



This resource is part of a suite of materials created to inspire entrants, and support parents, teachers and those out-of-school to make deeper connections with their surroundings. The *maths inside* is waiting to be discovered!

Below, you can find an example documenting the submission journey for an **Third/Forth Level** entry to the *maths inside* photo competition ([credits](#)).

We welcome [entries](#), both individually and in groups, from all ages of children and young people, as well as parents, guardians, carers and teachers and anyone qualifying for the out-of-school category! See mathsinside.com for full details.

Cycling in Order

Have you ever thought about the maths inside riding a bike? I like riding my bike and am lucky that I can do this more recently. What maths is involved in bikes? How can you capture the maths inside in a title, commentary and photo with the *maths inside* sticker on it? Let's explore together!

Picture a bicycle in your mind, it uses many shapes: circles, cylinders, triangles, quadrilaterals — why does it use these shapes? We might investigate this “why” and talk about it in our commentary but let us take a look beyond the shapes to another interesting mathematical idea that is inside my bike...

When I went for a bike ride recently, I got a puncture. This was a bit annoying, but it made me notice some strange maths inside my bike ride — the idea that order matters! I realised this because I would have to fix my puncture *before* I could cycle home. If I tried to do it the other way around, the cycle home would not be so fun! There was a nice sunset at the time, so I thought it was my perfect chance to take a photo with this mathematical idea hidden inside!



The next task is to come up with a title and commentary for my photo. Let's have a look at my first try. The title I chose was

Cycle Ride

And I wrote the following commentary

The order that we do things, matters. While out on a cycle, I got a puncture. So, before I could cycle home, I had to fix it.

What do you think of this title and commentary? Can we make it better in any way? I think we can!

Maybe we could think about the idea a little bit deeper in our commentary. To do this, it's often good to ask ourselves lots of questions! Why does the order matter here? What would've happened if the order was reversed — if the person cycled home *before* fixing their puncture? It's important to explore the "why" in your concepts — this often leads to a deeper understanding! Here, we could ask why we would prefer one ordering over the other.

We might also want to choose a title that not only describes the photo, but also, relates to the mathematical ideas that we thought of!

So, maybe we could update our title to be

Cycling in Order

And our commentary could be

The order that we do things, matters. When I got a puncture while out cycling, before I could carry on, I had to fix it. If I tried to do the reverse order - cycle my bike before fixing the puncture - it would be more hard work and dangerous. This is because the bike doesn't move as easily with a flat tyre and so it is more difficult to cycle. And when the tyre is flat, it moves around in the wheel which makes cycling dangerous, especially around corners. But if the puncture is fixed before I cycle, these problems disappear!

What could you write in your commentary? What photo will you take to capture the *maths inside*? Where else in life or nature does the order matter and why? What would it be like if lambs were born after summer? How would the world be if order never mattered? This would be pretty weird — cycling home before or after fixing my puncture would've felt the same! What other situations can you think of that would be strange if the order didn't matter?

Remember that submissions need to be original to be eligible for the maths inside photo competition. Judges can only accept original photos, commentaries and titles that are not featured, shared or displayed elsewhere (this includes social media and other competitions). See the [T&C](#) for more information, and please do get in touch if you have any additional 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](#), and [Dr Andrew Wilson](#) (*maths inside* Founder and Director).

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The photo above is credited to Hector Spencer-Wood.