

Hydrocephalus Numeracy for Parents



Many students with Hydrocephalus, and Spina Bifida, will have trouble with mathematics irrespective of their general ability level. These difficulties may include:

- Remembering number facts, e.g. addition facts and multiplication tables;
- Doing mental arithmetic;
- Understanding ideas about movement, direction, and measurement;
- Handling instruments, e.g. compasses, protractors, rulers, and pens/pencils.

Co-Ordination and Perception

Co-Ordination

Because children with hydrocephalus often have a weak hand grip and balance problems, they will usually not have been as active as other children. This means they may have had fewer experiences of:

- Viewing objects from different angles;
- Moving at different speeds across given distances;
- Manipulating objects in different ways (e.g. folding; turning, 'flipping', fitting objects inside other objects).

Many will need help and lots of practice to learn words for 'position', e.g. 'under' and 'in front of'. They will also need a lot of help to build up ideas about 'time'.

Perception (of what is heard, and what is 'seen')

Estimation games are helpful, as these help build up ideas about the relative size of things, and the distance between things.

Listening skills may be improved if children are taught to repeat (whisper to themselves) any instructions they are given, and explain what they have to do. (This technique can also be used when reading maths problems – first 'whisper' it, then read it again, aloud, then explain what has to be done).

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Short-term Memory

Both visual memory, and memory for speech may be limited, and so it is better if 'maths' starts with real objects so that children can 'feel' what it is about, as well as see and hear what it is about.

Real objects can be used to show them what for example 'adding' means before this is written down as a 'sum'. It is even better if they can make up some of their own 'maths' using objects, and then tell you what they have done, and write it.

Being able to 'visualise' things is important in numeracy. It can help if children are encouraged, e.g. when counting a number of object, to first of all look, point, and count; then to close their eyes, try to 'see' the objects, and point and count the 'picture' in their minds. (Some children may only be able to cope with a few - three or four - objects at a time).

Thinking Skills

A lot of maths depends on the ability to notice things that are the same in some way, i.e. looking for 'patterns' in things. This is very important for mental arithmetic. Children can learn how to look for 'patterns' in colours and shapes, and they can also be taught how to look for patterns in numbers.

Activities that can Help Children make Progress

It will be helpful if the school can allow homework time for practical mathematics, for example with the use of Multilink, and practical estimation activities in the kitchen. Large key calculators (desk-top calculators) with tiltable displays are also useful: with extra space between keys, children have more confidence that they will key in the right number.

Perception, co-ordination and fine motor control

- Duplo, in early years, and interlockable cubes, e.g. Multilink, from Junior Infants through to 6th year. (They may need help, initially, to click Multilink cubes together, but this activity may result in the added bonus of better pencil/pen control).



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Activities that can Help Children make Progress

Perception, co-ordination and fine motor control

- Measurement and estimation with non-standard units e.g. 'Guess how many cups of water will it take to fill this saucepan?'. 'Guess what number you can count to while the kettle boils?' (This should always be seen as a 'game' that both parent and child can play. It is sometimes best to stop 'half-way' and allow each person to change the original guess.)
- Learning 12-hour clock times, starting with things that are important to them in the day.
- Handling real coins and associating the feel of the two faces and the edge, the colour, and the 'weight', with the name of the coin;
- Opening up boxes flat, looking at the shape, and folding them up again (try opening them in different ways);

Pattern recognition

- Copying colour patterns (e.g. with Multilink); using listening and touch (with eyes closed), e.g. to hear simple two or three sound patterns, to feel patterns in sandpaper shapes, or different shapes of beads);
- Copying towers of Multilink and using words such as 'under', 'beside', 'in front of' etc.;
- Working out how to share a set (e.g. of Multilink) between two people, in different ways; writing these down, and looking for 'patterns' in the pairs (e.g. for '5' there would be '0+5' and '5+0;' '1+4' and '4+1' etc.)
- Identifying number patterns (e.g. multiplication tables) in the 100 square. (Five-six-year-olds may be taught first of all to notice 'patterns' when looking at the number 0 to 9, with the number 10 to 19 written below them – e.g. 10 below 0, 11, below 1, 12 below 2 etc);
- Using a calculator to predict patterns. Large key calculators can help children learn to count. Some have a special function whereby you can key in '+1' '=' and then every press of the = button adds on 1. Once they know the number 1 to 20, they can start at 19 and go on counting, with the calculator, 'guessing' what the number will be each time before they press the key. This helps them to pick up the idea of patterns in counting.
- Using Clixi (interlockable squares) combined with Multilink to make fold-up 'boxes'; 'guess and check' how many cubes will 'sit' on a square or rectangle of the box; and how many layers this size will be needed to 'fill up' the box.

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Building Ideas

Every so often children have to 'unlearn' some of what they already know, and form new ideas. This can be difficult for children with hydrocephalus. Some of the 'sticking points' may be:

- 'Counting on' (instead of starting from '1' each time). Two things can help:
 1. 'imagining' holding the first number in the fist and using fingers or objects to represent the second number.
 2. Playing a board game with dice, and squares number to 10.
- Exchanging coins of different denominations. Starting with 1 cent and 2 cents, children need to learn that it 'isn't fair' if they give you 2 cents and you only give them 1 cent – that would be cheating!
- *Understanding that subtraction and addition are 'opposites'.* Again, a board game can be used, with two dice, one marked with a plus sign, and one with a minus sign. The 'rule' is that the counter has to be moved in one direction at the first throw ('up' or 'right' for addition; 'down' or 'left' for subtraction), and the opposite direction with the second throw. (For older children, a number line that includes minus numbers can be used.)

Mental subtraction with larger numbers. Children need to be 'fluent' with the number pairs for 10. Then they can learn for example that $13 = 10 + 3$ etc. After this, cards can be used: one for the 10, and one each for digits 1-9 with the plus sign before each one; and another set of 1-9 with the minus sign before each one. The children can then be shown how to 'make' a subtraction, e.g. $13 - 8$, by using the 10, +3, and -8. The next step is to show them that the +3 and the -8 can be 'swapped round', leaving $10 - 8$, and +3. They will not be able to do these things the first time they try, and it may take weeks before they begin to understand the idea. However using this method will put less strain on their short-term memories.

Sorting things in different ways. Sorting objects in one way (e.g. for colour) is quite easy, but when children have to keep two things in mind they find it more difficult. Helping with the laundry could be useful, e.g. a pile of white things, and non-white things; then a pile of white things that are wool, and not wool; and a pile of non-white things that are wool, or not wool.