanding, Communication using symbols, Fluency, Logical reasoning and Strategic competence – can be applied and connected by using a range of real-life contexts to introduce and explore mathematical concepts, as well as to consolidate them. For example, percentages can be applied to annual percentage rates (APRs) to demonstrate their use in financial literacy.

[Mathemateg a Rhifedd: Cynllunio eich cwricwlwm - Hwb](#)

Statements of what matters.

AREA OF LEARNING AND EXPERIENCE

Mathematics and Numeracy

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|---|--|
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- The number system is used to represent and compare relationships between numbers and quantities
- Algebra uses symbol systems to express the structure of mathematical relationships
- Geometry focuses on relationships involving shape, space and position, and measurement focuses on quantifying phenomena in the physical world
- Statistics represent data, probability models chance, and both support informed inferences and decisions

[Mathemateg a Rhifedd: Cynllunio eich cwricwlwm - Hwb](#)



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Principles of Progression.

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Progress in the Mathematics and Numeracy Learning and Experience Area (Field) involves the development of five interrelated and interdependent competencies. They are not in order of importance, and considering these competencies is crucial as schools plan their curriculum to ensure learner progress.

Conceptual understanding
Communicate using symbols
Strategic competence
Logical reasoning
Fluency

[Mathemateg a Rhifedd: Cynllunio eich cwricwlwm - Hwb](#)



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The 5 Proficiencies.

Conceptual understanding

Mathematical concepts and ideas should be built on, deepened and connected as learners experience increasingly complex mathematical ideas. Learners demonstrate conceptual understanding through being able to explain and express concepts, find examples (or *non-examples*) and by being able to represent a concept in different ways, flowing between different representations including verbal, *concrete*, visual, digital and *abstract*.

Communication with symbols

Learners should understand that the symbols they are using are abstract representations and should develop greater flexibility with the application and manipulation of an increasing range of symbols, understanding the conventions of the symbols they are using.

Strategic competence

Learners should become increasingly independent in recognising and applying the underlying mathematical structures and ideas within a problem, in order to develop strategies to be able to solve them.

Logical reasoning

As learners experience increasingly complex concepts, they should also develop an understanding of the relationships between and within these concepts. They should apply logical reasoning about these relationships and be able to justify and prove them. Justifications and *proof* should become increasingly abstract, moving from verbal explanations, visual or concrete representations ~~to~~ abstract representations involving symbols and conventions.

Fluency

As learners experience, understand and effectively apply increasingly complex concepts and relationships, fluency in remembering facts, relationships and techniques should grow, meaning that facts, relationships and techniques learned previously should become firmly established, memorable and usable.

The Progression Steps.

Progression step 1

I have experienced and explored numbers, including [cardinal](#), [ordinal](#) and [nominal](#) numbers, in number-rich indoor and outdoor environments.

I can notice, recognise and write numbers in a range of media, through a multisensory approach, from 0 to 10 and beyond.

I can use mathematical language to describe quantities, and to make estimates and comparisons such as 'more than', 'less than' and 'equal to'.

I have experienced the counting sequence of numbers in different ways, reciting forwards and backwards, and starting at different points.

I can use my experience of the counting sequence of numbers and of [one-to-one correspondence](#) to count sets reliably. I can count objects that I can touch, and ones that I cannot.

Progression step 2

I can read, write and interpret larger numbers, up to at least 1000, using digits and words.

I can understand that the value of a number can be determined by the position of the digits.

I have engaged in practical tasks to estimate and round numbers to the nearest 10 and 100.

I am beginning to estimate and check the accuracy of my answers, using [inverse](#) operations when appropriate.

I can order and sequence numbers, including odd and even numbers, and I can count on and back in step sizes of any [whole number](#) and simple [unit fractions](#).





Mathematics and Numeracy

Curriculum for Wales 2022

Mathematics and
Numeracy

Documents

Cross-curricular skills frameworks

Part of Curriculum for Wales

Numeracy Framework



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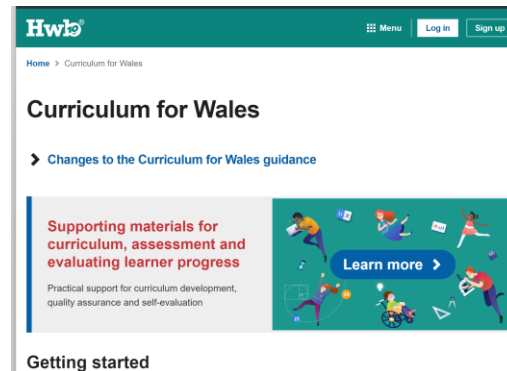
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Foundation phase/stage/learning



[foundation-phase-framework.pdf \(gov.wales\)](https://gov.wales/foundation-phase-framework.pdf)



[Curriculum for Wales - Hwb \(gov.wales\)](https://gov.wales/curriculum-for-wales)



[Curriculum for funded non-maintained nursery settings - Hwb \(gov.wales\)](https://gov.wales/curriculum-for-funded-non-maintained-nursery-settings)



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How do children learn best?

