GENERAL KINETICS

Take a general reaction:

$$aA + bB \rightarrow cC + dD$$

then, rate $= v = -\frac{1}{a}\frac{d[A]}{dt} = -\frac{1}{b}\frac{d[B]}{dt} = \frac{1}{c}\frac{d[C]}{dt} = \frac{1}{d}\frac{d[D]}{dt}$

To understand this, put in some numbers, e.g. $a=1, b=0, c=2, d=0$

then $v = -\frac{d[A]}{dt} = \frac{1}{2}\frac{d[C]}{dt}$ for $A \rightarrow 2C$

- -ve because rate of consumption of reactants
- rate of consumption of A is half (i.e. twice as slow) as rate of production of C.
- This makes sense because we make 2 moles of C for each mole of A consumed. i.e. rate of production of C is 2x rate of consumption of A.

More complex: $a=1, b=2, c=\frac{1}{2}, d=3$

$\Rightarrow A + 2B \rightarrow \frac{1}{2}C + 3D$

$$v = -\frac{d[A]}{dt} = -\frac{1}{2}\frac{d[B]}{dt} = 2\frac{d[C]}{dt} = \frac{1}{3}\frac{d[D]}{dt}$$

- A is consumed 3 times more slowly than D is produced.
- measure other rates relative to this
- A is used up half as quickly as B
- C is produced half as quickly as A is consumed