

# Honors Geometry Final Polyhedron Project

For this project you will create a polyhedron, a geometric solid with polygonal faces. The purpose of this project is to give you a hands-on experience with designing, planning and construction of a precise physical model from given criteria.

Criteria: The shortest edge length of your polyhedron should be **exactly 5.8 cm**.

## Part 1: Due Friday May 8<sup>th</sup>, 2020

- Pick a polyhedron to make (choices on next page). Find the correct net for that polyhedron (4 points) and create a template piece drawn to scale (6 points): 10 homework points total

The net can just be emailed. It does not need to be drawn to scale yet. Please make sure you find the correct net for your shape.

The **template** is an accurate construction of each polygon that will be required in order to complete your net. It is not the net of the polyhedron. For example, if your polyhedron is made up of triangles, pentagons and squares, you must create one full size pattern of each shape with accurate edge lengths and angles. Pattern should be made on cardstock or some other stiff material.

## Part 2: Due Tuesday May 12<sup>th</sup>, 2020

- **Surface Area of your shape: 10 POW points**

You should have the total surface area of your polyhedron calculated. Calculations must be shown. They need to be clear and easy to follow. You should have a sketch of each shape in your polyhedron labeled with the correct dimensions and showing all the steps in your calculations.

\*Please use the method we learned for calculating the area of regular polygons by dividing them up into triangles. No random formulas from the internet that we haven't discussed in class.

## Part 3: Due Monday May 18<sup>th</sup>, 2020

- **Completed Polyhedron: 50 exam points with a required zoom check in to get points for this.**

**Be sure to think about the following aspects during selection and construction of your polyhedron**

**Color Scheme:** Your shape should be decorated or have a color scheme that is pleasing to look at.

**Durability:** Your shape should stay intact during normal handling and should also stay intact over time.

**Accuracy:** Your shape should resemble the shape you selected, with all geometric properties identical. Your shape should have consistently accurate edge lengths. Accuracy will be increased when you make very careful calculations and constructions!

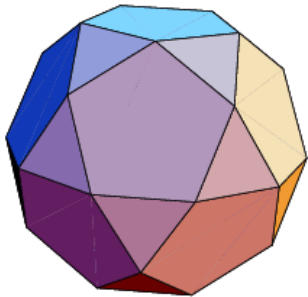
**Pre-made models will not be given a grade.**

Your Polyhedron choices are:

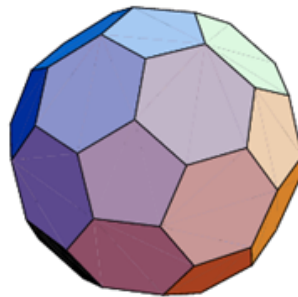
<p><b>*These are slightly easier*</b>          Icosidodecahedron          Truncated Icosahedron          Truncated Dodecahedron          Great Rhombicuboctahedron          Snub Cube</p>	<p>Great Dodecahedron          Great Rhombicosidodecahedron          Small Rhombicosidodecahedron          Snub Dodecahedron</p>	<p><b>*These are harder and will be considered for extra credit if done well*</b>          Small Stellated Dodecahedron          Great Stellated Dodecahedron          Compound of 5 Tetrahedra          Small Ditrigonal Icosidodecahedron</p>
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Do some research on the choices - what shapes do you need to be able to accurately construct to make the polyhedra (some are easier than others)? **Other polyhedra will be considered if you find one you really want to make.**