Discuss



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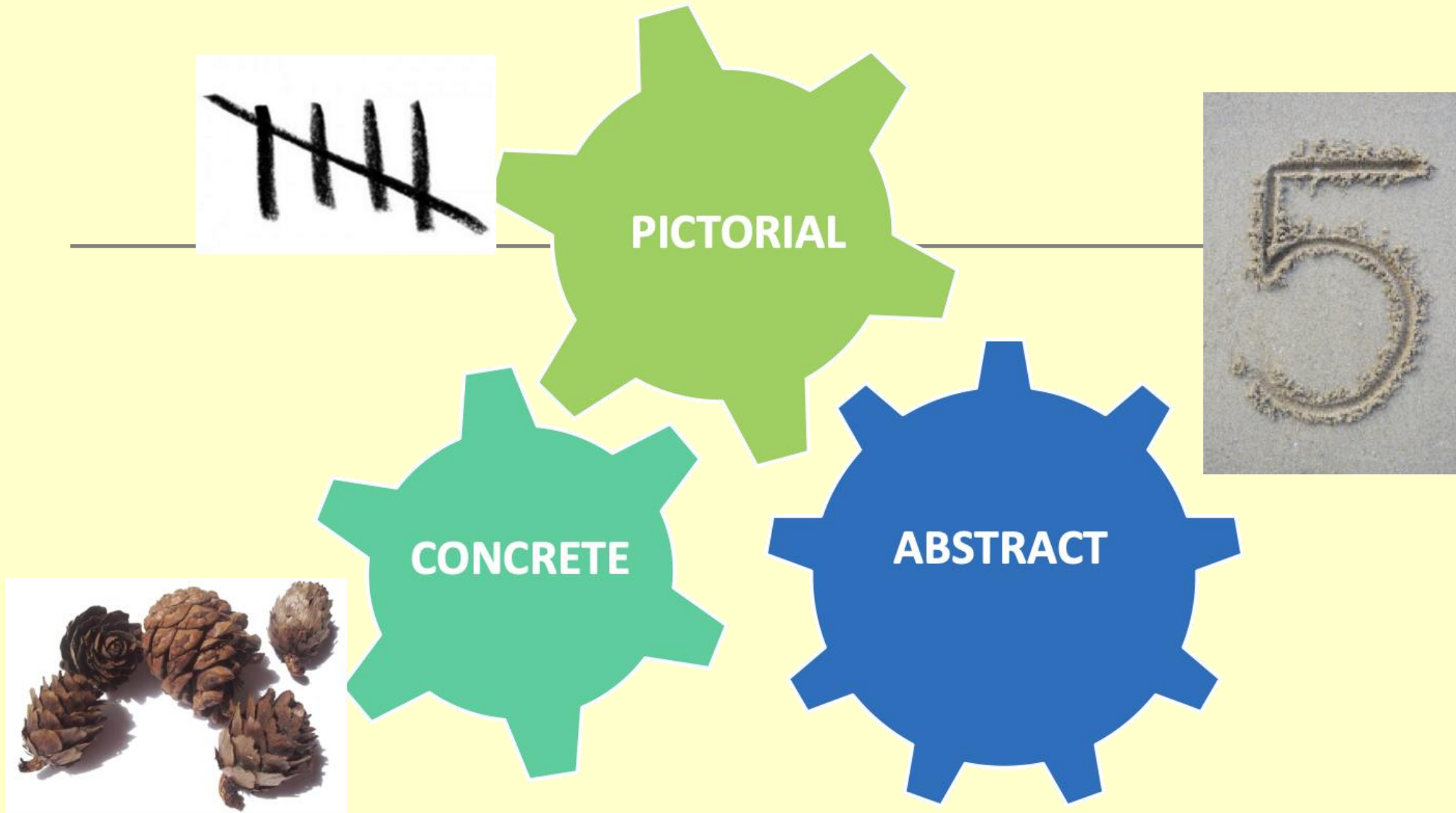
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Revising the CPA approach - Jerome Bruner

The abstract nature of maths can be confusing for children, but by using concrete materials they are able to 'see' and make sense of what is really going on.

Previously, there was a misconception that concrete resources are only for learners who find it difficult to math. In fact, concrete resources can be used in a wide variety of ways at all levels. All children, regardless of ability, benefit from the use of practical resources to ensure that understanding goes beyond procedural learning.

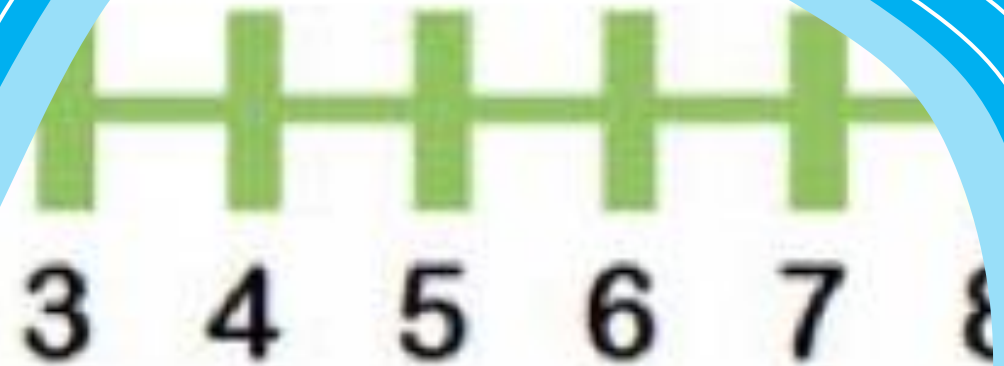
Practical resources promote reasoning and discussion, enabling children to express and explain a concept. Teachers are also able to observe the children to gain a better understanding of where misconceptions lie and to establish the depth of their understanding.

