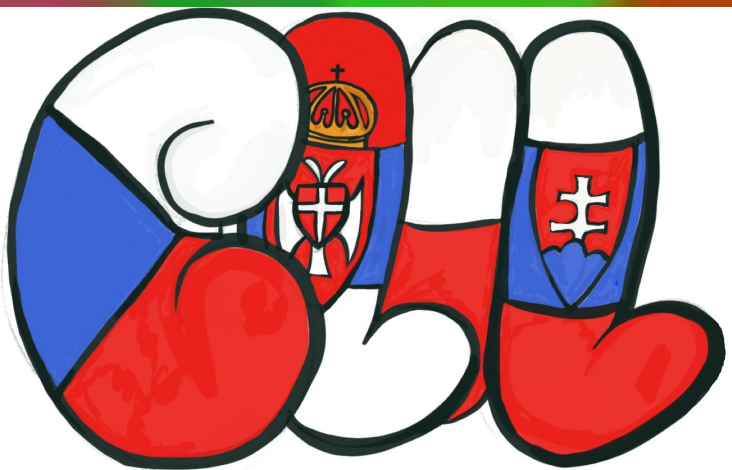


# PLATONIC SOLIDS



Erasmus+

**PROGRAM ERASMUS + EDUKACJA SZKOLNA - AKCJA KA2 -  
PARTNERSTWO STRATEGICZNE**

**Numer projektu: 2019-1-CZ01-KA229-061391**

**Tytuł projektu: "CLIL ponad granicami - baw się i ucz"**

# WHO WAS PLATON?

**PLATON** - he lived in Ancient Greece. He was born in about 427 BC, he died in 347 BC. He is one of the most famous philosophers of ancient Greece. He was a student of Socrates and a teacher of Aristotle. He was the founder of the Platonic Academy and the creator of Platonic solids.



# PLATONIC SOLIDS

They are regular polyhedra. Their name is due to the fact that Plato was the first to discover the fact that they occur in a strictly defined number.



