What is a chemical reaction?

rearrangement of atoms

= new substances are made

What is reaction rate? What info is needed to determine rate?

speed, how fast the rxn occurs

$$\frac{\Delta \text{ concentration}}{\Delta \text{ time}} = \frac{M}{s}$$

Why do we care?

cooking

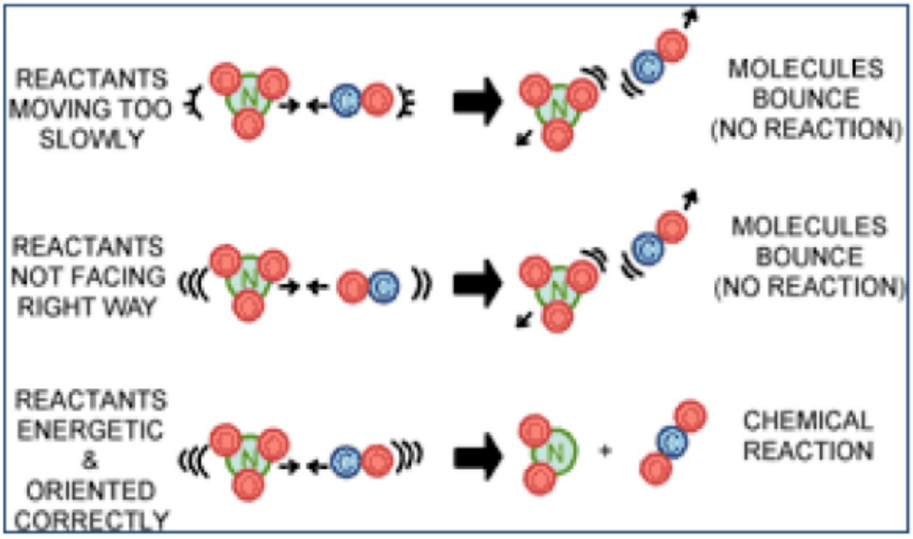
medicine

How do chemical rxns occur?

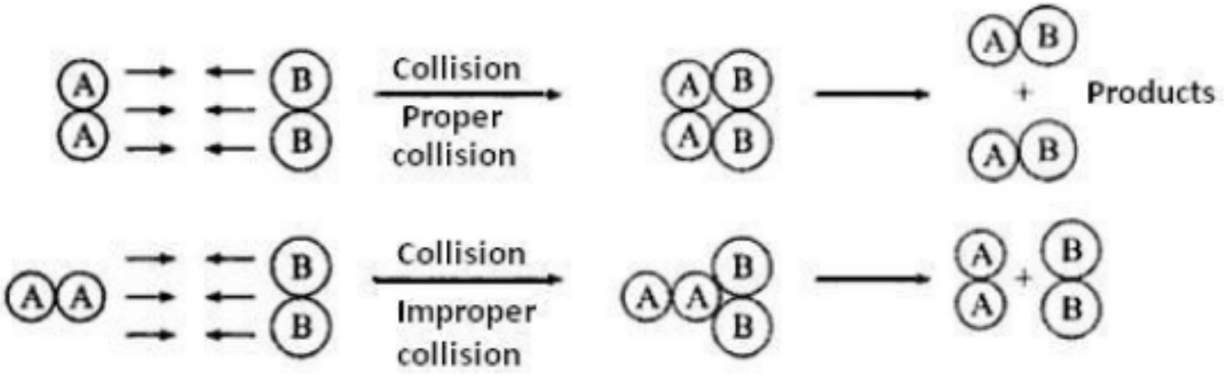
collisions = sufficient E + proper orientation

"sweet spot"