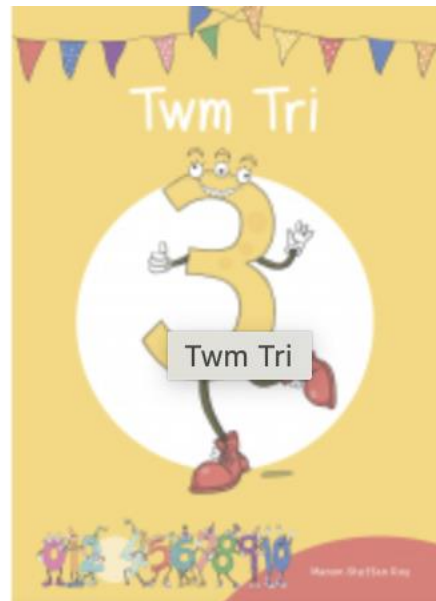
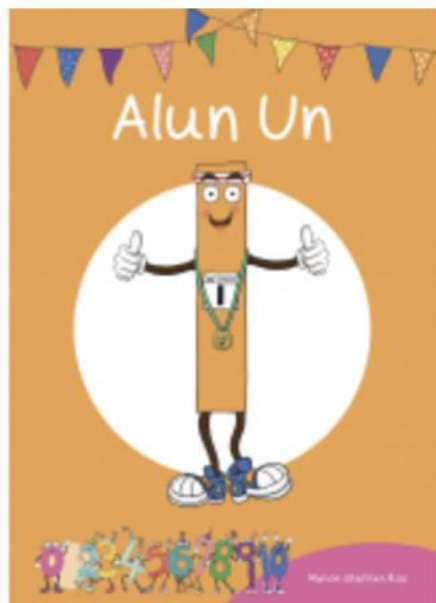


CPA Approach – Jerome Bruner

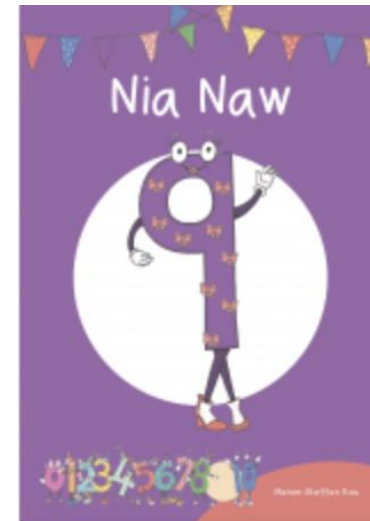


Adnoddau - Resources





<https://peniarth.cymru/>



Nia Naw



Mathematical Language

count in ones, twos, fives and tens

more, less, many, few

tally

odd, even

every other

how many times?

multiple of

sequence

continue

predict

pattern, pair, rule

Digit, 2-digit number

Estimate

Fraction, whole, half, quarter,

equal parts

Units, one, tens

Above, below, compare

+, add, addition, more, plus

make, sum, total

score

double, near double

-, subtract, take away, minus,

difference between

half, halve

=, equals, sign, is the same as

lots of, groups of

multiple of, x, times,

repeated addition

array, row, column

double, halve

share, share equally

one each, two each, three each...

group in pairs, threes... tens

equal groups of

Yr Amgylchedd | The Environment

Amgylchedd Cyfoethog mewn

Rhif

- Rhif lle bynnag y bo'n bosibl - blychau, arwyddion, ardal chwarae rôl
- Gwrthrychau pob dydd - clociau, calendrau, amserlenni, cyfrifianellau
- Ardal Fathemateg - rhyngweithiol, offer, gweithgareddau, heriau
- Traciau rhif, llinellau rhif a sgwariau cant - uchder plant
Arddangosfa - cefnogi dysgu cyfredol, 2D a 3D, gwaith plant, addas i'r dysgu (amser real)
- Chwarae rôl, chwarae mawr, creadigol, traws gwricwlaidd
- Annibyniaeth
- Creadigol a chyd-destunol

Number rich Environment

- Numbers wherever possible - boxes, signs, role play area
- Everyday objects - clocks, calendars, timetables, calculators
- Mathematics Area - interactive, tools, activities, challenges
- Number tracks, number lines and hundred squares - child height

Exhibition - supporting current learning, 2D and 3D, children's work, relevant to their learning in real time.

Role play, big play, creative, cross-curricular

Independence

Creative and contextual



- Calendr sy'n cyfeirio at y diwrnod, dyddiad, mis a'r flwyddyn.
- **Calendar which refers to the day, date, month and year.**



