NRICH FAQs

Quick answers to commonly asked questions about NRICH

What is it?
NRICH is a website providing **free**, carefully designed mathematics enrichment resources and teaching support materials. There are thousands of resources and each month a new edition of NRICH provides a set of new problems for which students can submit their own solutions.

Who is it for?
NRICH is used by teachers of all Key Stages in their classrooms. The resources are used by all learners aged 5 to 19, not just the highest attaining students.

How do the problems differ from textbook questions?
NRICH problems are all rich mathematical tasks. They frequently allow multiple methods of solution, are open to allow exploration, conjecture and investigation, work at a range of levels of sophistication and provide intriguing and fascinating contexts.

How do I use NRICH problems in the classroom?
NRICH tasks are designed for use in the classroom. Many problems are accompanied by detailed **Teachers' Notes**, giving guidance and support.

In addition, our **curriculum mapping documents** give suggestions for suitable tasks at various points in the curriculum.

What will learners gain from using NRICH?
It is well known that rich tasks draw learners into the mathematics, providing a more meaningful, interesting and long-lasting learning experience than traditional bookwork or learning by rote.

What are the problems like?
The problems are very diverse: they cover a very wide range of mathematical styles, content and level. Many contain interactive elements. For a few examples, see inside this booklet!

What do the stars mean?
We love low threshold-high ceiling; Challenge Level indicates the threshold:

Challenge Level: ★
Easier to get started with, although often very rich.

Challenge Level: ★★
Harder to get started with, but again often very rich.

Challenge Level: ★★★
Reserved for very difficult or involved problems!

NRICH,
University of Cambridge, Centre for Mathematical Sciences, Wilberforce Road, Cambridge CB3 0WA
enquiries.nrich@maths.org
nrich.maths.org

NRICH is part of the family of activities within the Millennium Mathematics Project at the University of Cambridge
mmp.maths.org

A quick introduction to KS1&2

NRICH

NRICH is a mathematics enrichment project run by a team of qualified teachers who specialise in rich mathematical thinking. NRICH is ideally placed to offer advice and support to both teachers and learners of mathematics, from Key Stage 1 through to Key Stage 5.

At the heart of what we do are the problems on our website nrich.maths.org. They are free, and there are thousands from which to choose.

NRICH aims to:

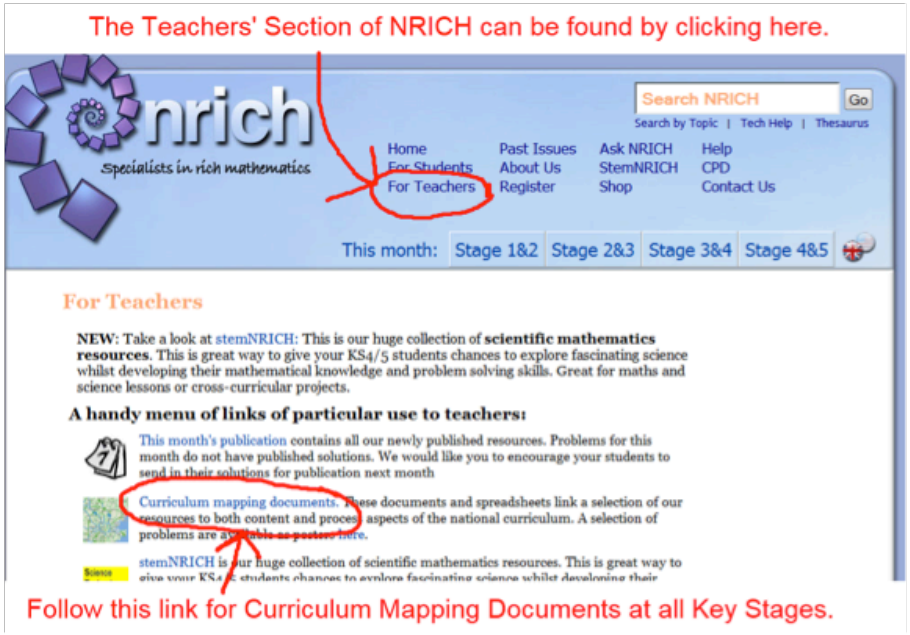
- Enrich the experience of the mathematics curriculum for all learners
- Offer challenging and engaging activities
- Develop mathematical thinking and problem-solving skills
- Show rich mathematics in meaningful contexts
- Work in partnership with teachers, schools and other educational settings

