



Accessing the Mathematics curriculum - Strategies for differentiation for Students with Downs Syndrome

Adaptations: tips and checklists

A summary of adaptations that will help some children with Down syndrome to access the Mathematics curriculum are described below;

Supporting children's fine motor skill development

- Use a wide range of multi-sensory activities and materials, large and small
- Practise skills in real and meaningful situations to increase motivation
- Provide additional guidance and encouragement when learning motor skills
- Practice - all motor skills improve with practice

Supporting visual skills

- Place children near the front of the class
- Use larger type
- Use simple and uncluttered presentation
- Provide additional help with skills involving hand-eye coordination
- Follow advice from the child's optician or teacher for the visually impaired
- Use peers to help children in large spaces



Encouraging speech, language and communication

- Do not judge cognitive ability upon competence in spoken language
- Listen carefully to children so that you can understand them
- Use face to face and direct eye contact
- Speak clearly using clear whole sentences, with repetition of the key words of the sentence and use of signs as necessary for the individual
- Be aware of the child's hearing status and follow advice for how to help listening
- Check understanding and help memorising by asking the child to repeat back instructions (if they have the expressive skills in speech or sign to do this)
- Avoid ambiguous language
- Reinforce speech with facial expression, gesture and sign
- Teach reading and use the printed word to support speech and language
- Reinforce spoken instruction with print, pictures, diagrams, concrete materials
- Emphasise key words and reinforce key words visually
- Teach math grammar through the printed word – flash cards, games, pictures of prepositions, symbols
- Avoid 'closed' questions so the child is encouraged to speak and communicate, not just answer 'yes' or 'no'
- When children are keen to communicate, don't be too quick to help them – try waiting a little longer between sentences, say 'hm', 'that's interesting' (pause), etc. and encourage them to keep going
- Give sufficient time for the child to process language and respond
- Encourage the pupil to speak aloud in class by providing visual prompts - allowing the child to read information may be easier for them than speaking spontaneously
- Encourage the child to lead interactions and ask for their opinions and thoughts.



Figure 1 Source Down Syndrome Today

Encouraging understanding and participation

- Provide visual supports
- Provide taped versions, e.g. stories, instructions
- Provide alternative methods of recording

- Ask pupils to write about topics within their experience and understanding
- Pace any dictation appropriately and include repetition; check and change vocabulary and grammar as necessary for the child's level of engagement and language understanding
- Provide picture and sentence sequencing practice (from two picture sequences to story boards, webs, maps, etc)
- If copying from the board – select and highlight words in a different colour, or prepare a shorter version for the pupil to copy
- Model activities – allow children to watch others, if they wish to, before participating
- Teach key words or new vocabulary – teach these carefully, use them in natural language and provide a list with their meanings, reinforced with illustration as necessary for the individual



Figure 2 Source Down Syndrome Today

Ways to support recording and responding

- Provide visual supports such as pictures, sentence or word card sequences, story board, webs, maps, frames
- Card sorts of various types
- 'Cloze' procedures (sentences with gaps indicated by lines and a choice of words to select from)
- Prompt sheets using pictures and/or words
- 'Answer-question' links
- 'Yes/No' tick sheets
- Use of the computer, tape recorder, Dictaphone
- Help from a scribe
- Discussion
- If copying from the board, provide shorter text highlighted within larger text
- To enable writing - provide the words within pupils' sight vocabulary, including lists of key words
- Modified work sheets
- Photograph objects, materials, result or process of lesson (e.g. group work, talking in group, pupil engaging in activity) and print as a record of the lesson, write explanatory sentences or print and paste words and sentences into the child's book or file



Figure 3 Source Open Books Open Doors

Supporting short term or working memory

See also:

- [Memory development for individuals with Down syndrome](#)
- Help the child to understand longer sentences and instructions by filtering out the more important bits of information from a block
- Lists or help sheets of the most important information or instructions, displayed on the wall and given individually
- Teach rehearsal techniques by repeating information
- Support rehearsal by cumulative, sequential visual frames, e.g. for telephone numbers, addresses, times tables
- Teach categories and classification - simple tasks graduating to more complex
- Give the pupil practice in taking messages - graduating from simple to complex
- Play memory games: e.g. Kim's Game, Pelmanism, 'Mastering Memory' computer software
- Limit the amount of verbal instructions at any one time
- Repeat individually to pupil any information/instructions given to class as a whole
- Plan for visual translation and/or an alternative activity in lengthy whole class instruction and discussion
- Quick drawings and doodles for 'unplanned' visual translation – or 'cue drawings'

