

# Geofold

Where geometry unfolds.

This hands-on toolkit was developed to improve spatial skills in high school students (ages 12–15) during math classes. The toolkit contains foldable pyramids that form magnetic cubes, which are used alongside five sets of question cards that connect directly to geometry chapters in the curriculum. Rather than replacing full lessons, the activities

substitute the making of additional exercises, ensuring they fit within the existing structure of the classroom.

The tool introduces a physical, exploratory element into math education, helping students develop spatial skills through manipulation, experimentation, and play. It bridges the

gap between abstract math and real-world experience, aligning with the educational trend towards design learning.

Geofold makes learning fun again.

## Insights

### Scientific Insight

Spatial ability plays a crucial role in solving mathematical problems, especially in geometry. It involves switching between 2D and 3D representations, mental rotation, and understanding shape relations. Often overlooked in both education and theory, is how spatial skills are intertwined with real-life; spatial problems don't have to be solved in the mind, but can also be approached by using the body and environment.

### Contextual Insight

Students enjoy math more when it feels like solving puzzles. They are motivated by interactive, visual, and collaborative tasks. However, schools are bound to rigid structures, time pressure, and frequent testing. This creates a tension between students' learning preferences and the system's practical limitations.

### Design Insight

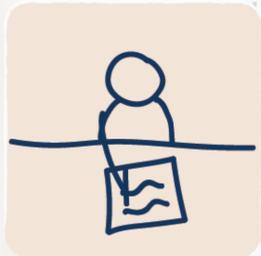
The sweet spot lies in creating tools that support spatial reasoning within the constraints of a standard lesson. A tangible and intuitive tool like Geofold can bring play and experimentation into the classrooms, without replacing or disrupting the existing math curriculum.

## How to use

The toolkit uses the principles of origami to form a geometric shape that can shift between two- and three-dimensional by using magnets. By folding the sides of the star-like shapes up, a pyramid is created, which forms a cube when six are put together.

The foldable pyramids are accompanied by assignment cards that align with the curriculum and introduce open-ended spatial challenges.

1. The student finishes the class exercises.



2. The student gets up to grab the GeoFold toolkit instead of doing extra work from the book



3. The student returns to their desk with one assignment card and the corresponding amount of fold-outs.



4. They then 'play' with the exercises until class is over



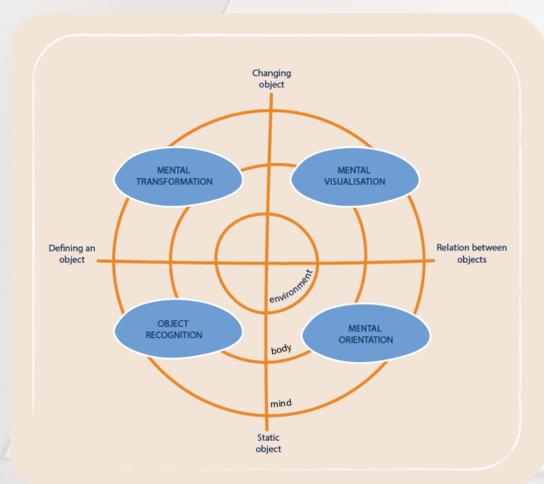
## Stakeholders value

For **students**, the toolkit provides a refreshing and playful way of learning, boosting motivation and confidence by turning math into a puzzle-like experience. The tactile aspect, particularly the magnetic click, was well-received and adds intuitive, immediate feedback.

For **teachers**, it offers structured content that still allows space for creativity, collaboration, and exploration within the bounds of the curriculum. Because it aligns with existing geometry chapters, it fits seamlessly into lesson plans while creating curiosity and in the classroom.

For **schools and curriculum developers**, it supports the shift towards more spatial reasoning and active learning, while respecting time constraints, testing pressure, and limited budgets. Although the prototype was expensive, multiple options were presented to fit the tight school budgets; A low-cost cardboard version was developed to ensure broad accessibility and easier implementation.

In a broader sense, the toolkit shows how design thinking and tangible learning tools can bridge gaps between abstract subjects and real-world understanding, contributing to more engaging education.



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