Physics 211 **Week 8**

Energy Conservation: Pothole (Solutions)

A car is traveling along a horizontal road when it suddenly encounters a pothole, in which the level of the road abruptly changes by a height *h*. The suspension springs of the car have a spring constant of 110,000 N/m and can compress a maximum distance of 0.4m. The mass of the car is 1200 kg. What is the maximum value of *h* that the car can tolerate before bottoming out?

All of the gravitational potential energy becomes spring potential energy when the car enters the pothole. Because the gravitational potential energy changes as the spring compresses vertically, the height that should be used for the change in gravitational potential energy is the sum of the height of the pothole and the amount the spring is compressed. Equating this value with the expression for spring potential energy, you can solve for the spring compression. You should obtain a compression of 0.35 *m*.