



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!

Discovering and documenting the *maths inside* colour matching

What is this?

This is an example to inspire and support Secondary Teachers to design an interdisciplinary learning (IDL) activity based on the *maths inside* photo competition, and leads learners towards the creation of an entry. This activity is based on Third/Fourth Level experiences and outcomes (Es+Os) and complements the [Shoelace Combinations example journey](#), its [displayed final submission](#), and [Image Bank 1](#) for Early Years to Fourth Level (Pre-school–S3).

CfE experiences and outcomes: Third/Fourth Level

- Having investigated patterns in the environment, I can use appropriate mathematical vocabulary to discuss the rotational properties of shapes, pictures and patterns and can apply my understanding when completing or creating designs [MTH 4-19a](#)
- I can illustrate the lines of symmetry for a range of 2D shapes and apply my understanding to create and complete symmetrical pictures and patterns [MTH 3-19a](#)
- I have discussed the importance of mathematics in the real world, investigated the mathematical skills required for different career paths and delivered, with others, a presentation on how mathematics can be applied in the workplace [MTH 4-12a](#)
- I can analyse and discuss elements of my own and others' work, recognising strengths and identifying areas where improvements can be made [HWB 3-24a](#)
- I can convey information, describe events, explain processes or concepts, and combine ideas in different ways [LIT 3-28a](#)
- I can persuade, argue, evaluate, explore issues or express and justify opinions within a convincing line of thought, using relevant supporting detail and/or evidence [LIT 4-29a](#)
- I have continued to experiment with a range of media and technologies, handling them with control and assurance to create images and objects. I can apply my understanding of the properties of media and of techniques to specific tasks [EXA 4-02a](#)

Purpose of the activity

To creatively explore patterns, their variations, combinations and symmetry. To encourage pupils to think about the *maths inside* everyday objects and activities. To embark on a creative journey to record the discoveries made in an engaging piece of writing and in a visually appealing photograph. To provide opportunity to apply digital literacy skills.

Learning activity

- In groups, discuss the common shoelace patterns
- Using old trainers or shoes, experiment with different patterns and discuss the utility, benefits, disadvantages, and visual appeal of these
- Encourage learners to consider how different rules can lead to these patterns and what these rules might be
 - for example, rules could be: demanding that a lace only passes through each hole only once, choosing only patterns where the shoes do not fall off, demanding that ends of the laces start and finish at the top holes
- Using the questions in [Image Bank 1](#) or the [Shoelace Combinations example journey](#), invite learners to discuss
 - how many shoelace combinations there are in total, by first restricting the number of holes they have for the laces (for example, start with 1, 2, 4 holes and increase the number used)
 - what shoelace combinations lead to patterns that are not practical (for example, laced only with holes on one side of the shoe)
 - what rules to restrict the number combinations to those that are practical they might choose, and why
- In groups or individually, captures these findings in a commentary and photo
- Invite learners to write down their discoveries in a commentary, either individually or in groups
- Have each group or individual take a photograph of their matched objects and discuss what makes a visually appealing and engaging photograph
- Digitally add the *maths inside* sticker ([how to guides](#) available) and [submit](#) to the competition

Extension activity

- Encourage pupils to further experiment with different patterns, expand the number of holes, add in other creative elements. For example, more shoelaces, different types and colours of shoelaces
- Invite learners to consider if they can reduce the number of possible combinations by considering those that are mirror images of each other

National benchmarks

These activities provide learners opportunity to engage in further thinking and to integrate skills from across the curriculum in a context. Observation and feedback from these learning activities could contribute towards overall assessment of learners progress.

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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