Cube  
Earth



Tetrahedron  
Fire



Dodecahedron  
the Universe



Icosahedron  
Water

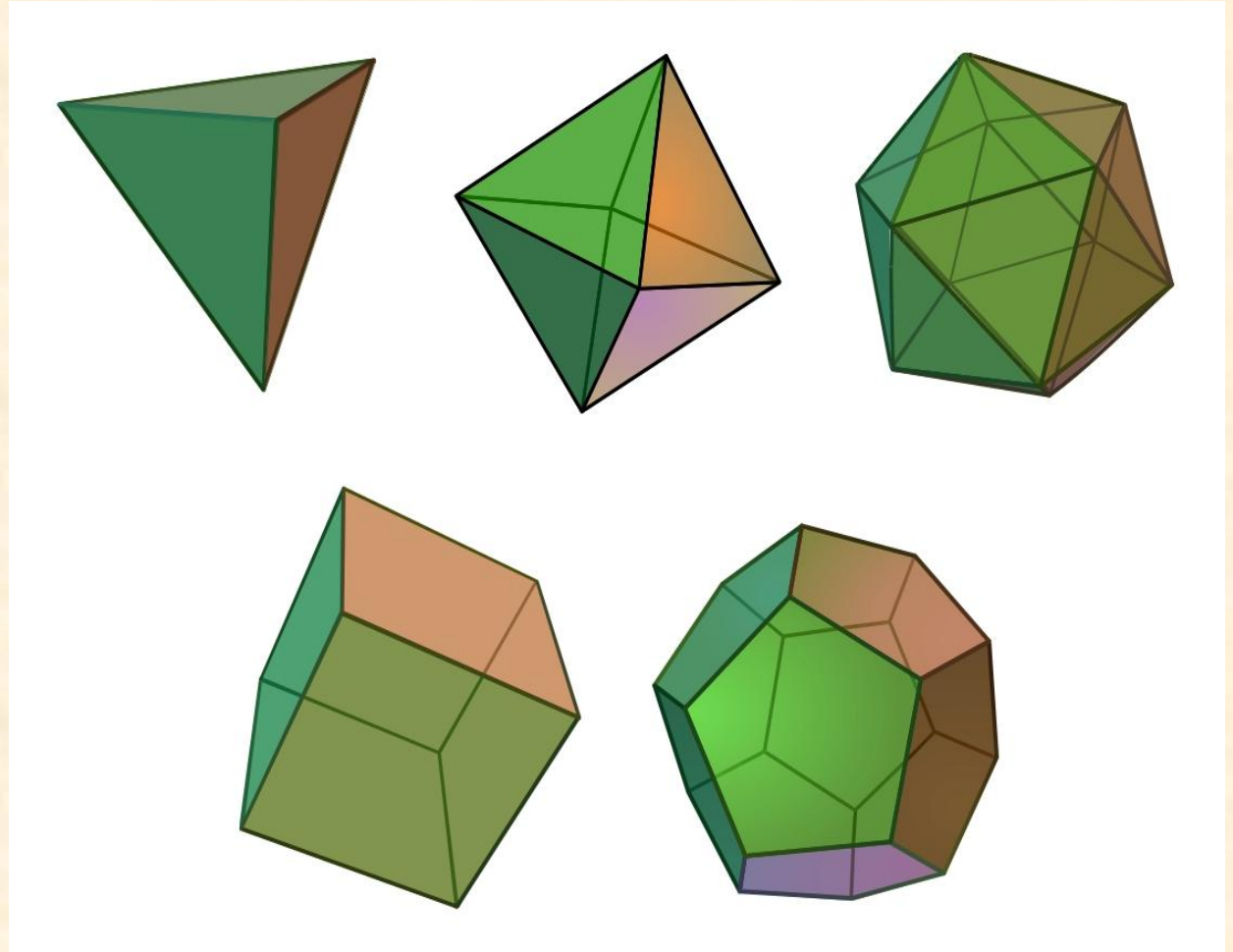


Octahedron  
Air



# PLATONAL SOLIDS

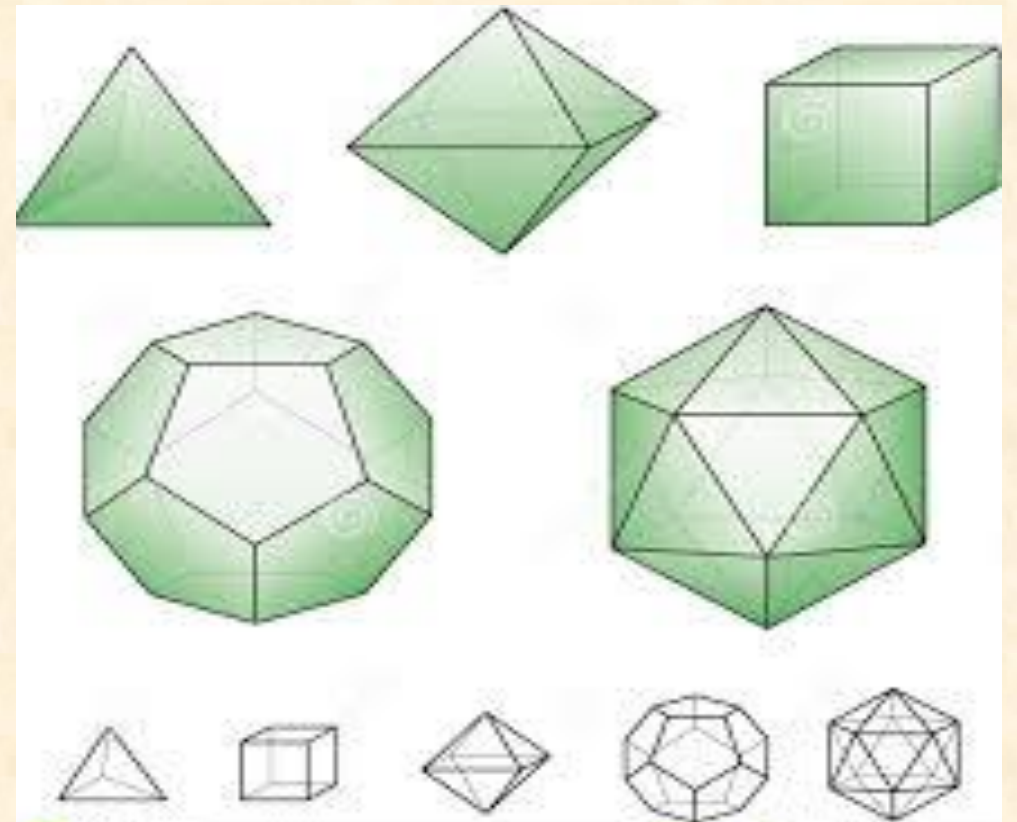
From an appropriate number of the same mathematical elements, Plato created five regular polyhedra, which the philosopher considered to be the building blocks of all matter.



