

A booklet about teaching  
early development skills  
in pre-school.



# Developing early skills



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# Early years education for children with Down's syndrome

Successful education in early years is based on understanding how each individual child learns, their individual needs, the importance of interaction, and that all children need to feel included.

Children with Down's syndrome require an environment that is rich in learning activities and need many opportunities to interact with and explore their environment. The range of skills that can be developed with adult guidance and encouragement goes way beyond what can be attained alone.

## Specific learning profile

Children with Down's syndrome tend to have an uneven learning profile, they are not just generally delayed. Developmental milestones may be reached later, and, at certain times, children may appear to slow down in one area whilst making progress in another. The specific learning styles and individual needs of each child must be considered when planning new learning activities.

## Factors that have a positive influence upon learning

Children with Down's syndrome model their behaviour and attitudes on peers and adults. Generally, they have good visual learning skills and are able to learn using signs and gestures. They acquire new concepts and skills best by using practical materials and hands-on activities and can be taught to read and write using the written word or whole word approach.

## Factors that may slow learning

Many children with Down's syndrome experience delayed speech and language development. Approximately 80% of children encounter some form of hearing loss and 50% experience conductive hearing loss due to glue ear mostly in the early years. Hearing should be regularly checked since any impairment will affect speech and language.

Make certain that the child is within their own hearing distance and speak directly to them reinforcing speech with facial expression, sign, and gesture. Provide visual reinforcement for all verbal instruction. When other children give an answer repeat this aloud to ensure that it has been heard.

Children with Down's syndrome are often at a greater risk of having visual defects. Regular examination is essential as they may be more likely to require glasses. Research undertaken at Cardiff University, (Woodhouse, 2005), shows that 70% of children with Down's syndrome have difficulty when focusing on near targets. This is similar to what many adults experience when approaching middle age. It appears to persist even when wearing glasses. Trials indicate that children who experience this difficulty benefit from wearing bi-focal lenses.

## **Fine and gross motor skills**

Poor muscle tone and loose joints (hypotonia) are common in children with Down's syndrome and can affect their fine and gross motor skills. Milestones in motor development may be delayed which can limit experiences in the early years and slow down cognitive development.

Many children take longer to process information from the senses resulting in slower reaction times when coordinating movements. There is also evidence of difficulties in adapting movements. For example, when asked to finger tap faster a child may respond with more pressure.

The physical structure of the hands often affects fine motor skills. The fingers tend to be shorter and stubbier with the thumb set lower down. Some children may not have all the bones present in the wrist.

Motor skills improve with practice. It is essential to offer lots of opportunities for wrist and finger strengthening activities such as threading, drawing, tracing, sorting, cutting, and squeezing.

## **Speech and language development**

Most children with Down's syndrome experience speech and language impairment and may be significantly delayed in their understanding and use of words. They may have a smaller vocabulary with less general knowledge and may leave out the connecting words. Additionally, they tend to have problems learning and managing social language.

This delay is the result of a combination of factors, some of which are physical and some due to more perceptual and cognitive difficulties. Any delay in learning to understand and use language inevitably leads to cognitive delay. The ability to learn new skill and concepts will be compromised.

Receptive language skills are greater than expressive skills. This means that children with Down's syndrome understand language better than they can speak it. As a result, their cognitive skills are often underestimated.

Regular input from a Speech and Language Therapist is critical. It is important that a programme of language development is in place as early as possible, ideally beginning almost from birth. The programme should comprise a carefully planned set of individualised activities designed to develop language understanding and communication as well as speech articulation.

## **Short-term auditory memory**

Additional speech and language problems arise from difficulties with the auditory short-term memory, the store used to hold, process, and understand spoken language. A deficit in short-term auditory memory will greatly affect a child's ability to respond to or learn from spoken instruction or information.

Children with Down's syndrome are strong visual learners, but often poor auditory learners. Limit the amount of verbal instruction and allow time for processing. Use short simple sentences giving instructions one at a time. For instance, instead of saying, "hang your coat on the peg and put your shoes in the box", say "hang your coat up" then say, "Put your shoes in the box".

## **Shorter concentration span**

Many children with Down's syndrome have a short concentration span and are easily distracted. They will benefit from having a range of short, focused and clearly defined tasks. At carpet times arrange for the child to sit at (not on!) the class teacher's knee. A carpet square may help to encourage the child to sit in one place.

An activity box containing a range of things that the child enjoys such as books, card games and fine motor skill games can be used when the child needs a change of activity or time out. It will encourage choice within a structured situation. Allowing one child to join in is a good way of encouraging friendships and cooperation.

