

Momentum Worksheet

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Part 1: Building a Foundation

What is the formula for momentum?

Hint: Consider the relationship between mass and velocity.

- A) $p = m + v$
- B) $p = m \times v$
- C) $p = m / v$
- D) $p = v / m$

Which of the following statements about momentum are true?

Hint: Think about the properties of momentum.

- A) Momentum is a scalar quantity.
- B) Momentum is the product of mass and velocity.
- C) Momentum has both magnitude and direction.
- D) Momentum is measured in $\text{kg}\cdot\text{m/s}$.

Explain in your own words what is meant by the conservation of momentum.

Hint: Consider how momentum behaves in isolated systems.

List the two main types of collisions and describe one key characteristic of each.

Hint: Think about how energy is conserved in each type.

1. Elastic Collision

2. Inelastic Collision

Part 2: comprehension and Application

In an elastic collision, which of the following is conserved?

Hint: Consider the properties of elastic collisions.

- A) Only momentum
- B) Only kinetic energy
- C) Both momentum and kinetic energy
- D) Neither momentum nor kinetic energy

Which factors affect the momentum of an object?

Hint: Consider the variables that define momentum.

- A) Mass
- B) Velocity
- C) Time
- D) Force

Describe how impulse relates to momentum change and provide an example.

Hint: Think about the relationship between force, time, and momentum.

A car with a mass of 1000 kg is moving at 20 m/s. What is its momentum?

Hint: Use the momentum formula $p = m \times v$.

- A) 20,000 kg·m/s
- B) 2,000 kg·m/s
- C) 200 kg·m/s
- D) 10,000 kg·m/s

Calculate the change in momentum for a 5 kg object that accelerates from 2 m/s to 10 m/s.

Hint: Use the formula for momentum change: $\Delta P = m(v_{\text{final}} - v_{\text{initial}})$.

Part 3: Analysis, Evaluation, and Creation

If two objects collide and stick together, what type of collision is this?

Hint: Consider the characteristics of collisions.

- A) Elastic
- B) Inelastic
- C) Perfectly elastic
- D) Superelastic

Analyze the following scenarios and identify which involve an impulse:

Hint: Think about actions that change momentum quickly.

- A) A bat hitting a baseball
- B) A car parked on a hill
- C) A swimmer pushing off the pool wall
- D) A book resting on a table

Compare and contrast elastic and inelastic collisions in terms of energy conservation.

Hint: Think about how energy is transferred in each type of collision.

Which of the following best explains why airbags are used in cars?

Hint: Consider the relationship between force, time, and impulse.

- A) They increase the time over which the force acts, reducing the impulse.
- B) They decrease the time over which the force acts, increasing the impulse.
- C) They increase the force, increasing the momentum.
- D) They decrease the force, decreasing the momentum.

Design a simple experiment to demonstrate the conservation of momentum using everyday materials. Describe the setup and expected outcomes.

Hint: Think about how you can use common items to illustrate momentum.