Daily-do list

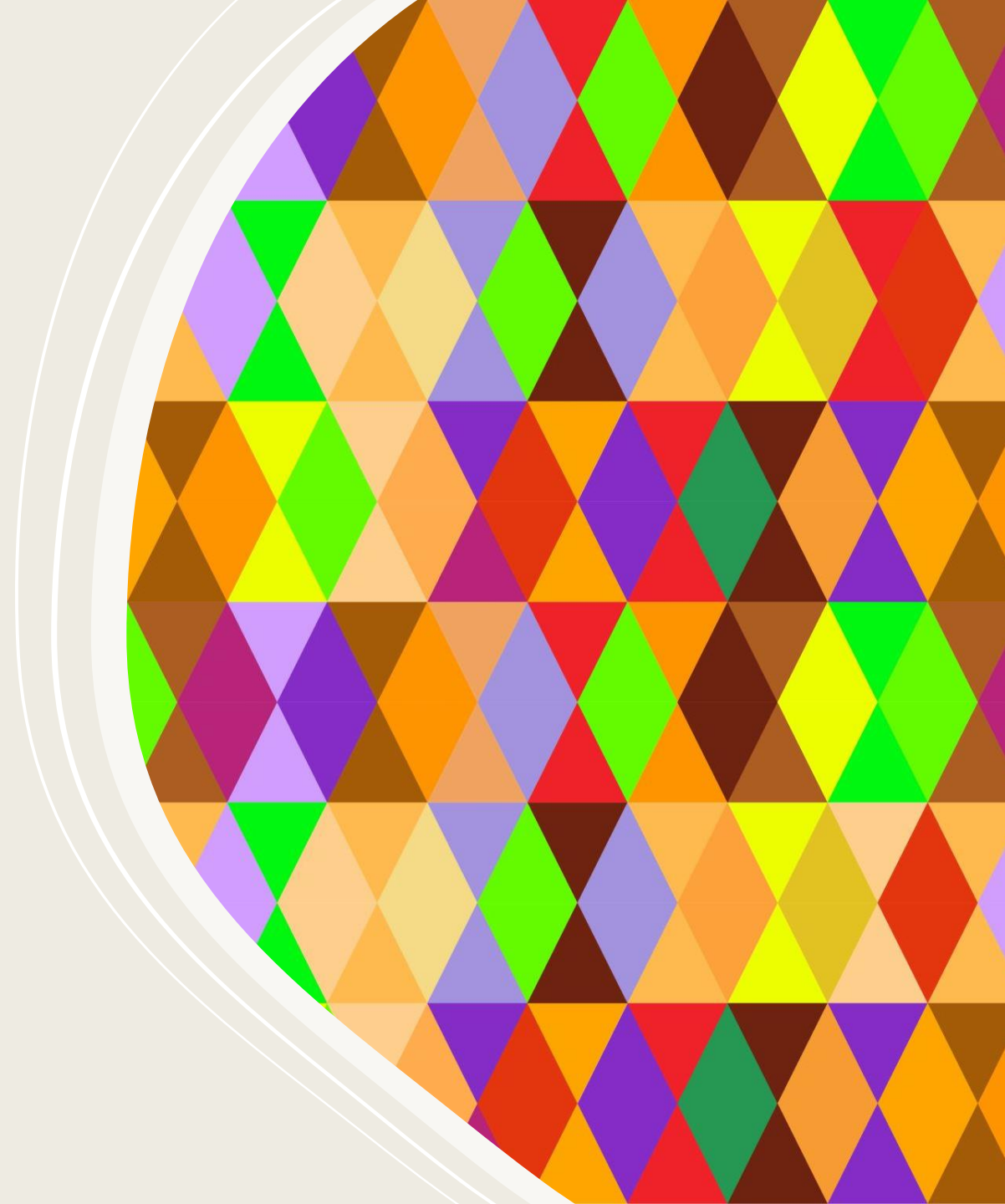
How do I ensure that children develop their Maths and Numeracy skills throughout the day?

Pa rif yw'r
mwyaf?

Which number is
the biggest?

