

STEM from Home

Find the Strongest Shape!

As you travel around in a bus or a car through a city, what do you see? Parks, schools, buildings, monuments, hospitals and so many sights that make your city so beautiful. Look at the buildings carefully and you will note that most of them have all the geometrical shapes you have been exposed to – lines, triangles, cubes, squares, steeples and so many more. Yes, geometry is part of our life from the square piece of bread on our plate to the cuboidal chocolate you love! Even prominent buildings and monuments like The Taj Mahal, Big Ben, Sydney Opera House which have stood the test of time are all miracles of geometry. Designing buildings involve the application of the concepts like force, pressure and area.

$$\text{Force} = \text{Pressure} \times \text{Area}$$

In this STEM card, you will explore different 3D geometrical shapes using Geogebra and 5D Planner tools; explore tangrams through a fun and enjoyable online game; and challenge yourself to create a 3D structure that will be stable and also withstand the weight of an object.

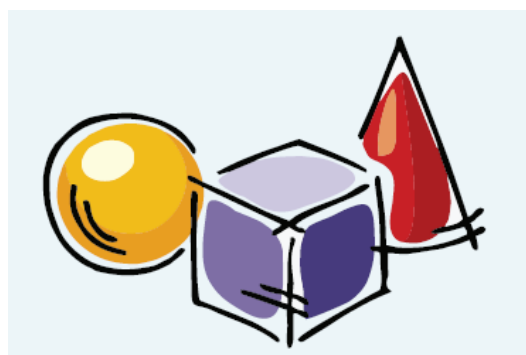
Main Activity: Visualise 3D Shapes Using Geogebra And Planner 5D

What You Will Need

A computer with internet connection

What you will learn

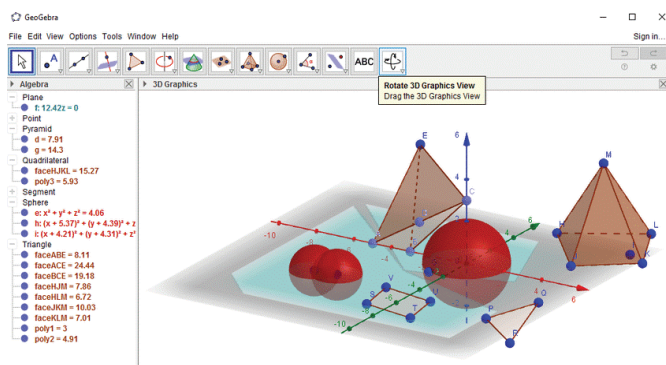
Visualisation of different solid shapes.



Getting Started

- To use “Geogebra” draw the following 3D shapes- cube, cylinder, cone and tetrahedron
- Visualize 3D shapes and find out about their faces, edges and vertices.
- Research about shapes help in making stronger architecture and create your own home design in 2D & 3D using “Planner 5D”

[Click here for the activity details.](#)



Bonus Activities:

Tangram Game

The domain of architecture boasts of various combinations of shapes. Architects and engineers work hard to arrange and combine these shapes to make them safe and yet aesthetically appealing. Would you like to explore an online game that will test your creativity and problem-solving skills, as you try and put together components of a given image to form the final picture?

Let's begin with the Tangram game. Click here to know more about tangrams. Arranged correctly, these tangram shapes can be fitted together as a large square, rectangle, or triangle. They can also be arranged in a variety of complex shapes, including fanciful ones (You will find some in the game!)



[Click here to access the game.](#)

Challenge Activity: Create the Strongest 3D Geometrical Structure

What You Will Need

Modelling clay/gummy sweets (to hold the sticks), skewer sticks/toothpicks, something to use as weight (books/ small objects acting as weights)



Clay or gummy balls



Books or some heavy objects to use as weights



Skewer sticks/toothpicks

Getting Started

Use clay/gummy sweet and skewer sticks to construct a structure using different 3-dimensional shapes such as cube, cuboid, pyramid, triangular prism. The skewer sticks will be used to make the edges of the 3D structure whereas the clay or gummy balls will be used to join the edges that will represent the vertices of the structure.

[Click here](#) to see some examples of different shapes made using a similar technique.

Based on the thickness/sturdiness of the skewer sticks, test how strong is your model by placing some weight on top (small weight objects for example). Think of what modifications you can make to your structure (maybe adding some truss or arches) to make it more stable. Test it again by increasing the weight gradually.

Now you know what shapes help in creating strong structures and why you can find them all around you in buildings, bridges, and even furniture!

