



NEW POWERFUL METHOD TO LEARN MATH

VISUAL SUPPORT:
Subitization

COMMUNICATIVE APPROACH:
Four languages of math in use *

PARTICIPATION

Pupil has an active role in
numberconcept
learning-
interaction

INDIVIDUALIZING

Assesment and support
according to the level of
pupil's thinking

METACOGNITION

Pupil becomes aware of his/
her ability to count by
grouping and think flexibly

DEEP LEARNING
OF NUMBER
CONCEPT

ENGAGEMENT

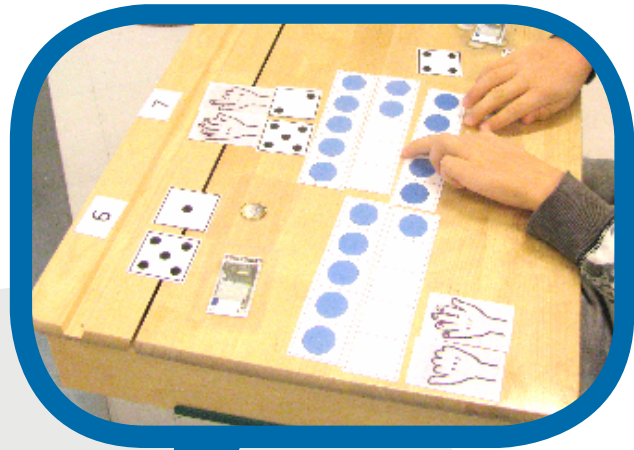
Pupils self-efficacy is
confirmed by deeper
understanding
and structural conceptins

- From prosedural thinking and counting by ones to structural thinking and flexible use of numbers
- "Seeing" number relations via subitization
- Visual support to "seeing by mind's eyes" (Sfard 1991;2008)

Do you speak math?

*Four languages of math

(Joutsenlahti & Kulju 2014)



Bob eats
2 bananas
and....

I know that
 $2 + 4$ is equals 6,
because...

Natural
language

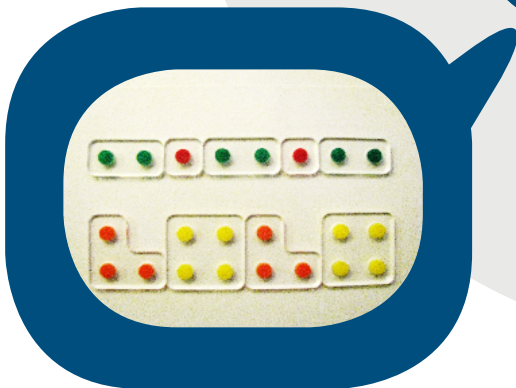
Tactual
language of
doing

Discussion

Pictorial
language

Symbol
language

$4 + 2 = ?$



Algebraic
thinking:

$$2 + _ = 10 - 4$$

$$12 ? 2 > 14 - 5$$

Do you
understand
numbers?

Innovative EMMA-materials support
understanding of number connections
e.g. part-whole relationship.



The first step: cardinality.
- The number of the berries is six!
I know it is six! I can see it!

Visualization helps to participate

Visualization is used not only to support conceptual understanding but also to participate pupils in their learning processes by asking them to explain, justify and argue for their reasoning. In the beginning they do it in pictorial language with EMMA-materials.



**What number is two more than four? How do you know?
Can you "justify" it?**

Every child can participate.

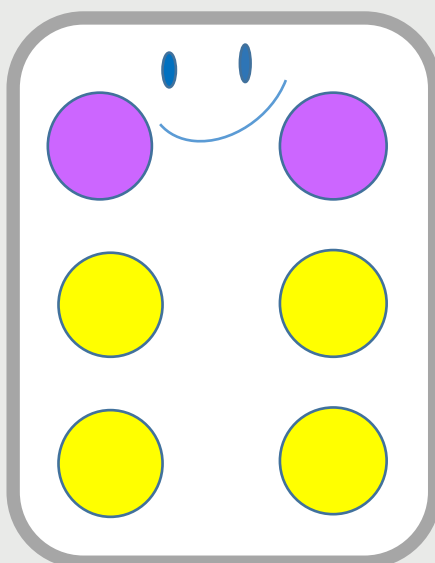
EMMA- Numbers



Numbertalk: what numbers are and what can be done with them?

Basic activities:
Explaining, justifying, reasoning

Subitization means our ability to see small quantities accurately and easily without counting in ones
- Supports cardinality



6 SIX

All four languages in active use

Focus on quantity

Different solutions

Part-whole principle

Self-efficacy