Newton's 2nd Law

Newton's Second Law will let us calculate acceleration.

$$\text{acceleration} = \frac{\text{Net Force}}{\text{mass}}$$

or $\vec{F} = m\vec{a}$

or $\vec{a} = \frac{\vec{F}_{net}}{m}$

state proportionality statements

Definition: 1 Newton is the force required to accelerate a 1.0kg mass at 1 m/s^2.

$$1\ N = 1\ kg \times m/s^2$$

Ex 1: An unbalanced force of 45.0 N acts on a stationary 10.0 g mass. What is the acceleration of the mass?

Ex 2: What unbalanced force is required to accelerate a 1000.0 kg car from 100.0 km/hr to a complete stop in 6.2 s?

3. What unbalanced force would be required to accelerate a 0.50 kg grapefruit at :

a) 14.0 m/s^2

b) 0.80 m/s^2

4. What acceleration would a net force of 84 N produce on each of th following masses?
a) 8.2 kg
b) 28.4 kg

5. A 1200 kg car experiences an air resistance of 5000N and a frictional force of 2200 N. If the wheels exert a force of 7500 N, what is the car's acceleration?

6. Calculate the unbalanced force acing on a 4000.0 kg truck that char its velocity from 22.0 m/s [N] to 8.00 m/s [N] in 3.50 s.

7. A 0.50 kg model rocket accelerates at a constant rate from 20.0 m/s [up] to 45 m/s [up] in 0.70 s. Calculate the unbalanced force acting on it.

* Acceleration measured in "g"s

a = 2g simply means that the acceleration has a magnitude of twice gravity so: $a = 2(9.80) = 19.6\ m/s^2$.

The negative is omitted because the acceleration may or may not be "down"

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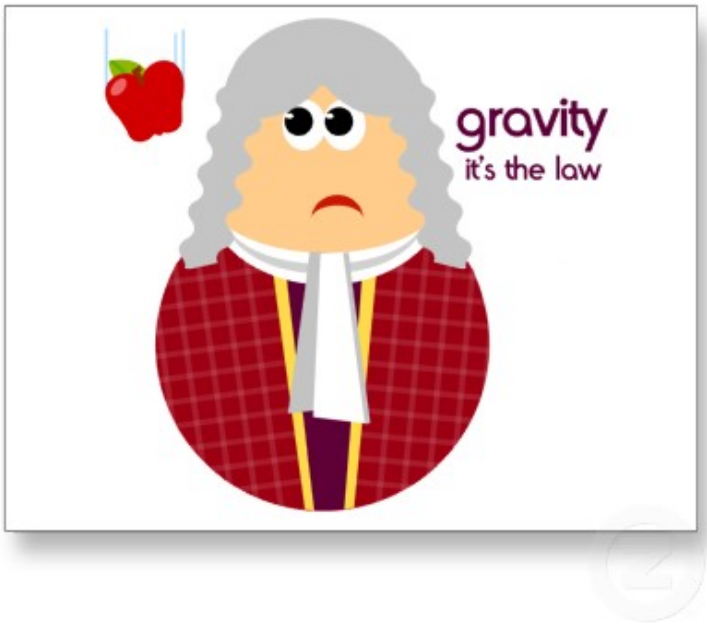
#19, 20, 21, 22, 23, 24, 26, 29



In class practice...for you!!!
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