

Special Education Support Service: Down Syndrome

Acquiring Basic Skills in Maths

Note: The Special Education Support Service wishes to acknowledge and thank Fidelma Brady, former Education Officer with Down Syndrome Ireland, for permission to use this information.

- In planning the maths curriculum for a pupil with Down syndrome, learning outcomes should be feasible and activities and tasks manageable, within the resources available. They should be relevant to the pupil's capabilities and realistic, by providing the appropriate skills for future needs.
- In curriculum planning, neither the pupil's IQ nor the Down syndrome label are of much use in target setting. More relevant to the teacher are their number vocabulary, their ability to enumerate and their level of task understanding. Additionally, it is important to bear in mind their level of self motivation, the quality of tasks and instruction and the pupil's individual and preferred learning style.
- You will need to recap and revisit previously covered materials and teach key mathematical terminology as a specific skill. Use directed practice together with teacher instruction, followed by independent practice and positive feedback. During the directed and independent practice, provide many and varied opportunities to manipulate concrete materials to assist conceptual understanding.
- Consider existing background knowledge. Mathematics depends heavily on previously learned skills. Consequently, it is important to ensure that prerequisite skills have been acquired prior to the introduction of new ones. Attentiveness during practice is as crucial as the time spent on the task. Distributed practice, meaning regular practice in small doses, is particularly beneficial e.g. two ten minute sessions per day are likely to be better than a two hour session once a week.
- Initially pupils need to learn that counting involves pointing objects individually and giving each a specific and different number name. The stable order principle, which comes next, involves the realisation that counting the same set of objects several times will always give the same result.
- In learning the cardinal principle, the pupil becomes aware that the final number of a count represents the whole group. Next, the abstraction principle illustrates that the number of objects in a set will remain the same however they are arranged. Finally, the order irrelevant principle involves teaching the pupil that the number of objects in a set will remain the same whatever order they are counted in.
- Practical activities to develop these principles should be devised, progressing along the following sequence:
 - i) Sorting and matching like objects by colour, size and shape
 - ii) Rote counting objects from 1-10
 - iii) Counting up to 10 objects in a row
 - iv) Associating numerals with the written words, spoken words and appropriate amounts
 - v) Selecting up to 5 objects from a set of 10
 - vi) Matching numerals 1-5
 - vii) Selecting numeral 1-5 on request
 - viii) Sequencing numerals 1-5 in correct order
 - ix) Sequencing amounts 1-5 in correct order
 - x) Identifying and selecting correct numeral on request
 - xi) Labelling amounts 1-5 with correct numeral

- xii) Copying numerals 1-5 on request
- xiii) Repeating items (v) - (xii) using numerals 1-10
- xiii) Counting left to right using 1:1 correspondence
- xiv) Organising materials so they can be counted accurately
- xv) One digit addition e.g. 3+4
- xvi) Counting objects to 20
- xvii) Subtracting one digit e.g. 4-2

Numeracy skills

Many difficulties are due to difficulties with storing or keeping track of numbers and sequences while further processing is carried out. Mental maths and times tables can be particularly hard.

How do I improve such skills?

- Reinforce numbers visually: number lines, number cards, 100 squares etc.
- Use concrete materials as much as possible.
- Teach pupil to associate numerals with particular visual images or colours.
- Use visually based mathematical schemes and equipment e.g. Numicon and Cuisenaire rods.