1. A mass m1 is attached to a spring (of spring constant k) on a frictionless table. The spring is compressed through a distance x and released. Mass m2 is struck by mass m1 and the two move off with a velocity v. How fast does the combination move off with?

2. A mass m1 is placed on an inclined plane (frictionless, inclined at an angle θ). The mass falls through a distance h and then slides on a flat table. The mass strikes a mass m2 which is twice the mass of m1. If the collision is completely elastic, how fast does each mass move after the collision?

3. A mass m1 is moving with a velocity v_b. The mass strikes and sticks to a mass m2. The pair moves off with a velocity v_a. Later on, the pair strike and compress a spring of spring constant k. How much does the spring compress at the point where the pair stops?

4. A mass m1 is moving with a velocity v_b. The mass strikes and sticks to a mass m2. At that point the coefficient of friction between the pair and the table is μ. How far does the combination move before it stops?

5. A mass m1 strikes mass m2 which is ½ of the mass of m1. Mass m1 is moving with velocity v_1 at the instant of the collision. The collision is completely elastic. If the coefficient of friction is μ. How far does each mass slide before it stops?

6. A mass m_1 falls through a height h and strikes a spring of spring constant k. How much does the spring compress before the mass stops? Then, a spring of spring constant k is compressed through a distance x. How high does a mass m1 travel when the compression is released. You can assume the mass does leave the spring.

7. Mass m1 is traveling towards mass m2 with a velocity v relative to a fixed frame of reference. Mass m2 is moving in the same direction as mass m1 but with a velocity u relative to the fixed frame of reference. If the two masses collide (you may assume $u<v$) inelastically, how fast is the combination moving after the collision? Now, consider the situation where a mass m is moving with a velocity Va. The mass separates into two parts (one of mass m1 and the other of mass m2) and it is observed that mass m1 moves with a velocity ½ Va in the same direction as Va. What is the velocity (and direction) of mass m2?