> 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*

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 *Packing Pebbles* example journey, and Image Bank 1 for Early Years to Fourth Level (Pre-school–S3).

CfE experiences and outcomes: Third/Fourth Level

- I can solve practical problems by applying my knowledge of measure, choosing the appropriate units and degree of accuracy for the task and using a formula to calculate area or volume when required MNU 3-11a
- Through experimentation, I can explain floating and sinking in terms of the relative densities of different materials SCN 4-08b
- By contributing to experiments and investigations, I can develop my understanding of models of matter and can apply this to changes of state and the energy involved as they occur in nature SCN 3-05a
- Having investigated the relationships between the radius, diameter, circumference and area of a circle, I can apply my knowledge to solve related problems MTH 4-16b
- Through gaining an understanding of the structure of atoms and how they join, I can begin to connect the properties of substances with their possible structures SCN 4-15a
- 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

See also, for example, ENG 3-27a/4-27a, EXA 3-02a/4-02a, EXA 3-03a/4-03a, EXA 3-04a/4-04a, and LIT 3-28a/4-28a.

Purpose of the activity

To explore, through outdoor learning, the idea behind packing problems, methods of estimating volume and calculating density, and the impact of mathematics in the world. To embark on a creative journey to record the discoveries made in an engaging commentary and in a visually appealing photograph. To provide opportunity to apply digital literacy skills.

Learning activity

- Visit a local beach, river, forest, park, or other location that contains pebbles or small stones
- Using the questions in Image Bank 1 or the *Packing Pebbles* example journey, invite learners to:
    - gather a collection of pebbles or small stones with roughly the same shape and size
    - mark out a small area on the ground
    - see how many pebbles or stones they can fit inside their chosen area
    - use measuring and estimation to calculate the density of their packing
- Ask learners to write down their discoveries in a commentary, either individually or in groups
- Have each group or individual take a photograph of their pebble or stone arrangement
- After returning indoors, digitally add the *maths inside* sticker (how to guides available) and submit to the competition

Extension activity

- Invite learners to experiment with differently shaped pebbles or stones, and compare their results with using regular building blocks
- If practical, suggest that learners make a rough design of their arrangements on paper before creating them, using suitable 2D and 3D shapes to model the pebbles or stones

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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