Sufficient Energy + Proper Orientation = Successful Collision

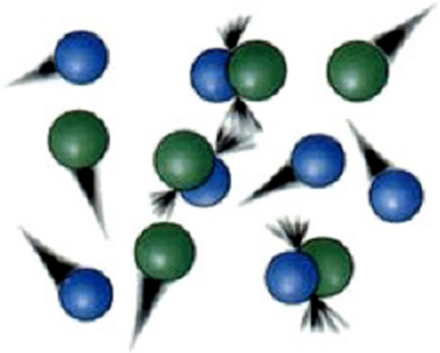


Sufficient Energy + Proper Orientation = Successful Collision

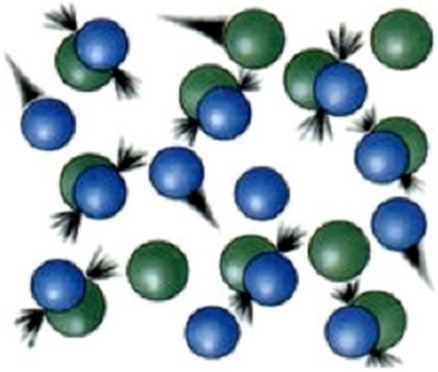


Five Factors That Affect Rxn Rate

#1 Concentration of Reactants



Low concentration = Few collisions



High concentration = More collisions

= Faster rxn

#2 Nature of Reactants

-Physical States

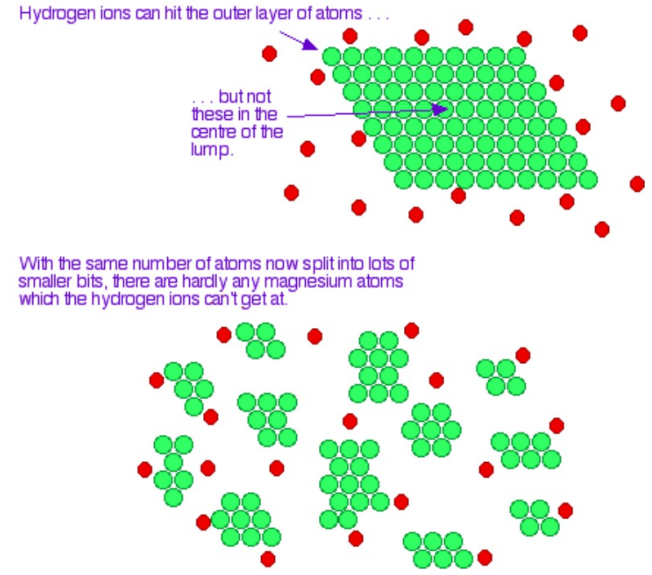
- gases react faster than liquids
- liquids react faster than solids

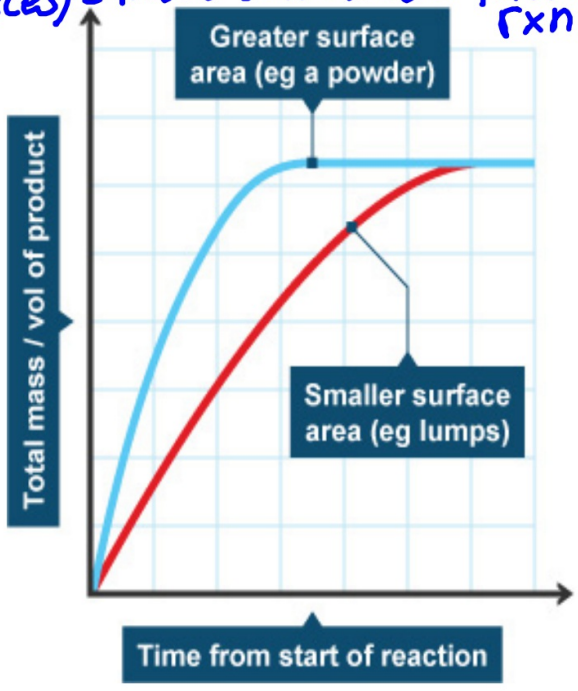
-Type/Strength of Chemical Bonds

- stronger chemical bonds of reactants requires more E to break
  ∴ slower rxn.

