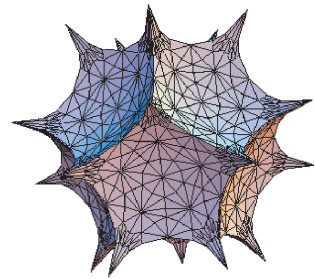# Willamette Math Problem of the Week
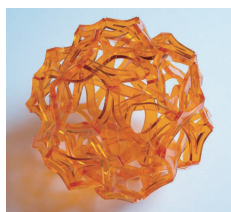
October 1 2007
Breaking Chocolate

A rectangular chocolate bar is marked with vertical and horizontal lines into $m \times n$ squares, m wide and n long. You want to break it into individual squares. At each step, you pick up a piece of the bar and break it along one of the lines. Show that every breaking method requires the same number of breaks.

Submit all solutions before the appearance of the next problem to Josh Laison in person, by e-mail (jlaison@willamette.edu), or by walkie-talkie. 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 *The First Prime*:

Congratulations to Christina Edholm, who solved the problem first and won a Sparking Space Gun.

The first prime on the list is 8,808,808,889, or "eight billion eight hundred eight million eight hundred eight thousand eight hundred eighty nine". Our alphabetical list will begin with: eight (8), eight billion (8,000,000,000), eight billion eight (8,000,000,008), eight billion eight hundred (8,000,000,800), ..., eight billion eight hundred eight million eight hundred eight thousand eight hundred (8,808,808,800), ... None of these are prime, since they are all even. So any prime in the interval $(8,808,808,800, 8,808,808,900)$ comes before any other prime in the list. A computer search of the numbers in this interval reveals three primes: 8,808,808,807; 8,808,808,843; 8,808,808,889. The first of these three is 8,808,808,889.