# The Dodecahedron
## ~ Finding Meaning in the Renaissance Logo ~

by Susan Reres

Ever notice the unique symbol serving as the Renaissance logo? You'll find it on our letterhead, print media, and on this website, lingering in the background rather like a watermark. Pronounced "doh-dek-uh-hee-druhn", this fascinating polyhedra has been around a long time. It was drawn by Renaissance artist Leonardo da Vinci in 1509 for mathematician Luca Pacioli's book, *The Divine Proportion*.
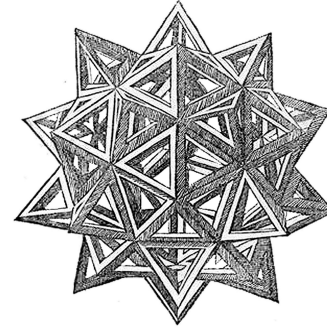
Leonardo da Vinci...painter, sculptor, inventor, writer, mathematician, scientist, botanist, musician, engineer, architect, and geologist...whew!

Widely considered by historians as one of the greatest minds of all time, da Vinci is revered at Renaissance as much for his insatiable curiosity as anything else. He embodies the ideal of an integrated curriculum and what it means to become a "Renaissance thinker".

Furthermore, this particular polyhedron symbolizes the interdisciplinary nature of the Renaissance curriculum, the connectedness of the Renaissance School community, and the creativity we bring to our educational experience each day. Simply put, it is a symbol of the connections we are forging in our educational pursuits and in our relationships with each other and with the broader community.

## *Evolution of a polyhedron*

For the more persnickety among you (or the more geometrically-inclined), you may have noticed the name is not quite right. While "dodecahedron" serves as a nickname, the formal name of this graphic is much more thought-provoking. It's actually called an ***elevated icosidodecahedron***, a geometric solid with an intriguing evolution and one that even more meaningfully symbolizes the Renaissance educational philosophy. It finds its origin in a merging of the icosahedron and the dodecahedron, hence the nickname. But referring as often as we do to a logo called an elevated icosidodecahedron might feel a bit cumbersome, so dodecahedron will have to suffice. Read on if you're curious...

In order to trace the evolution of the Renaissance polyhedron, we need to begin with the Greek prefixes used to name polyhedra. As George W. Hart put it in *Virtual Polyhedra*, "Polyhedra terminology is a somewhat painful matter, to expert and novice alike. There is a certain logic to certain aspects of the long conventional names, but there is also much which is impractical, ungeneralizable, and only survives because it is entrenched. Perhaps these names are being asked to do too much: to succinctly describe the inherent properties of a polyhedron and also ascertain of its relationships to other polyhedra." So, if this feels complicated, it's because it is. Hang in there, it's worth it.
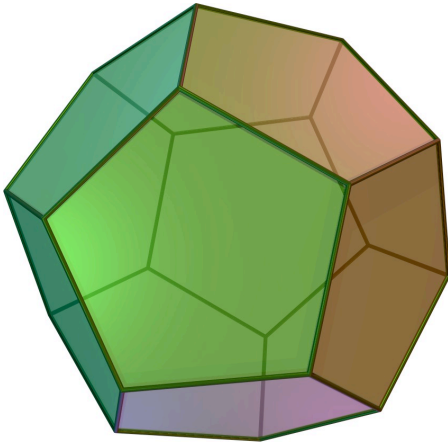
In Greek numerical terminology, *do* means 2 and *deca* means 10. A *dodecahedron* is a polyhedra with 12 sides or faces (2 plus 10), *hedron* referring to the sides. Our logo begins as a dodecahedron with 12 regular pentagonal faces, 20 vertices, and 30 edges (pictured at left). It is one of the five Platonic solids. A Platonic solid is "any one of five solids whose faces are congruent regular polygons and whose polyhedral angles are all congruent." (www.thefreedictionary.com)

Enter the *icosahedron*.

