Geometry 2-H   NAME _____
12.1 Exploring Solids
Platonic Solids

A Platonic solid is a polyhedron whose faces are identical regular polygons. The ancient Greeks were able to show that there are exactly five such Platonic solids.
Predict the number of edges, vertices, and faces for each platonic solid as it is displayed.

Then predict what the shape of the "dual" of each solid is.   The dual of a Platonic solid is another solid inside the first. The vertices of the inner (dual) Platonic solid are the center points of each of the surfaces of the outer Platonic solid.

Platonic Solid	Prediction	Actual	Dual is a….
1) **TETRAHEDRON – each face is a …**			
Edges			
Vertices			
Faces			
2) **CUBE– each face is a …**			Dual is a….
Edges			
Vertices			
Faces			
3) **OCTAHEDRON– each face is a …**			Dual is a….
Edges			
Vertices			
Faces			
4) **DODECAHEDRON– each face is a …**			Dual is a….
Edges			
Vertices			
Faces			
5) **ICOSAHEDRON– each face is a …**			Dual is a….
Edges			
Vertices			
Faces			

Teacher instructions for activity

You must be able to project the following website to the class:
http://nlvm.usu.edu/en/nav/category_g_4_t_3.html
From the list, choose "Platonic Solids"
http://nlvm.usu.edu/en/nav/frames_asid_128_g_4_t_3.html?open=instructions&from=category_g_4_t_3.html
This is an interactive website that allows you to view platonic solids and see them from different angles, as "transparent" solids or as opaque solids. It also allows you to count the edges, vertices, and faces (press the shift key and click on each edge, vertex, or face)

Part 1 : Guess the number of edges, faces and vertices
Have students download and open the learn check file "platonic solids.edc".
Show the first solid, the tetrahedron to them for one minute, moving it around a bit, then making it transparent, moving it some more, then leaving it for students to observe. They should be done filling in their worksheet and typing in their answers on the learn check file after the minute is up.

Press the "New Shape" button and repeat with the next solid. When you get to the dodecahedron and icosahedron, give students 2 – 3 minutes to make their observations and record their guesses.

Collect the answer files, then go back to the tetrahedron, count the edges, vertices and faces and display the correct answers. Repeat for the other solids.

Part 2: Guess the "duals" of the Platonic solids
Go to the related activity (reached from the same link above) and choose "Platonic Solids - Duals"
http://nlvm.usu.edu/en/nav/frames_asid_131_g_4_t_3.html?open=instructions&from=category_g_4_t_3.html
Have students open the learn check file "Platonic Solids Duals.edc
Read and explain the definition of a "dual". Explain that the dual of each of the five Platonic Solids is also one of the five Platonic Solids.
Show them the first one (that the dual of a tetrahedron is another tetrahedron). You may need to emphasize that the number of faces of the first solid has to match the number of vertices of the dual – or you may want them to figure that out for themselves.
Then show them the other platonic solids (a minute or less for each)
Collect the answers to the learn check file
Go back and display the duals on the website.

Options – you may want to combine the two learn check files and have students record their guesses about the duals before showing the correct number of edges, vertices and faces.