## **Difficulties with consolidation and retention**

Children with Down's syndrome may take longer to learn and consolidate new skills. Fluctuations in their ability to learn may occur daily. They need to acquire all new skills in a variety of different ways using concrete, hands-on activities in a carefully graded steps approach. They will also require additional time and opportunities for reinforcing and practising these skills.

## **Structure and routine**

Children with Down's syndrome prefer and succeed best in a structured environment with familiar routines and clearly focused activities. Informal times of the day are more difficult as children can be upset by sudden changes in their routine. Simple visual timetables using photographs or signs as prompt cards, will help prepare the child for each new activity in advance. Should there be any changes to the routine it is important to give plenty of advanced warning and inform the parent of changes.

# Cognitive development

## Copying

From birth children with Down's syndrome are interested in people. They are attracted to faces either real or in photographs. Copying underpins all development and is fundamental to developing language and cognitive skills. Children with Down's syndrome need many more opportunities to copy than their typically developing peers.

## Strategies

- Take your cue from the child and imitate simple actions and sounds such as blowing raspberries, making funny faces, mouthing 'oooooh' or sticking out tongues.
- Play games such as peek-a-boo, looking in a mirror and making faces and noises and encourage copying.
- Use the hand over hand method and say the action as it takes place. For instance, guide the child's hand to build a tower of bricks and say, "pick up the brick" followed by, "put it on top". Reduce support and guide elbow.
- Use filmed or spoken action nursery rhymes and encourage child to perform actions with classmates or an adult.
- Plan a simplified version of Simon Says, saying, 'Simon says touch your nose' or 'Simon says hold your ear'.
- Engage the child in real activities such as household chores or simple classroom tasks and provide opportunities to work alongside an adult or another child and imitate their actions.

## Exploring objects

All children develop their knowledge and understanding of how things work by manipulating and experimenting with objects. Babies first explore objects by putting them into their mouths, as this is highly sensitive and gives most information. They investigate by shaking and hitting against different surfaces and by feeling, dropping, and throwing. They learn about properties such as thick and thin, rough and smooth, hard and soft and discover what objects can and cannot do. These experiences underpin conceptual thought and are the building blocks on which all future learning will take place.

Because of the delay in developing fine and gross motor skills children with Down's syndrome may need support to explore their environment to the same degree as their typically developing peers. Additionally, infants with Down's syndrome tend to underperform and may use avoidance routines on tasks regardless of difficulty, and many do not practice or reinforce new skills independently. Consequently, they need encouragement and more motivational opportunities to

explore their environment. Access should be provided to a wide variety of different types of objects particularly those that they find stimulating and interesting.

## Strategies

- Provide toys that are large and easy to handle to begin with, then gradually reduce the size.
- Provide a wide variety of toys and other objects that have many different properties, for instance, textures, shapes, colour, and those that make a variety of sounds.
- Use kitchen utensils, fabrics and containers filled with different materials such as liquids, powders, sand, or coloured beads. \*
- Provide percussion instruments, drums and home-made rattles made from clear and opaque containers filled with a variety of materials such as rice, dried peas marbles and coins\*
- Attach Velcro strips to a variety of objects and allow the child to experiment with attaching and tearing them off different fabrics.

\* NB ensure tops are well sealed, so child cannot ingest materials

## Object permanence

In early infancy, children believe that people and objects only exist when they can be seen and that when they have disappeared they cease to be. Children at this stage do not look for a toy or object that has gone from view. Knowing that objects continue to exist is a major developmental milestone, which indicates the child's ability to conceptualise.

The level of delay in developing fine and gross motor skills significantly affects the rate at which children with Down's syndrome begin to develop this concept. They may require lots of encouragement and opportunities to experience objects disappearing and being returned together with encouragement to watch and search for objects that have gone from view.

## Strategies

- Play games such as peek-a-boo and hide and seek.
- Hide toys and objects partially, then fully, then reveal. Follow this by encouraging the child to hide objects and involve peers in finding them.
- Hide objects under clear pots first, then under opaque ones.
- Roll cars and marbles\* through tunnels or down tubes and play at crawling through tunnels, disappearing from view and reappearing at the other end.
- If child has visual difficulty place the objects just out of view and encourage child to search for them

**NB marbles are a CHOKING HAZARD**

## Cause and effect

When children play with toys and objects they begin to learn that actions produce an effect. They learn that when they drop objects a certain sound is produced and that different objects make different sounds. Learning about cause and effect is another fundamental skill as they become aware that they can influence objects and their environment.

Children with Down's syndrome may grasp the concept of cause and effect much more slowly than their typically developing peers due to their delayed motor skills.