nrich.maths.org

UNIVERSITY OF CAMBRIDGE

For teachers of mathematics we:

- Offer free enrichment material (problems, articles and games) that will inspire and engage **all** learners.
- Publish curriculum mapping materials and teachers' notes to aid planning and promote rich mathematical thinking in classrooms.
- Offer professional development courses and workshops which help to embed rich tasks into everyday practice.
- Help teachers to think strategically about progression in problem solving.



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Ask learners to suggest some questions they could ask about magic Vs and then direct their attention to finding out how many other magic Vs there are, using the numbers 1−5. Children could work in pairs, using digit cards to try out their ideas. They could record magic Vs on this sheet. After some time, bring them together to share some of the magic Vs they have found so far. You could record them on the board and then invite learners to comment on what they notice. Can they offer explanations?

Having given them more time to explore and make generalisations, you could allow learners to pursue one of the questions they asked at the start of the lesson. These might include, for example, investigating different ranges of numbers or Vs which have four numbers in each arm.

Key questions

What do your magic Vs have in common?
Can you explain why?
What would happen if we used five different consecutive numbers?
Can you explain why?

Possible extension

Children can be challenged to investigate Vs of different sizes with different ranges of numbers. Are they always possible to solve and can they predict the number of solutions? Further extensions to this problem include other arrangements of the numbers, for example a magic cross.

Possible support

Using mini-whiteboards and digit cards may 'free up' some children so that they don't worry about getting a magic V straight away.

We look out for, and highlight, interesting and different approaches in all the solutions we receive from children. We publish a selection of these on the site each month, together with the children's first names and their school.

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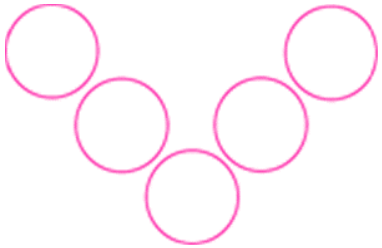
Full NRICH problem: *Magic Vs*

Stage: 2 Challenge Level: ★★

Place each of the numbers 1 to 5 in the V shape below so that the two arms of the V have the same total.



How many different possibilities are there?

What do you notice about all the solutions you find?

Can you explain what you see?
Can you convince someone that you have all the solutions?

What happens if we use the numbers from 2 to 6? From 12 to 16? From 37 to 41? From 103 to 107?

What can you discover about a V that has arms of length 4 using the numbers 1−7?

Teachers' Notes

Why do this problem?

This problem gives opportunities for children to make conjectures, prove these conjectures and make generalisations. They will be practising addition and subtraction, and applying their knowledge of odd/even numbers.

Possible approach

You could start by having two Vs displayed on the board (interactively if possible), one which is "magic" (i.e. whose arms have the same total) and one which is not. Ask the children to talk about what they see. If it doesn't come up naturally, draw their attention to the total of each arm and introduce the term "magic V".

