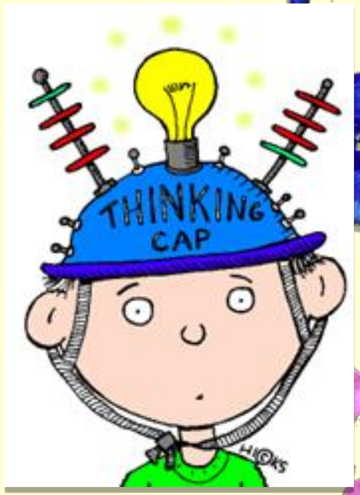
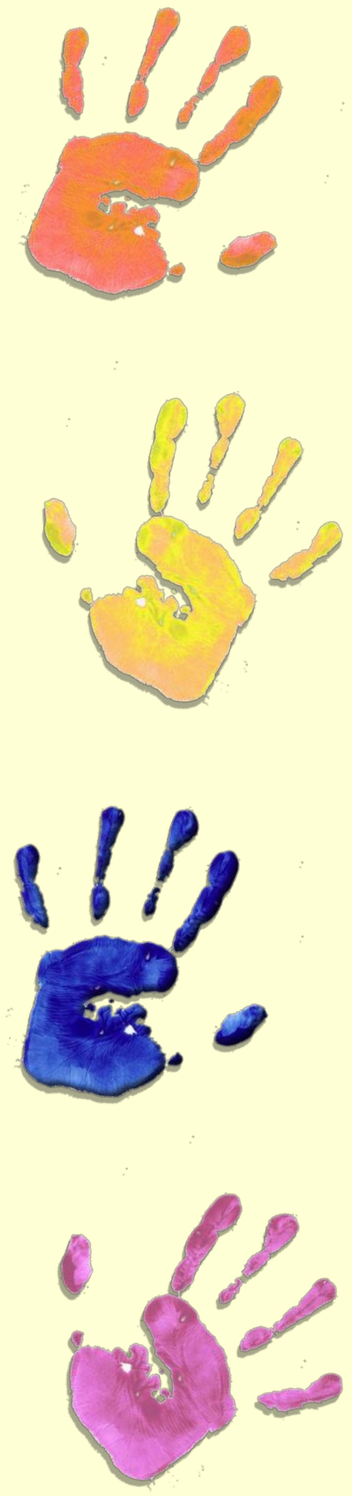
Cognitive acceleration
Cyflymiad gwybyddol



The session
Y sesiwn

- What is meant by effective thinking?
- To consider how to encourage the development of thinking skills (in ourselves and our pupils) through cognitive acceleration.

- Beth a olygir wrth feddwl yn effeithiol?
- I ystyried sut i hyrwyddo datblygiad sgiliau meddwl (yn ein hunain a'n disgyblion) drwy ddefnyddio cyflymiad gwybyddol.



Deallusrwydd /Intelligence

Theorists see intelligence as:-

- good processing of information;
- the linking of ideas;
- making connections.

They believe that:

intelligence is general as opposed to an IQ level 'fixed' at birth.

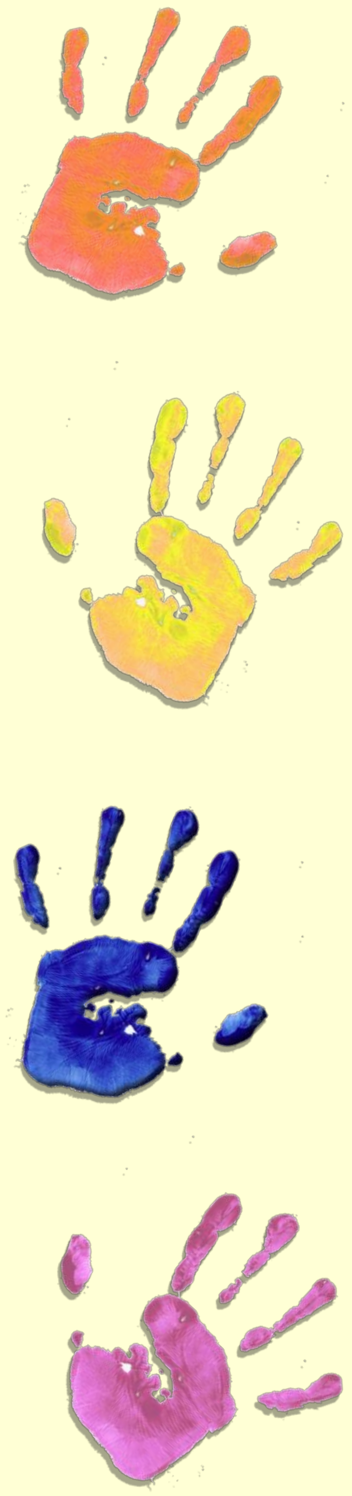
We can *improve* our pupils' intelligence.

