

Newton's Second Law of Motion

Notes

Read pp 94-95 and fill in the notes below.

- Describe/Define:
- Ex: A person with a greater _____ will push a person with less _____ in the direction the bigger person pushed him/her
- The rate the above person will accelerate after being pushed depends on _____ and _____ of the person doing the pushing
- Larger masses need _____ force than smaller masses to reach the same _____
- Newton's second law of motion can be expressed using the following equation:

$$F=ma$$

Quantity/Variable

force

acceleration

Symbol

m

a

Unit

N (Newton) = $\text{kg}\cdot\text{m}/\text{s}^2$

kg or g

Practice Calculations

1. A motorcycle and its rider have a mass of 270 kg. How much force is needed to accelerate the motorcycle and its rider $4 \text{ m}/\text{s}^2$?
2. What force is needed to accelerate a 0.5 kg soccer ball, at a rate of $3 \text{ m}/\text{s}^2$?

3. How much force will be needed to accelerate a car with a total mass of 1160 kg a rate of 4.5 m/s^2 ?

4. A 70 kg swimmer pushes off a pool wall and accelerates through the water at a rate of 3.6 m/s^2 . What force did the swimmer push with?

5. What force is needed for a dancer to lift his 80 kg partner above his head with an acceleration of 2.5 m/s^2 ?