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

Number of the day

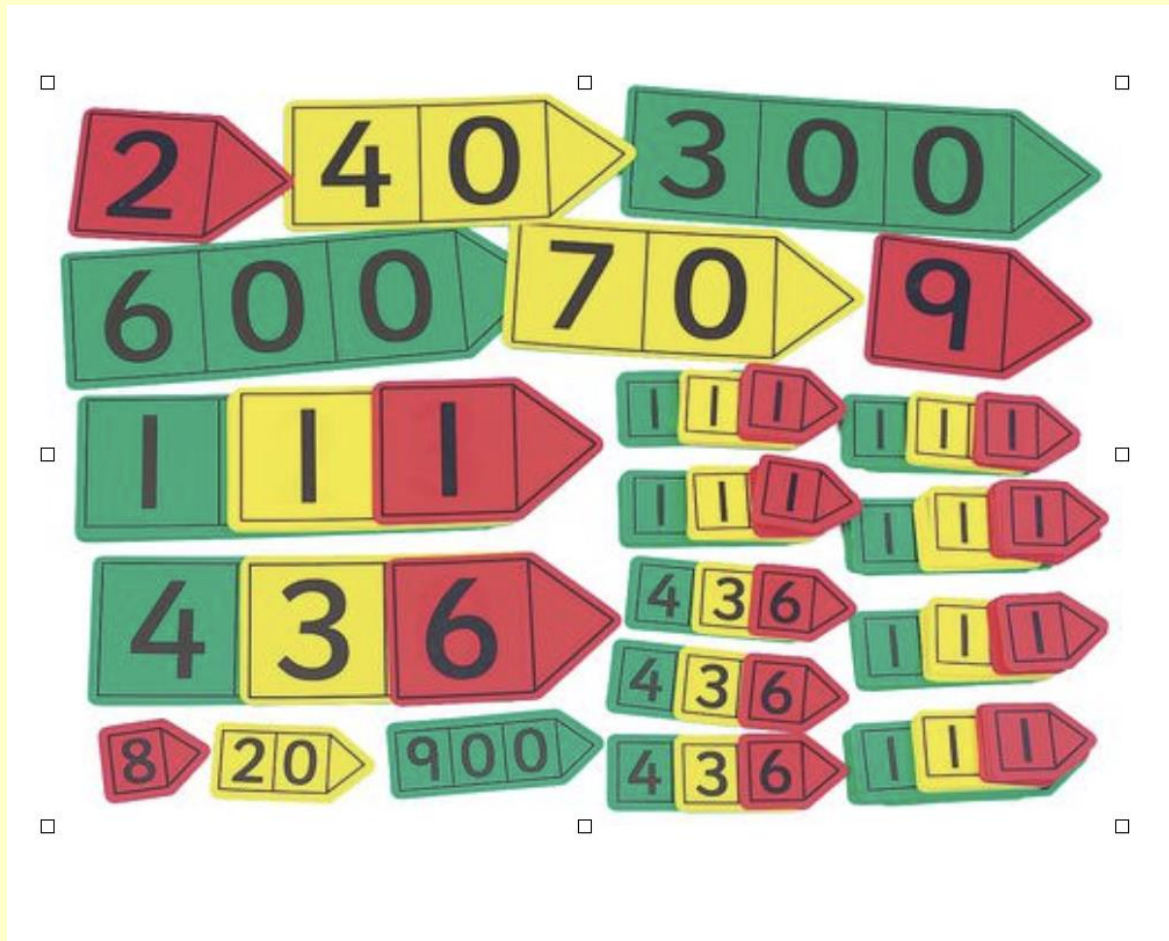




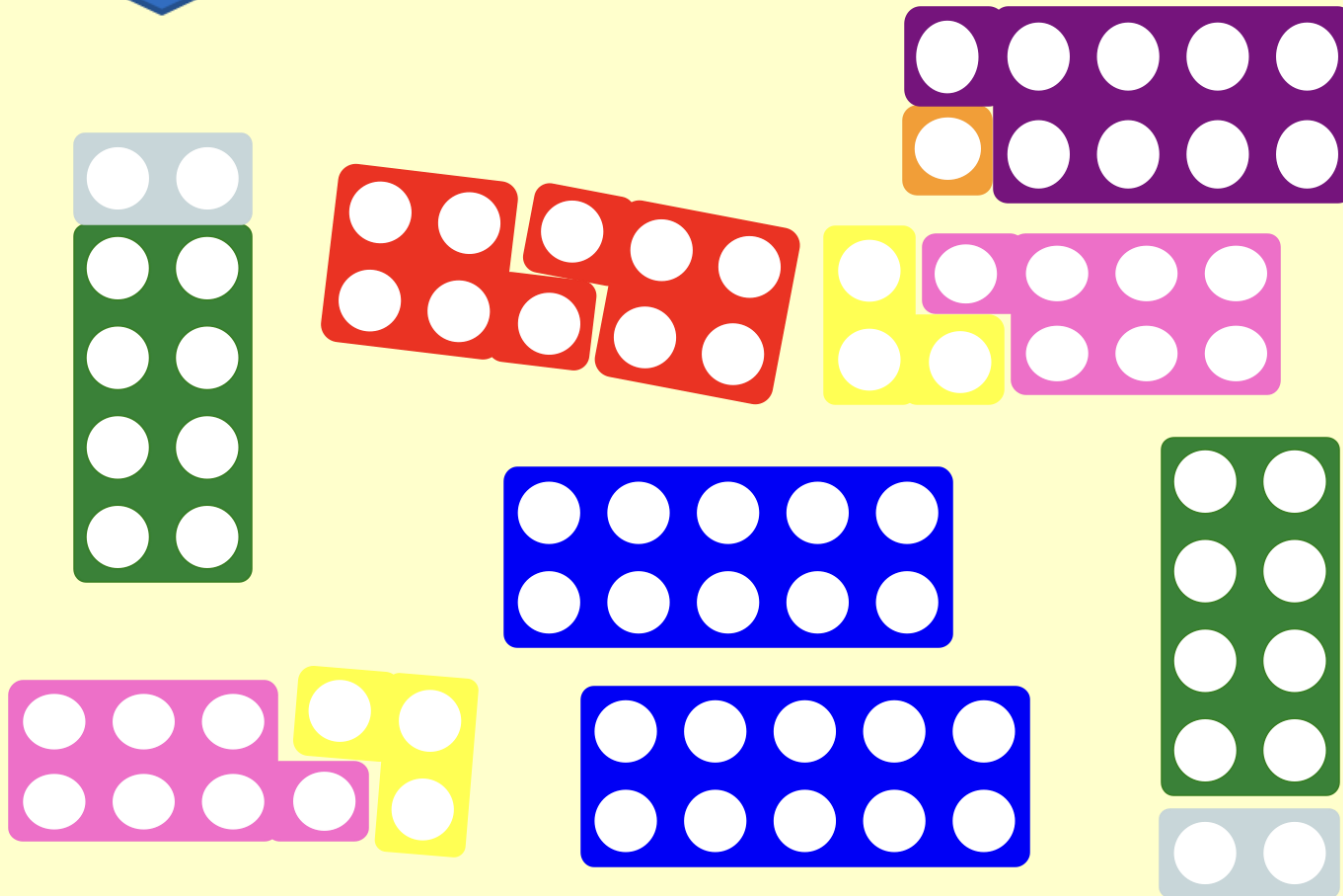
- Blwyddyn 2/3
 - Year 2/3
-
- Cwestiynau yn allweddol
 - Questioning is key