# PLATONIC SOLIDS

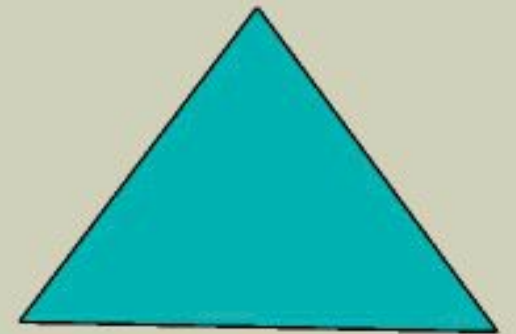
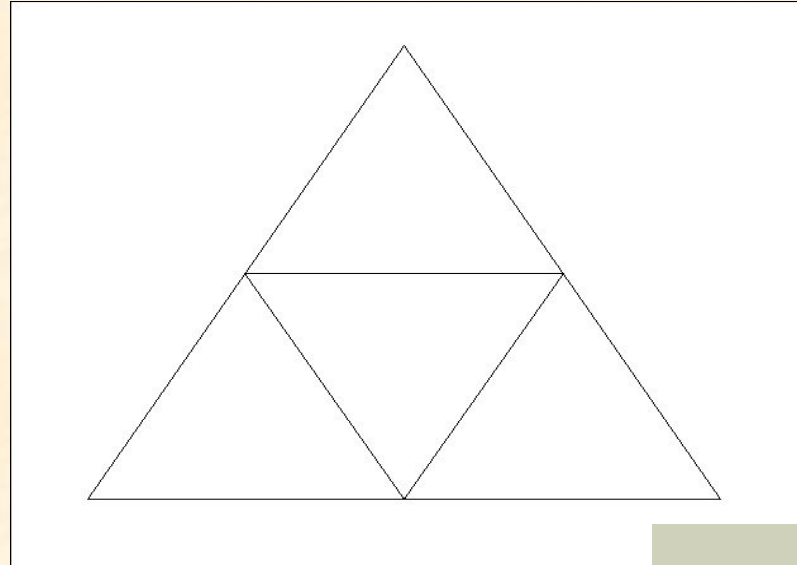
The Platonic solids include:

- ❖ tetrahedron,
- ❖ cube,
- ❖ octahedron,
- ❖ dodecahedron,
- ❖ icosahedron.

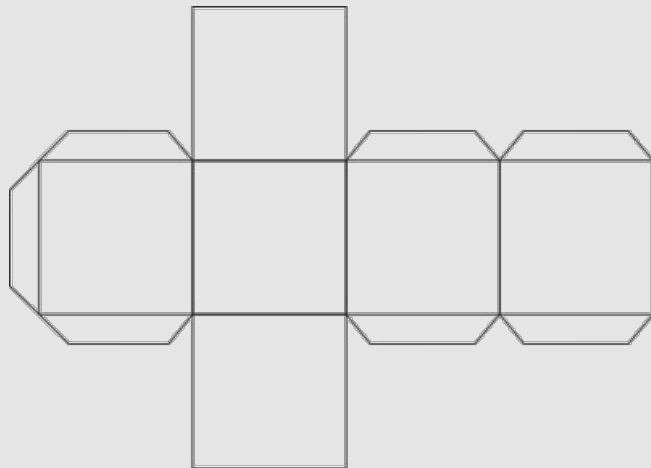
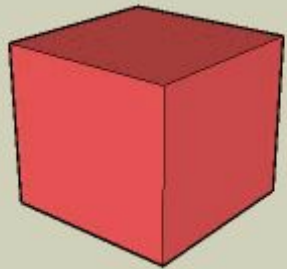


# TETRAHEDRON

A regular tetrahedron is a regular triangular pyramid. Its faces are congruent regular polygons, that is, equilateral triangles.



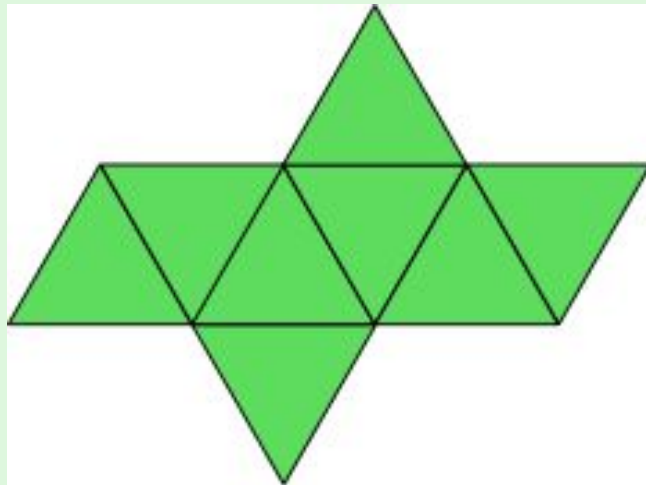
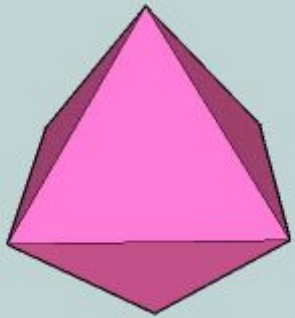
# CUBE



