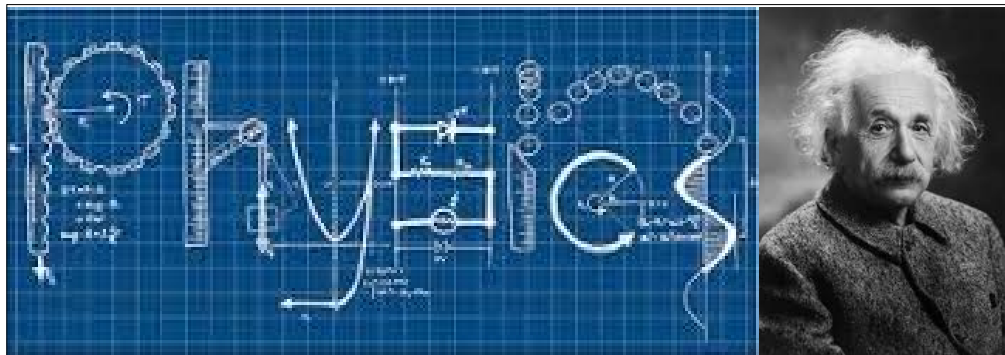


2.7 Force and Work.notebook



2.7 Force and Work

Force

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

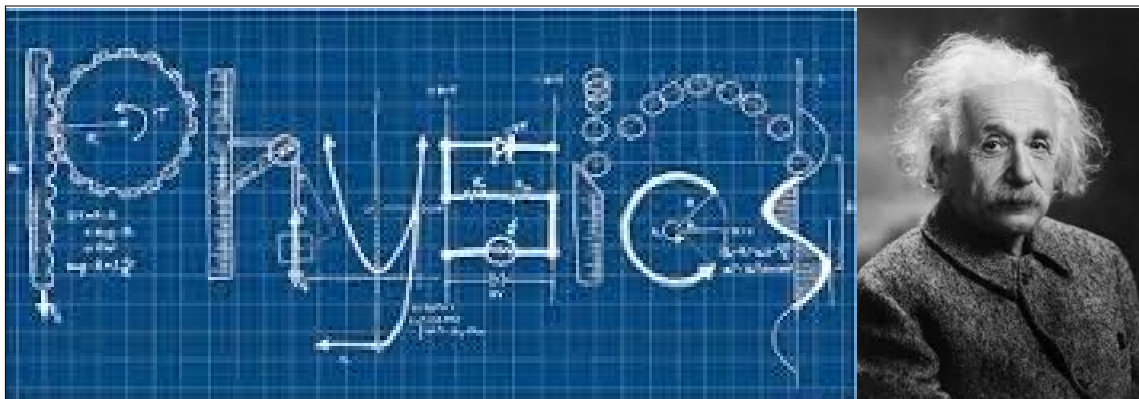
- an object moves when an unbalanced force acts upon it
- a push or pull on an object
- measured in Newtons (N)

Work

$$W = \vec{F}\vec{d}$$

$$W = mad$$

- a force applied over a distance
- the force has to be in the same direction as the object moves
- measured in Joules (J)



Ex.) A 30 kg kid is accelerated at 2.5 m/s², what is the force acted upon the kid?

$$\begin{aligned} m &= 30 \text{ kg} \\ a &= 2.5 \text{ m/s}^2 \\ F &= ? \end{aligned}$$

list all variables

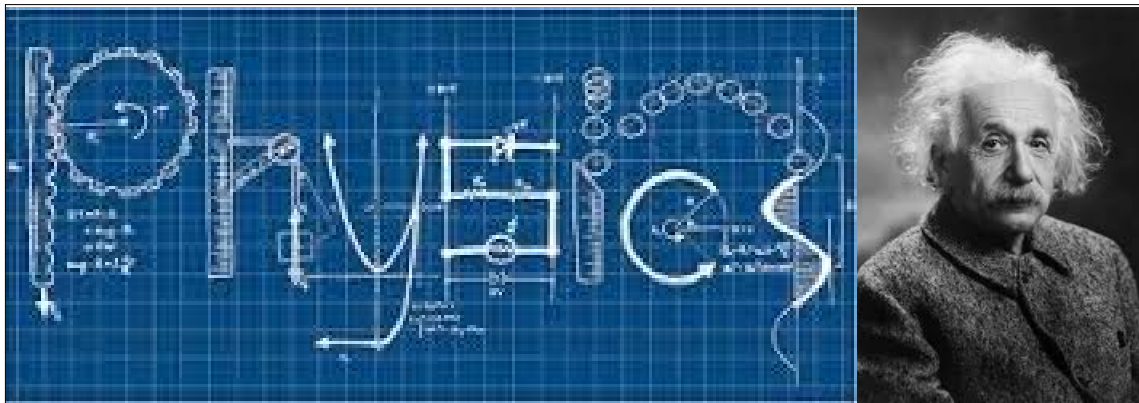
$$F = ma$$

formula

$$F = (30)(2.5) = 75 \text{ N}$$

substitute (with units) and solve

2.7 Force and Work.notebook



Ex.) A force of 800 N is acting on a 15 kg box, what is the acceleration of the box?

