

# 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!



## 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](http://nrich.maths.org). They are free, and there are thousands from which to choose.

### NRICH aims to:

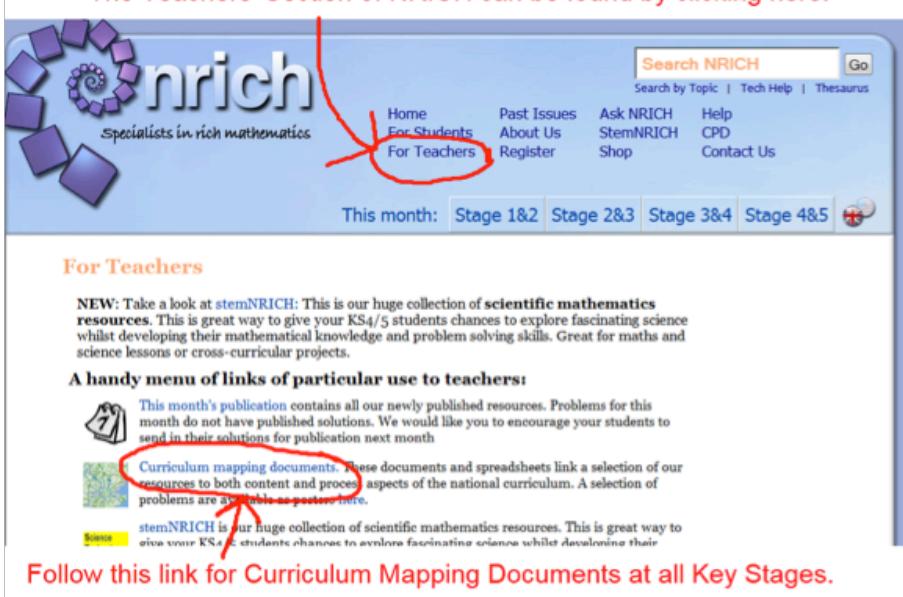
-  Enrich the experience of the mathematics curriculum for all learners
-  Offer challenging and engaging activities
-  Develop mathematical thinking and problem-solving skills
-  Show rich mathematics in meaningful contexts
-  Work in partnership with teachers, schools and other educational settings

[nrich.maths.org](http://nrich.maths.org)

# 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.

The Teachers' Section of NRICH can be found by clicking [here](#).



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**For Teachers**

**NEW:** Take a look at [stemNRICH](#): This is our huge collection of **scientific mathematics resources**. This is great way to give your KS4/5 students chances to explore fascinating science whilst developing their mathematical knowledge and problem solving skills. Great for maths and science lessons or cross-curricular projects.

**A handy menu of links of particular use to teachers:**

-  This month's publication contains all our newly published resources. Problems for this month do not have published solutions. We would like you to encourage your students to send in their solutions for publication next month
-  Curriculum mapping documents. These documents and spreadsheets link a selection of our resources to both content and process aspects of the national curriculum. A selection of problems are available to practice here.
-  stemNRICH is our huge collection of scientific mathematics resources. This is great way to give your KS4/5 students chances to explore fascinating science whilst developing their

Follow this link for Curriculum Mapping Documents at all Key Stages.

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

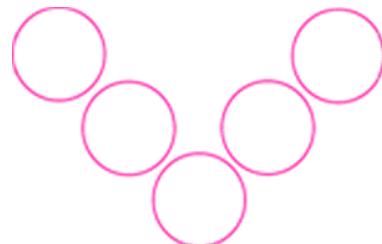
Using mini-whiteboards and digit cards may 'free up' some children so that they don't worry about getting a magic V straight away.

*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.*

# 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".

## 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.

**The Incey Wincey Spider Game**

Incey Wincey Spider  
Climbing up the spout;  
Down came the rain  
And washed the spider out.  
Out came the sunshine  
And dried up all the rain;  
Incey Wincey spider  
Climbing up again.

Play again

**A game for two players**  
One of you is the sunshine and one of you is the rain.  
Throw a dice to see how far you go.  
The sunshine makes the spider go up the drain pipe.  
The rain makes it go down.  
If you get right to the end, you win.

Who won?

Each month...

## Getting to know the NRICH site

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

## Stage 1 and 2 Monthly Index Page



# NRICH

Specialists in rich mathematics

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**Click here for other Stages**

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

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Stages

## Featured solutions from previous month

Articles  
and games  
appear  
on the right

Tech help offers advice on mathematical fonts, browsers, and using the site's interactivities

Ask NRICH is our forum for anyone seeking help answering maths questions

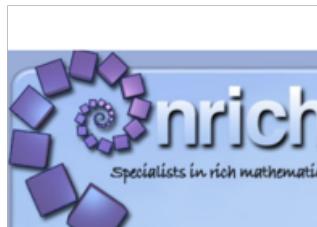
Tech help offers advice on mathematical fonts, browsers, and using the site's interactivities

Register for our email update here

Stem NRICH is our suite of scientific maths resources.

## Searching for problems and games:

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This month: Stage 1&2 Stage 2&3 Stage 3&4 Stage 4&5

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Some keywords match lots of resources!

Narrow down your search by resource type or stage.

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