### Strategies

- Provide a wide variety of experiences of different object and toys with various effects.
- Ensure the toys ad objects respond easily to a light touch.
- Use books with lift-up flaps or windows to peek through.
- Introduce toys that pop up, have push or slide buttons that light up and make interesting sounds.
- Create opportunities to compare the reactions and sound effects of dropping a ball and dropping a hard object.
- Make use of simple computer games with easy point and click activities.

## Relational play and building

This stage of development is when a child will begin to test how objects can be used in relation to other things such as putting objects into a box or filling empty containers. They discover that some things fit, and others don't. They make comparisons between size, weight and how things need to be placed in order to work.

As children play with more than one object they learn to combine them and begin to build simple towers to knock down. As their motor skills develop they become able to use smaller pieces and move on to using construction toys. As a result, they consolidate concepts of size, weight, shape, and three-dimensional objects. These comparisons and experiences are the building blocks for conceptual thought and mathematical thinking.

### Strategies

Provide as many activities as it takes to motivate the child to:

- Place one object on top of another using a small object on top of a much larger object. Gradually increase the level of difficulty by introducing blocks of different shapes.
- Develop the concepts and language of 'above, below, under, on top of,'.
- Make generalisations by providing a variety of different objects of different shapes and sizes.

- Place one object inside another using small easily handled objects and a large shallow tin, the noisier the activity the better. Encourage the child to shake the container. Gradually decrease the size of the objects and the containers and introduce posting boxes with a variety of shapes of opening.
- Roll and slide objects such as marbles\*, cars and balls\* of different sizes through tubes and tunnels varying the angle of the slope to alter the speed of the object
- Move objects without touching them by lining up two cars or a few bricks and pushing the last car or brick to shunt the line. Provide toy animals or vehicles with leads and allow child to pull towards and away from themselves. Place an object on a sheet of card and get the child to pull the card to bring it in reach.

**NB marbles and small objects are a CHOKING HAZARD**

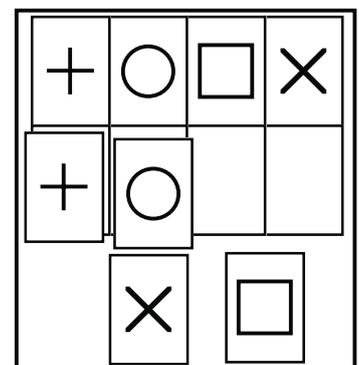
## Matching, selecting and naming

Children learn new concepts in a specific order. Firstly, they learn to match identical objects, then progress to generalising by matching objects by category and by more than one attribute. Following this, they learn to select an object from a group. They can make the association between the spoken word and an object and respond by pointing or picking it up. Lastly, they begin to name or sign the object. For some children signing may be the most appropriate method of response.

Children with Down's syndrome may take longer to generalise and understand that things can be the same in one respect but different in another. They may need more time to investigate and match lots of objects with a variety of shapes, sizes, and colours.

## Strategies

- Begin by matching simple everyday objects such as apples, cutlery, cups, and balls before moving on to photographs. Start with two sets of each of two objects. Place one set in front of the child and demonstrate placing its partner on top or alongside. Repeat the exercise encouraging the child to take part until they can match independently.
- Introduce matching photographs using the same methods as above.
- Use mathematical shapes and create posting boxes. Use inset puzzles with circles, triangles, squares and ovals or familiar shapes or characters to match.
- Draw symbols on card and provide matching cards for the child to place on top. Figure 1.



**Figure 1. Card Matching**

- Introduce harder concepts such as colour, size and shape, and match objects by one then two and later three attributes. For example, matching by colour 'the blue ball' to 'the blue ball' only. Gather yellow objects in a yellow bucket. Next by shape and colour from a variety of different coloured and sized objects match 'the big red balls' or 'the little yellow cars'. (See matching activities on CD-ROM).

Activities such as these will help the child with Down's syndrome to learn to do new things and prepare them to begin saying their first words.

## Pre-number skills

Children learn the concepts that are the building blocks for numeracy and mathematics through playing and developing all the previously mentioned skills. During this time, they will be consolidating concepts such as same, and different, big and small, long and short, heavy and light as well as the associated language. They begin to grasp the ideas of capacity, weight and measure and can compare and identify small, smaller, smallest.

Children need to learn to rote count without error and understand that one means one thing and two means two things. This is known as the 'oneness of one'. They must understand the concept of one and two before they begin to work on greater numbers.

Children with Down's syndrome can take longer to learn number concepts due to delay in developmental skills. Additionally, the abstract nature of number and mathematical concepts requires a level of cognitive development that individual children may not have reached.

