

mks or SI  
 1 rench Revolution: 1789. Enforce "Enlightenment" reason  
 in lieu of royalism (feet, inches) ("pounds")  $\leftarrow$  marketplace  
 "stone"

Use Earth, Water, Fingers (powers of 10)

New Units!

Space:

$$1 \text{ m} = \frac{\text{Eq - Pole distance}}{10^7} \quad \checkmark \quad \text{m}$$

Mass:  $1 \text{ kg} = \frac{\text{mass of } 1 \text{ m}^3 \text{ of water}}{10^3}$

Bonus: volume of 1 kg of water:  $\text{kg}$   
liter

time:  $1 \text{ s} = \frac{\text{time for Earth to rotate}}{10^5}$

~~$10^5$~~  24.60.60  
 86400

s

## Compound units:

Velocity:  $\text{m/s}$

(a) acceleration:  $(\text{m/s})/\text{s}$   $\underline{\text{m s}^{-2}}$

" $mv$ " momentum:  $\text{kg} \cdot \text{m/s}$

" $F=ma$ " force  $\underline{\text{kg} \cdot \frac{\text{m}}{\text{s}^2}}$

Newton

" $F/\text{area}$ " pressure  $\frac{\text{kg} \frac{\text{m}}{\text{s}^2}}{\text{m}^2} = \text{kg m}^{-1} \text{s}^{-2}$  Pascal "stress"

" $\int F \cdot dx$ " Energy  
 $\frac{1}{2}mv^2$  Power  
 $\text{kg} \cdot (\text{m/s})^2$   
 $\text{N} \cdot \text{m} = \left( \text{kg} \frac{\text{m}^2}{\text{s}^2} \right)$

Joule

Watt =  $\text{J/s}$

~~Flux~~  
butterfly flux = # of butterflies caught by a  $1\text{m}^2$  net in 1s  
mass flux = flux of mass through area in time  
 $\text{m}^2 \text{ s}$

units:  $\text{kg}(\text{m}^{-2})(\text{s}^{-1})$   
 "flux" of  
 whatever that is  
 defines word "flux"

Ex: ocean

$1\text{Sv} = 10^6 \text{ m}^3/\text{s}$  ← flux integrated over a  
 whole area

flux of what integrated over area?

$? \text{ m}^{-2} \text{ s}^{-1} (\text{m}^2) = ? \text{ s}^{-1} = 10^6 \frac{\text{m}^3}{\text{s}}$   
 integrated Volume

"Volume flux"

⇓  
velocity

$$\text{m}^3 (\text{m}^{-2}) (\text{s}^{-1})$$

units

$$\text{m s}^{-1}$$

What is pressure a flux of?

(stress too)

$$\text{kg m}^{-1} \text{s}^{-2} = \frac{\text{kg (m s}^{-1}) (\text{m}^{-2}) (\text{s}^{-1})}{\text{m}^2}$$

⇓  
Momentum