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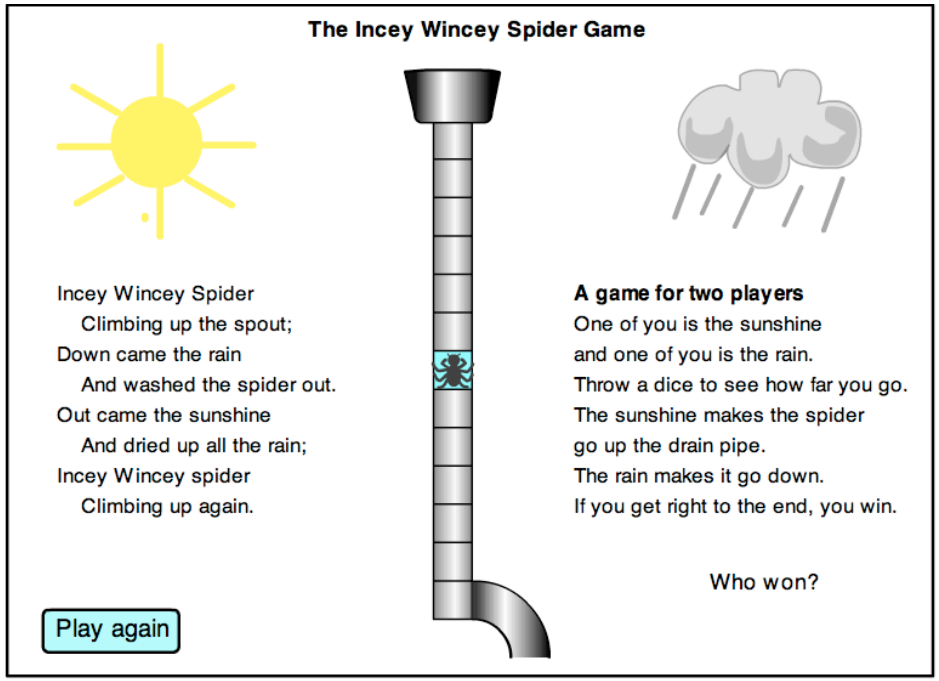
For those learning mathematics we:

- Provide free and interesting mathematical problems, articles and games which will challenge them to think in new ways.
- Invite them to send in their solutions to our problems for publication on the website.
- Give them the chance to explore a wider range of mathematical ideas than they might meet at school.
- Have a lively discussion board, Ask NRICH, where they can discuss mathematics and receive help and advice from a supportive community of mathematicians.



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Each month...

Each month there is a selection of new problems and articles at each stage.

Stage 1 and 2 Monthly Index Page

Click here for other Stages

Featured solutions from previous month

Articles and games appear on the right

Problems appear on the left, in order of stage and star rating

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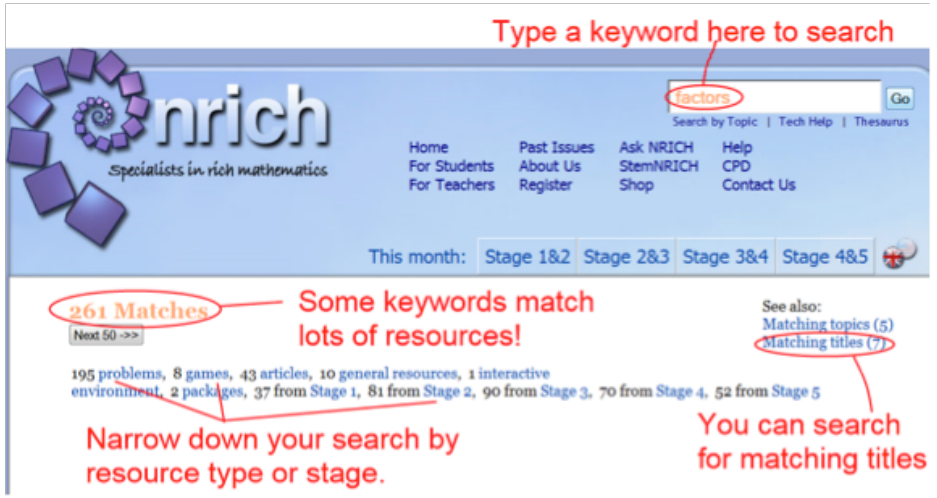
Getting to know the NRICH site

Searching for problems and games:



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