Children with Down's syndrome need plenty of practice with real objects in real situations and for a real purpose. With adult encouragement and plenty of opportunities, learning takes place through play by examining sets of objects and sorting them into groups of similar things. Gradually, with sufficient experiences children learn to identify common themes and generalise items such as forks, knives, spoons as cutlery, socks, trousers, and skirts as clothing.

Children with Down's syndrome may need to spend significantly more time using and manipulating objects and undertaking practical hands-on experience before moving on to formal written work.

## Strategies

- Engage the child in household chores or classroom activities that will provide opportunities to sort clothing, toys or classroom equipment by type, colour, or size.
- Sort similar things such as differently shaped shells, leaves, and flowers.
- Provide activities pairing objects that go together such as hat and gloves, socks and shoes, knife and fork.
- Group objects that have a similar purpose such as toys or tools.

- Provide real and play activities for laying the table, placing one piece of each required utensil and dish at each place setting.
- Provide games and activities matching pictures of dog and bone, sock and shoe, knife and fork chair and table.
- Use items that are easily manipulated. Always encourage the child to handle or touch objects as they are counted.
- Provide a wide variety of activities and games that will promote the concepts of big and small, heavy and light. full and empty.
- Sing and act out counting rhymes.

## Language development

### Receptive language

Receptive language is the knowledge and understanding received through the senses from the environment by interaction with people, investigating objects, listening to sounds, words and observing people, actions and gestures. Exposure to receptive language is vital to the development of communication.

### Expressive language

Expressive language is the communication made through crying, laughter, words, gesture, sign language or communication aids.

### Speech

Speech is the physical production of sounds. Spoken words are the result of combining receptive language with sound production. It is influenced by the quality and quantity of opportunities for interaction and communication. These are the cornerstones of learning new information, developing receptive language and most importantly creating additional language experiences. It is important to remember that speech regardless of how it is valued, is in fact only one form of expressive language.

### Signing

During the development of early speech and language skills children with Down's syndrome benefit greatly from signing as a means of communication. Signing provides a bridge to speech and reduces the frustration due to speech delay. It enables children to communicate, understand and learn new words where speech alone is not enough. When speech is unclear, signing will enable the listener to comprehend and promote further communication opportunities. All children must communicate in order to reach their potential.

Eye contact is another fundamental part of language development. Children develop their understanding of communication by watching lip movements and other facial features. They learn turn-taking in conversation and pick up on emotions from facial expressions particularly in the eyes. Children with Down's syndrome are especially skilled in this area making efficient use of gesture and body language and tend to develop a good understanding of the non-verbal aspects of language.

Speech, sound work and signing should be a priority from birth. Signing is an aid to speech and experience shows that children who are supported by signing have larger vocabularies. Awareness of this will have implications for staff training in early years establishments. By school age signing should only be used when necessary.

It is vital to the development and progression of language and communication skills in children with Down's syndrome that everyone involved improves the method and increases the amount of communication during everyday activities.

Before embarking upon a programme to develop communication skills it is important to become familiar with the development stages of speech and language and understand the factors that influence the rate of progress.

## Reading

All children need to develop an interest in books, learn to hold them and turn the pages correctly. They begin by understanding that pictures have meaning and progress to understanding that print also has meaning, it is the written form of spoken language and, in English, is read from right to left.

Good visual discrimination skills are required, and this is an area where children with Down's syndrome excel. Their good visual skills make it appropriate to begin teaching reading at an early age. They find learning by looking easier than learning by listening. Words that are presented in print are easier to remember than those that are spoken. Print can be looked at for as long as is needed to process the meaning. It makes language visual and overcomes the difficulties that children have with learning through listening. It provides an aid to memory and overcomes the difficulties that arise because of the short-term auditory memory deficit.

The earlier a child with Down's syndrome begins reading the faster their language and communication skills develop. Learning to read from an early age introduces new vocabulary and grammar in context.

## Strategies

- Provide simple picture books with bright bold and uncluttered illustrations of familiar objects, animals, and people.
- Encourage interaction with the pictures by pointing to them and imitating actions such as barking like a dog, cutting a cake, or kissing the baby.

- Develop visual skills by providing spot the difference puzzles and activities.
- Make flash cards of familiar objects in the home and classroom and play matching games where the child has to place the card on or beside the appropriate object. Gradually introduce photographs and progress to drawn pictures.
- Create simple picture books with photographs of family members, familiar objects, family and school visits and special events.
- Teach reading, begin by using child's own spoken or signed vocabulary. (See Teach Reading to Teach Talking guidelines in CD-ROM)
- Use the 'look and say' or 'whole word' method
- Teach the meaning of all new vocabulary.
- Introduce new single words gradually.
- Teach functional words, not necessarily the most frequently used words, in context.

