EXPERIENCE WORKSHOP



THE EXPERIENCE-CENTERED MATH/ART MOVEMENT www.experienceworkshop.org



Experience Workshop's STEAM Learning Material

EXPERIENCE WORKSHOP'S 4DFRAME BUBBLE PARADE

Dr. Kristóf Fenyvesi University of Jyväskylä



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Introduction of 4D Frame

For Free Imagination and Infinite creativity



4D Land Corporation / 4D Math and Science Creativity Institute, KOREA



The 4Dframe educational modelling kit is based upon the analysis of building techniques utilized in the construction of Korea's traditional, wooden buildings, in which no any nails have been used.

4Dframe has been proved to be a very appropriate tool for developing various skills in the $\dot{\sim}$ transdisciplinary framework of STEAM learning.



Traditional Korean Wooden Palace

Principle of Architecture

4D Frame Tube

4D Frame Connector







Bend, Cut & Connect!













The traditional Nordic christmas decoration: the himmeli



















Experiment about Fermat Point by soap bubbles and 4Dframe



Ingredients for making Bubble Water: Cleanser, Glycerine (water-type) Water

Bubbles form because of the surface tension of water. Hydrogen atoms in one water molecule are attracted to oxygen atoms in other water molecules, and cling together.

Bubbles enclose the maximum volume of air with the minimum bubble solution, so they are normally round. THESE bubbles are also minimum surfaces, i.e., they're the most efficient way to link the balls and struts with surfaces.

The surface tension of water, alone, is too strong to make good bubbles – adding soap reduces surface tension. It also adds oily film that slows down the evaporation process, so you get longer-lasting bubbles!

Background material: Optimal Bubbleology by Amy Liu: https://prezi.com/nvi02elbp0w6/optimal-bubbleology-original/





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Experiment with tetrahedron





Experiment with tetrahedron













Experiment with regular hexahedron (cube)



Experiment with regular hexahedron





Experiment with truncated tetrahedron







Experiment with truncated tetrahedron



Tetrapod & Truncated tetrahedron







Work in pairs or in small groups! Work as a team of engineers!

You need to solve a given problem within a given amount of time, based on a given amount of resources:

- Set goals
- Make plans
- Do tests
- Record the thinking / design process
- Do more with less



Interested in STEAM? Looking for support in connecting mathematics & art in education? Do you have a good idea?

Contact us: <u>info@experienceworkshop.org</u> Website: <u>www.experienceworkshop.org</u> Facebook: <u>www.facebook.com/experienceworkshop.math.art</u>