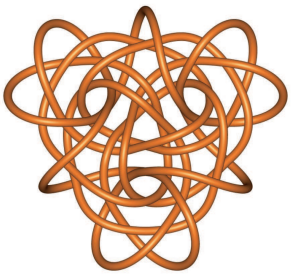
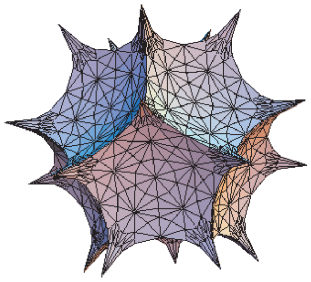
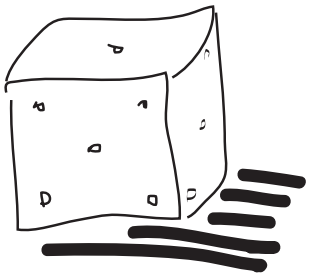




Willamette Math Problem of the Week

September 24 2007 Die Roll



On average, how many times do you need to roll a die before all six numbers have turned up?

Submit all solutions before the appearance of the next problem to Josh Laison in person, by e-mail (jlaison@willamette.edu), or by ocean liner. The first correct solution gets a prize; all correct solutions get fame and glory. Preference for the prize goes to problem-solvers who haven't won one yet.

Solution to *Egg Drop*:
Congratulations to **Alice Worden**, who solved the problem first and won a Pig Catapult, and to **Eddie Mertz** and **Kyle Evans**, who also submitted correct solutions.
The smallest number of egg-droppings guaranteed to work is 8. We drop the first egg from floors 8, 15, 21, 26, 30, 33, 35, and 36. If it doesn't break, floor 36 is safe. If it does break, say on floor 26, we can drop the second egg from floors 22, 23, 24, and 25. This takes at most 8 drops in all cases. On the other hand, if we require only 7 drops, we must drop the first egg from at most the 7th floor the first time, then at most the 13th floor the second time, etc. After 7 drops, we have only tested up through floor 28. So 8 drops is the minimum.