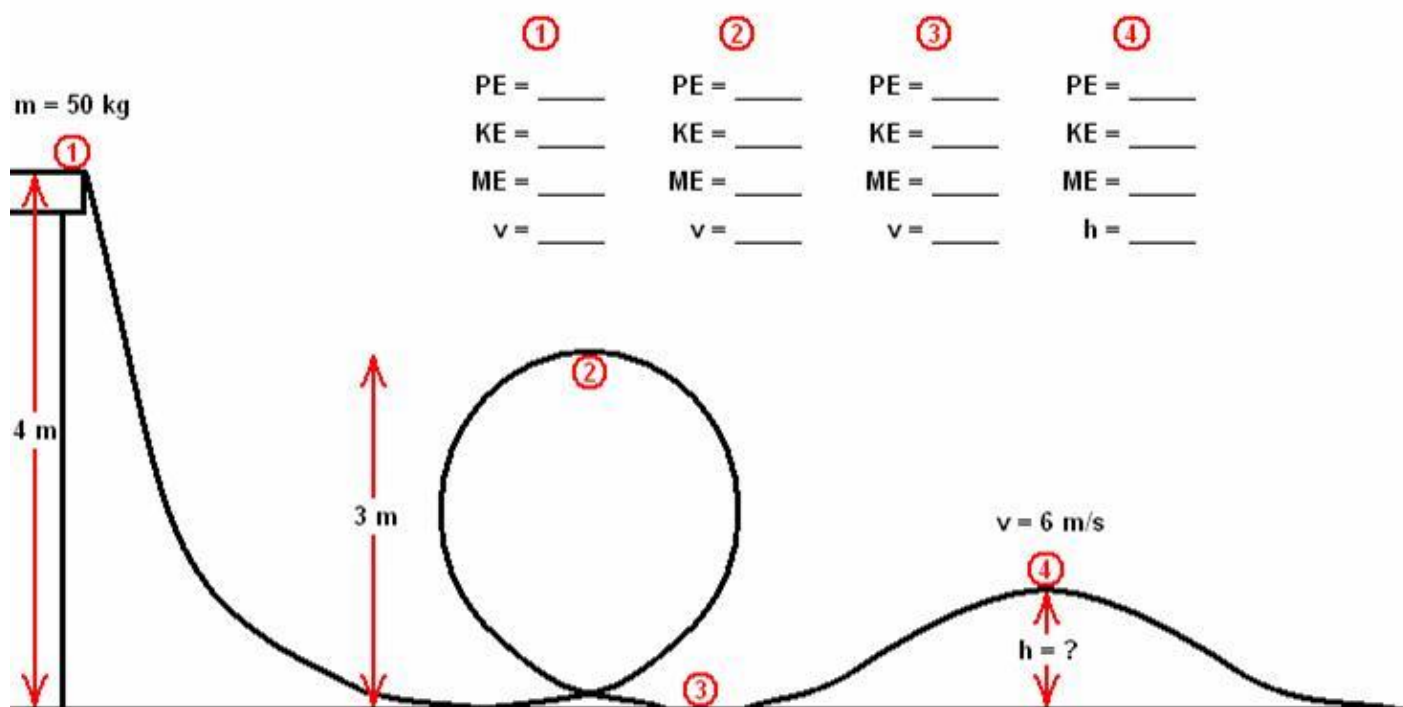


## ENERGY & WORK PRACTICE

**Instructions:** Show all of your work completely in your journal, including the equations used in variable form. Pay attention to sig figs and units; use complete sentences if applicable.

- Rick and Carl come across an abandoned bowling alley. Rick has an 8.0 kg ball and rolls it at  $2.0 \text{ m/s}$  toward a 12 kg bowling ball at rest. If the 12 kg ball has a final velocity of  $1.5 \text{ m/s}$ , calculate the velocity of the 8.0 kg ball. What type of collision is this?
- Use conservation of energy to fill in the blanks for the diagram below. Show all of your work!



- Daryl finds an old ballistics lab and decides to have some fun with physics. The muzzle velocity of guns (the velocity of the bullet right as it leaves the gun) can be found by firing the bullet into a massive block of wood on a frictionless surface and measuring the final velocity of the block.
  - What type of collision is this?
  - Given that the mass of the bullet is 13 grams, the mass of the block is 4.0 kg and the final velocity of the block with the embedded bullet is  $1.2 \text{ m/s}$ , find the initial velocity of the bullet.
  - What is the magnitude of change in momentum experienced by the bullet just after impact?
  - If the bullet slows to a stop in 0.090 seconds, what is the magnitude of average **force** on the bullet?
  - Describe how momentum and energy are conserved in this situation?