Name_____

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Impulsive Force Model Worksheet 1:
Qualitative Impulse-Momentum

The Impulse-Momentum theorem: $F_{net}\Delta t = \Delta(mv)$

1. If you throw a ball horizontally while standing on roller skates, you roll backwards. Will you roll backwards if you go through the motions of throwing the ball, but hold on to it instead? Explain your reasoning.

2. Which has the greater change in momentum, a 50 gram clay ball that strikes a wall at 1 m/s and sticks or a 50 gram superball that strikes a wall at 1 m/s and bounces away from the wall at 0.8 m/s? **Explain your reasoning.**

3. A Hummer and a VW Beetle traveling at equal speeds have a head-on collision.
   a. Which vehicle will experience the greater force of impact? Justify your answer.

   b. Which vehicle will experience the greater change in momentum? Justify your answer.

   c. Which vehicle will experience the greater acceleration? Justify your answer.

4. Discuss the following in terms of impulse and momentum:

   a. Why are padded dashboards safer than hard dashboards in automobiles?

   b. Why are nylon ropes, which stretch considerably under stress, favored by mountain climbers?

   c. When starting a heavy train, why will train engineers sometimes back up, stop, and then proceed forward? (This technique is called "bunching slack.")