

You have been hired as a technical consultant for a television edutainment company that is producing a TV series for children. Your job is to make sure that the action scenes do not bend (or break) any physical laws. Your boss has just given you the script from Episode 4. In the script, a wagon containing two boxes of gold (total mass of 150kg) has been cut loose from the horses by an outlaw. The wagon starts from rest 50 meters up a hill with a 6° slope. The outlaw plans to have the wagon roll down the hill, across the level ground, under a tree and then over a cliff crashing into a canyon where his confederates wait. But in a tree 40 meters from the edge of the canyon cliff wait the Lone Ranger (mass 80 kg) and Tonto (mass 70 kg). They drop (about 2.3 meters) vertically into the wagon as it passes beneath them. The script states that it takes the Lone Ranger and Tonto 5 seconds to grab the gold and jump out of the wagon, but is this correct? You assume that the wagon rolls with negligible friction.