*Icosi*, in Greek, means 20, and an icosahedron describes a polyhedron with 20 equilateral triangular faces. It has 30 edges and 12 vertices, and is pictured at right. Like the dodecahedron, this polyhedron is also one of the five Platonic solids.
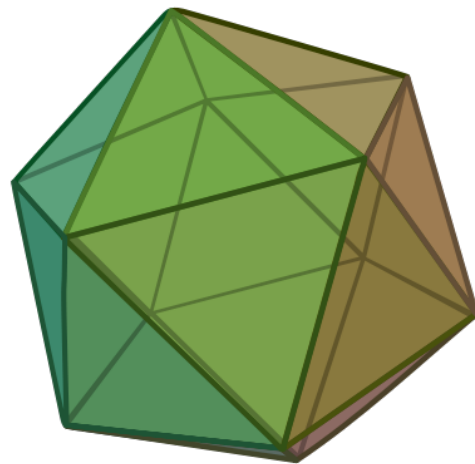
Now for the fun part. Put the dodecahedron and icosahedron together, and things get interesting...an *icosidodecahedron* is born (pictured at left). Borrowing from Wikipedia, "an icosidodecahedron has 30 identical vertices, with two triangles and two pentagons meeting at each, and 60 identical edges, each separating a triangle from a pentagon. As such it is one of the Archimedean solids."
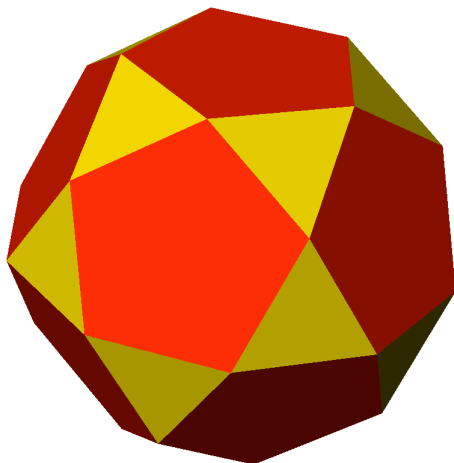
As long as we're adhering to specifics, here's a definition of this more complicated solid from the Illinois Mathematics and Science Academy:

"Archimedean solid: a convex semiregular polyhedron. All faces are regular polygons, but not all faces are the same."

**Connections and intersections...the heart of Renaissance pedagogy.**

Back to Pacioli's book, *The Divine Proportion*. Pictured at right is Leonardo da Vinci's hand drawing of an icosidodecahedron. One can only imagine how beautiful it is as a three-dimensional solid.

Beautiful, yes, but it still doesn't look like the Renaissance logo.
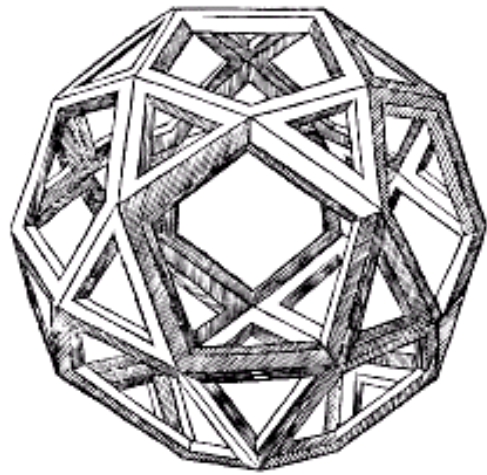
Now we're getting somewhere. Da Vinci took this handsome geometric solid and elevated it, producing for Pacioli's book a marvelous combination of artistry and mathematics.

Voila! An ***elevated icosidodecahedron,*** and the perfect symbol to represent the Renaissance School philosophy, takes form (pictured at left).
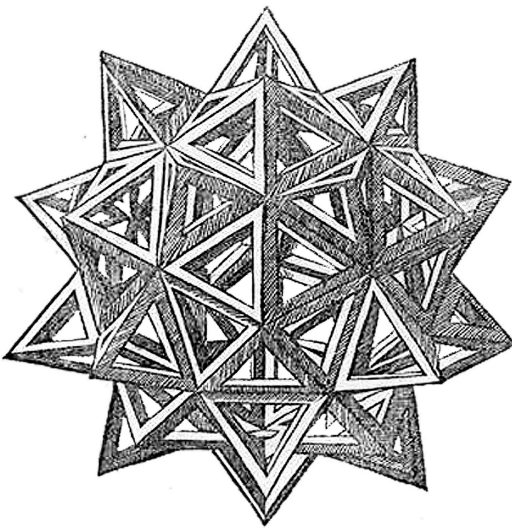
Study it and you'll begin to see the 12 pentagons and 20 triangles of the original icosidodecahedron emerge in relief, pushing outward in 5-sided and 3-sided pyramidal structures. Stare at it long enough and it almost has the quality of an Escher drawing. Also emerging is a meaningful symbol, one that finds its roots in connections and intersections, and then pushes outward from the flat planes in a blend of artistic and mathematical beauty. You can almost imagine it as a star radiating light from the outermost vertices.

At Renaissance School the arts, humanities, and sciences are held in equal balance and each discipline is viewed as vital to the curriculum, just as a three legged stool sits level without tipping. A balance of disciplines. But faculty also recognize that it is at the intersections of knowledge where the best of education occurs, where the student uses higher order thinking to compare new information to that which has been learned before. Connections. Intersections. Integration.

Yet the work does not stop there. At Renaissance we emphasize our role as social beings, our relationships with each other and with the larger community. Though a small school, you'll find our students and faculty all over town (and alumni all over the world) making a difference. Just as the ***icosidodecahedron*** vectors its geometric beauty outward when it is ***elevated***, our work at Renaissance is most valuable when we turn our attention outside of our selves.

Sources


*Virtual Polyhedra*, 1999, by George W. Hart
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