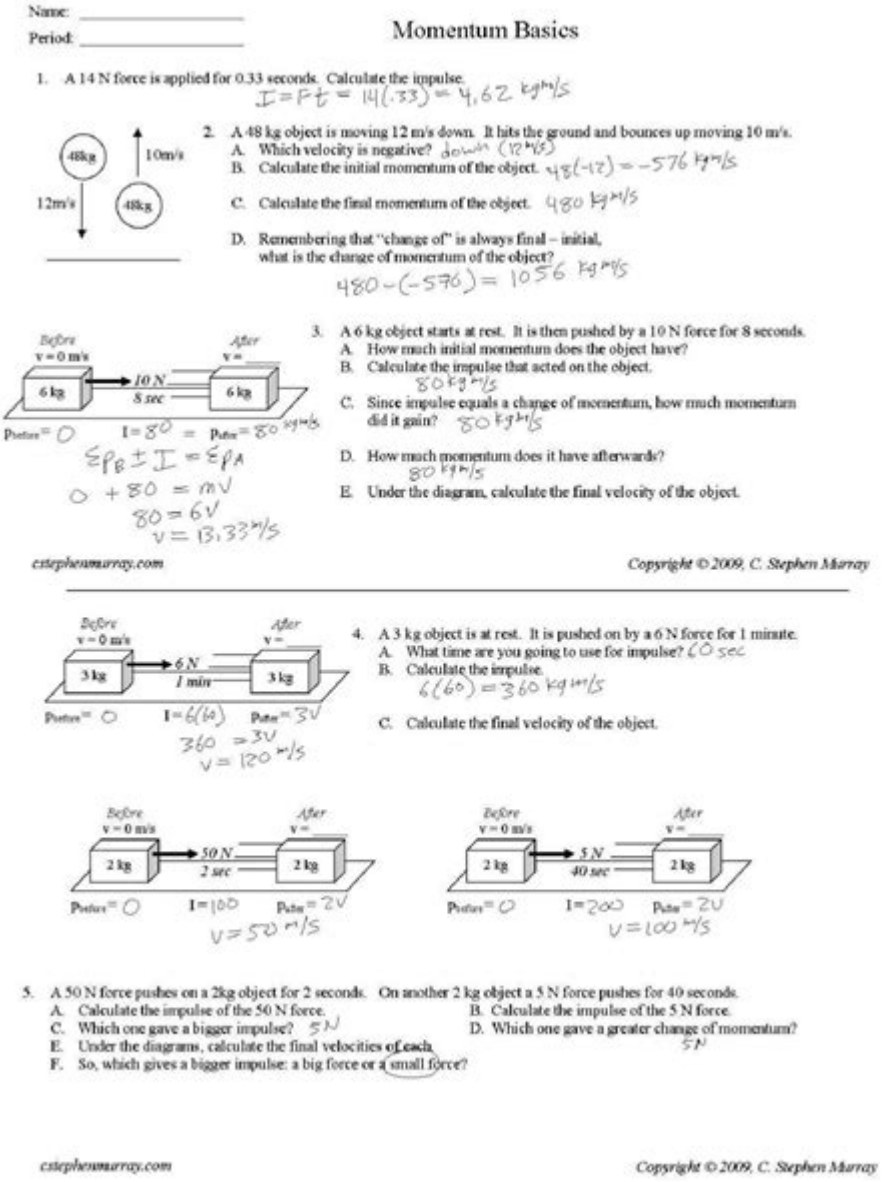
Impulsive Force Model Worksheet 2 Answers



Name: _____
Period: _____

Momentum Basics

1. A 14 N force is applied for 0.33 seconds. Calculate the impulse.
$I = Ft = 14(.33) = 4.62$ kg·m/s

2. A 48 kg object is moving 12 m/s down. It hits the ground and bounces up moving 10 m/s.
   A. Which velocity is negative? down (12 m/s)
   B. Calculate the initial momentum of the object. $48(-12) = -576$ kg·m/s
   C. Calculate the final momentum of the object. 480 kg·m/s
   D. Remembering that "change of" is always final – initial, what is the change of momentum of the object?
$480 - (-576) = 1056$ kg·m/s

3. A 6 kg object starts at rest. It is then pushed by a 10 N force for 8 seconds.
   A. How much initial momentum does the object have?
   B. Calculate the impulse that acted on the object. 80 kg·m/s
   C. Since impulse equals a change of momentum, how much momentum did it gain? 80 kg·m/s
   D. How much momentum does it have afterwards? 80 kg·m/s
   E. Under the diagram, calculate the final velocity of the object.

$\varepsilon p_B \pm I = \varepsilon p_A$
$0 + 80 = mv$
$80 = 6v$
$v = 13.33$ m/s

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4. A 3 kg object is at rest. It is pushed on by a 6 N force for 1 minute.
   A. What time are you going to use for impulse? 60 sec
   B. Calculate the impulse. $6(60) = 360$ kg·m/s
   C. Calculate the final velocity of the object.

$360 = 3v$
$v = 120$ m/s

5. A 50 N force pushes on a 2kg object for 2 seconds. On another 2 kg object a 5 N force pushes for 40 seconds.
   A. Calculate the impulse of the 50 N force.
   B. Calculate the impulse of the 5 N force.
   C. Which one gave a bigger impulse? 5N
   D. Which one gave a greater change of momentum? 5N
   E. Under the diagrams, calculate the final velocities of each.
   F. So, which gives a bigger impulse: a big force or a small force?

