



### Acceleration

- An unbalanced force causes something to \_\_\_\_\_.




### Acceleration

- Acceleration is directly related to the \_\_\_\_\_ of the force and the \_\_\_\_\_ of the force.
- It accelerates in the direction you \_\_\_\_\_ or \_\_\_\_\_ it.



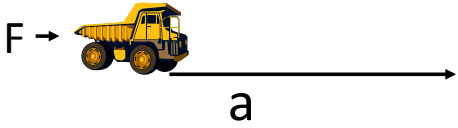
### In other words....

\_\_\_\_\_ Force = \_\_\_\_\_ Acceleration



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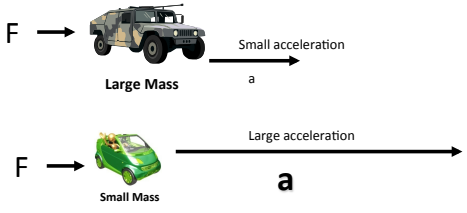


So....if you push twice as hard, it accelerates twice as much.

### But there is a twist....

- Acceleration is \_\_\_\_\_ related to the mass of the object.

### In other words....using the same amount of force....



### Newton's Second Law

- Newton, that brilliant genius, observed those "rules" of acceleration and came up with his second law of motion. It is both a formula & a law.



Newton

### Newton's Second Law

- The \_\_\_\_\_ of an object is directly proportional to the net \_\_\_\_\_ & inversely proportional to it's \_\_\_\_\_.

- $F = ma$

- \_\_\_\_\_ = \_\_\_\_\_ x \_\_\_\_\_

### Okay then...

- First, you need to know the units of Force, Mass & Acceleration.
  - The units used for force are Newtons (\_\_\_\_\_)
  - The units used for mass are kilograms (\_\_\_\_\_)
  - The acceleration units are meters per second squared (\_\_\_\_\_).

### Practice Problem 1

- An object is moving with an acceleration of 3 m/s<sup>2</sup> and has a mass of 55 kg. What force was applied to the object?
- $F = ma$
- F=
- m=
- a=

### Practice Problem 2

- A force of 245 N is applied to an object. The object then accelerates at a rate of 4.2 m/s<sup>2</sup>. What is the mass of the object?
- $F=ma$  **SO**  $m=F/a$
- F=
- m=
- a=

### So...

- If the \_\_\_\_\_ force is applied:
  - If \_\_\_\_\_ is big, \_\_\_\_\_ will be small

$$F = m \cdot a$$

- If \_\_\_\_\_ is small, \_\_\_\_\_ will be big

$$F = m \cdot a$$