

Here are a few suggestions to help to create a dyscalculia-friendly classroom environment that will help all learners.

The suggestions have been grouped, with some suggestions being more appropriate for learners in primary school. However, there is considerable overlap, as many of the difficulties experienced by secondary school learners are rooted in primary concepts.

## For primary learners

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### Use dot patterns to develop a sense of number

It is best to stick to one pattern to begin with until the learner is confident with recognising the dot patterns for numbers 1–10. Then you can move on to representing numbers with different patterns, encouraging generalisation. You can look at the similarities between dice patterns and dominoes, or you can compare dot patterns to the Numicon tiles. Encourage the learner to look for patterns within patterns, for example, can they 'see' the dice pattern of three in the dice pattern of five?

### Make your lessons based on games and activities as much as possible (rather than on worksheets)

The more actively involved a learner can be, the more likely they are to retain that knowledge and understanding. Games and activities can also help to reduce maths anxiety.

### Make sure that you count backwards with learners as often as you count forwards and don't always start counting from 1

Once a learner is confident in the number system from 1–10 then you can start making connections with scaling by powers of ten, for example, linking 1–10 to 10–100 and 100–1,000. If the learner can see the connections, then they are less likely to be afraid of larger numbers.

## For primary and secondary learners

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### Use manipulatives as part of your daily routine in maths lessons

Have a wide range of manipulatives such as place value counters, two-coloured counters, Cuisenaire rods, Base ten materials and/or Numicon, so that the learners can model problems using the most effective manipulative for the task in hand. This will also help to develop their visualisation skills. Make sure that manipulatives are always available to *all* learners, thus removing any stigma attached to using them.

### Encourage learners to follow the concrete, pictorial, abstract (CPA) approach

Often, we go straight from the concrete to the abstract and bypass the pictorial altogether, but we need to make sure that learners are modelling maths in a concrete way and then representing it pictorially before they move on to the more symbolic abstract representation. If they can visualise the maths, then they will be able to draw on that when they are working without any manipulatives.

### Don't assume anything!

It is easy to make an assumption that a Year 6 learner will have a good grasp of place value, or that a Year 9 learner knows their times tables, but we can't assume this is the case just by reason of their year group. Break problems down into small steps and make sure that each step is understood before moving on. This may mean a lot of repetition, consolidation and overlearning.

### Encourage the use of the correct mathematical vocabulary and use a range of terms

For example, use a wide variety of ways of expressing 'add'. This will help learners to understand the concept when presented in different ways. Support learners in communicating their understanding verbally and in writing as well as by using diagrams.

### Don't hurry

Give learners time to process and understand new information and don't be in a rush to get to the abstract level of thinking.

### Ask learners to explain their reasoning, to you and to each other

This can help them to develop their conceptual understanding as well as developing their understanding of mathematical language.

### Remember the building blocks

Make sure that learners have the prerequisite knowledge needed to develop a new concept. [www.learningtrajectories.org](http://www.learningtrajectories.org) is a great website for exploring typical trajectories in mathematical development.

### Encourage learners to approach problems in a more interactive way

Are there parts that learners do understand? What parts don't they understand? Where can they go for support? Promote the idea of questioning what they are doing at each step rather than automatically following a procedure without thinking whether that is the best approach.

### Teach for understanding

Try to avoid rote learning of number facts. Teach learners how to use key facts, such as the  $2\times$ ,  $5\times$  and  $10\times$  times tables to derive new facts.

### Provide learners with different tools

- Allow the use of squared paper if learners have trouble setting out their calculations.
- Provide multiplication squares, addition squares and 100 squares to reduce the load on working memory.
- Allow the use of calculators for problems that are not purely assessing mental maths.
- There is a calculator app for people with dyscalculia:  
<https://apps.apple.com/gb/app/dyscalculator/id508012847>
- Use aperture cards so that the learners can focus on one question at a time. Aperture cards are simply a piece of card with a window cut out so that only one word problem or question can be viewed at a time.

### Use group work

Encourage learners to work in small groups to solve a problem rather than in isolation. Frequently check in with learners to ascertain their level of understanding.

### Use low threshold high ceiling tasks

These tasks are designed so that they are easy to access but can be explored at greater depth and you can find examples here: <https://nrich.maths.org/8769>. These tasks can alleviate maths anxiety as learners who may perceive themselves as struggling with maths can see that they are doing the same problem as other learners who they may perceive as being very able in maths.

### Encourage learners to make connections from one fact/concept to another

For example, if you know that  $6 + 4 = 10$ , then what else do you know?  $60 + 40 = 100$ ?  $5 + 5 = 10$ ? etc.

### Get learners to create their own word problems

For example, if 24 is the answer what could the questions be? Write a word problem with 24 as the answer, or write an addition word problem using the numbers 5 and 6.

### Give praise for the process rather than the outcome

Removing the emphasis on getting the right answer can really help to alleviate anxiety. The more that focus is on the strategy and whether the chosen method is helpful, the less anxiety there will be about performance in maths.

### Avoid league tables

Make sure that you only compare progress against the learner's own results.

### Celebrate mistakes

See mistakes as a positive learning opportunity rather than a failure. Having a display of the 'mistake of the week' can make mistakes part of life, part of maths lessons, and something to be explored and learned from rather than something learners have done wrong.