Mae damcaniaethwyr yn ystyried deallusrwydd fel a ganlyn:-

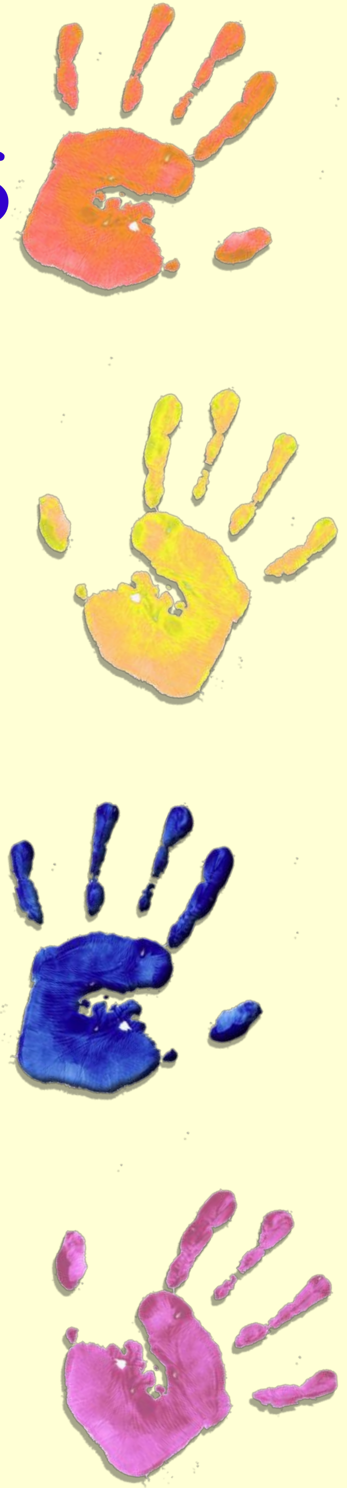
- Prosesu gwybodaeth yn dda;
- Cysylltu syniadau;
- Gwneud cysylltiadau;

Maent yn credu bod: deallusrwydd yn rhywbeth cyffredinol, yn hytrach na lefel IQ sydd wedi'i sefydlogi ar enedigaeth.

Gallwn *wella* deallusrwydd ein disgyblion.



‘Let’s Think’ @ KS1/FP
‘Dewch i ni feddwl’ am CA1/CS



- Developed by King’s College, trialled over two years in primary schools.
- 30 activities.
- Not subject specific, but covers skills relating to language, literacy and communication; personal and social development; knowledge and understanding of the world; mathematical development; creative development and problem solving.
- Y1 children (i.e. the entry to Piaget’s Concrete Operations stage.).
- The teacher works on ‘Let’s Think’ with one group of 6 children at a time.

- Wedi’i ddatblygu gan King’s College a’i ragbrofi dros ddwy flynedd mewn ysgolion cynradd.
- 30 o weithgareddau.
- Nid yw’n bwnc-benodol ond mae’n cwmpasu sgiliau sy’n ymwneud ag iaith, llythrennedd a chyfathrebu; datblygiad personol a chymdeithasol; gwybodaeth a dealltwriaeth o’r byd; datblygiad mathemategol; datblygiad creadigol a datrys problemau.
- Plant Bl1 (h.y. Y cyfnod mynediad at stad weithredu ddiriaethol Piaget.
- Mae’r athro yn gweithio ar ‘Dewch i ni Feddwl’ gydag un grŵp o 6 phlentyn ar y tro.

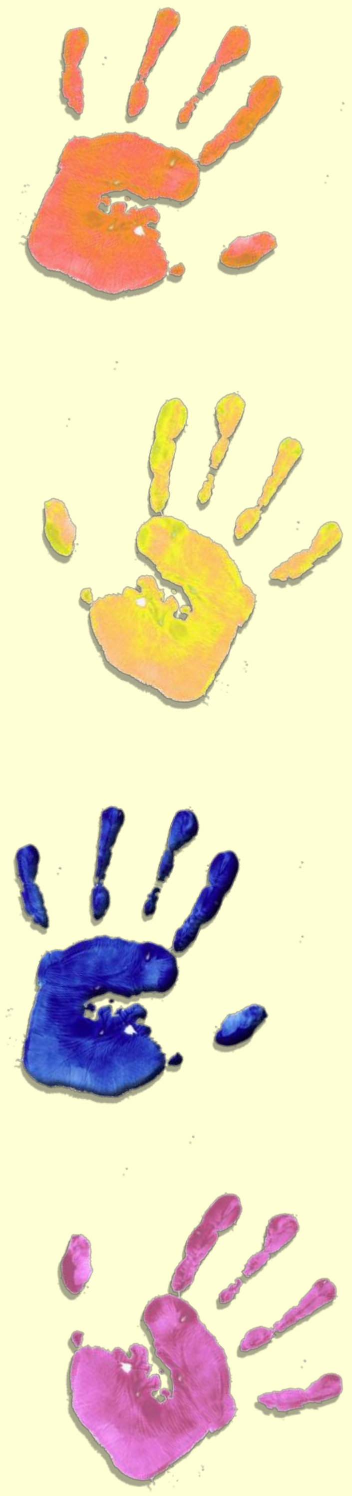
'Let's Think'
'Dewch i ni feddwl'

