

## Learning Difficulties Australia

Learning Difficulties Australia is an association of teachers and other professionals dedicated to assisting students with learning difficulties through effective teaching practices based on scientific research.



 [www.ldaustralia.org](http://www.ldaustralia.org)
 @LearningDifficultiesAustralia

 [enquiries@ldaustralia.org](mailto:enquiries@ldaustralia.org)
 @LD\_Australia



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## Sarah Wedderburn


BA, PGCE, SpLD Dip, AMBDA, MCCT.

The importance of Diagnostic Maths Assessment in the creation of Maths Support plans.



Sarah taught for many years as a main-stream primary teacher before retraining as a specialist teacher. She founded Unicornmaths over 20 years ago where she worked with a team of specialist maths teachers supporting students with dyscalculia and maths difficulties. She now runs dyscalculia training courses for teachers as well as delivering INSETs and presentations to national and international conferences.

Sarah is the author of the Diagnostic Assessment of Numeracy Skills (DANS), DANS Solutions One & DANS Solutions Two.



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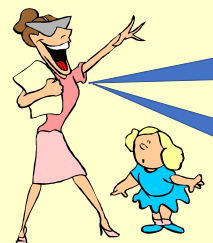
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## What are my initial objectives



I need to boost their confidence and show them that maths is fun and they can do it – otherwise they are not in a place where they can learn anything

I need to locate any holes in their foundation knowledge

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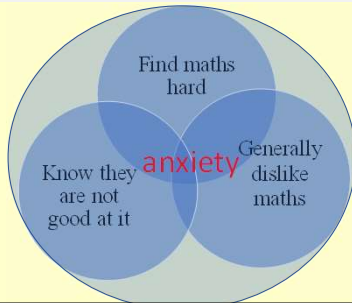
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By definition, any student who comes to be assessed is having difficulty with maths



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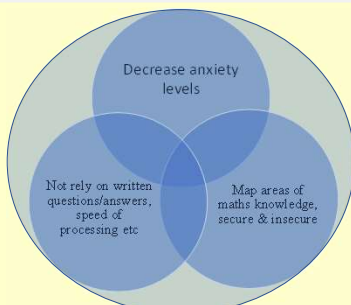
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An assessment that shows true knowledge and ability will



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### Advantages of diagnostic assessment

A qualitative assessment that involves discussion, concrete resources and interactive games will lower anxiety levels and give a more accurate picture of the student's maths abilities, as well as starting to rebuild their confidence and enjoyment of maths.

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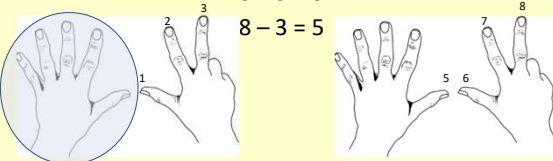
### Finger Numbers

$$5 + 3 = 8$$

$$3 + 5 = 8$$

$$8 - 5 = 3$$

$$8 - 3 = 5$$



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### Advantages of diagnostic assessment

- Real knowledge is shown - not just written answers
- Students' use of language and maths vocabulary can be analysed
- Encourages interaction with concrete resources

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### Diagnostic assessment using concrete resources

Can you get 34 for me using any of the resources on the table.



Why you have chosen this resource?

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## Analysis via diagnostic assessment

Key Stage Two.

Snakes and ladders with two 12-sided dice and a multiply/divide dice.

A game, and it's competitive – both of which will relax the student and encourage them to interact.



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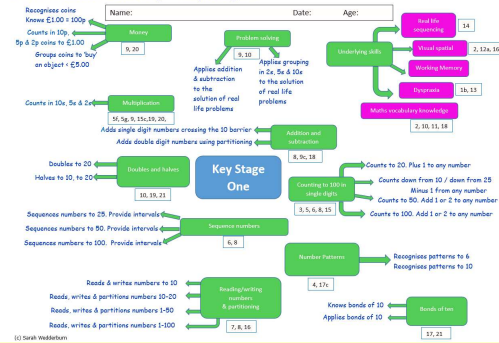
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### DANS Assessment Map - Key Stage 1



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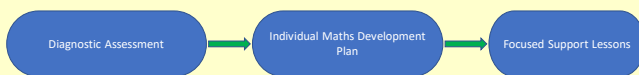
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## Focused Support Plans



