Rate Expressions

car

$$\text{rate} = \underbrace{\frac{\text{miles}}{\text{hour}}}_{\text{units}} = \underbrace{\frac{\Delta \text{distance}}{\Delta \text{time}}}_{\text{equation}}$$

↳ can change   ↳ does NOT change

Rxn

$$\text{rate} = \frac{M}{\text{sec}} = \frac{\Delta \text{concentration}}{\Delta t} = \frac{\Delta [X]}{\Delta t}$$
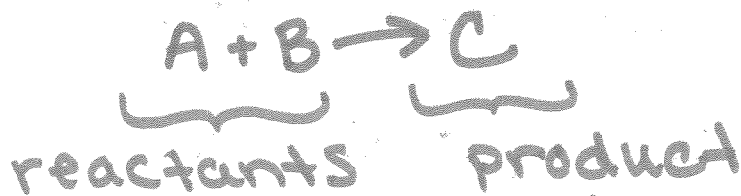
M = molarity

$= \dfrac{\text{moles}}{L}$

= concentration unit

= [HCl] = 2 M

"two molar"

$$A + B \rightarrow C$$

reactants   product

losing ←   └→ making
reactants   product

[A] ↓   [C] ↑
[B] ↓

$-\Delta [\ ]$ $+\Delta [\ ]$
negative change   positive change
in concentration

$$\text{rate} = \frac{-\Delta [A]}{\Delta t} = \frac{-\Delta [B]}{\Delta t} = \frac{\Delta [C]}{\Delta t}$$

rate expression

* what about coefficients ???

$$2H_2 + O_2 \rightarrow 2H_2O$$

$$\text{rate} = \frac{-\Delta [H_2]}{2 \Delta t} = \frac{-\Delta [O_2]}{\Delta t} = \frac{\Delta [H_2O]}{2 \Delta t}$$

coefficients go on the bottom
so you divide