Nodanna

Making tables add up!

Turning the Tables was published a number of years ago in response to a request from teachers for more support in relation to the teaching and learning of multiplication tables. Due to the positive reaction received from teachers, articles that explore addition tables will feature in this and next month's issue. This first article will provide an overview of the thinking strategies that children need to acquire in order for them to memorise and recall basic addition facts. Next month's article will present a variety of enjoyable activities and resources for teaching and consolidating addition tables to develop a positive attitude to mental mathematics.

Thinking strategies and addition facts

Learning 'tables' from our school days for the most part involved chanting and repetition. The Primary School Curriculum (1999) strongly advocates the use of a variety of strategies to effectively teach and learn addition tables; counting, using concrete manipulatives, discovering patterns and applying addition tables to real-life situations.

While some children will assimilate the basic number facts through the wide range of activities in the classroom, most, however, will have to commit these facts to memory. According to the Primary School Curriculum, "All children gain from using strategies for number facts" (p26). These strategies facilitate their learning and retention of the basic facts and transfer to other problems.

Some children acquire these strategies effortlessly but explicit instruction will be required for others to support them in acquiring efficient strategies for solving the basic facts.

Such strategies enable the child to comprehend relations between the facts thus aiding in memorisation and recall. It is important that children progress through the steps below and that learning is consolidated at each step before progressing to the next.

Step 1: Adding on 0, 1, 2 (infants)

a. Develop this concept using various concrete materials.

b. Use a peg number line to effectively reinforce this concept.

c. Involve the children themselves.

- Adding zero: Invite three children to stand in line. Teacher says "we have three children and zero (no more) children came along. We still have three children".
- Adding 1: Similarly, "we have three children and one more came along, now we have four children altogether", and so on.

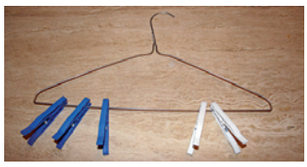
d. Appeal to the children's auditory senses.

- Adding on 1: Teacher says a number, for example, "3", then asks the children "What is the next number?" The children say in unison "4". Then to a rhythmic beat the children sing "3 and 1 is 4" emphasising the 3 and 1.
- Adding on 2: Teacher says "Yesterday 3 and 1 was 4, so what is 3 and 2? So what is the number after the next number?" Use rhythmic beat again when chanting out "adding on 2" tables.

Step 2: Commutative property (infants – second class)

Buy one get one free (3+2 = 2+3)

a. If children understand the commutative property, they only have to remember half of their tables. Use a hanger with three blue clothes pegs on one side and two white ones on the other side to demonstrate this. "3 and 2 is 5. Now turn it around and we have 2 and 3 is 5."



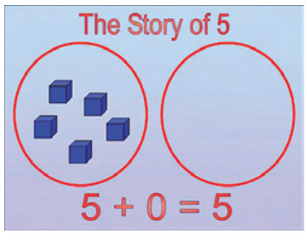
b. Use two different coloured dice. Children throw a red and a white die simultaneously. If they throw a 4 and a 3, demonstrate that 4+3 is the same as 3+4.

c. Use dominoes. Take any domino, for example, the 4:3 domino. Show that 4 and 3 is 7 and by turning the domino upside down, show that 3 and 4 is 7.

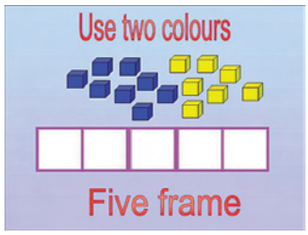
Note: Take 3+5 as an example. Train children to count on from the larger addend first as it is easier to count on 3 from 5, than count on 5 from 3.

Step 3: Story of 5

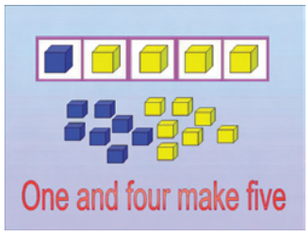
a. Use two hoops and five cubes. Place five cubes in one hoop and children see that 5+0=5. Now place four cubes in one hoop and one cube in the other hoop so that they see that 4+1=5, and so on.



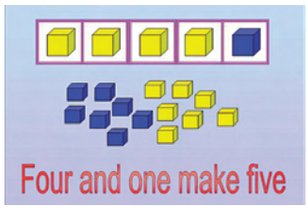
b. Use the five frame.
Using the frame below, (start filling the five frame from left to right), invite children to place one cube in the first box.



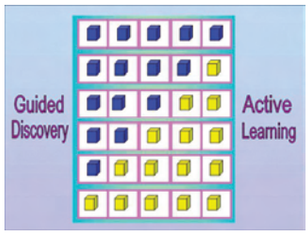
Teacher says, "We have one blue cube and how many empty spaces?" Now place four yellow ones in the empty spaces. In unison: "So 1 and 4 is 5."



Demonstrate the commutative property. Turn the five frame around, "now we have 4 and 1 is 5."



Similarly, invite children to place 2/3/4/5 cubes on the five frame.

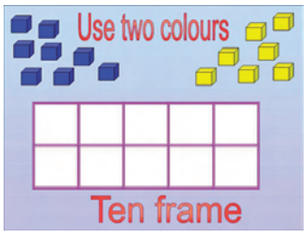


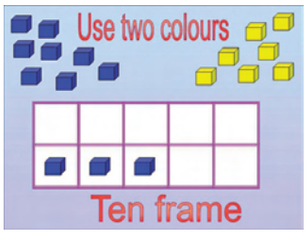
c. Appeal to children's visual memory by getting children to colour in the story of 5 as above and display the five frames in the maths area.