$v = 50$ m/s
$v = 100$ m/s

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Impulsive force model worksheet 2 answers provide an essential resource for students and educators alike who are delving into the dynamics of impulse and momentum in physics. Understanding the principles behind impulsive forces is crucial for mastering concepts in mechanics, particularly when analyzing collisions and impacts. This article will explore the impulsive force model, its applications, and how to effectively use worksheet 2 to enhance your comprehension of these topics.

Understanding Impulsive Forces

Impulsive forces are significant, short-duration forces that act on an object, resulting in a change in momentum. These forces are typically

experienced during high-impact events, such as collisions or explosions. The key characteristics of impulsive forces include:

- They occur over a very short time period.
- They can cause instantaneous changes in velocity.
- They are calculated using the impulse-momentum theorem.

The impulse-momentum theorem states that the impulse experienced by an object is equal to the change in its momentum. Mathematically, this can be expressed as:

$$
I = \Delta p = F_{avg} \Delta t
$$

where I is impulse, Δp is the change in momentum, F_{avg} is the average force, and Δt is the duration of the force's action.

Impulsive Force Model Worksheet 2 Overview

Worksheet 2 on the impulsive force model is designed to reinforce the understanding of these principles through practical problems and examples. Here are some common elements you can expect to find in this worksheet:

Types of Problems

Worksheet 2 typically includes a variety of problem types, such as:

1. Calculating Impulse: Problems that require students to calculate the impulse given the average force and the duration of the force.

2. Momentum Changes: Scenarios where students must determine the change in momentum resulting from an impulsive force.

3. Collision Scenarios: Questions involving two colliding objects where students analyze the forces acting during the collision.

4. Applications of Impulsive Forces: Real-world applications, such as sports or vehicle collisions, illustrating the relevance of impulsive forces.

Why Use Worksheet 2?

The impulsive force model worksheet 2 answers not only provide solutions but also guide students in their learning process. Here are several reasons why this worksheet is beneficial:

- Practical Application: By working through the problems, students can see how theoretical concepts apply in real-life situations.

- Skill Development: The worksheet helps develop critical thinking and problem-solving skills essential for success in physics.

- Concept Reinforcement: Repeated practice with different scenarios strengthens comprehension of impulsive forces and their effects.

Step-by-Step Guide to Solving Impulsive Force Problems

To effectively tackle problems in worksheet 2, follow these steps:

Step 1: Identify the Known Variables

Start by carefully reading the problem and identifying all known quantities, such as mass, velocities, time duration, and forces involved.

Step 2: Determine the Required Quantity

Identify what the problem is asking for—whether it’s impulse, change in momentum, or another quantity.

Step 3: Apply the Impulse-Momentum Theorem

Use the impulse-momentum theorem to set up the equations needed to find the unknown. Remember to check the units and ensure consistency throughout your calculations.

Step 4: Solve Algebraically

Rearrange the equations as needed and solve for the unknown variable. Be meticulous about your calculations to avoid mistakes.

Step 5: Review and Interpret the Results

Once you have your answer, revisit the problem to ensure that your result makes sense in the context of the scenario. Consider if the magnitude and direction of forces are reasonable.

Common Mistakes to Avoid

When working with impulsive force problems, students often make several common errors:

- **Forgetting Direction:** Remember that forces are vectors; always consider their direction when solving problems.
- **Neglecting Units:** Ensure all units are consistent, converting where necessary to avoid confusion.
- **Ignoring External Forces:** Sometimes, external forces may affect the system. Be sure to account for them when analyzing problems.

Conclusion

Impulsive force model worksheet 2 answers serve as a vital tool for students aiming to deepen their understanding of impulse and momentum in physics. By engaging with the problems and solutions provided in the worksheet, learners can enhance their analytical skills and apply theoretical knowledge to practical situations. As you work through the problems, remember to take your time, apply the steps methodically, and avoid common pitfalls to achieve the best learning outcomes. With practice and dedication, mastering the concepts surrounding impulsive forces will become increasingly attainable.

Frequently Asked Questions

What is the impulsive force model used for in physics?

The impulsive force model is used to analyze situations where forces act over a short time interval, allowing us to relate impulse to changes in momentum.

How do you apply the impulsive force model to solve problems?

To apply the impulsive force model, identify the forces acting during the short time interval, calculate the impulse (force multiplied by time), and use the impulse-momentum theorem to find changes in momentum.

What are common examples of scenarios where the impulsive force model is applicable?

Common examples include collisions between objects, such as billiard balls, car crashes, and the impact of a bat hitting a ball.

What factors affect the magnitude of impulsive forces in a collision?

The magnitude of impulsive forces in a collision is affected by the masses of the colliding objects, their velocities before impact, and the duration of the collision.

Where can I find the answers to impulsive force model worksheet 2?

Answers to impulsive force model worksheet 2 can typically be found in the teacher's guide, educational resources, or by discussing with classmates or instructors.

Impulsive Force Model Worksheet 2 Answers

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1. characterized by actions based on sudden desires, whims, or inclinations rather than careful thought: an impulsive man. 2. based on emotional impulses or whims; spontaneous: an impulsive kiss.

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characterized by actions based on sudden desires, whims, or inclinations rather than careful thought: an impulsive man based on emotional impulses or whims; spontaneous

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