

Momentum

PART A – MOMENTUM

- 1) A moving car has momentum. If it moves twice as fast, its momentum is _____ as much.

- 2) Two cars, one twice as heavy as the other, move down a hill at the same speed. Compared to the lighter car, the momentum of the heavier car is _____ as much.

- 3) A steel ball whose mass is 2.0 kg is rolling at a rate of 2.8 m/s. What is its momentum?

GIVEN	WORK
ANSWER:	

- 4) A marble is rolling at a velocity of 1.5 m/s with a momentum of 0.10 kg·m/s. What is its mass?

GIVEN	WORK
ANSWER:	

- 5) On April 15, 1912, the luxury cruise liner Titanic sank after running into an iceberg. What was the cruise liner's speed when it collided with the ice berg if it had a mass of 4.23×10^8 kg ship and a momentum of 4.9×10^9 kg·m/s?

GIVEN	WORK
ANSWER:	

PART B – CONSERVATION OF MOMENTUM

- 6) Suppose you are traveling in a bus at highway speed on a nice summer day and the momentum of an unlucky bug is suddenly changed as it splatters onto the front window.
- Compared to the force that acts on the bug, how much force acts on the bus. (more) (the same) (less)
 - Although the momentum of the bus is very large compared to the momentum of the bug, the **change** in momentum of the bus compared to the **change** in momentum of the bug is (more) (the same) (less)
 - Which experiences the greater acceleration (**HINT**: think of Newton's 2nd Law)? (bus) (both the same) (bug)
 - Which, therefore, suffers the greater damage? (bus) (both the same) (the bug of course!)
- 7) A 4.5-kg ham is thrown into a stationary 15-kg shopping cart. At what speed will the cart travel if the ham had an initial speed of 2.2 m/s?

BEFORE	AFTER
ANSWER:	

- 8) Make two event chains showing what happens when a rolling ball (Ball 1) hits a resting ball (Ball 2). Use the phrases: *gains momentum, hits Ball 2, is hit by Ball 1, loses momentum, rests, rolls, slows down, starts rolling.*