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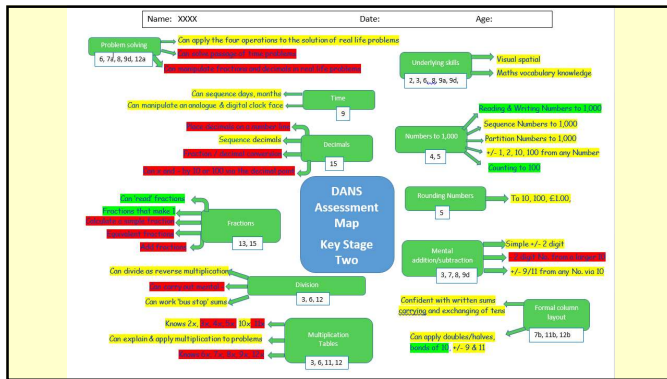
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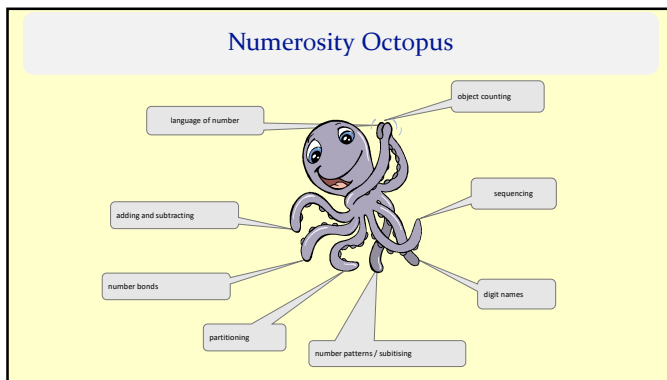
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**Number Patterns**

During the DANS number pattern recognition to 6 is assessed as a game – number dominoes. This encourages the student to relax and enjoy their lesson, so enabling them to show their full potential.

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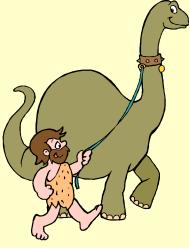
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### Dinoscore



double 3



$10 = 5 + \underline{\quad}$

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### DANS - everything is in the bag





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### DANS at Key Stage Two

Numbers to 1,000 – sequencing, partitioning,  $\pm$  1, 2, 10, 100 from any number

Rounding numbers to 10, 100, £1.00

Mental addition/subtraction – simple 2 digit, 2 digit from a 10, 9/11 from any number

Formal column sums- carrying and decomposing, application of appropriate strategies

Multiplication tables – 2, 3, 4, 5, 10, 11 and 6, 7, 8, ,9 12

Division – reverse multiplication, mental  $\div$ , 'bus stop'  $\div$

Fractions – making 1, 'reading' a fraction, calculate unit fractions, equivalent fractions

Decimals – understanding of decimal point, sequence, place on number line, convert

Time – sequence of days, months, manipulate and read analogue & digital clocks

Problem solving – correct application of four operations, manipulate real life fractions and decimals

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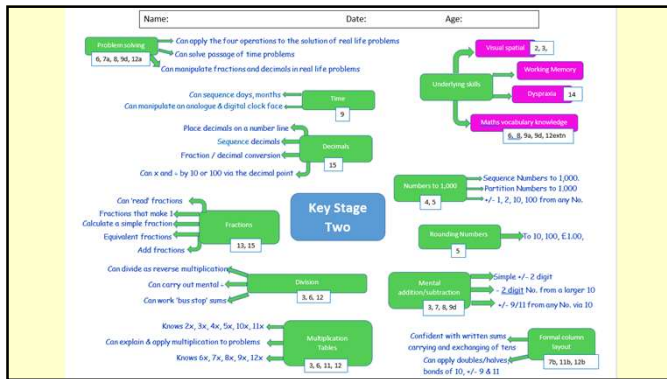
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### Sequencing numbers, addition and place value



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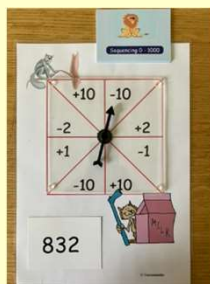
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### Sequencing numbers, addition and place value



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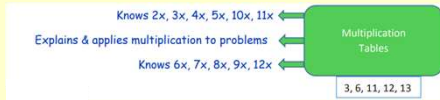
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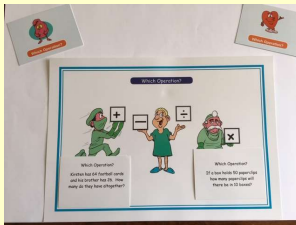
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## Multiplication Tables

### Test 6: Which Operation



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## Reading

Recent research by GL Assessment Published in February 2020, has shown that a quarter of all 15-year-olds have a reading age of 12 or below and that reading ability affected GCSE maths results by a larger amount than it affected GCSE English Literature.

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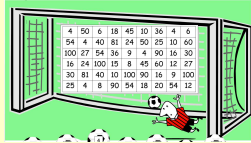
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### Multiplication Tables

#### Test 11: Multiplication Football



Followed by:

Completion of a multiplication square

Completion of a multiplication sum on a white board – eg  $45 \times 3$

note their method - horizontal, grid or column

note any hesitations

Extension: a 3 digit by 2 digit multiplication sum

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### Multiplication Tables

#### Test 12: Division

1. Can they explain what division is? Can they demonstrate using concrete materials?
2. Complete prose division worksheet 1
  - Can they read the questions fluently?
  - Can they retell the problem in their own words?
  - Can they write the problem as a number sentence?
  - Can they solve the problem with ease?

Extension:

Complete prose division worksheet 2 – do they understand remainders?

Can they complete a formal division sum – eg.  $45 \div 3$ ?