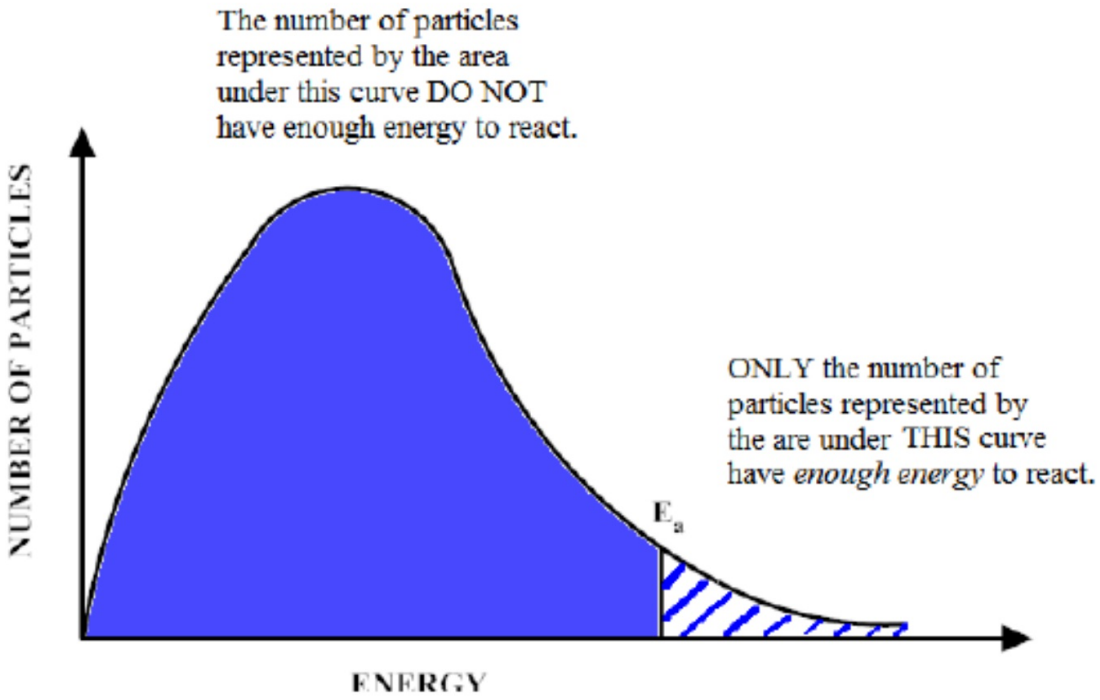
#3 Surface Area

higher surface area (i.e. smaller pieces) = more collisions = faster rxn





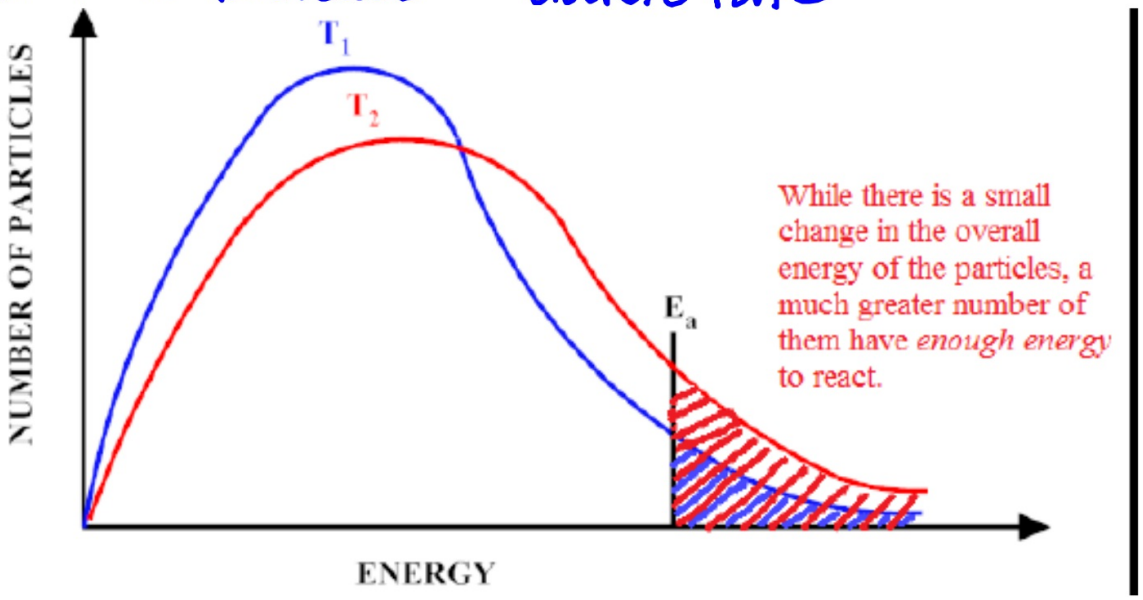
#4 Temperature



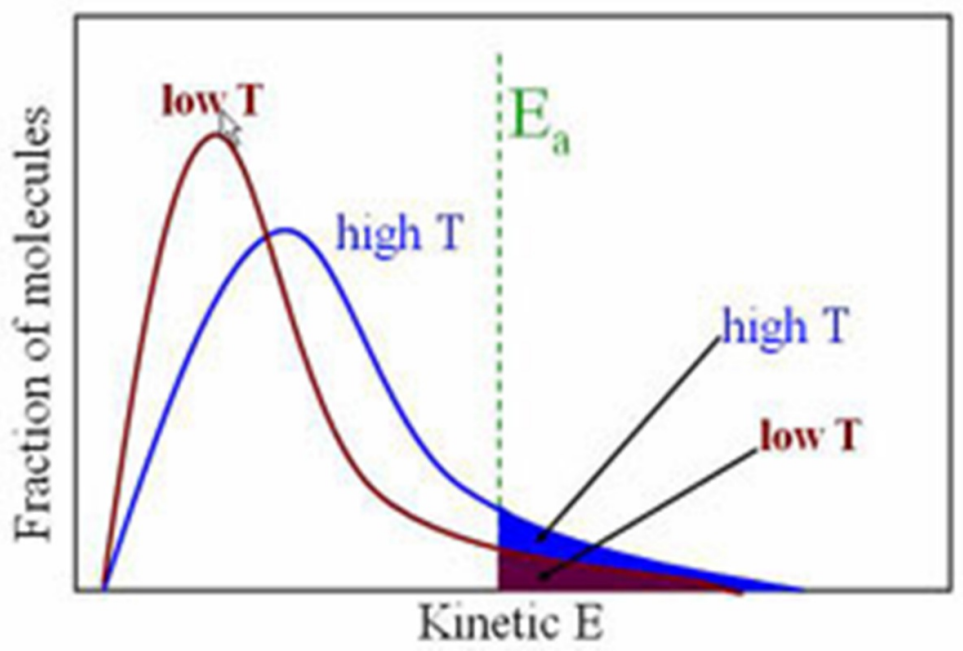
#4 Temperature

Increase in temperature = more particles w/ sufficient E to react

★ A 10°C increase = double rate



#4 Temperature



#5 Catalyst