$$\begin{aligned} F &= 800\text{N} \\ m &= 15\text{kg} \\ a &= ? \end{aligned}$$

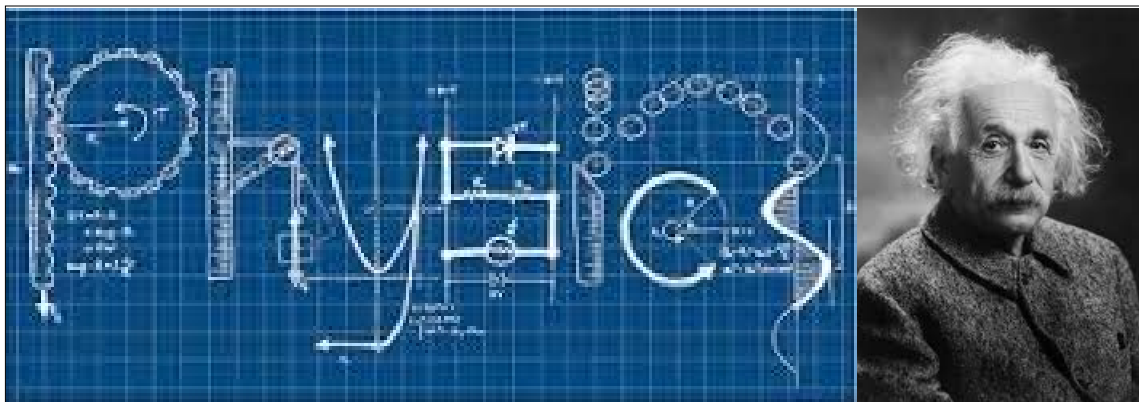
list all variables

$$F = ma$$

formula

$$\frac{800}{15} = \frac{15a}{15} \quad \boxed{a = 53\text{m/s}^2}$$

substitute (with units) and solve



Ex.) A force of 300 N is required to move an object 3.0 m. What is the work done?

$$\begin{aligned} F &= 300\text{N} \\ d &= 3.0\text{m} \\ W &= ? \end{aligned}$$

list all variables

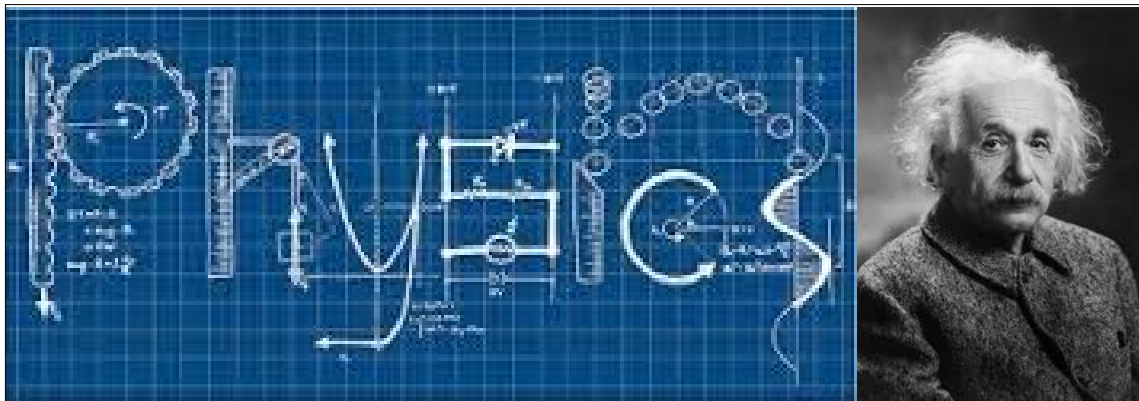
$$W = Fd$$

formula

$$W = (300)(3.0) = 900$$
$$= \boxed{9.0 \times 10^2 \text{ J}}$$

substitute (with units) and solve

2.7 Force and Work.notebook



Ex.) A force of 250 N moves an object. The work done is 1000 J, how far did it move?

$$\begin{aligned}d &= ? \\ F &= 250\text{ N} \\ W &= 1000\text{ J}\end{aligned}$$

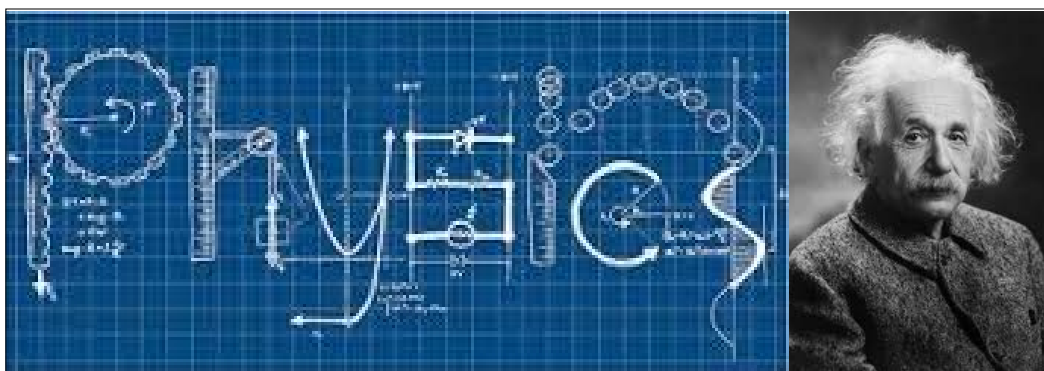
list all variables

$$W = Fd$$

formula

$$\frac{1000}{250} = \frac{250d}{250}$$
$$d = 4.00\text{ m}$$

substitute (with units) and solve



- In order for work to be done:**
1. A force must be applied.
 2. The object must move in the direction of the force.

$$\text{Work} = \Delta \text{Energy}$$

"change in"

2.7 Force and Work.notebook

