

# MATHEMATICS



## Solid figures

### BOX NOTICE

Name of the activity	Solid figures
Activity duration	1 h
Material needed	Solid figures box, scissors, glue
Number of pupils involved (per box)	2 if you want all children to build all five solid figures, more if you want to save some time

### Step 1: Preparation

Start by asking your pupils what they know about solids. What are they? Can they name some? You may show them some items in the classroom: a chalk stick or a pencil case can look like cylinders, a sponge can look like a cuboid, and you may find examples of balls outside the classroom!

### Step 2: Platonic solids & use of the box

Platonic solids are a specific variety of solid figures that philosopher Plato observed in the wild. They consist of a series of identical geometric shapes. Plato then gave those shapes an element to explain the meaning of the universe. These elements are fire, air, water, earth, and space. What do each of these solid figures represent?

The theory of the four elements (with space as the fifth) was used to explain how the world worked in ancient times and was a widespread theory: the Greeks used it, but so did several other civilisations in Asia, Africa and America. This theory then vanished when confronted with modern science during the Renaissance, but we can still notice



Co-funded by  
the European Union

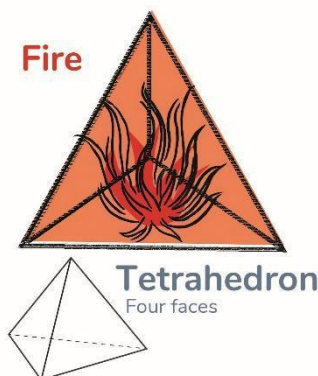
MY BOX OF STEAM (project nr. 2022-2-EE01-KA220-SCH-000099273) is funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

# MATHEMATICS

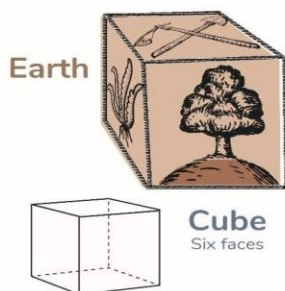
Its impact on several occasions. For example, in astrology, each of the zodiac signs is associated with one of the four main elements.

To proceed with the activity while involving your pupils, you may either build the platonic solids found in the activity sheets beforehand or show them the printed images with the elements associated with each solid.

Here are some examples of what you can ask with each solid figure. When facing your class, you may refer to the story in the box to help with the narrative aspect! You may also present each solid figure in any order, depending on your preferences. In this document, the solid figures are presented according to their number of sides.



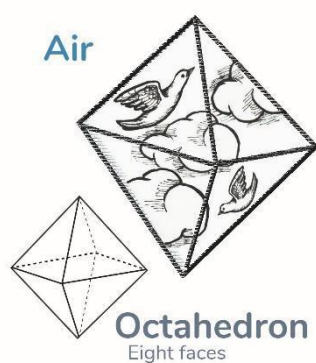
The tetrahedron sits atop the Earth; it represents the fire that rises to the sky. Its sharp edge highlights the dangerous nature of the element. You may ask your pupils: what does this figure represent according to you? Does this remind you of something in particular? Do you agree with Plato's opinions, or would you have associated some of the figures with other elements? Why?



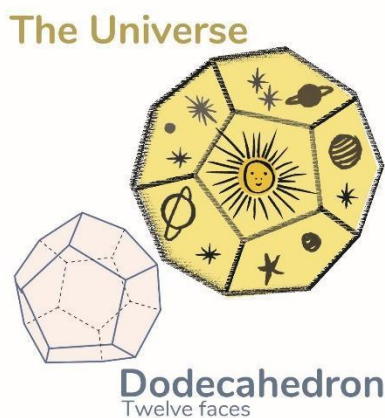
Co-funded by  
the European Union

# MATHEMATICS

The cube represents stability and simplicity; therefore, it represents the Earth. According to Plato, the Earth is made of cubes itself, which explains why the Earth holds together. In 2020, a group of researchers led by D.J. Jerolmack from the University of Pennsylvania partly confirmed this hypothesis as they discovered that rocks would tend to break in a cubic pattern. The full thesis can be found here (in English): <https://doi.org/10.1073/pnas.2001037117>



The octahedron, made of two pyramids and eight triangles, represents the air. Triangles, from Plato's perspective, represent light features, which explains why he associated the tetrahedron (made of four triangles) with fire.



Co-funded by  
the European Union

MY BOX OF STEAM (project nr. 2022-2-EE01-KA220-SCH-000099273) is funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

# MATHEMATICS

The dodecahedron is made of pentagons. It has twelve sides, which explains why it is associated with the universe (or space in general): indeed, each side would represent one of the twelve constellations that are referred to in the zodiac signs.



The icosahedron is made of twenty triangles: it is the platonic solid with the most sides! Once again, since this solid is made of triangles, it means that water is an element that is ever-flowing and difficult to catch.

## Step 3: Building the solid figures

Now that you have learned about the story behind the platonic figures, you can start to build them. Glue the tongue of each figure to create the solids. Use the Creation of the Elements file to find all the tips!

If you are working on the first sequence of the box, you may ask your pupils to start working on the dimensions of each solid figure before building them. If you are working on the second sequence, you may ask your pupils to build the platonic solids first and then work on the activity about the volumes.



Co-funded by  
the European Union

MY BOX OF STEAM (project nr. 2022-2-EE01-KA220-SCH-000099273) is funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.