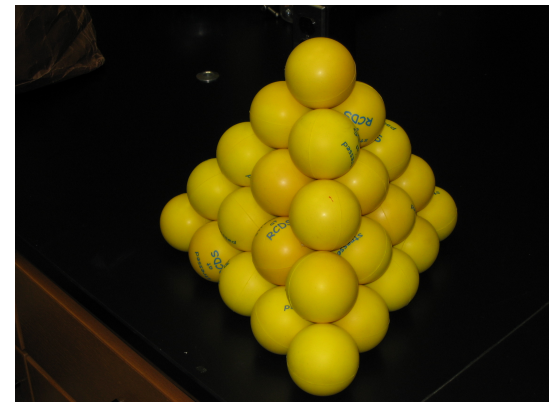# USAYPT 2014 USIYPT Problems:

#1 -- **Foucault Pendulum**: design, build, and operate a Foucault-type pendulum and use measurements of the pendulum's precession rate to measure your school's geographic latitude. Account for and assess the systematic and random uncertainties in your measurements. Compare and contrast your results with published values for your location. [You may not use a Foucault Pendulum that already exists at your school. Each team must build their own.]

#2 -- **Ball Stack:** predict and measure the maximum height of a freely-standing, roughly stable stack of spherical balls built on a horizontal table. Examine the relevant para-meters and at least three combinations of types of balls and tables.

USAYPT 2014 USIYPT Problems:

#3 -- **Wake Angle**: the angle between the edges of a wake behind an object traveling on the surface of water is surprisingly independent of the object, i.e., the angle is the same for a duck or an aircraft carrier. Why is this? Develop a theory that demonstrates the independence as well as identifies its limitations, and compare your predictions to multiple water-surface travellers.

#4 -- **Magnet Stack:** A common demonstration device consists of ring-shaped magnets repelling each other while concentrically stacked on a slender pole. Develop a theory that predicts the spacing between magnet stacks for three, four, five, … magnets and compare to experiment.