Station 1

You are given a cylindrical jar, with a height of 50cm and a radius of 3.25in. It is filled with identical marbles, and the packing constant is .74048. Each marble has a density of 1.31 g/cm^3. Assuming the marbles are packed as tightly as possible, find the mass of marbles in the jar. Show all work, and solve in kg.

Station 2

You have a rectangular prism of an unknown material with a height of 11.2 inches, a length of 2.3 meters and a width of 19.6cm. The density of the material is .79 g/cm^3. A 22mm radius hole is drilled into the top, going 2 inches through before stopping. Assuming that 1 inch = 2.54 cm, find the mass of the prism after the hole was drilled. Show all work, and leave your answer in kg.

Station 3

A projectile is launched from a top of a mountain on a distant planet at an angle of 35.8 degrees with a vertical velocity of 22.9 m/s. Assuming the mountain is 1675 meters tall and the projectile lands 3 * 10^5 cm away, find the acceleration due to gravity. Show all work and leave your answer in m/s^2.

4. We will provide you a hot plate, a beaker of water, a thermometer and several strips of (metal – haven't decided yet). Find the specific heat of the metal.

5. We will provide you with a piece of paper, a ruler, a protractor and scissors. Cut an isosceles triangle out of the paper that has a mass of exactly .5g.

6. Here is a water bottle, never opened before. Go ahead; squeeze some of it out into this cylinder. We provided two thermometers for you. Find how much air entered the bottle.

7. We give you a meter stick and a protractor. Tl;dr find the height of the door.

8. You're going to hate me for this. I set up this ramp here, you see, and I'd like to know the coefficient of kinetic friction. Relax, there's a ruler, a protractor, a stopwatch, a triple beam balance and a quarter.