

WEBQUEST TASK #1: MOMENTUM AND ITS CONSERVATION

Instructions: Please type your answers into a new document before submitting it to TurnItIn.com. For problems, utilize the equation editor (ask for help if you need it!) **You will NOT be able to upload this during class on the due date and I will NOT write a pass to the library for you to do so.** You will need to upload it **BEFORE** you come to class on the day it is due.

SECTION A: MOMENTUM

You will be using the links provided on the website in order to answer the following questions.

1. What is the definition of **momentum**?
2. What **symbol** is used when representing momentum in equations?
3. What is the **equation** for momentum? What two physical properties of an object determine its momentum?
4. Is momentum a **vector or a scalar** quantity? Why does it matter which it is?
5. What are the 2 different ways to write the **units** for momentum? Show how these units are equivalent.
6. On Physics Classroom Lesson 1a: Find the **Check Your Understand Questions** at the bottom of the page:
 - a. Choose **one** part of Question 1 (a, b or c) and show your work.
 - b. Choose **one** part of Question 2 and show your work.

SECTION B: CONSERVATION OF MOMENTUM

You will be using the links provided on the website in order to answer the following questions.

7. What is meant by a "**conservation law**"? What conditions are necessary in order to say that a system is obeying such a law?
8. What is Newton's third law of motion? In what way could this law **connect to the idea of conserving momentum**?
9. Give at least **one specific example** of when you have personally experienced conservation of momentum in action.
10. If a large trailer truck hits a Mini Cooper while they are both going the same velocity:
 - a. Which vehicle has greater **momentum**? Why?
 - b. Will they be pushed in the direction the truck was traveling or the direction that the car was traveling? **Why**?
11. What are the **three types of collisions**? Is momentum always conserved?

Check in with Instructor: _____

SECTION C: MOMENTUM GAME CHALLENGE

You will be using the online simulation (link on website) in order to apply what we learned in Section 2 to a real life situation: Bumper Cars!

Part I – How Bumper Cars Work:

Read the information about Bumper Cars and answer the following questions.

12. What is the **purpose** of the rubber bumper around the car?
13. Use **Newton's 1st law** to explain what happens to the riders in a bumper car when another car runs into them.

Part II – The Connection to Physics:

Click on the Colliding Cars arrow.

14. Use **Newton's 2nd law** to explain how the bumper car driver's mass affects the collision of the bumper cars.
15. Identify the **3rd Law action-reaction** force pair at work in a bumper car collision.

Part III – Predicting Collisions:

Click on the yellow "Begin" button.

16. Collision 1:

- a. Which car has greater **momentum**? How do you know?
- b. **Predict** the outcome of the collision.
- c. Was your prediction correct? **Describe** the outcome of the collision.

17. Collision 2:

- a. Which car has a greater **momentum**? How do you know?
- b. **Predict** the outcome of the collision.
- c. Was your prediction correct? **Describe** the outcome of the collision.

18. Collision 3:

- a. Which car has a greater **momentum**? How do you know?
- b. **Predict** the outcome of the collision.
- c. Was your prediction correct? **Describe** the outcome of the collision.

Part IV - Think It Through:

19. Use Newton's laws to **explain** why a parent is required to ride with a young child in the bumper cars (besides the fact that they can't reach the pedals).
20. Why is a **head-on** collision in bumper cars or real cars so much more damaging than a collision at an **angle**? (This one requires deeper thinking – think it through before you write your answer! You can do it!)

Check in with Instructor: _____