Cardiau Gwerth Lle

Place Value Cards



**Challenge – Find all the
bonds to 10.
Have I solved the problem?**

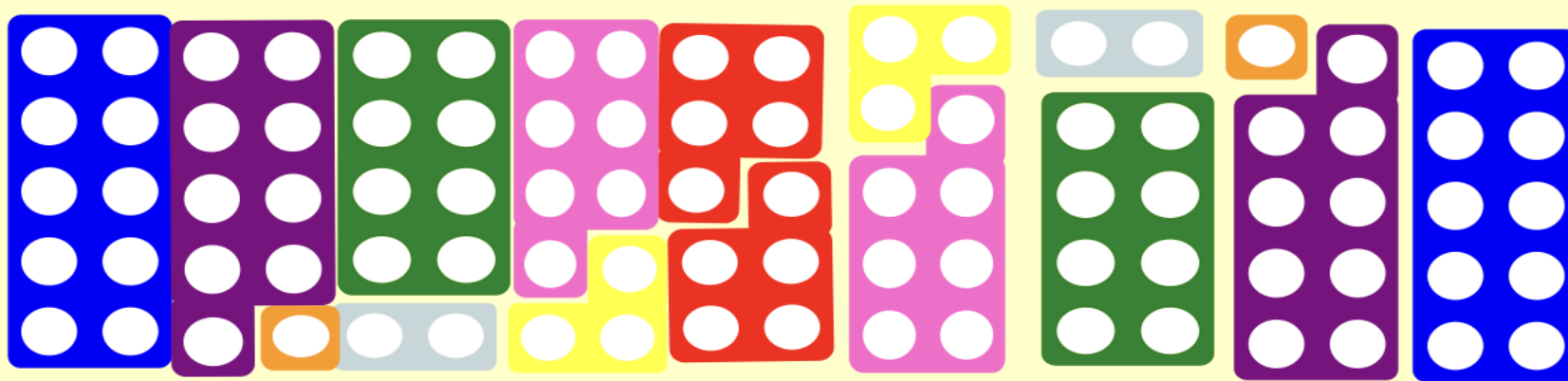


How can we find out /
check?

Prove it

Pa batrwm ydych yn gallu gweld?
Oes yna broblem?

What pattern can you see?
Is there a problem?









