

An origami interactive poster: from folds to axioms

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Abstract

The benefits of origami are well-known: hands-eye coordination, fine motor skills, spatial visualization, memorization of logic sequences, concentration and creativity. Moreover, it can be used to teach and learn mathematics in a dynamic tangible way that involves all the senses.

Following these aims, we present an interactive poster representing a summary of five simple origami bases as an introduction to origami world. The aim is not only to learn how to make the standard origami bases but also to understand the relation between mathematics and origami with a deeper vision through these bases. For that, the poster is accompanied by a kit that includes two sheets explaining origami symbols and axioms used on the bases and a booklet containing a proposal of activities, for children from three years to university levels.

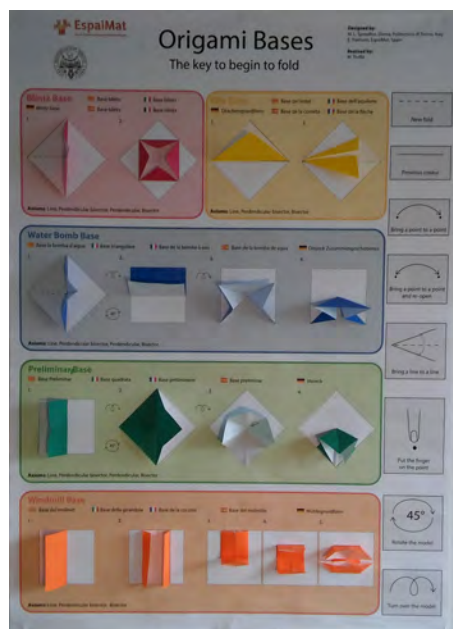


Figure 1: The poster

Hanged the poster on the wall of the classroom, see Figure 1, thanks to its dynamicity, children and students can touch it and fold the papers on it easily, interacting with it and repeating the

folding process as many times as they want. Since it uses touch it is appropriate for blind people or people with eyes disabilities too. The symbols and axioms sheets can also be hanged on the wall and stay there to be helpful while folding other origami models.

Teachers can choose freely the aim of the activity they want to do with their students. At first, students have the possibility to know and recognize five bases by heart: Blintz base, Kite base, Water bomb base, Preliminary base, and Windmill base, ordered on the poster by increasing level of folding complexity. Moreover, the symbols and axioms sheets give the possibility to analyze mathematically the meaning of the folds, approaching mathematics in different degrees of depth. One can start from the geometrical shapes that appear during the folding process until to analyze the origami axioms. This possibility makes our poster interesting from any school level.

To guide teachers in the mathematical use of the poster, in the booklet we suggest two types of mathematical activities. On one side we present a list of general activities that can be done for any of the five bases and on the other side we propose for each base a concrete activity very detailed that includes problems to solve and solutions. This second type of activity can be easily adapted to the other bases.

Our goal is to cover a range of mathematics focus, to show that the relation between mathematics and origami is very extensive.

Students, depending on the age and on the background, can copy printed patterns, recognize simple polygons that appear during the folding, study symmetries during the fold, concavity and convexity, consolidate mathematics vocabulary (vertex, edge, segment, angle, etc.), use Pythagoras theorem to make calculations on segments lengths, work with proportion and areas, know what a graph is and analyze which origami axiom gives a folded line (look at the sheet Symbols and Axioms), and compare origami axioms with ruler and compass axioms to construct a given point or line.

Finally, we think that origami is an intercultural tool and so we would like to invite people of different country to exchange folding experience. For this reason we propose the name of the bases and the booklet in five European different languages. If needed the poster can be easily modified changing languages depending on the geographical area people want to use it.