Physics 100 (Stapleton) Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Momentum, Impulse, and Foam Darts

**Formulas:** $Average velocity= \frac{Final velocity}{2}$ $v= \frac{d}{t}$

 $p=mv$ $Ft=∆p$

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| **Data Collection *PRACTICE*:** |
| 1 | What was the length of the tube, in meters? | **1.2** |
| 2 | What was the mass of your projectile, in **kilograms**? | **0.005** |
| 3 | What was the distance between your photogates, in meters? | **0.2** |
| 4 | How many seconds did it take your projectile to pass between the photogates?  | **0.01** |
| 5 | What was your projectile’s deceleration distance? In other words, how many meters did it travel while it was being slowed down by the backstop? | **0.3** |

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| **Calculations *PRACTICE*:** |
| 1 | What was your projectile’s average velocity at the end of the tube (as it passed between the photogates? |  |
| 2 | Using the final velocity from the previous question, calculate the projectile’s average velocity while it traveled through the tube? |  |
| 3 | At that average velocity, how long did it take your projectile to be pushed through the tube? |  |
| 4 | What was your projectile’s change in momentum, as it was pushed through the tube? |  |
| 5 | What average force pushed your projectile through the tube? |  |
| 6 | What was your projectile’s change in momentum, as it was slowed down by the backstop? |  |
| 7 | What was your projectile’s average velocity during the time when it was being slowed down by the backstop? |  |
| 8 | How many seconds did it take your projectile to decelerate to a stop, after hitting the backstop? |  |
| 9 | What average force did the backstop apply to your projectile? |  |

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