The 30 activities cover 6 main aspects of thinking (schemata):

- *Seriation;*
- *Classification;*
- *Time sequence (a special case of seriation);*
- *Spatial perception;*
- *Causality;*
- *Rules of a game.*

Mae'r 30 gweithgaredd yn cwmpasu 6 phrif agwedd meddwl (sgemata):

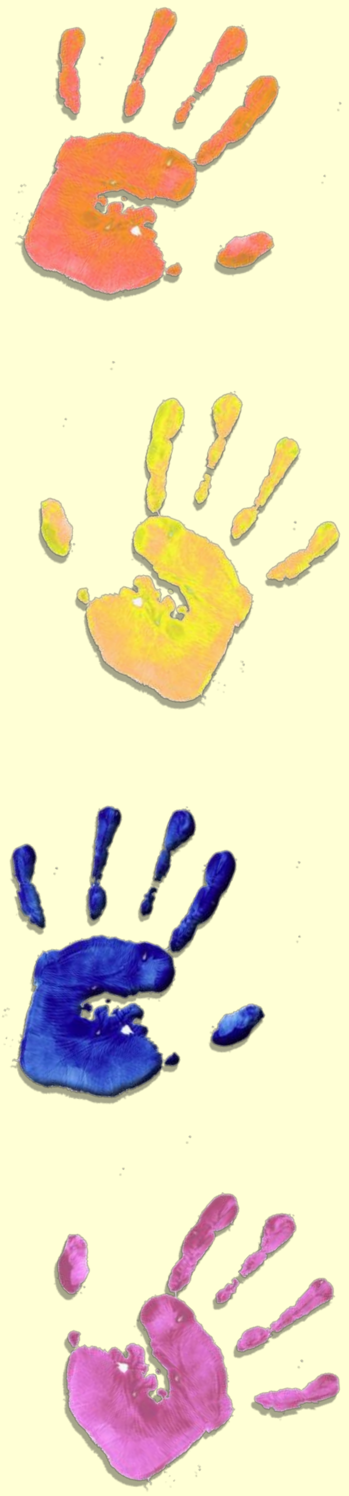
- *Cyfresiad;*
- *Dosbarthiad;*
- *Dilyniant amser (math arbennig o gyfresiad);*
- *Canfyddiad gofodol;*
- *Achosiaeth;*
- *Rheolau gêm.*



Pupil Opinions.

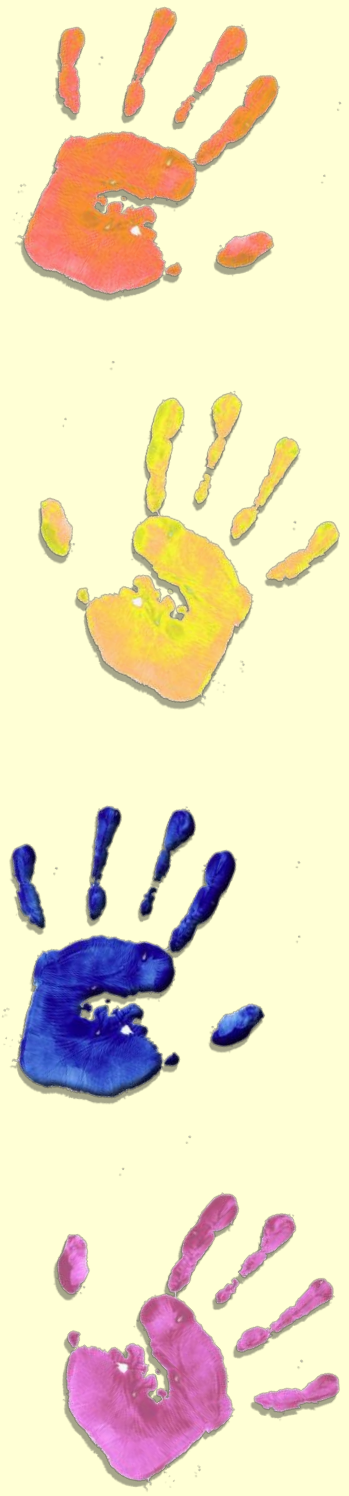
- 'When you help everybody in your group you can say ideas they don't know and then we all learn them. If you don't help you just keep your own ideas and they might be wrong and you don't learn and your friends don't either.' Y1 pupil.