Regular hexahedron  
(hexahedron, regular  
hexahedron = cube) -  
consists of six faces in  
the shape of identical  
squares. The angle  
between the faces is a  
right angle.

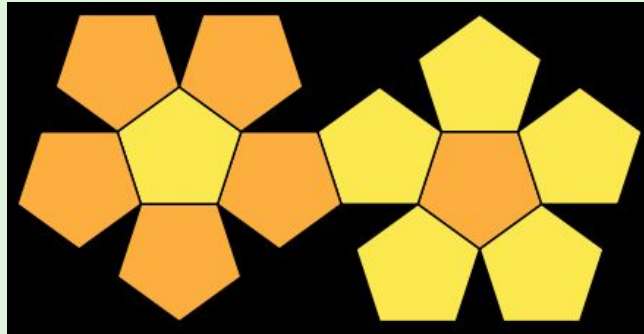
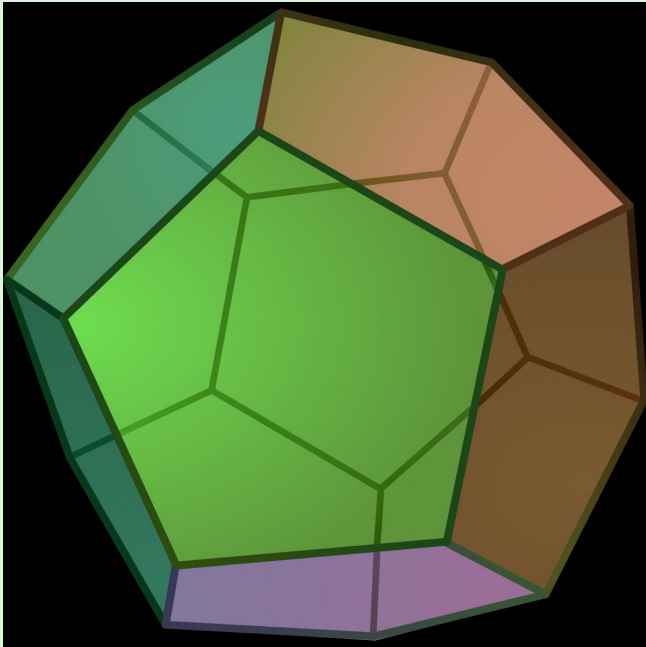


# OCTAHEDRON



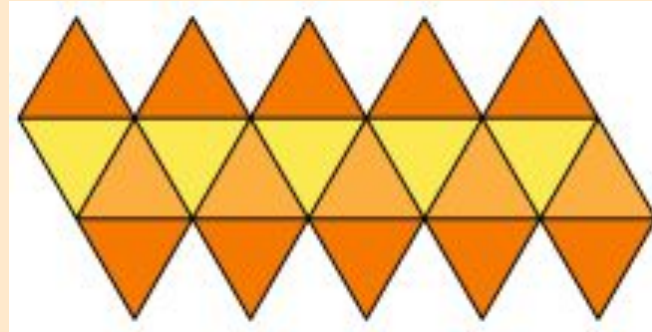
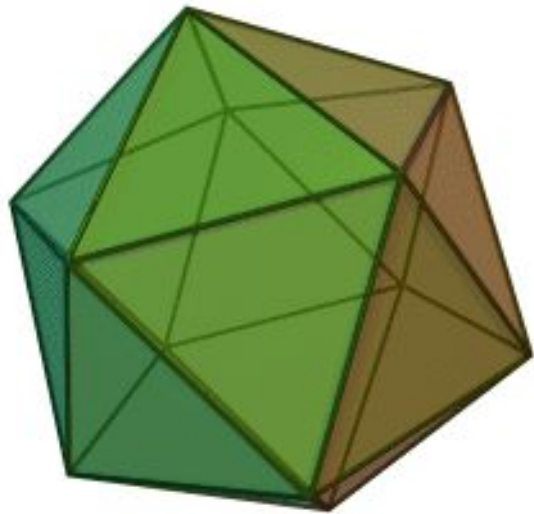
Regular octahedron (octahedron) - has eight faces in the shape of identical triangles. It has four pairs of walls that are parallel to each other. It is also an antiprism.