## Writing skills

When children begin to write they need physical control to make a mark. They need to understand the relationship between the writing or drawing tool and the writing surface plus an understanding that each mark represents something. This requires a specific level of physical and cognitive development. Starting too early with letter formation is not always successful. Children do not respond well in situations where failure is imminent.

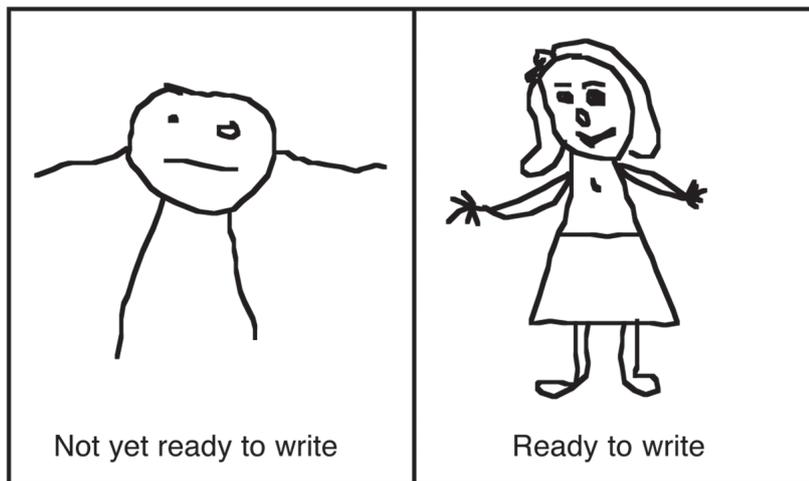
Initially children scribble randomly and gradually progress to making more controlled marks such as horizontal and vertical lines, dots, and circles. They grasp the idea that these marks have more than one purpose and first learn they can be used to make pictures. They begin to draw simple pictures of people, animals, and familiar people. Later they learn that the marks can be used to make letters.

## Strategies

- Allow the child to explore different drawing and painting tools such as wax crayons, coloured chalks, pastels, felt pens, dry wipe pens, paint brushes and soft 'B' pencils.
- Provide lots of activities involving random scribbling beginning with A2 paper or bigger. Gradually develop control by reducing the size of the paper and increasing the level of accuracy, for example, from A3 – A4 – A5 - 10 cm and lastly 5cm squares. (see Writing Programme on CD-ROM).
- Make patterns in sand using a stick. Use water and a large paintbrush attached to a pole to make patterns on the ground.

- Fill squeeze bottles with coloured water or paint and dribble patterns over large areas.
- Draw wide lines with thick black marker pens and encourage child to follow track from left to right using toy vehicles. For example, taking the car to the garage. Gradually increase level of difficulty by bringing lines closer together.
- Use floor road maps or train sets and allow child to manoeuvre toy cars and trains.

Before introducing letter formation assess the child's level of visual spatial development. Present the child with the task of drawing his very best picture of a favourite family member. Give no assistance or prompt. The child who has achieved 'writing readiness' will produce a detailed drawing. Should the drawing be immature, do not introduce writing at this stage but embark on a programme of drawing. Talk about the pictures and encourage the child to look more closely, then add additional information such as features or objects or people, see Figure 2.



**Figure 2. Writing Readiness**

The benefits of a programme such as this are;

- Developing spatial awareness.
- Opportunities for increasing receptive and expressive language together with meaningful communication.

## Effective partnership with parents

Parents are the first and most enduring educators. They are in the best position to judge their child's abilities, interests and preferred learning style. It is important that parents and staff work together in early years settings. A successful partnership will provide a two-way flow of information, the exchange of knowledge and expertise to produce results that will have a positive impact on development and learning.

Children entering pre-school education bring learning experiences gained from their family, friends, neighbours, and relatives. They learn a great deal through play in the home and attending parent and toddler groups and playgroups. These experiences have a great impact upon how they develop in later years. Each child will have his or her own individual range of learning experiences and skills depending on the opportunities for communication, interaction and activities that have taken place.

The vital contribution of pre-school education lies in motivating the child and broadening these learning experiences, so that each child becomes a confident and enthusiastic learner.

## Reference

**Stewart, R.E., Woodhouse, J.M.,** Trojanowska, L.D. (2005) In Focus: the use of bifocal spectacles with children with Down's syndrome, *Ophthalmic and Physiological Optics* 25 6 514-522, Nov 2005

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Down's Syndrome Scotland,  
Riverside House, 502 Gorgie Road,  
Edinburgh, EH11 3AF

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