- 'Now I can think myself through problems and that makes it so much easier. When I got to mainstream school some of my new friends here couldn't think their way out of a paper bag and I can think my way out of the hardest problem you can give me.' Y9 pupil, ex-special school.



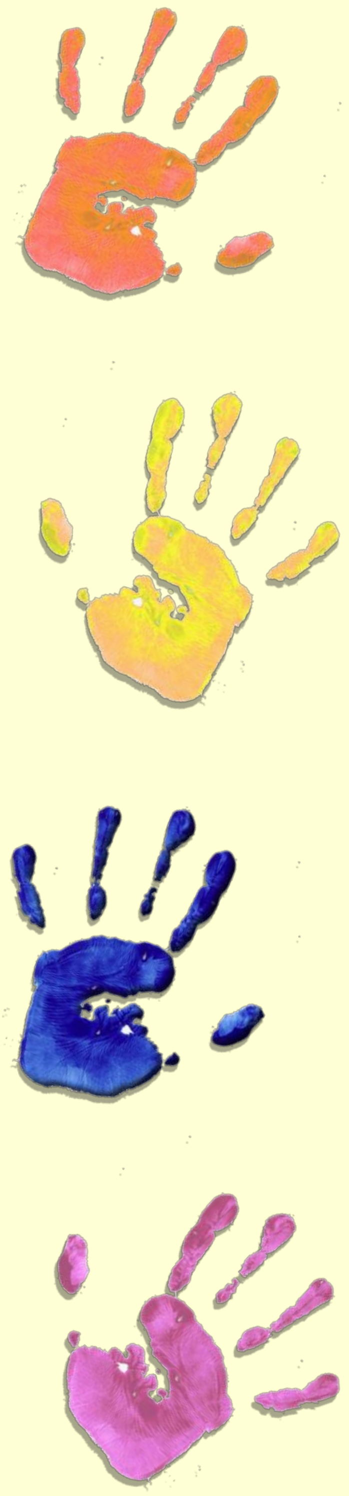
Barnau Disgyblion

- ‘Pan fyddwch yn helpu pawb sydd yn eich grŵp, gallwch sôn am syniadau nad ydyn nhw’n gwybod amdanynt ac yna, gallwn i gyd eu dysgu. Os nad ydych yn helpu, byddwch yn cadw at eich syniadau chi eich hun yn unig, a gallant fod yn anghywir, ac felly, nid ydych chi’n dysgu, na’ch ffrindiau chwaith.’ Disgybl Bl 1.
- ‘Yn awr, gallaf feddwl drwy’r problemau ac mae hynny’n gwneud pethau cymaint yn haws. Pan gyrhaeddais ysgol prif lif, nid oedd rhai o’m ffrindiau newydd yma yn gallu meddwl eu ffordd allan o gwd papur, ond gallaf innau feddwl fy ffordd drwy’r broblem fwyaf anodd y gallwch ei rhoi i mi.’ Disgybl Bl 9 a ddaeth o ysgol arbennig.



Teacher opinions

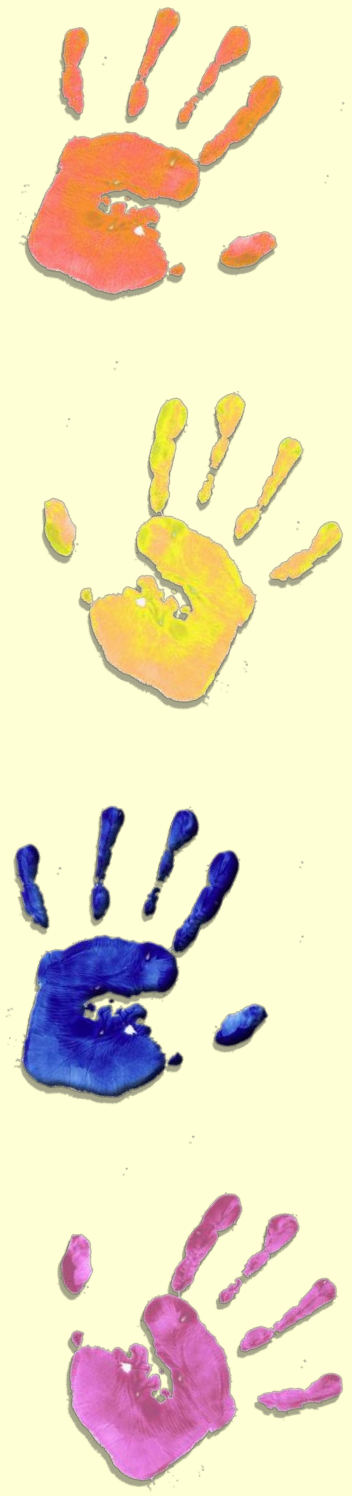
- 'The children are very vocal and can verbalise, they can make predictions, and they can also argue, which is good.'
- 'Children become more confident about expressing ideas because the whole atmosphere is it's ok to suggest things.'
- 'The language they use is so much more mature, and they use it in other lessons too.'
- 'They really look forward to the activities – and in all honesty so do I.'



