

A KNOWLEDGE DISCOVERY PLATFORM FOR SPATIAL EDUCATION: APPLICATIONS TO SPATIAL DECOMPOSITION AND PACKING

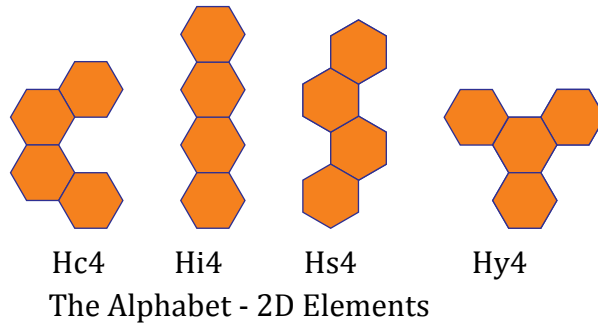
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The workshop aims to introduce the XColony Knowledge Discovery Kit -- a new teaching platform based on geometric manipulatives and designed in the STEM education context for training creativity and spatial intelligence in primary and middle school students. After a brief introduction of the basic concepts, participants are invited to evaluate the platform from students' perspective by actively participating in hands-on mini projects, with the goal of constructing 3D structures that allow them to discover new geometric properties. A relevant case study on how the platform can be utilized in class is presented and the participants discuss and identify other mathematical concepts and educational activities conducted in a similar manner. The workshop concludes with a test that participants can voluntarily take, or they can take it home and use it as a self-evaluation tool for spatial intelligence.

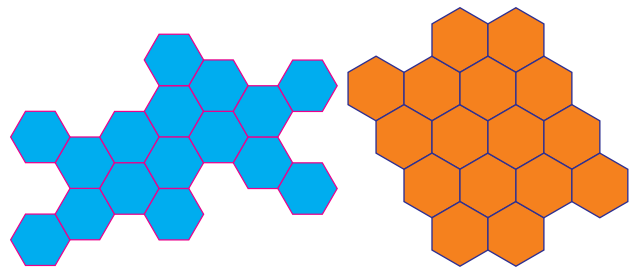
Planned timeline	Topic	Material / Working format / presenter
20 min	Concepts and Goals	PowerPoint slides, short videos, physical models / Presentation / Sorin Alexe
30 min	Hands-On Activities Geometric Puzzles	Specific manipulatives for each group, Video instructions, printed manuals, models / Hands-on Workshops (groups of 4-6 participants) / Cristian Voica, Sorin Alexe
40 min	Brain Storming on Spatial Education	Models, Spatial Intelligence Tests / Brain Storming / Cristian Voica

Appendix. Examples of Activities

The Shadow Puzzles

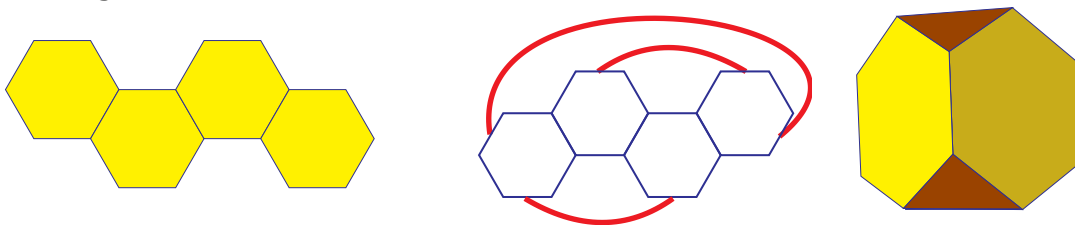


Using the 2D elements shown above find decompositions of the areas depicted on the right with one type of elements only. How many solutions exist?



Module T

In order to construct the T-module, start with an Hs4 element. Associate to it the polyhedral graph and perform the contraction operation as described below: the red arcs represent the edges that overlap. Use clear adhesive tape to materialize the connection between the contracted edges.



Linear Packing Problem

Find the shortest linear arrangement using T modules. Modules have to stand on the table, to align their centers of gravity and to display the smallest distance between the first and the last modules. Is the solution shown below optimal?

