Conservation of Energy Problems

1. A large chunk of ice with a mass of 15.0 kg falls from a roof 8.00 m above the ground.
   a) Find the kinetic energy of the ice when it reaches the ground.

   b) What is the speed of the ice when it reaches the ground?

2. Tarzan, mass of 85 kg, swings down from a tree limb on the end of a 20 m vine. His feet touch the ground 4.0 m below the limb. How fast is Tarzan moving when he reaches the ground?

3. A bike rider approaches a hill with a speed of 8.5 m/s. The total mass of the bike and rider is 85 kg.
   a) Find the kinetic energy of the bike and rider.

   b) The rider coasts up the hill. Assuming there is no friction, at what height will the bike come to a stop?

A roller coaster car, 500 kg, is to travel from 8 m/s down a wavy hill. It will coast without friction. Near the end of the ride it will make a death defying jump.
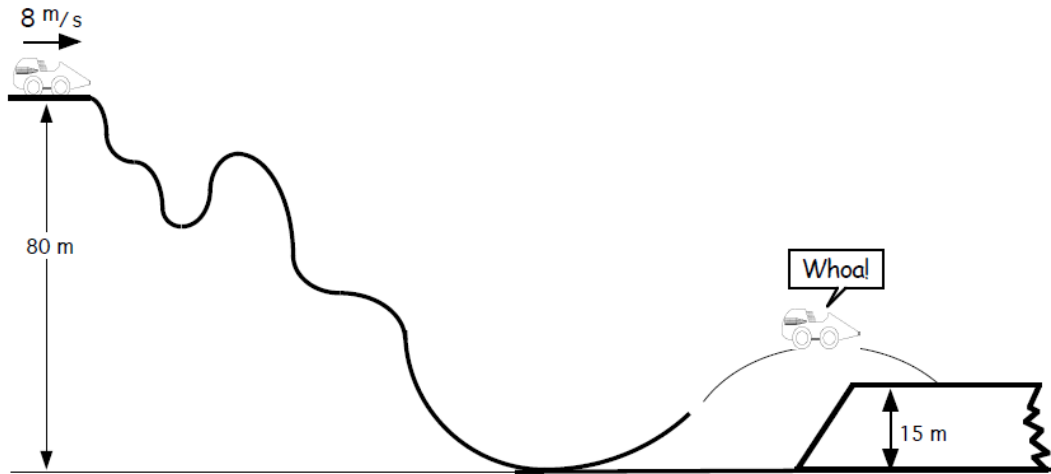
4. What is the total energy of the system at the top of the hill?

5. What is the total energy of the system at the bottom of the hill?

6. . What is the speed of the car at a height of 30 m?

7. What is the speed of the car at the bottom of the hill?