NAME _____ DATE _____

## Scenario

*Blake is given two carts of unequal masses, $m$ and $M$, and a long track that ensures both carts travel in a straight line with no noticeable friction. He also has access to other commonly available equipment. The carts do NOT have any way to connect together when they come into contact. He asks three questions:*

1. *When the two carts collide, is the total momentum of the system conserved?*
2. *When the two carts collide, is the mechanical energy of the two-cart system conserved?*
3. *When the two carts collide, is the force $m$ exerts on $M$ equal to the force that $M$ exerts on $m$?*

## Experimental Design

**PART A:** Outline a procedure that Blake could follow to make measurements that could be used to answer all three questions above. Give each measurement a meaningful algebraic symbol and state with what equipment each measurement is made. Draw a labeled diagram showing each piece of equipment being used.

| What Needs to Be Measured and Algebraic Symbols | Procedure: |
|---|---|
| Labeled Diagram of the Setup | |

## Data Analysis

**PART B:**

i. Explain how the measurements made in Part A can be used to answer question 1.

ii. Explain how the measurements made in Part B can be used to answer question 2.

iii. Explain how the measurements made in Part A can be used to answer question 3.