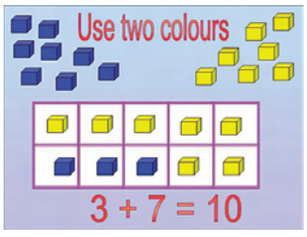
Step 4: Story of 10

Using the ten frame, (start filling the ten frame from the

bottom row, left to right), invite the children to place three cubes on the ten frame. Teacher says, "We have three cubes and how many empty spaces?" Now place seven yellow cubes in the empty spaces. In unison, "so 3 and 7 is 10".







Repeat for all the facts of ten.
Note: Templates for five and ten frames are available on www.pcsp.ie

Demonstrate the commutative property. Turn the ten frame around "now we have 7 and 3 is 10."

Similarly, invite children to place any number of cubes from 0 to 10 thus visually demonstrating the story of 10.

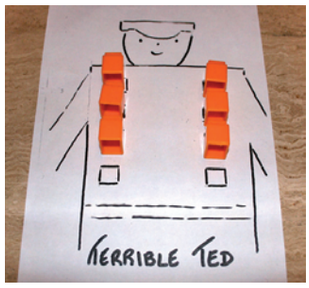
Appeal to their visual memory by getting children to colour in the story of ten as discussed in step 3, part c above

and display the ten frames in the maths area.

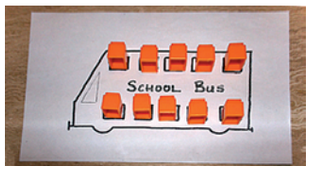
Step 5: Doubles

a. Use multi-link cubes for this strategy. Build up a visual picture with the children.

b. Terrible Ted has three buttons and three buttons on his coat. How many altogether?



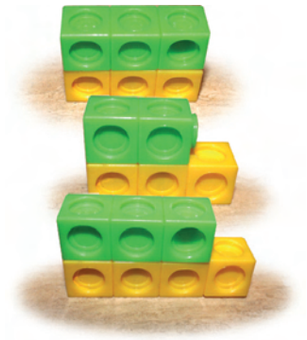
c. There are five boys and five girls on the bus. How many children altogether?



Note: Templates for Terrible Ted and The Bus are available on www.pcsp.ie

Step 6: Near Doubles

a. Build on the children's knowledge of the doubles for this strategy. Again, use multi-link cubes to demonstrate this strategy. Show 3+3 using the cubes, then allow children to work out taking one off (3+2) and adding one on (3+4). Teacher asks "3 and 3 is 6, what's one more/one less than the double?"



b. Use Terrible Ted and The Bus

to demonstrate this strategy also.

Strategy Cards

This activity provides practice in identifying and using strategies to find out answers to number facts.

Materials needed:

- assorted number fact cards (ideally on white card, laminated and magnetised) distributed to all or some of the children, for example, 5+6 =
- three strategy labels (Double, Near Double, Make 10)

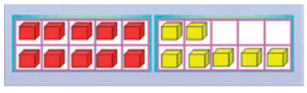
Strategy labels are placed at the top of the Magnetic Board. Children get a card and place it under the correct strategy label, for example the child who gets "6+6 =" places this under Double. The child who gets "7+8 =" places this under Near Double. Similarly "4+6 =" is placed under Make 10.

Children could then either:

- Say the answer.
- Use the strategy to find the answer.
- Another child could provide the answer.

Step 7: Adding 10

Place two ten frames side by side. Invite the children to put ten red cubes on one ten frame and seven yellow cubes on the other. (Remember to fill the ten frames from left to right, starting with the bottom row first).



Ask how many cubes altogether? "So 10 and 7 is 17."

A similar approach should be used for all other 10+ tables.

Step 8: 9+ is one less than 10+

a. Place two ten frames side by side. Use 9+3 as an example.

Invite the children to place nine red cubes on one of the ten frames. Then pick up three yellow cubes. The children fill the ten frame with one of the yellow cubes and place the remaining two in the empty ten frame. They are now able to see that 9+3 is the same as 10+2.

b. Link back to adding on 10. 10+3=13, therefore go back one to solve 9+3.

Step 9: Through 10 (bridging the 10)

Place two ten frames side by side.

Use 7+5 as an example. Invite the children to place seven red cubes on one of the ten frames. Then pick up five yellow cubes. The children fill the first ten frame with the seven red cubes and three of the yellow cubes. Then, fill the second ten frame with the remaining two yellow cubes. The children are now able to see that 7+5 is the same as (7+3)+2.

Similarly, children can see that 8+5 is the same as (8+2)+3. This strategy is called "bridging the 10".

Step 10: Subtraction is the inverse of addition

While teaching all of the addition tables, it is important to demonstrate informally that subtraction is the inverse of addition. The Number Stories domino game (instructions in next month's issue of *InTouch*) is excellent for demonstrating this along with the commutative property.

Conclusion

This month's article provided a comprehensive and systematic overview of the thinking strategies. These thinking strategies enable the child to understand relations between the addition facts which ultimately aids in memorisation and recall. In next month's issue of *InTouch* we will explore some tried and tested games that can be used in the classroom to consolidate the addition and subtraction tables. In the meantime reflect on your current practice in teaching addition tables and consider how the thinking strategies could enhance your approach.

Article compiled by members of the Primary Support Programme (PCSP). For further ideas visit website at www.pcsp.ie