Solutions

2.1

- Rebound $= ev = 2.000$ m/s.
- Height $= v^2/2g = 0.2039$ m.

2.2

- $J = m(1+e)v = 1.8 \times 1.5 \times 4.0 = 10.8$ N $\cdot$ s.
- $F = J/\Delta t = 10.8/0.0060 = 1800$ N.

2.3

- Momentum: $7.5 = 3.0v_1 + 2.0v_2$; separation: $v_2 - v_1 = 0.80 \times 2.5$.
- $v_1 = 0.700$ m/s, $v_2 = 2.700$ m/s.
- KE: $9.375 \to 8.025$ J, loss 1.35 J.

2.4

- $F = \dot{m}v = 0.120 \times 8.50 = 1.020$ N.
- The flow is steady - momentum passes through continuously, with no frozen before/after pair.

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