

Teaching an understanding of number

Children with autistic spectrum disorders (ASD) are often very good at reciting and ordering numbers. Many recognise written numbers from one to ten at an early age and love to name them and line them up. They find it easy to learn by rote and may learn to count to large numbers, but not understand a simple instruction like “give me three biscuits”, even when the instruction is given with a visual number three. In order to move on and learn to use mathematics in daily routines, a child needs to have a firm grasp of basic number concepts. Real understanding of number may only come after a lot of practice of repetitive, practical activities.

What you can do

There are many opportunities throughout the day at home and school to teach an understanding of number. For example, counting eyes, ears, buttons on coats, steps, jumps, spoons, plates, biscuits, apples, etc. Although new concepts and structured activities are best taught at a quiet time when there are few distractions, number skills the child has learned should be supported by plenty of practical examples at home and school.

Matching

It can be helpful to have cards with a number on each and a matching number of squares drawn (in outline) underneath the number symbol as a simple matching exercise. The child then places one object in each of the squares so matching the number of objects to the number of squares and so matching the number symbol.

Simple information, clearly and visually presented with plenty of practical experience to support it, is best at this stage.

When a child can match the correct number of objects to the number on each card, use smaller cards upon which only the number symbol is written. Hold one card up, then ask the child to drop the matching number of objects in to a box, thread the right number of beads onto a thread or lace, put biscuits on a plate, drop balls down a slide, or whatever other activity you choose.

When you have had plenty of practice with one and two, gradually increase the numbers to five, then ten.

Number songs

You can use number songs with pictures that are stuck to a board, added and counted as each verse is sung. Use songs that increase in number from one to five and other songs that decrease in number from five to one, or zero.

Interactive books

You could make an interactive book using laminated pages, with picture and number cards attached, for example with Velcro. The pictures (e.g. of ducks) can then be removed and counted, added or subtracted on each page, depending on what you are working on at the time.

If a child has special interests, you may be able to use that to help develop an understanding of number. If he likes motorbikes, for example, you could do some

work with motorbikes, signals, drivers, etc. You could make a number line with a series of motorcycles, each with a sequential number placed on each picture, or make a book and ask him to put a certain number of people on each motorbike. If you have access to a digital camera, you could make a book more interesting by using photos of family members or other children he knows. If you do make a book and you want the child to match a number on each page with a number of objects or people, it can be helpful to put all the numbers and all the pictures on Velcro. Then, when the child has learnt the numbers in order, you can jumble them up and teach them in a different order.

Increasing understanding

When a child has counted a number of objects arranged in a line (for example, small cubes), jumble them up and ask him to count them again while they are spread out on the table. Many children with ASD have difficulty doing this and it can help to provide a pot or container to count the objects in to.

Stamping activities

Ink stamps and an inkpad can be good fun to use for counting activities. You can give a child a piece of paper with a number on it and ask him, for example, to “stamp four cats”. When he has more understanding and can work independently, he can go down a page of numbers, stamping the correct number of pictures beside each one.

As a variation, draw or cut and stick the correct number of objects beside each number. Link the pictures used to favourite stories or interests.

Using dice

Play dice games so the child learns to recognise numbers up to six without counting the dots each time.

One easy game to play uses a dice, counters and a board of squares for each player. The child throws the dice and covers the correct number of squares with counters. The first person to cover all their squares is the winner. Some children may need to practise with an adult first, but, when they are confident, ask another child to play too.

Beginning to add

Many children with ASD can count up to ten, but become confused when shown how to add and, in particular, how to use a number line. One reason for this may be that they have not developed a concept of numbers and need to practise some of the ideas given above. When you are sure the child does have a concept of number, you can practise adding on.

Start adding-on using practical examples. Do not introduce paper and pencil until you are sure the child is ready. Looking at numbers and writing an answer is an additional skill that first requires a firm understanding of number when used with real objects.

After counting a set of objects, ask the child what the total would be if he added “one more”.

Use the same phrase until you are sure the child understands it. Then introduce new vocabulary gradually. Children with ASD can be inflexible in their thinking and, therefore, may have difficulty generalising what they have learnt from one example to

another. Every time they learn a new way to do the same thing, it can be like starting again, so take it slowly, step by step, and use plenty of visual examples.

- Use your fingers and ask the child to count how many fingers you are holding up.
- Use large dice with dots. Throw two dice and ask the child to count the number of dots on the tops of the dice. If he recognises the number of dots on one dice he can count on from that number. Alternatively, use one dice with numbers and one with dots. Throw them both and ask the child to count on from the number dice. Similarly, you can use dominoes instead of dice.
- Before introducing a number line, teach the child to count on using a simple game board with ten blank squares and a large dice with numbers on the faces. Two children could play if they both had their own board. When the child is confident counting along the squares, number the squares and use two dice with dots totalling no more than ten. The child counts the dots on the first dice, finds that number and puts his counter on it. He then counts the number on the second dice and counts on. You can then add number cards underneath each square so that the child can see the corresponding number at each stage of the process. When he is confident with this, try introducing a number line.

It is helpful to put an emphasis on mathematical concepts such as ‘more’, ‘less’, ‘all’, ‘some’, ‘before’, and ‘after’ at an early stage. These concepts can be difficult to grasp for children with language difficulties and an inability to think flexibly or generalise information across a range of examples. Likewise, estimation, rounding up and rounding down may also need to be taught with many examples and much repetition.

Further reading:

Hannah, L. (2001). *Teaching young children with autistic spectrum disorders to learn: a practical guide for parents and staff in mainstream schools and nurseries.*