

# Algebra Board!

In this article, we look at some activities that can support children's conceptual development in algebra. The activities are not designed as stand-alone lessons nor are they aimed at a particular class group. Their purpose is to consolidate learning and to explore the child's awareness and understanding of math symbols and their relationships.

### Confusing symbols

It is not uncommon, at the end of Third Class for children to record

$$6+2 \text{ as being } = 12$$

The confusion is usually caused by a lack of understanding of the individual symbol and the relationship between the symbols.

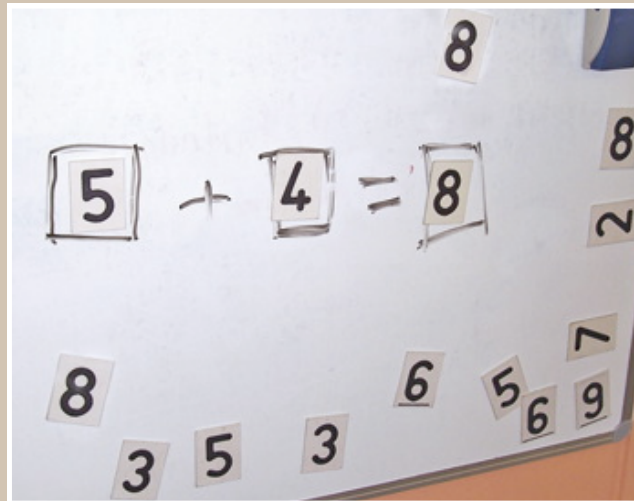
This awareness of the meaning of symbols can best be developed initially through oral activities rather than written. The following number sentence would require a lot of discussion, indeed it would be essential to talk to the child about exactly what they think it means before starting to try to solve it.

$$4 + \square = \bigcirc + 2 = \triangle$$

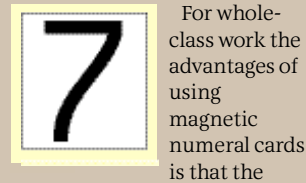
When you analyse it you can see that many content statements are being targeted in a single question (addition of single digit numbers, understanding of plus, equals, algebraic frames and the commutative law).

### Description of the activities

Materials needed:  
A large magnetic white-board and whiteboard markers (if available).



- Cards (5cm x 7cm, approx.) with the numerals 0-9 written on them (two of each).



For whole-class work the advantages of using magnetic numeral cards is that the child can have the number to hand and not have to worry about numeral formation. It will also be visible to the whole class.

**NOTE:** where the term *algebra-board* is mentioned it refers to the type of math sentence written on the magnetic board for whole class work. In this article, the symbols + and = are used, in older classes the multiplication and division symbols can also be used.

Right: an example of how the algebra board may be used as a table-top exercise with a group



Magnetised numeral cards, at least two of each number 1 to 9 are made available to the children. (see photograph on the left)

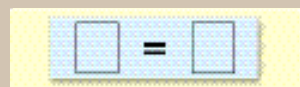
The teacher asks the child to come and place two numbers in the frames on the board, for example:



The reason for posing the task in such a manner is to assess the child's awareness of the equal symbol. The class are then asked to indicate, by raising their hands whether they agree or disagree with what is on the board. If all of the children agree then they can be asked to make the sentence not true and discuss what the sentence 'says'.

If children disagree the teacher asks one child to read the 'sentence' and explain why

**Board No. 1**  
Two frames, with an equal symbol, are drawn on the magnetic board.



**The algebraic frame (a box, or other shape which acts as a placeholder)** Although the algebraic frame has moved from Infants into First class, some children leave the Infant programme 'seeing' the frame merely as a place or box in which to write their answer and the equals sign as indicating "the answer comes next".

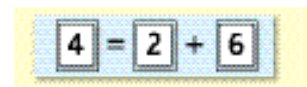
$$6+1 = \square$$



**Symbols in the Environment**

The importance of looking carefully at the signs can be related to speed signs that children see on the road. In Maths, speed-reading causes accidents!

see it, the “answer” below being quite common.



Here, a ‘remembered’ addition fact also masks the presence of the symbols and the importance in being aware of them. Children will sometimes ‘read’ this as “four and two is six”, and see nothing wrong. What they have said is correct but does not relate to the actual reading of the sentence.

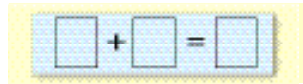
The same sequence follows as before, i.e. Number in **first** frame. Number in **last** frame. Number in **middle** frame.

**Conclusion**

These hands-on activities generate rich mathematical dialogue and enjoyment. They use a variety of methodologies and also help to develop mathematical skills. By *physically* constructing their own mathematical sentences, children are also *mentally* constructing a deeper understanding of the symbols. Sometimes children can feel ‘lonely’ standing at the whiteboard and it might be an idea to allow them to *phone a friend* (ie to ask another child to come up and help) if they feel they would like further support.

s/he disagrees with it. Magnetic cubes can be placed on the board beside the numerals to help the children see the equation. The teacher then asks that child to go to the board and change the sentence so that becomes true.

**Board No.2**



This time, the plus sign is introduced. Each time the class is asked whether they **agree** or **disagree** and to explain their reasons. In all of these activities, the focus is on generating **talk** and **discussion**, not simply on completing equations. These activities would take place over a number of maths lessons.

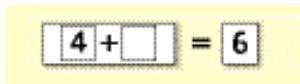
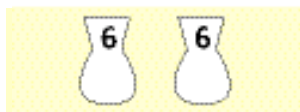
1. Initially, the children are asked to place **any three numbers** in the three frames.
2. The activity is extended by asking a child to place any number in the **first** frame while another child is asked to place any two numbers in the remaining two frames.
3. Then the child is asked to place any number in the **last** frame (ie the frame after the equals sign) while another is

asked to place two numbers in the remaining frames.

4. Finally, a child is asked to place a number in the **middle** frame with another asked to place two numbers in the remaining two frames. (This can be quite difficult for children in second and third classes).

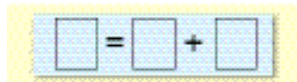
A useful analogy to explain the equals sign is that of 2 bags containing sweets. The total sweets that must be in each bag is written in the handles of the bags, the equals sign indicating that each bag must have the same number of sweets, in this case 6 sweets.

The other bag has 4 sweets but needs some more in order to have a total of 6 sweets.



Using a balance with cubes will also help understanding of this concept but the purpose of the activity is to reinforce the need to actually ‘read’ the symbols.

**Board No.2 (Second Position)**



This time the board is turned around, so that the equals sign is directly after the first frame.

Initially, the children are asked to place any **three** numbers in the **three** frames.

This format of the math equation often causes difficulty and the children may ‘chose’ not to

**Complied by the Maths Team of the Primary Curriculum Support Programme. Visit the website at [www.pesp.ie](http://www.pesp.ie) for further ideas.**