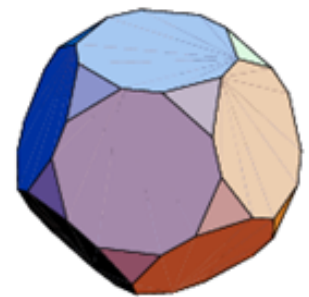
Icosidodecahedron



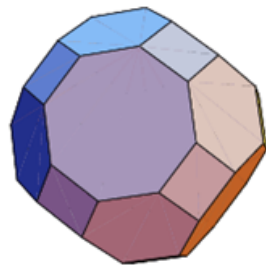
Truncated Icosahedron



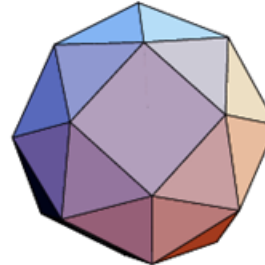
Truncated Dodecahedron



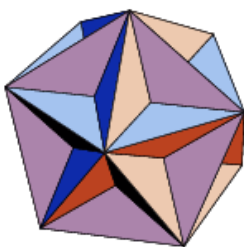
Great Rhombicuboctahedron



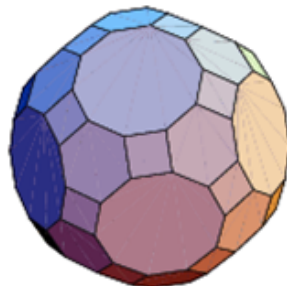
Snub Cube



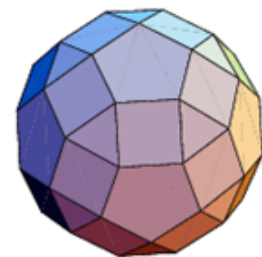
Great Dodecahedron



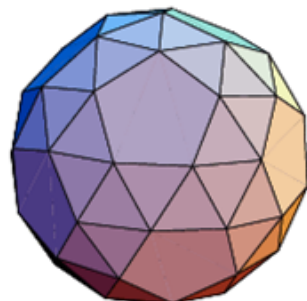
Great Rhombicosidodecahedron



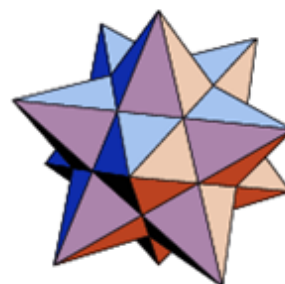
Small Rhombicosidodecahedron



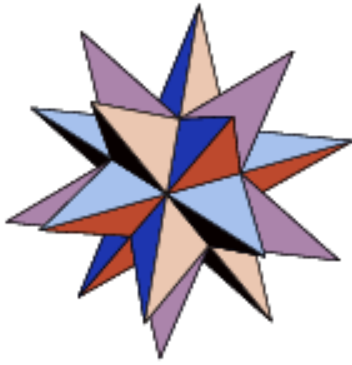
Snub Dodecahedron



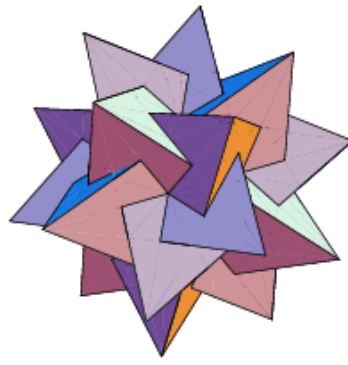
Small Stellated Dodecahedron



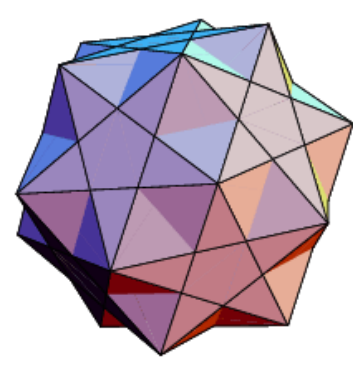
Great Stellated Dodecahedron



Compound of 5 Tetrahedra



Small Ditrigonal Icosidodecahedron



Note: When choosing your shape, think about the complexity and your resources and ability to create a good shape. A harder shape is more likely to get a better grade if done well, but if you pick one that is too hard but can't get it done, that won't be a very good grade.

So far the online learning has been largely based on a participation grade. You got full points for doing the assignment even if it had errors. **This project will be graded on accuracy.**