Pythagorean Solids
Five Regular Solids

Euclid, *Elements of Geometrie* (London, 1570), trans. Henry Billingsley.

Can you identify the five regular solids?
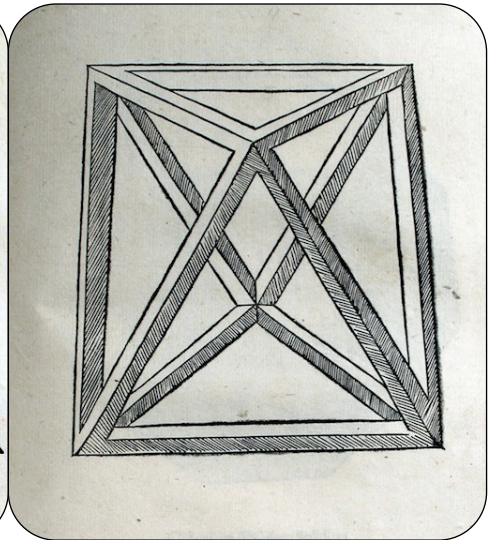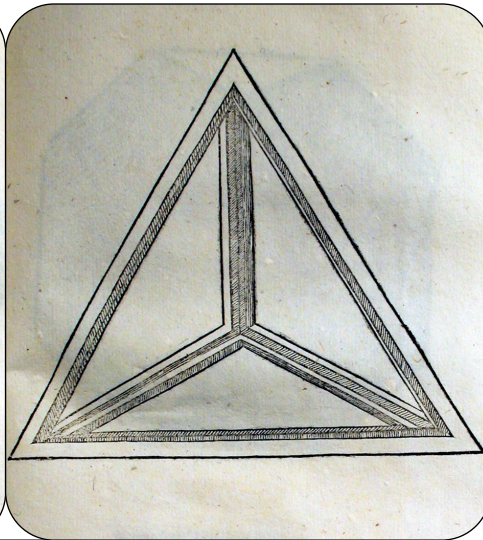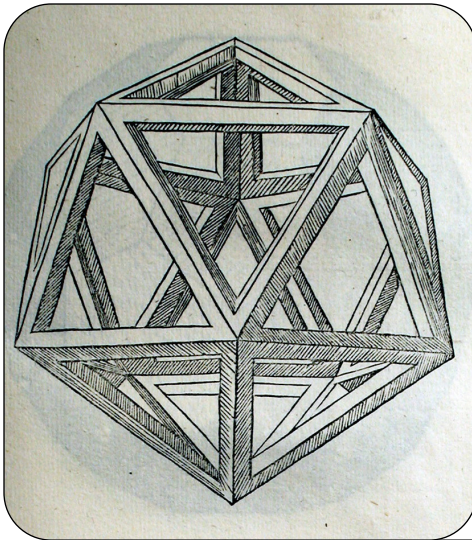
Pythagorean Solids: 5 Regular Solids

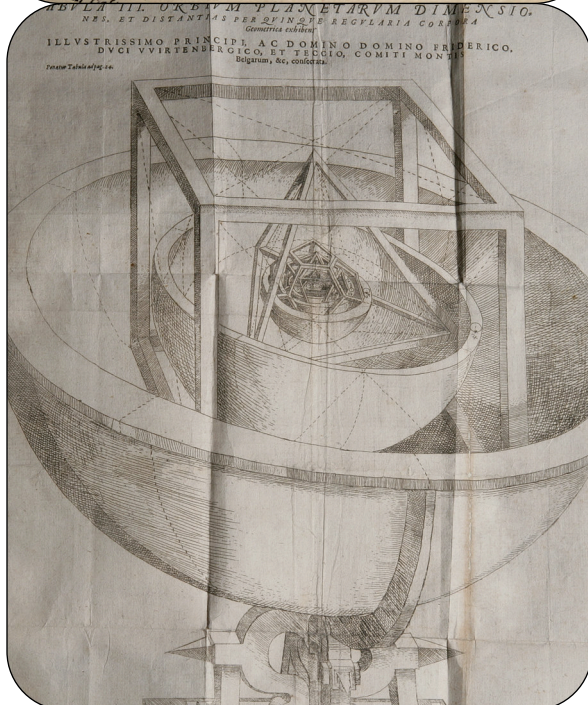We can define a solid as regular when every face, edge and corner angle is identical, whether a square on every side of a **cube**, or a triangle on every side of a **tetrahedron**. The Pythagoreans proved that there are only five regular solids: The **octahedron**; the **dodecahedron**; and the **icosahedron**. There are no others.

Name	Face	#sides
Cube	Square	6
Tetrahedron	Equilateral triangle	4
Octahedron	Equilateral triangle	8
Dodecahedron	Pentagon	12
Icosahedron	Equilateral triangle	20

In the images on this page, which is which? And which solid shown is *not* a regular solid?

Because Plato used the 5 regular solids to explain the structure of the Universe in his dialogue, *Timaeus*, they are also called the Platonic Solids. After Plato, astronomers supposed that the geometry of these five solids would hold an essential clue to the true structure of the universe. Euclid analyzed the properties of the regular solids in Book 13 of his *Elements of Geometry*. Kepler used the regular solids to prove Copernicanism. The works of Leonardo da Vinci, Luca Pacioli, Albrecht Dürer, and Lorenzo Sirigatti show that artists, in addition to astronomers, mathematicians and philosophers, were also deeply familiar with the properties of regular solids.

Kerry Magruder