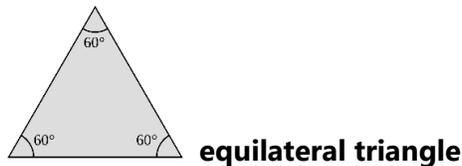


SPECIAL SHAPES

Some shapes have very long and unusual names. Have you ever heard of an **icosahedron**? A WHAT, you may ask?

An **icosahedron** is one of five **3-D (three dimensional)** object with height, width, and depth) shapes known as **Platonic solids**. The Platonic solids have been known since ancient times. They are named after the Greek philosopher Plato, who studied and wrote about them in 360 BC. A Greek mathematician named Euclid is known as the father of **geometry**, the branch of math that deals with shapes and figures. Euclid mathematically described the Platonic solids in 300 BC.

Each face of a Platonic solid is built from the same type of **polygon**, a flat shape with straight sides. These five geometric solids have faces that are all identical, regular polygons meeting at the same 3-D angles. An icosahedron has 20 sides made up of **equilateral triangles**, which are triangle with three equal sides and three equal angles. All angles measure 60 degrees.



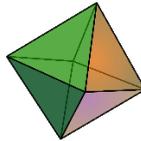
The five different Platonic solids are the **tetrahedron** with four faces, the **hexahedron** (or **cube**) with six faces, the **octahedron** with eight faces, the **dodecahedron** with twelve faces, and the **icosahedron** with twenty faces.



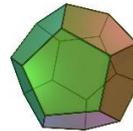
tetrahedron



hexahedron or **cube**



octahedron



dodecahedron



icosahedron

Can you find any of these shapes in your home or yard? Which was the easiest to find? Hint: check your board games. Sometimes you can find dice in the shape of Platonic solids, like these:



Let's try an activity that will show you how to make a type of icosahedron. Make one in your favorite colors or perhaps make it in holiday colors to enjoy during a special time of the year!

You will need:

- Several different colors of construction paper
- Circular shape to trace circles onto the construction paper, all the same size
- Glue, either a glue stick or liquid school glue
- Stapler (optional)
- Scissors
- A ruler

Start by cutting out 20 circles of different colors (Step 1). If you make them at least 4 or 5 inches in **diameter**,  the straight line that passes through the center of a circle with the endpoints on the circle, they will be easier to work with.

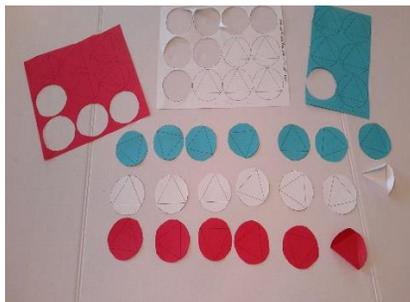
After cutting out the circles, fold them into equilateral triangles (Step 2).

After they are all folded, glue or staple 5 of them into a round shape, attaching them by the flaps (Step 3). **You will need two of these, five for each, using 10 circles total for this step.**

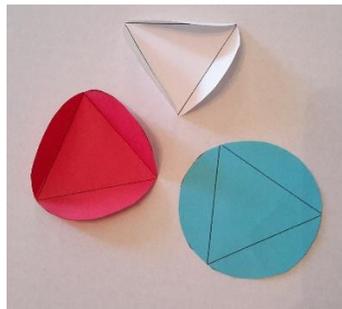
Take the last 10 pieces and glue and/or staple them in a long line, alternating the triangles to point up or down (Step 4).

When the strip is finished, glue it to form a circle.

Glue the round pieces to the top and bottom of the circle (Step 6). The last section will be the trickiest and may take two people working together to complete.



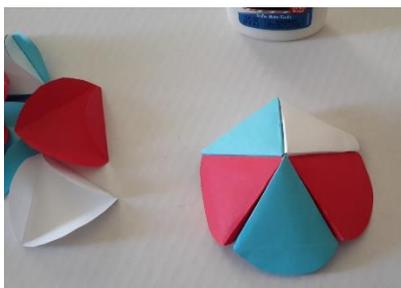
Step 1



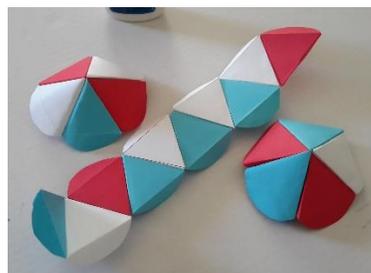
Step 2



Step 2 – all folded



Step 3



Step 4 (Step 5 not shown)



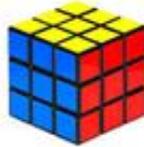
Step 6

Remember that we learned **geometry** is the branch of mathematics that deals with shapes and figures? Geometry is used in many kinds of work. For example, it is used by architects to design bridges and buildings, and by scientists who are planning space travel.

Here is one more interesting fact for you. A **polyhedron** is a solid with flat faces. The word comes from the Greek *poly*, meaning many, and *hedron*, meaning face. Each face is a polygon.



Tetrahedrons in art



Hexahedrons form the Rubik's cube puzzle



Octahedrons bound together in magnetite crystals



Dodecahedron calendar



Icosahedron in a model of the Adenovirus, the cause of many illnesses.

ADDITIONAL RESOURCES:

https://www.youtube.com/watch?v=gVzu1_12FUc

https://www.mathsisfun.com/platonic_solids.html