

3. A spring whose spring constant is 850 N/m is compressed 0.40 m. What is the maximum speed it can give to a 500. g ball?

4. If the spring in #3 were compressed twice as much, how many times greater would the velocity of the ball be?

5. A bullet with a mass of 10. g is fired from a rifle with a barrel that is 85 cm long.
 - a. Assuming that the force exerted by the expanding gas to be a constant 5500 N, what speed would the bullet reach?

 - b. Do an energy pie chart analysis of the situation, with the entire gun and bullet as the system.

6. A 24 kg child descends a 5.0 m high slide and reaches the ground with a speed of 2.8 m/s.
 - a. How much energy was dissipated due to friction in the process?

 - b. Do a pie chart analysis of this situation, using an accurate % of the pie to represent the amount of E_{diss} in the process.

7. Remember the Opus shot from cannon problems? Suppose a robust 10. kg Opus was shot straight up with an initial velocity of +50 m/s.
 - a. Assuming that all his initial E_k was transformed into E_g , what is the maximum height he could reach?

 - b. Suppose that 20% of his initial E_k were lost due to friction with the air (air resistance). What is the maximum height he could reach?