NRICH

Teachers: Early Years

The Box Game

Adding and subtracting
Solving problems

Children often enjoy visualising how many toys are hidden in a box.
Adults could start by using three large toys and a giant box with a group of young children. Then use bigger numbers or miniature toys with smaller groups or individuals.

The Activity
Put toys one at a time into the box, so children cannot see them inside, counting altogether. Ask: 'Can you show on your fingers how many are hidden?'. Display a large numeral.
Add one to the box, without showing the objects inside and ask children to show on their fingers, 'How many are there now?' Then show how many are inside the box and count to check.

Encouraging mathematical thinking and reasoning:

Describing
How many are there to start?
How many now?

Reasoning
How do you know?
How did you work it out?

Opening Out
What if we add two more?
What if we take one out? Two out?
Imagine there are 10 in there and I take out 6 - how would you know how many were left?

Recording
Can you show how many there were?
Can you show how many there are now?
Can you show how many there were and what happened?

The Mathematical Journey

Counting and cardinality
- saying numbers in the right order
- saying one number for each object
- saying how many there are showing 'finger numbers'
- by counting fingers
- instantly, without counting

Matching numerals and amounts
- selecting numerals to match the starting and finishing numbers

Adding
- predicting adding one to a number (or two)
- modelling on fingers
- counting all e.g. putting up 4, then 2 more, then counting from one through to 6.
- counting on, starting from the first number: '4, 5, 6'
- visualising or counting mentally, e.g. nodding at hidden objects; saying, 'I went 4, 5, 6'
- using number facts: 'Because there were 3 and you put one more', 'I know 2 and 2 is 4'.

Subtracting
- predicting taking one from a number (or two)
- modelling on fingers
- counting all, then how many left: putting up 6, putting down 2, counting the 4 still up.
- visualising or counting backwards mentally; 'I went 6, 5, 4, so there's 4'.

Development and Variation
Increase numbers to start, to add and take away:
- repeatedly add one to the previous number.
- repeatedly subtract one from the previous number.
- vary the starting number, but just add one each time (or two):
- keep one starting number and subtract varying amounts to build number fact knowledge
- repeatedly add 2, or subtract 2 from a starting number.

Children can choose how many to add or take away.
Vary the context: use pennies in a pot, children behind a screen, dinosaurs in a cave. Model with fingers, Numicon, large number line, 'staircase' of cubes or other resources.

Resources
- Box or tin with lid, a pot to upturn or a screen, cloth, cave ...- Toys, pennies, children, dinosaurs ...- Large numerals to display

Acknowledgement:
Martin Hughes (1986) Children and number Oxford: Blackwell