# Momentum Worksheet

Name_____

Date _____

Period ____

**True or False?**

_____1.) Momentum is not equal to the mass of an object divided by its velocity.

_____2.) The momentum of an object can change.

_____3.) Two objects with the same mass will always have the same momentum.

_____4.) All moving objects don't have momentum.

_____5.) When an object speeds up, it gains momentum.

_____6.) Objects with different masses can't have the same momentum.

_____7.) Direction does not matter when you are measuring momentum.

_____8.) Momentum can be transferred from one object to another.

_____9.) When objects collide, some momentum is lost.

_____10.) A tiny bullet can have more momentum than a huge truck.

**Fill in the blank.**

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

12.) 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.

**Given the following data, solve for momentum. P = *mv***

| **Object** | **Mass (kg)** | **Velocity (m/s)** | **Momentum (kg-m/s)** |
|---|---|---|---|
| 13.) Bird | .04 | 19 | .76 |
| 14.) Football player | 100 | 10 | |
| 15.) Skier | 60 | 20 | |
| 16.) Bullet | .004 | 600 | |
| 17.) Frog | .9 | 12 | |
| 18.) Meteorite | .1 | 1,000 | |
| 19.) Baseball | .14 | 30 | |
| 20.) Wagon | 2 | 3 | |
| 21.) Satellite | 3,000 | 8,000 | |

| Equation | Gives you… | If you know… |
|---|---|---|
| $P = mv$ | Momentum | Mass and Speed |
| $m = \frac{P}{v}$ | Mass | Momentum and Speed |
| $v = \frac{P}{m}$ | Speed | Momentum and Mass |

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

| **Looking for** | **Solution** |
|---|---|
| **Given** | |
| **Relationships** | |

23.) 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?

| **Looking for** | **Solution** |
|---|---|
| **Given** | |
| **Relationships** | |

24.) 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 $4.23 \times 10^8$ kg ship and a momentum of $4.9 \times 10^9$ kg·m/s?

| **Looking for** | **Solution** |
|---|---|
| **Given** | |
| **Relationships** | |

25.) 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.

a) Compared to the force that acts on the bug, how much force acts on the bus. (more) (the same) (less)

b) 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)

c) Which experiences the greater acceleration (**HINT**: think of Newton's 2nd Law)?
(bus) (both the same) (bug)

d) Which, therefore, suffers the greater damage? (bus) (both the same) (the bug of course!)