Encouraging positive engagement in tasks, with increasing duration

- Shorter work sessions interspersed with choosing activities
- Recognise that children need breaks in their learning in an ordinary classroom environment - this may not occur naturally when a pupil receives learning support
- Short sessions - two short sessions are likely to be more valuable than one long one
- Double lessons in secondary - it may be more suitable for some pupils to attend the first lesson only and use the second half for individual reinforcement or work on basic skills
- Build a range of tasks and activities into the lesson
- Break tasks and activities down into short, clear and concise steps
- Focus on one aim at a time



Figure 4 Source Cardiff

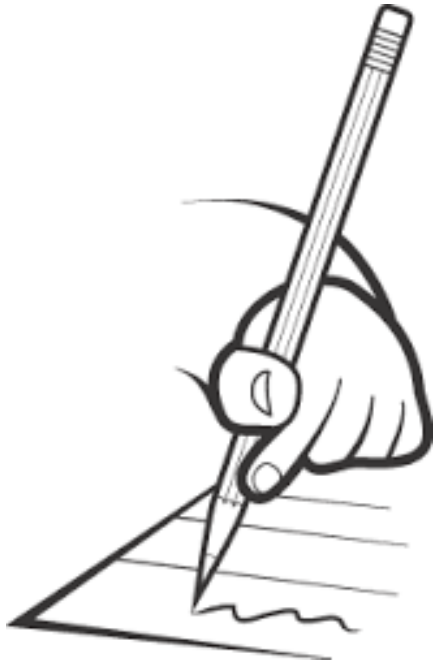
- Vary the level of demand from task to task
- Vary the type and extent of support
- Allow peers to help keep the pupil on task
- For younger pupils provide an 'activity box' and use for alternative activities or as an incentive to complete tasks
- Provide a range of activities in the box, which can either be done independently or with a partner
- For some older pupils, continue to use alternative activities and teach the pupil how to collect, complete, show to the teacher and return resources to an independent activity work base

Encouraging learning

- Provide shorter tasks that are within pupils' capabilities so that they can achieve success
- Provide extra time and opportunities for additional repetition and reinforcement
- Present new skills and concepts in a variety of ways, using concrete, practical and visual materials as much as possible
- Check backwards so that previously learned skills have not been forgotten
- Use errorless teaching
- Although it is important that pupils with Down syndrome, as with all pupils, learn from their mistakes, many are very sensitive to failure. Errorless learning can therefore help in certain situations - teaching pupils to complete a new task by guiding them through each step correctly, not allowing them to fail. As pupils become more capable, the prompt can be reduced until it is not needed.
- Give encouragement, praise and positive messages often, although do not interrupt children engaging well in tasks they are interested in
- Use peers as models and to motivate learning
- Choose appropriate context for whole class, small group, partner and one-one work



Figure 5 Source Open Books Open Doors



Tips for preparing worksheets (adapted from Lewis, 1995^[3])

- Use meaningful material
 - Is it within, or close to, the pupil's own experience?
 - Introduce new concepts in familiar context
 - Make the tasks self-contained
 - Provide plenty of visual cues, e.g. pictures, diagrams and print
 - Use illustrations
 - Ensure illustrations tie in closely with text
 - Give plenty of opportunities for success
 - Use pupils' feedback to decide whether or not the written task sheets fulfil your educational aims and objectives
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- Supplement with a taped version of the task sheet - pupils can re-play for reinforcement
 - Try out several versions of a written task sheet
 - Leave a wide border all round the edge of the page
 - Highlight and explain all key words
 - Illustrate these words if necessary
 - Use type or print in preference to handwriting
 - Use a simple and uncluttered layout
 - Break up continuous text
 - Highlight instructions in some way, e.g. in a box, particular font or colour
 - Use coloured as well as white paper, both for variety as well as coding purposes

Adapted from Down Syndrome Education Online <http://www.down-syndrome.org/information/education/curriculum/?page=3>

References

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