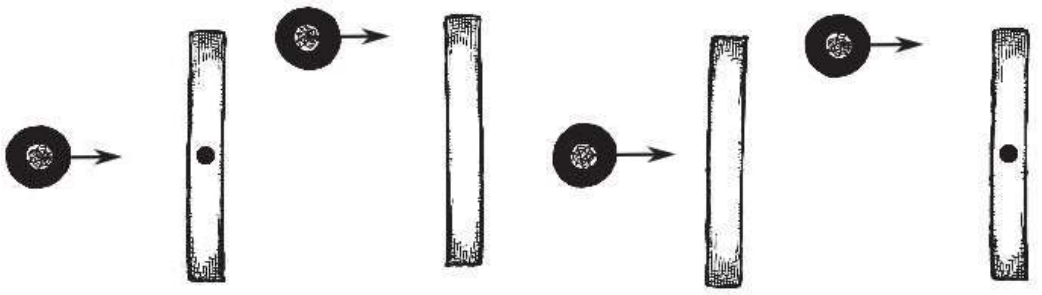
NAME _____ DATE _____



Case A *Case B* *Case C* *Case D*

Scenario

The four cases above show four pucks (viewed from above) sliding to the right on a smooth table. Each puck collides with and sticks to a rod that can move or rotate with negligible friction. In all four cases, the pucks are identical, the rods are identical, the initial rightward velocities of the puck are identical, and the initial velocities of the pucks are perpendicular to the rods' lengths. In Cases A and D, the rod is fixed to the table by a pin with negligible friction, but in Cases B and C, the rod is free to move. In Cases A and C, the puck collides with the center of the rod.

Analyze Data

PART A: For each case, determine whether angular momentum, linear momentum, and kinetic energy are constant. Put a check mark in the box if the quantity is constant and an *x* in the box if the quantity changes during the collision.

	Case A	*Case B*	*Case C*	*Case D*
Angular Momentum				
Linear Momentum				
Kinetic Energy				

PART B: Rank the cases according to which case has the most rightward linear momentum instantaneously *after the collision* from "least rightward momentum" to "most rightward momentum." Include <, >, or = to clarify your ranking.

_____ _____ _____ _____

Least rightward momentum Most rightward momentum

Justify your ranking.

PART C: Rank the cases according to which case has the most clockwise angular momentum taken about the center of the rod instantaneously *after the collision* from "least clockwise" to "most clockwise" angular momentum. Include <, >, or = to clarify your ranking.

_____ _____ _____ _____

Least clockwise angular momentum Most clockwise angular momentum

Justify your ranking.