Barnau'r athrawon

- 'Mae'r plant yn lleisiol iawn ac yn gallu , mynegi mewn geiriau; gallant ragweld, a hefyd dadlau, sydd yn beth da.'
- Mae plant yn dod yn fwy hyderus wrth fynegi syniadau, am fod yr holl awyrgylch yn adlewyrchu ei bod hi'n iawn i awgrymu pethau.'
- 'Mae'r iaith maent yn ei defnyddio yn llawer mwy aeddfed, ac maent yn ei defnyddio mewn gwersi eraill hefyd'.
- 'Maent yn wir edrych ymlaen at y gweithgareddau – a dweud y gwir, yr wyf innau hefyd.'

CASE & CAME
CASE a CAME



- These are acronyms for Cognitive Acceleration through Science / Maths Education.
- The original CASE project was set up in 1981 by Michael Shayer.
- CAME was developed 2 years later.
- Evidence shows certain types of teaching enhance thinking skills.
- The aim is to enable children to 'use their minds effectively so that they learn better in all subjects'.

- Acronymau yw'r rhain am Cognitive Acceleration through Science / Maths Education.
- Sefydlwyd y prosiect CASE gwreiddiol yn 1981 gan Michael Shayer.
- Cafodd CAME ei ddatblygu 2 flynedd wedyn.
- Mae'r dystiolaeth yn dangos bod mathau penodol o addysgu yn cyfoethogi'r sgiliau meddwl.
- Y nod yw galluogi plant i 'ddefnyddio eu meddyliau yn effeithiol er mwyn iddynt ddysgu'n well ym mhob pwnc'.

Concrete preparation.
Paratoi Diriaethol

- The context in which the problem is set is explored.
- Words are found to name the parts of the situation.
- Early thoughts and experiences are expressed.

- Caiff cyd-destun y broblem ei archwilio.
- Defnyddir geiriau i enwi rhannau'r sefyllfa.
- Mynegir syniadau a phrofiadau cynnar.

Cognitive conflict.
Gwrthdaro gwybyddol.

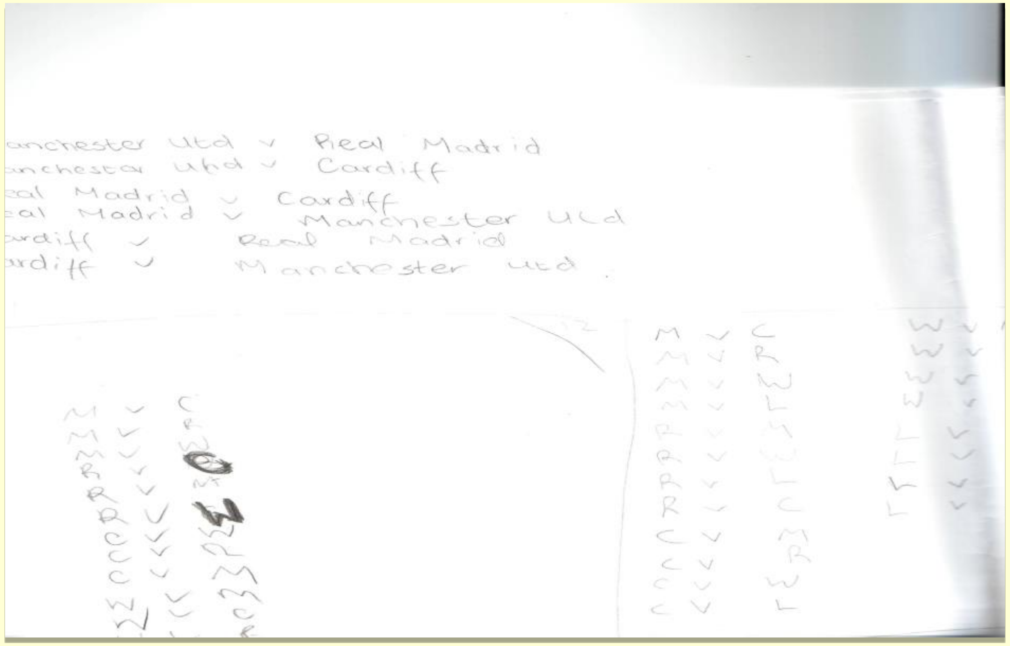
- The children become aware of the purpose of the activity.
- The children become aware of a difficulty which, although it is understood, cannot be readily resolved.
- They take ownership of their learning.