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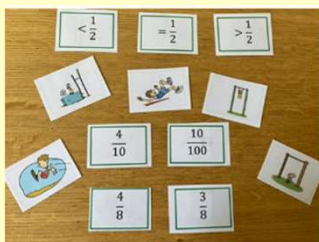
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### Understanding fractions



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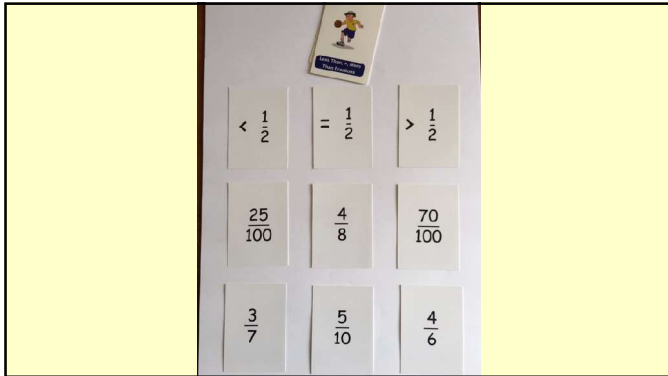
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**Fractions**

What fraction has been coloured in?

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\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Complete these fraction sentences.

$\frac{1}{3} + \frac{\quad}{3} = 1$

$1 = \frac{2}{5} + \frac{\quad}{5}$

$1 = \frac{4}{10} + \frac{\quad}{10}$

$\frac{5}{7} + \frac{\quad}{7} = 1$

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**Decimals**

- 1) What is the value of '6' in 3.6?
- 2) Can you explain the role of the decimal point?
- 3) Why does the number 5 not have a decimal point?
- 4) Can you calculate  $24 + 3.7$ ?

These are questions that a student needs to be able to answer with confidence. They can be asked in a qualitative assessment where the student can answer verbally.

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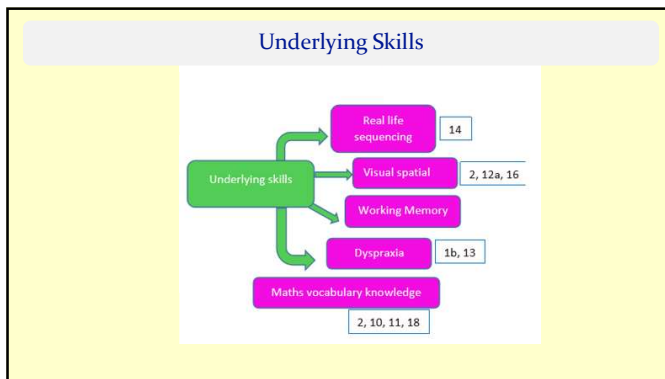
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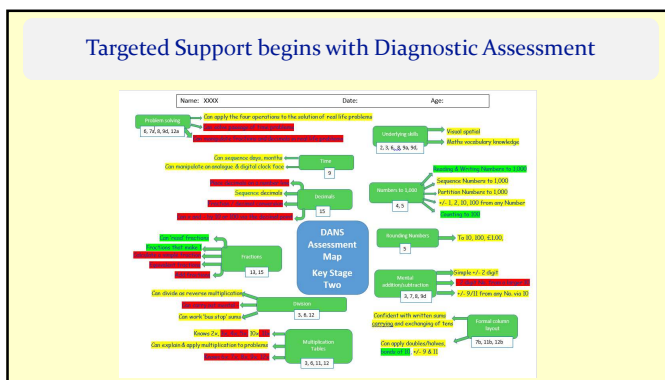
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[illegible]

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DANS can be used to show progress

To select the targets for an IMDP look at the sub-concepts on their DANS Map that are *working towards knowledge and understanding*.

Develop these concepts by building up on the student's *secure base blocks*.

As these consolidate, the yellow sub-categories will become more secure and the **lacking knowledge and understanding** sub-categories will develop into **working towards knowledge and understanding**.

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### In Conclusion

Targeted support necessitates a clear map of the students' mathematical knowledge.

For this, we need structured diagnostic assessment (that is enjoyable for our students.)



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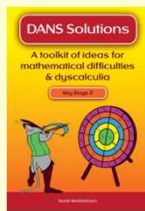
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The Diagnostic Assessment of Numeracy Skills (DANS) and DANS Solutions One and Two are available from SEN Books

<http://www.senbooks.co.uk/search/Diagnostic-Assessment-of-Numeracy-Skills>

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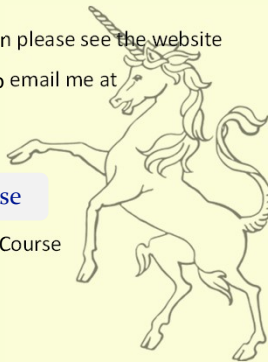
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If you would like further information please see the website [www.unicornmaths.com](http://www.unicornmaths.com) or feel free to email me at [sarahwedderburn@unicornmaths.com](mailto:sarahwedderburn@unicornmaths.com).

### Advanced Dyscalculia Course

The two-day Advanced Dyscalculia Course will run as a virtual training on November 3<sup>rd</sup> and November 11<sup>th</sup>.



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