

What Tooti Tooti is

Make a tessellation by cutting open an envelope!



In these activities, we will use an envelope to create planar patterns with four kinds of 2-fold rotational symmetries, and we will explore a connection between these symmetries and the four corners of the envelope: we call this type of symmetry 2222 (Tooti Tooti!)

This lesson is just one example of [a wider mathematical phenomenon](#): every planar symmetry has a kind of “envelope” associated with it, and we can learn mathematical facts about symmetry by studying these.

[Rotations and Symmetry](#)

Here are the important ideas that we’ll need:

Transformations are motions of the entire plane. There are different kinds of transformations. For example a “translation” shifts everything over.



Rotations pivot the plane around a point, a **rotation point**. In this activity we are especially interested in **2-fold** rotations, rotations by 180 degrees, half-way round a circle.



A **Symmetry** of any kind of pattern is a transformation that leaves the pattern the same. For example, here are two photos of the same pattern. What do you think: *Did I rotate the pattern between the time I took the first photo and the time I took the second photo?*



Maybe, maybe not. You just can't tell! The pattern has a 2-fold rotation as a symmetry.

Why?

Where are the corners of the original envelopes?

Where are the 2-fold rotation points in the pattern?

The tiles will fit together to make a pattern in the plane.

Unfold the envelope, to make a tile!

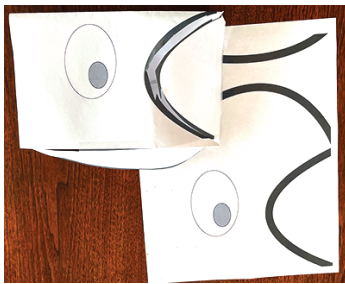
Be sure to cut all the way to each corner.

Cut along the thick lines — but don't cut all the way through!

Fold each sheet over and tape up the sides to make an envelope.

Print out lots of copies of one of the Tooti Tooti designs, enough for a good-sized piece of pattern.

Quick Start Guide:



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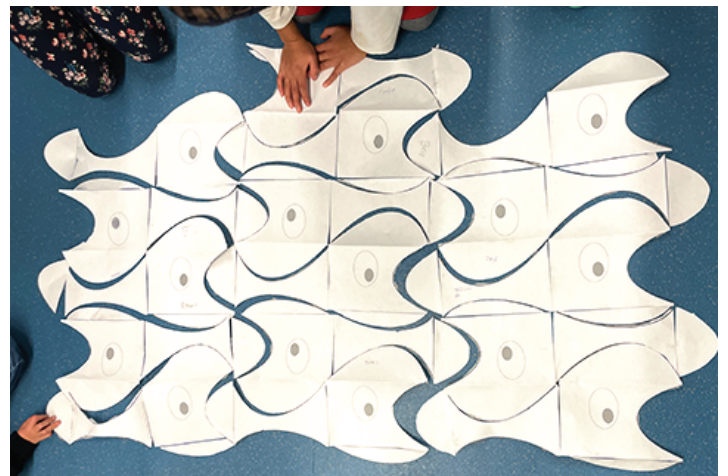
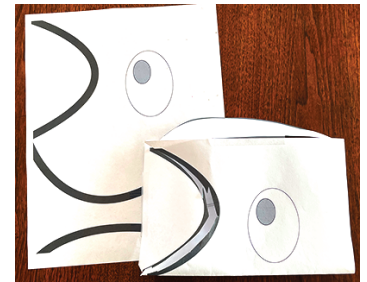
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Where are the corners of the original envelopes?

Why?







don't cut through the other side!

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