

Name: \_\_\_\_\_

Science 7

Date: 10/29/18  
Motion (NOTES)

Aim: I can explain how force, mass and acceleration are related.

Do Now:

The empty shopping cart will demonstrate the greatest acceleration

Notes:

Acceleration:

- The rate of change in velocity.
- Speeding up, slowing down or changing direction.

\* Acceleration  
unit  $\rightarrow$   $m/s^2$

### Acceleration

= change in velocity

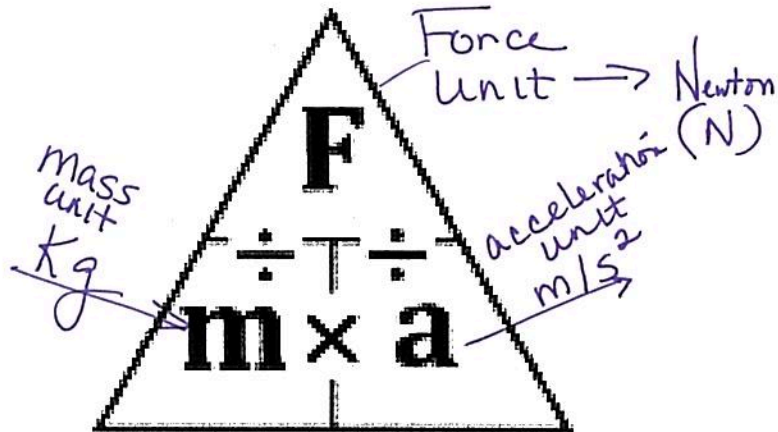
change in speed    Change in Direction    Change in both

Newton's Second Law of Motion

- A net force acting on an object cause the object to acceleration in the direction of the force.
- Acceleration is determined by the size of the force and the mass of the object.
- Force = mass x acceleration
- $F = MA$
- Larger force creates greater acceleration
- Larger mass requires larger force

**F = ma**

N                      kg                       $m/s^2$

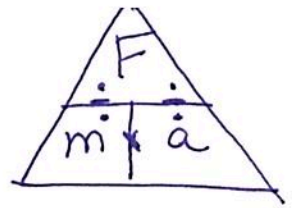


Examples:

?

m

a



1. What net force is needed to accelerate a 15 kg cart at 9m/s<sup>2</sup>?

Formula:	$f = m \cdot a$
Substitute:	$f = 15 \text{ Kg} \cdot 9 \text{ m/s}^2$
Final Answer with Units:	$f = 135 \text{ N}$

2. A boy pushed a shopping cart with a force of 12N, and the cart accelerates 3m/s<sup>2</sup>? What is the mass of the cart?

f

a

Formula:	$m = \frac{f}{a}$
Substitute:	$m = \frac{12 \text{ N}}{3 \text{ m/s}^2}$
Final Answer with Units:	$m = 4 \text{ Kg}$

## do the math!

Every year in cities around the world, teams create cars, push them across platforms, and hope they will fly. Unfortunately, the cars always end up accelerating down into the water.

① Calculate If a 100-N net force acts on a 50-kg car, what will the acceleration of the car be?

$$a = \frac{f}{m} \quad a = \frac{100 \text{ N}}{50 \text{ Kg}} \quad a = 2 \text{ m/s}^2$$

② After that same car leaves the platform, gravity causes it to accelerate downward at a rate of 9.8 m/s<sup>2</sup>. What is the gravitational force on the car?

$$f = m \cdot a \quad f = 50 \text{ kg} \cdot 9.8 \text{ m/s}^2 \quad f = 490 \text{ N}$$