- Daw'r plant yn ymwybodol o ddiben y gweithgaredd.
- Daw'r plant yn ymwybodol o anhawster, ond er eu bod yn ei ddeall, nid ydynt yn gallu ei oresgyn yn hawdd.
- Maent yn cymryd perchnogaeth o'u dysgu.

Social construction
Adeiledd cymdeithasol

- The children are challenged by the problem.
- The children have different ideas and suggestions.
- They explore each others ideas.
- They take ownership of their group and its thinking.
- They arrive at some solution.

- Caiff y plant eu herio gan y broblem.
- Mae gan y plant syniadau ac awgrymiadau gwahanol.
- Maent yn archwilio syniadau ei gilydd.
- Maent yn cymryd perchnogaeth o'u grŵp a'i ffordd o feddwl.
- Maent yn dod at ryw ddatrysiad.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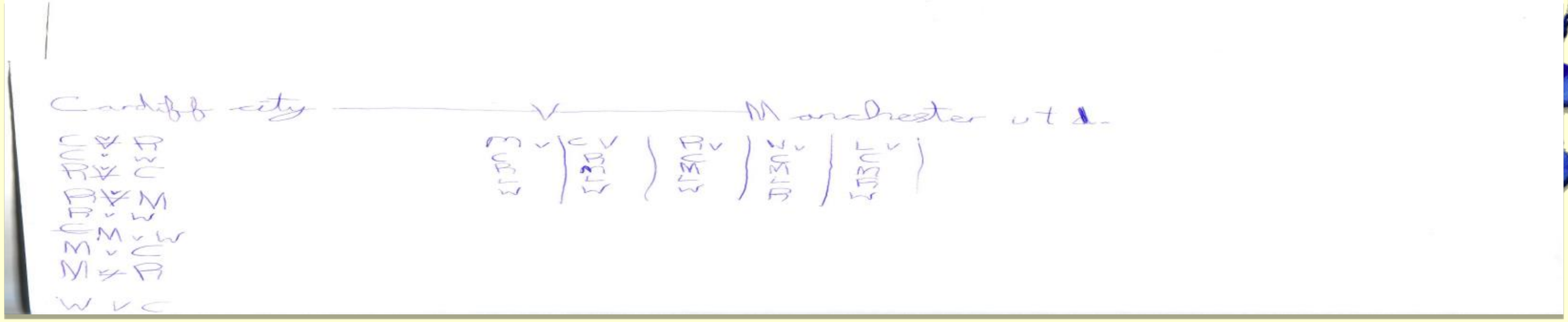
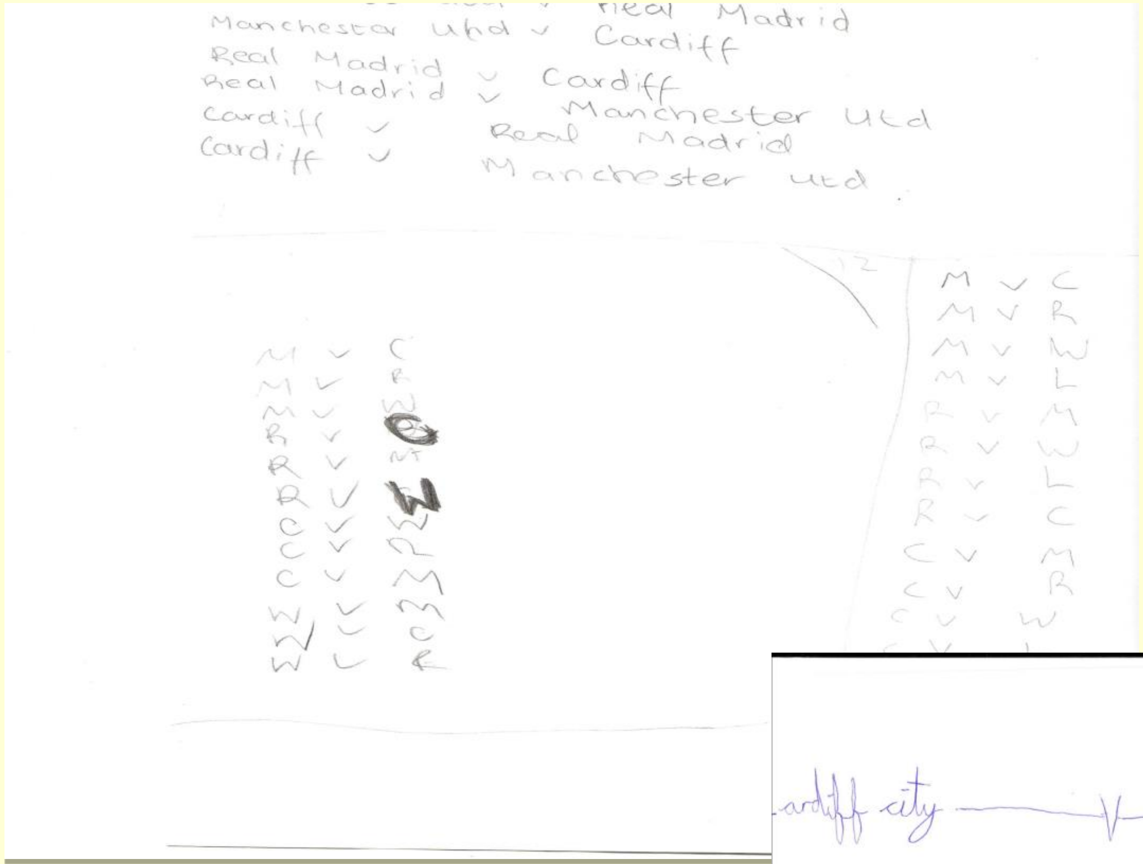

