

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Per: \_\_\_\_\_

Mr. Ahearn

## Collisions Lab

A collision occurs when a baseball bat hits a baseball, or a tennis racket hits a tennis ball. What would happen if you hit a baseball with a table-tennis paddle, or a table-tennis ball with a baseball bat? How do the masses of colliding objects change the results of collisions?

### Problem:

How does changing the size and number of marbles in a collision affect the momentum?

### What do you think will happen? (Hypothesis):

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What is Momentum? \_\_\_\_\_

What is the Law of Conservation of Momentum?

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### Materials:

Small marbles (5)

Meter sticks (2)

Large marbles (2)

Tape

### Goals:

Be able to determine how the speeds after a collision depend on the masses of the colliding objects.

## Procedure:

1. Tape the meter sticks next to each other, slightly farther apart than the width of the large marbles. This limits the motion of the marbles to nearly a straight line.
2. Place a small target marble in the center of the track formed by the meter sticks. Shoot a small marble from one end of the track toward the target marble by flicking it with your finger. Describe the collision.
3. Repeat step 2, replacing the two small marbles with the two large marbles.
4. Repeat step 2, replacing the small shooter marble with a large marble, the target marble will be small.
5. Repeat step 2, replacing the small target marble with a large marble, the shooter marble should be small.
6. Repeat step 2, replacing the small target marble with four small marbles that are touching, the shooter marble should be small.
7. Place two small marbles at opposite ends of the meter sticks. Shoot the marbles toward each other and describe the collision.
8. Place two large marbles at opposite ends of the meter sticks. Shoot the marbles toward each other and describe the motion.
9. Place a small marble and a large marbles at opposite ends of the meter sticks. Shoot the marbles toward each other and describe the collision.

# Data Table: Marble Collisions

Trial	Shooter (Moving)	Target (Stationary)	Before Collision Drawing	After Collision Drawing
1				
2				
3				
4				
5				
6				
7				
8				

1. In which collisions did the shooter marble change direction? How did the mass of the target marble compare with the shooter marble in these collisions?

2. Explain how momentum was conserved in these collisions?