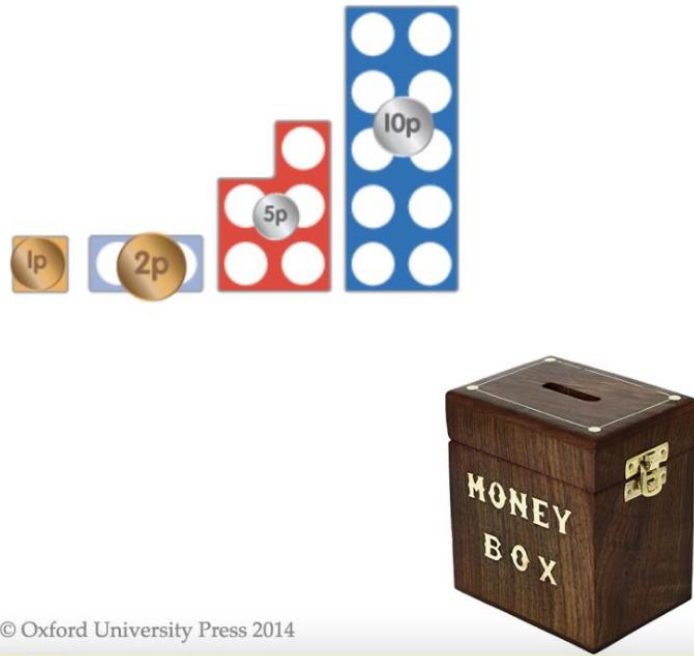




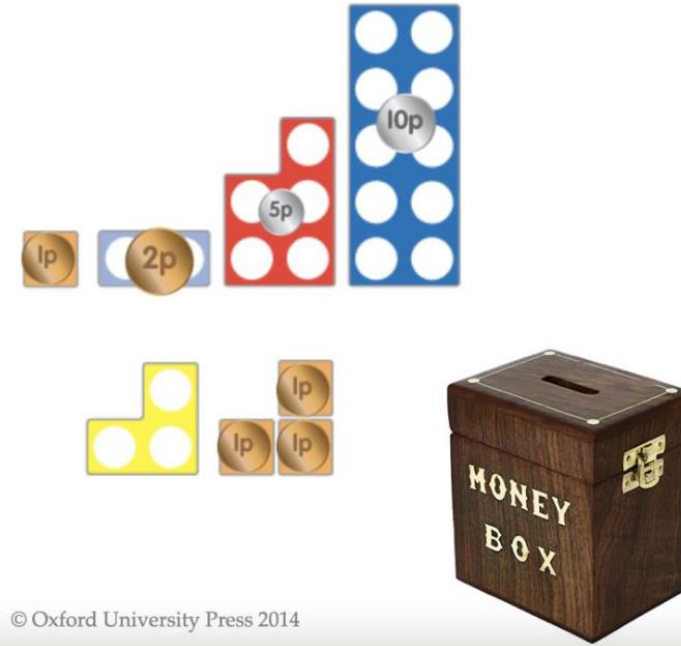




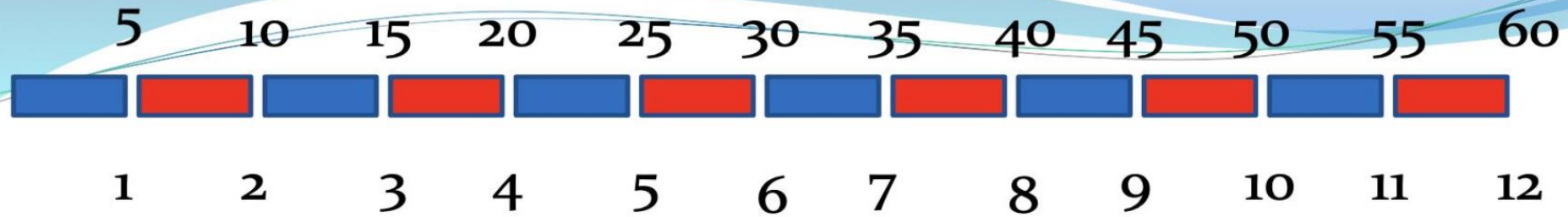
Money, money, money



Arian, arian, arian

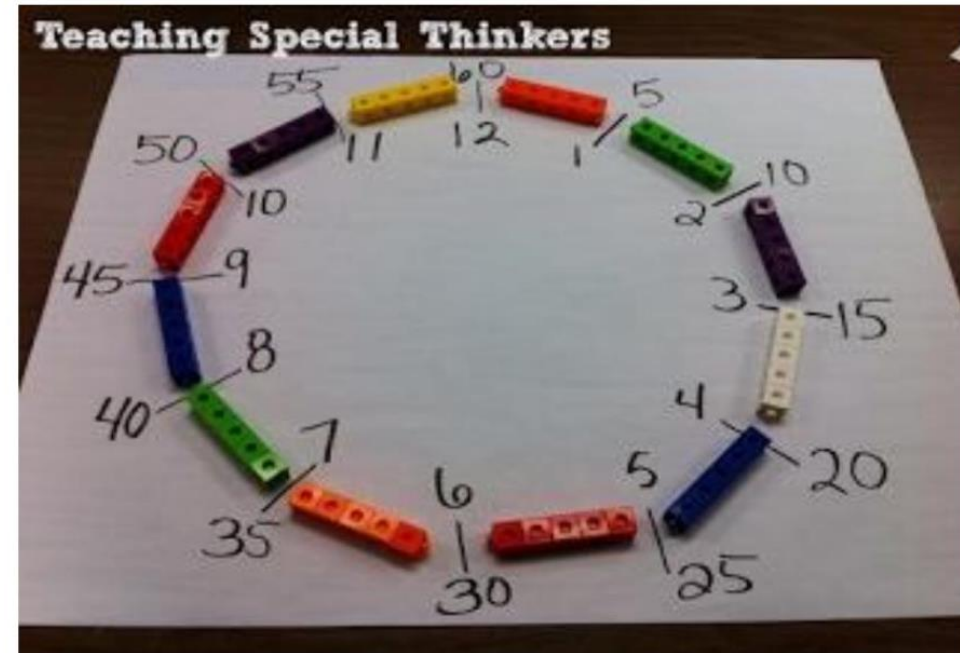


Arian - Money



Make connections about the number pattern created

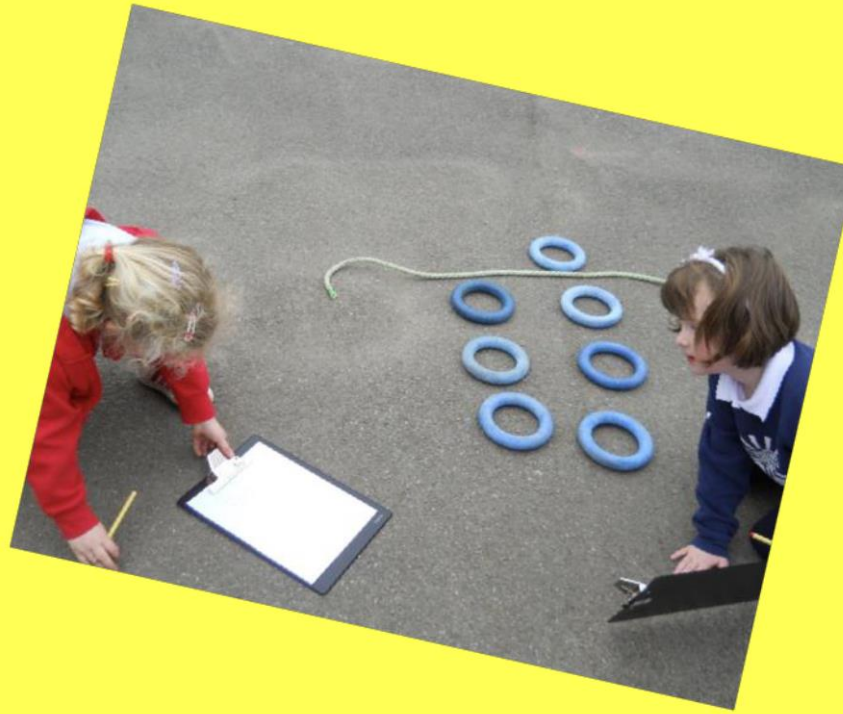
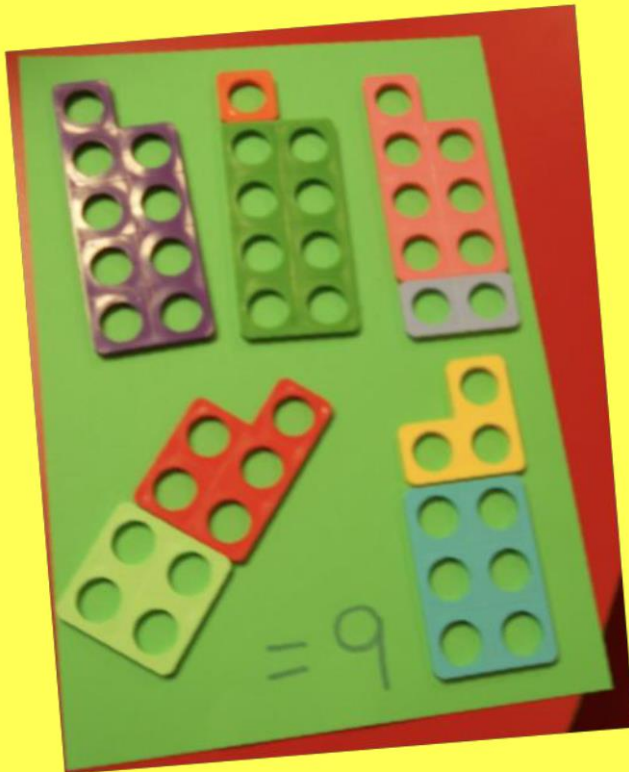
The long hand is needed to point at the numbers on the outside.
The short hand can point at the hours on the inside.

