



This resource is part of a suite of materials and activities created to inspire entrants, and support teachers, and parents to enter *maths inside*: a photo competition open to everyone in Scotland.  
*maths inside*: see different, make connections, celebrate!

Looking for a lesson starter, or something to spark off a conversation during registration?

### what is this?

This is an image bank activity containing images and questions to inspire interdisciplinary investigation and learning based on the [maths inside photo competition](#) and lead pupils towards the creation of an entry. It is suitable for **Early Years to Fourth Level (Pre-school–S3)** ([credits](#))

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[maths inside](#): see different, make connections, celebrate!

### complementary resources

→ [example journeys](#) towards an entry to the competition, which also provide possible answers to the questions posed here

→ [example interdisciplinary learning \(IDL\) activities](#) based on the CfE experiences and outcomes (Es+Os)

→ [Image Bank 2](#) for Senior Phase (S4–S6)

## Matching



This is a piano playmat. The keys on it are numbered 1 to 8 and all have different colours. When a key with a small number is pressed a low note sounds. When a key with a bigger number is pressed a higher note sounds. Different keys have different sounds and each has its own number and colour. Each number and colour matches a musical note. “Happy Birthday” can be “red, red, orange, red, purple, yellow”. It is also “1, 1, 2, 1, 4, 3”

What songs can you play? What order of numbers and colours do you think will sound good? Can you close your eyes and match the number with the sound you hear when I press a key? Why do the numbers always play the same note? How could they be different? What number on my piano mat is your favourite colour? How can they be matched in a different way? Where else have you seen numbers and colours matching?

What other things can you match with numbers? How can you match other things to the colours? How can you match objects around you with numbers? How can you match numbers and colours? What ways can you match numbers and colours? Can you match them in different ways? What patterns can you make with numbers and colours?

→ [Matching example journey](#)

→ [Matching example IDL activity with Es+Os](#)

## Measuring Trees with Hugs



Can you see any shapes in this tree stump? Can you see circles inside each other, growing out and getting bigger and bigger? Why are there circles inside each other on trees? Why do they look like this? Why are there circles at all on trees?! Can they be related to trees growth? How old is a tree? Can you tell if one tree is older than another tree, just by looking at it? How many round circles are there? Another stump has more circles, is the tree older or younger?

Where else can you see circles inside circles in nature? Where can you find something with repeating shapes? Why do the shapes you found repeat? What patterns can you find?

→ [Measuring Trees with Hugs example journey](#)

→ [Measuring Trees with Hugs example IDL activity with Es+Os](#)



## Currency denomination



What number is next if I tell you “one, two, ...”? Looking at the money in a wallet the answer is five! For the pence, the smallest three coins are 1p, 2p and 5p. For pounds, there is a £1 coin, a £2 coin, then a £5 note. There are also £10, £20, and £50 notes. What is going on? Why do the numbers 1,2,5 keep appearing, and not other numbers? Why don't we have notes and coins for every number? Why do we choose 1, 2, 5 and their multiples (10, 20, 50, 100, ...) on notes and coins? Why not other numbers? How would it work with 1, 3, and 7? What numbers would not work?

## Colour Wheel



What colours can be made from mixing red, yellow and blue? How many different combinations of colours are there? Where else do things mix and cannot be “unmixed” or sorted? What things can be mixed and sorted again? Where else can “one-way” processes be found?

→ [Colour Wheel example journey](#)

→ [Colour Wheel example IDL activity with Es+Os](#)

**Goal?**

How does the striker know which way to shoot? How many options do they have? What should the goalkeeper do? What should the goalkeeper do when the striker looks left as they run in? How should the striker respond when there have already been penalties in the game? When the diver dives right the first time, will they dive right again? What about when they dive right the first two times, or the first three times? What other choices can the striker make? The goalkeeper?

Where else do you need to think about how others will respond before you choose what to do? How can you make sure that you get what you want?

→ [Goal? example journey](#)

→ [Goal? example IDL activity with Es+Os](#)

## Chances in Camping



This tent has three tent poles of different lengths to fit in three sleeves. How likely is it to pick the correct pole? How many different ways are there to put tent poles in the sleeves? How many of these are correct? How could we decrease the chance of making a mistake? Or reduce the need for uncertainty at all? What do you do in your summer holidays? Can you find the *maths inside* what you do?

→ [Chances in Camping example journey](#)

→ [Chances in Camping example IDL activity with Es+Os](#)



## Packing Pebbles



How many pebbles fit into this square? What is the best way to arrange them to fit as many as possible? Is there a particular shape of pebble that is easier to work with? What is the best shape? The worst? What about packing inside a hole, a box, or a different shape? Why are arrangements that fit as many as possible important?

→ [Packing Pebbles example journey](#)

→ [Packing Pebbles example journey IDL activity with Es+Os](#)



## Shoelace Combinations



How many possible ways are there to lace up your shoes? How many holes do the laces go through? Why do all the holes need to be used? What happens when a hole is used twice? How are the patterns the same when the shoes are laced up from the right or left first? Where are the differences? Can you have identical patterns? What rules can be set so that the patterns are useful? How can the number of patterns be reduced further? What new rules can be made? Why have patterns that are symmetrical? What patterns can be discovered using more than one lace? How many possible shoelace combinations are there? What rules do you want to have? Why?

→ [Shoelace Combinations example journey](#)

→ [Shoelace Combinations example IDL activity with Es+Os](#)

*Open to all ages with prizes in each level. You only need a mobile, the internet & curiosity! Enter on your own or as a team, mind to add the maths inside sticker, and submit in one, or in as many categories as you like. The photo should be your own, without changes, and for a chance to win, cannot be shared anywhere else. View the [T&C](#) for more information, and please do get in touch if you have any questions.*

## credits

This [suite of resources](#) are the fruit of a collaborative project between undergraduate and postgraduate students from the [University of Glasgow — School of Mathematics & Statistics](#), [Education Scotland](#), and [Dr Andrew Wilson](#) (*maths inside* Founder and Director)

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The photos above are credited to [Jannes Glas](#), Emma Hunter, Harkamal Kaur, Christian Lao, Samuel Lewis, Kathleen McGill, Megan Ruffle, Andrew Wilson, and Yuanmin Zhu