**Force and Projectile Motion Problems**

1. Arta, Lee and Jonathan invent a game involving a potato cannon and a large moveable target. They can fire the cannon at 16° and the potato is released at 10 m/s. If they tie Neil to the target, at what distance should they place the target to ensure that they hit him? How long does Neil have to untie the ropes before impact? Heather looks on during this procedure with interest.

2. Hunter and Collin are trying to push a large cumbersome physics device, with Quinn sitting on top with a number of physics textbooks in his lap with a mass of 250 kg combined, across the floor. Hunter pushes with a force of 450 N [NE] with his mass of 70 kg and Collin pushes with a force of 560 N [S50°E] with his 65 kg. If the coefficient of friction between the floor and the 400 kg physics device is 0.35 how far can they push the device in 10 s (assuming they start from rest and continue to apply the same unbalanced force the whole time)?

3. Claire and Devan are trying to pull a 150 kg sled up a 15° incline. As well Connor and Connor are sitting on the sled and each have a mass of 65 kg (very large sled). If the coefficient of friction between the sled and the incline is 0.34, what force do each of the girls need to apply to move the sled up the incline with constant velocity? (Assume they share the load equally and act straight up the incline)

4. a. The force of gravity between Planet Emma and Planet Kove is 5.6 x 104 N. If they are at a distance of 4.5 time the radius of the earth from each other what are their respective masses? (Assume Kove is the same mass as Emma)

b. How far would Katie (mass 55 kg) have to go from the surface of Planet Kove for her mass to go to ½ its original value?

5. Laura, Jackson and MJ are playing a game on the following slopes. They slide their 5 kg physics textbook down slide A and see who can get it up moveable slide B the furthest. They have the initial velocities of 6m/s, 5 m/s and 4.5 m/s respectively. Slide B is at angle 25o for Laura, 22o for Jackson and 24o for MJ. Find out who wins the game.