



Name _____ Class _____ Date _____

AFTER THIS WORKSHEET YOU CAN

- ✓ Understand: Momentum Definition
- ✓ Understand: Units of Momentum
- ✓ Understand: Conservation of Momentum
- ✓ Understand: Elastic vs. Inelastic Collisions

 Section A • Concept Check • BEGINNER $4 \times 1 = 4$ _____

- 1 Find momentum of a 7 kg object at 9 m/s.

- 2 Find momentum of a 20 kg object at 1.5 m/s.

- 3 A 3 kg ball at 8 m/s hits a stationary 5 kg ball and they stick together. Find final velocity.

- 4 A 2 kg ball moving at 10 m/s collides with a 3 kg ball moving at -4 m/s (opposite direction). Find total momentum before collision.

 Section B • Problem Solving • INTERMEDIATE $4 \times 3 = 12$ _____

- 5 What additional quantity is conserved in an elastic collision, beyond momentum?

- 6 Why does kinetic energy typically decrease in an inelastic collision?

- 7 A 1500 kg car moving at 20 m/s crashes into a stationary 1500 kg car and they lock together. Find their common velocity after impact.

- 8 Why is momentum considered a vector rather than a scalar quantity?

 Section C • Challenge • CHALLENGE $2 \times 2 = 4$ _____

- 9 A 4 kg object moving at 5 m/s has its momentum measured. What are the units of this measurement?

- 10 In a game of billiards, one ball strikes another and transfers most of its motion. What physical principle governs this transfer?

🌸 Reflection — the most useful thing I learned: _____

A ___/4 B ___/12 C ___/4 **Total ___/20**

Teacher's Signature

Parent's Signature

⌘ ANSWER KEY — FOLD OR CUT BEFORE HANDING OUT

1 = $63 \text{ kg}\cdot\text{m/s}$ 2 = $30 \text{ kg}\cdot\text{m/s}$ 3 = $24=8v$, $v=3 \text{ m/s}$ 4 = $2\cdot10+3\cdot(-4)=20-12=8 \text{ kg}\cdot\text{m/s}$ | 5 = Kinetic energy
6 = Some kinetic energy converts into other forms, such as heat, sound, or deformation of the objects
7 = $30000=3000v$, $v=10 \text{ m/s}$ 8 = It depends on both mass (a scalar) and velocity (a vector), so momentum inherits a direction | 9 = $\text{kg}\cdot\text{m/s}$ 10 = Conservation of momentum (and approximately conservation of kinetic energy, since billiard collisions are nearly elastic)