Cardiff city — v — Manchester utd.

Metacognition - Metawybyddiaeth

- There is an opportunity to look at other solutions.
- The value of ones own solution is explored.
- Problems that arose are discussed.
- How people feel is recognised.
- People acknowledge the support of others.

- Ceir cyfle i ystyried datrysiadau gwahanol.
- Archwilir gwerth eich datrysiad eich hunan.
- Trafodir y problemau a gododd.
- Ystyrir teimladau pobl.
- Cydnabyddir cymorth gan eraill.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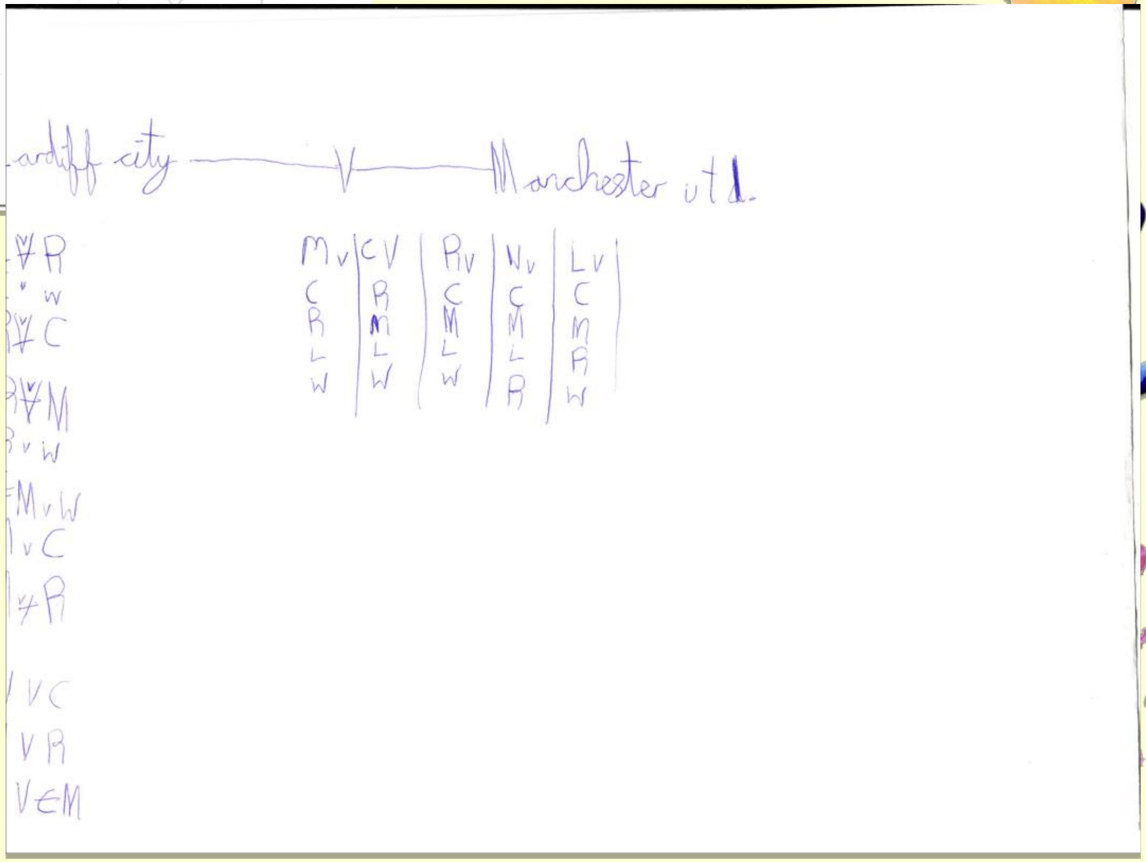
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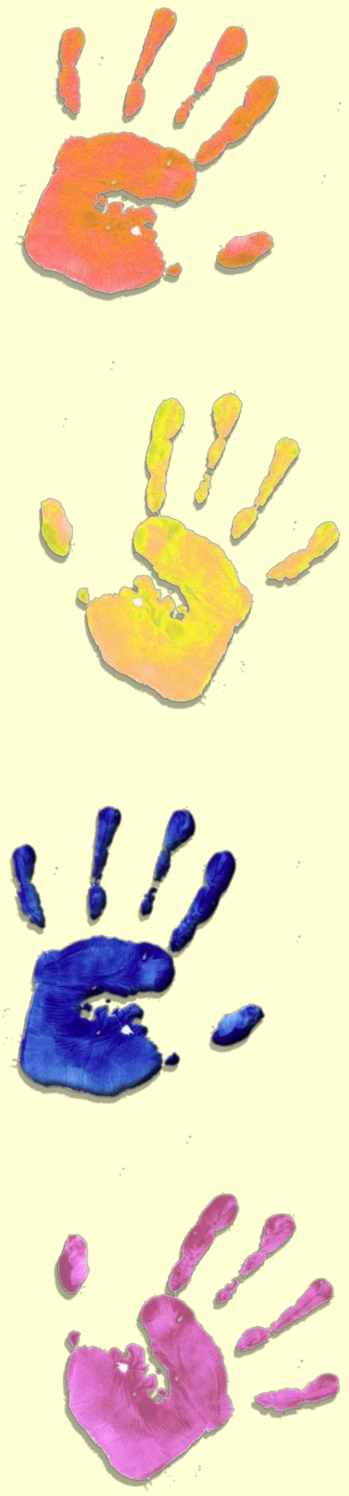
Bridging - connections
Pontio - cysylltiadau

