For the Christmas break some friends got an electric snowball launcher. Before they used the launcher they wanted to do some Physics calculations to predict how it would work.

1. The label on the snowball launcher rated its power as 140 watts. If it takes 0.25 seconds to launch a snowball, how much energy does the snowball launcher use?
2. The label on the snowball launcher rated its efficiency as 80%.
   1. How much energy is transferred to a snowball when it is launched?
   2. How much waste energy is produced by the launcher?
   3. What types of energy could be produced as waste energy?
   4. Draw an Energy Transformation Diagram for the snowball launcher.
3. The length of the launcher is 0.5m and the mass of a typical snowball is 250g.
   1. What is the initial kinetic energy of the snowball?
   2. What is the final kinetic energy of the snowball as it leaves the launcher?
   3. How much work is done on the snowball by the launcher?
   4. What is the force on the snowball applied by the launcher?
4. If the mass of a typical snowball is 250g, what is the speed of a snowball as it leaves the launcher?
5. If the launcher was pointed straight upwards, what is maximum height that a snowball could reach? (Ignore air resistance.)
6. If the launcher was pointed at a slight angle towards a basketball net and backboard, at what speed would the snowball hit the backboard assuming it was 3.5m above the ground?