

## Spring Energy Quiz – Individualized

1. A spring with stiffness constant  $k = 59 \text{ N/m}$  is compressed horizontally a total of 0.19 meters. A mass of 4.1 kg is placed in front of the spring and receives all of the spring's potential energy when it is released. Assume no friction. What is the velocity in m/s of the mass after the spring is fully extended? Carry the decimal to two places.
2. A spring with stiffness constant  $k = 93 \text{ N/m}$  is compressed vertically a total of 2.23 meters. A mass of 8.01 kg is placed on top of the spring and receives all of the spring's potential energy when the spring is released. Assume no friction. What is the maximum height reached by the mass in meters after the spring is fully extended? Carry the decimal to two places.  $g = 10 \text{ m/s}^2$
3. A spring with stiffness constant  $k = 68 \text{ N/m}$  is compressed vertically a total of 1.7 meters. A mass of 3 kg is placed on top of the spring and receives all of the spring's potential energy when the spring is released. This is friction with the air resulting in heat of 7 Joules while the mass is on the way up. What is the maximum height reached by the mass in meters after the spring is fully extended? Carry the decimal to two places.  $g = 10 \text{ m/s}^2$
4. A spring with stiffness constant  $k = 80 \text{ N/m}$  is compressed horizontally a total of 1.4 meters. A mass of 3 kg is placed in front of the spring and receives all of the spring's potential energy when it is released. If there is a friction force of 5 Newtons on the mass after it is released by the spring, how far in meters will the mass travel? Carry the decimal to two places.
5. A spring with stiffness constant  $k = 87 \text{ N/m}$  is compressed horizontally a total of 2.3 meters. A mass of 1 kg is placed in front of the spring and receives all of the spring's potential energy when it is released. Assume no friction, but the object travels up an incline with height 5 meters. What is the velocity in m/s of the mass after it reaches the top of the incline? Carry the decimal to two places.
6. A spring with stiffness constant  $k = 56 \text{ N/m}$  is at the bottom of an incline. A mass of 2 kg is at the top of the incline of height 1.5 meters and has an initial velocity of 0 m/s. Assume the spring receives all of the energy of the mass when it reaches the bottom of the incline. Assume no friction. What will be the maximum displacement of the spring? Carry the decimal to two places.
7. A spring with stiffness constant  $k = 94 \text{ N/m}$  is at the bottom of an incline. A mass of 1.6 kg is at the top of the incline of height 2 meters and has an initial velocity of 1.5 m/s. Assume the spring receives all of the energy of the mass when it reaches the bottom of the incline. Assume no friction. What will be the maximum displacement of the spring? Carry the decimal to two places.