

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

## Lesson 3, Bouncing Balls Activity (for High School) – Bouncing Balls Worksheet



### Data

Ball Types:

Surface Types:

Ball 1: \_\_\_\_\_

Surface 1: \_\_\_\_\_

Ball 2: \_\_\_\_\_

Surface 2: \_\_\_\_\_

Ball 3: \_\_\_\_\_

Surface 3: \_\_\_\_\_

1. Based on the **Height** of the bounce for each ball, is the collision more elastic or inelastic? Fill in the table accordingly.

Case	Ball	Surface	Mass of Ball (kg)	Bounce Height (m)	Elastic or Inelastic

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### Calculations and Results

2. Calculate the velocity of each ball right before it hits the surface (Starting Velocity). Why do you only have to perform this calculation once?

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3. Calculate the velocity of each ball right after it hits the surface (Ending Velocity).

4. Calculate the momentum of each ball before it hits the surface (Starting Momentum).

5. Calculate the momentum of each ball after it hits the surface (Ending Momentum).

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6. Calculate the change in momentum and the percentage of momentum that was lost for each case.

Fill in the Table below with your answers:

Case	Starting Velocity (m/s)	Ending Velocity (m/s)	Starting Momentum (kg*m/s)	Ending Momentum (kg*m/s)	Change in Momentum (kg*m/s)	Percent of Momentum Lost

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**Further Learning**

7. Why did all of the balls lose momentum? What happened to the momentum that was lost?

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8. What would have happened if the collisions were perfectly elastic? Use your own words or calculations to help explain your answer.

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9. Based on your experiments, which ball would be the best to use for dodge ball? For bowling? Why?

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

10. Which ball and surface from the experiment would be best for playing basketball? What about for street hockey? Why?

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11. All of the sports associations have hired you to develop the next big sport. They want you, as an engineer, to develop a sport that includes components of other sports. Describe your new sport, including what type of ball and surface will be used and why. Remember to discuss momentum and elasticity.

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