- Making links and connections.
- Looking forward as well as reflecting.
- Making explicit the usefulness of the activity.

- Gwneud cysylltau a chysylltiadau.
- Edrych ymlaen yn ogystal ag adfyfyrio.
- Amlygu pa mor ddefnyddiol yw'r gweithgaredd.



Man U

Man U - Cardiff C

CardiffC - Man U

Real M - Card C

Cardiff C - Real M

(12)

3 → 6

4 → 12

5 → 20

6 → 30

7 → 42

8 → 56

9 → 72

10 → 90

6, 8, 10, 12, 14, 16, 18 (+2)

Find out how to work it out with different

1,000,000 —×999 999→ 999,999,000,000

(12)

	7000
×	6999
	63 000
	630 000
	630 000
	4 20 000
	1 7 4 3 0 0 0

1,7

7000 —×6999→ 1,7

Working together and c[illegible] up with different Solutions

City 4
[illegible]
12 ÷ 2 = 6

times the number by the number that is one number lower

or take away one

CK and NATHAN

2 / 6

/ 12

/ 20

/ 0

M v C
M v R
M v X
M v L

C v M
C v R
C v X
C v L

R v M
R v C

L v M
L v C
L v R
L v X

3 $\xrightarrow{\times 2}$ 6
4 $\xrightarrow{\times 3}$ 12
5 $\xrightarrow{\times 4}$ 20
6 $\xrightarrow{\times 5}$ 30
7 $\xrightarrow{\times 6}$ 42
8 $\xrightarrow{\times 7}$ 56
9 $\xrightarrow{\times 8}$ 72
10 $\xrightarrow{\times 9}$ 90
11 $\xrightarrow{\times 10}$ 110

Research Evidence.
Tystiolaeth ar sail Ymchwil

Preliminary evaluations (quantitative and qualitative) carried out in 2000.

Children who were involved in the project made significantly greater gains in cognitive development when compared with matched controls.

These gains were transferable to other aspects of the curriculum.

The biggest gains were made by children who scored lowest in pre-project tests.

Gwerthusiadau rhagarweiniol (meintiol ac ansoddol) a gynhaliwyd yn 2000.

Gwnaeth y plant a gymerodd ran yn y prosiect gynnydd, o ran datblygiad gwybyddol, a oedd sylweddol yn fwy o'i gymharu yn erbyn rheolyddion cyfatebol.

Gellir trosglwyddo'r cynnydd hwn i agweddau eraill o'r cwricwlwm.

Cafodd y cynnydd mwyaf ei wneud gan y plant hynny a enillodd y sgôr isaf mewn profion cyn prosiect.