# DODECAHEDRON



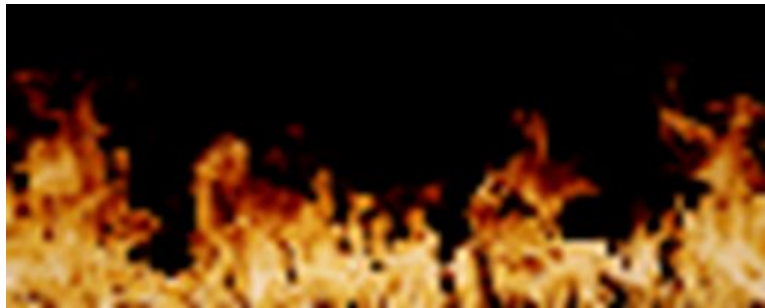
Dodecahedron  
(dodecahedron) -  
12 pentagonal faces,  
20 vertices, 30 edges.  
Each of its faces is a  
regular pentagon.

# ICOSAHEDRON



Icosahedron - the most complex regular polyhedron. It has 20 faces in the shape of congruent equilateral triangles. It has 30 edges, 12 vertices and 15 planes of symmetry.





# INTERESTING

## FACTS

Plato proclaimed that:

the tetrahedron symbolizes the

fire

cube - earth

octahedron - air

dodecahedron - cosmos

icosahedron - the personification

of a water molecule

# PLATONIC SOLIDS IN EVERYDAY LIFE



PACKAGING,

DICES,

AQUARIUMS,

FURNITURE,

TOYS (FOOTBALL - INSPIRATION),

HOUSE DECORATIONS,

MEGAMIX CUBES,

LANTERNS,

SPEAKERS





**PLATONIC SOLIDS IN**

**EVERYDAY LIFE**

# Extra Exercises

Exercise 1.

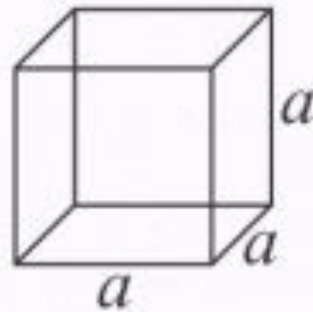
Calculate the area of a cube with an edge of 15 cm.

Exercise 2.

What is the edge length of a regular octahedron if its volume is equal  $\frac{\sqrt{2}}{3}$ ?

Exercise 1

$$\begin{aligned} P &= 6 \cdot a^2 = \\ &= 6 \cdot (15 \text{ cm})^2 = \\ &= 6 \cdot 15 \text{ cm} \cdot 15 \text{ cm} = \\ &= 6 \cdot 225 \text{ cm}^2 = \\ &= 1350 \text{ cm}^2 \end{aligned}$$



Answer key

## Exercise 2

We will use the formula for the volume of a regular octahedron:

$$V = \frac{1}{3}a^3\sqrt{2}$$

where  $a$  is the edge length. Given the volume we substitute into the formula above:

$$V = \frac{\sqrt{2}}{3}$$

$$\frac{\sqrt{2}}{3} = \frac{1}{3}a^3\sqrt{2} / \cdot 3$$

$$\sqrt{2} = a^3\sqrt{2} / :\sqrt{2}$$

$$1 = a^3$$

$$a = 1$$

# SOURCES:

1. Encyklopedia powszechna od a – z.
2. mFundacja, Bryły platońskie.
3. <https://www.youtube.com/watch?v=KaDf0fKk3Ys>  
<http://matematykainnegowymiaru.pl/open/lekcje.php?mode=pokaz&id=6>
4. [https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwil\\_YD1p5rvAhXq-SoKHXNeB0IQFjAJegQIIhAD&url=http%3A%2F%2Fwmii.uwm.edu.pl%2F~wzm%2Fwp-content%2Fuploads%2F2016%2F02%2F1.Matematyka.pdf&usg=AOvVaw0BoUEByPILU\\_zmC7dwnfNw](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwil_YD1p5rvAhXq-SoKHXNeB0IQFjAJegQIIhAD&url=http%3A%2F%2Fwmii.uwm.edu.pl%2F~wzm%2Fwp-content%2Fuploads%2F2016%2F02%2F1.Matematyka.pdf&usg=AOvVaw0BoUEByPILU_zmC7dwnfNw)





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