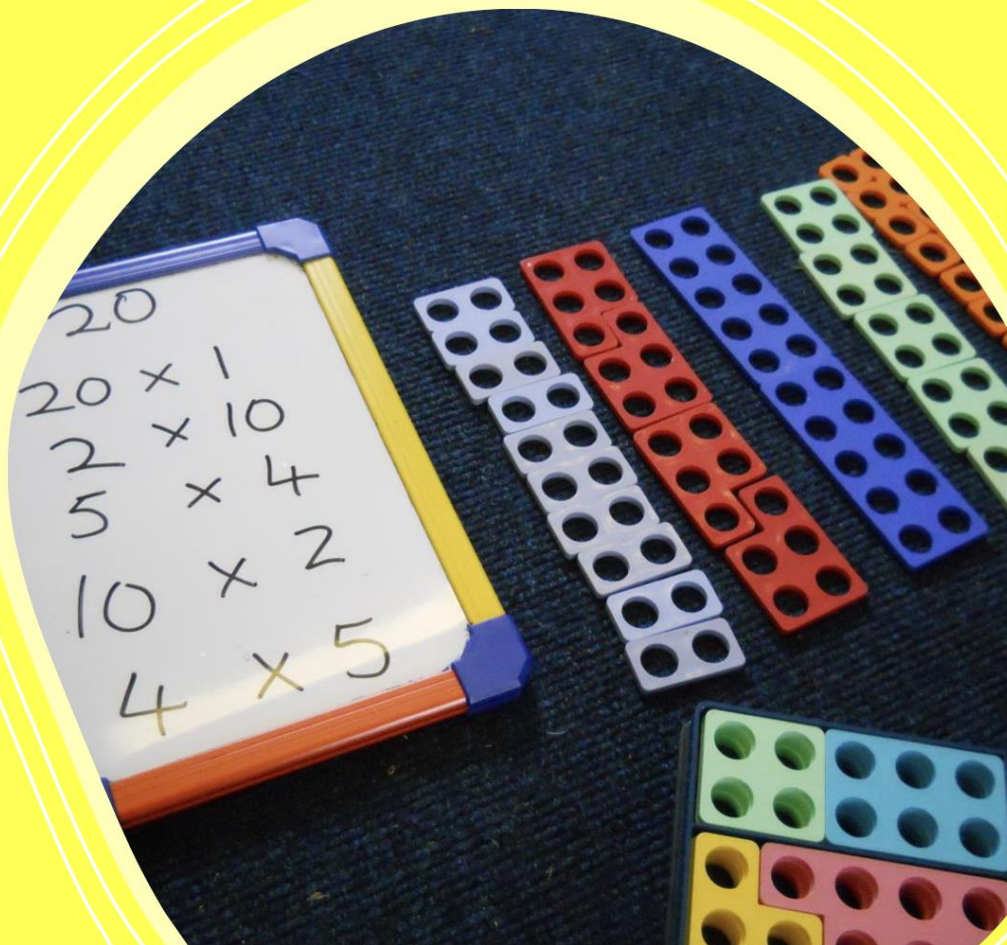


Make the connection with the clock by putting the number line into a circle.

How many ways can we make ____?

- Exploring number bonds is an activity children can carry out independently using Numicon, indoor and outdoor.





Numeracy outdoors



Exploring tessellation

Covers a surface with shapes to explore tessellation.



Outdoor challenge -
which objects will cover
the ground without
leaving any gaps?



cheque book-writing
number words

**Buying/making
stamps**

Add two stamps -
doubles

Weighing

How heavy is the parcel?
Is it less/more than 1kg

Envelope sizes

Matching and pricing
Measuring length/width



Odd & Evens

Addresses on envelopes

Data

Sorting parcels

Money

Sorting money bags -counting
in 2ps, 5ps, 10ps
£1 coins, £5 notes, £10 notes
Recording prices
Pay for items up to 20p

Capacity

Filling parcels for posting
Estimating how many will fit

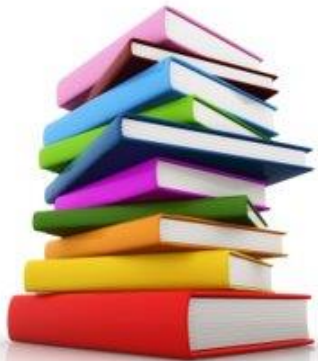
Timetable

Times of delivery
Calendars/clocks

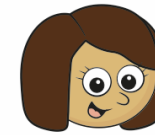
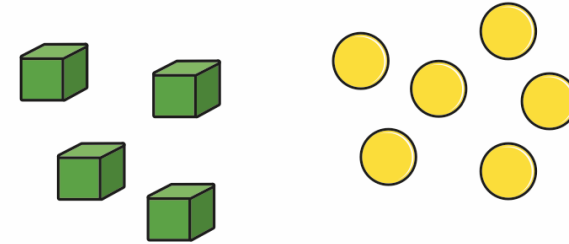
3D Shapes

Parcels of different shapes

- <https://whiteroseeducation.com/resources>



Kim and Mo are trying to find the sorting rule.



Kim

The objects are sorted into cubes and counters.



Mo

The objects are sorted into green and yellow.

Who is correct? How do you know?

Kim and Mo could both be correct, as all the cubes are green and all the counters are yellow.