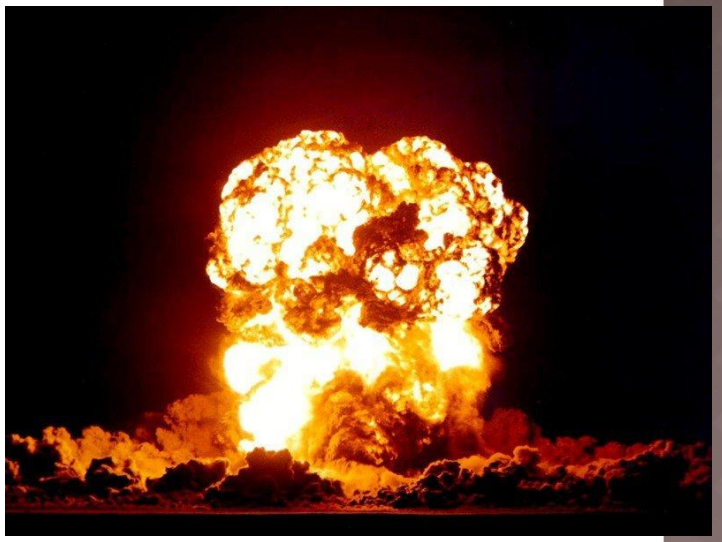
REACTION ENERGY

Please take out your Chemical bonding notes! (2 packets)

Test tomorrow!

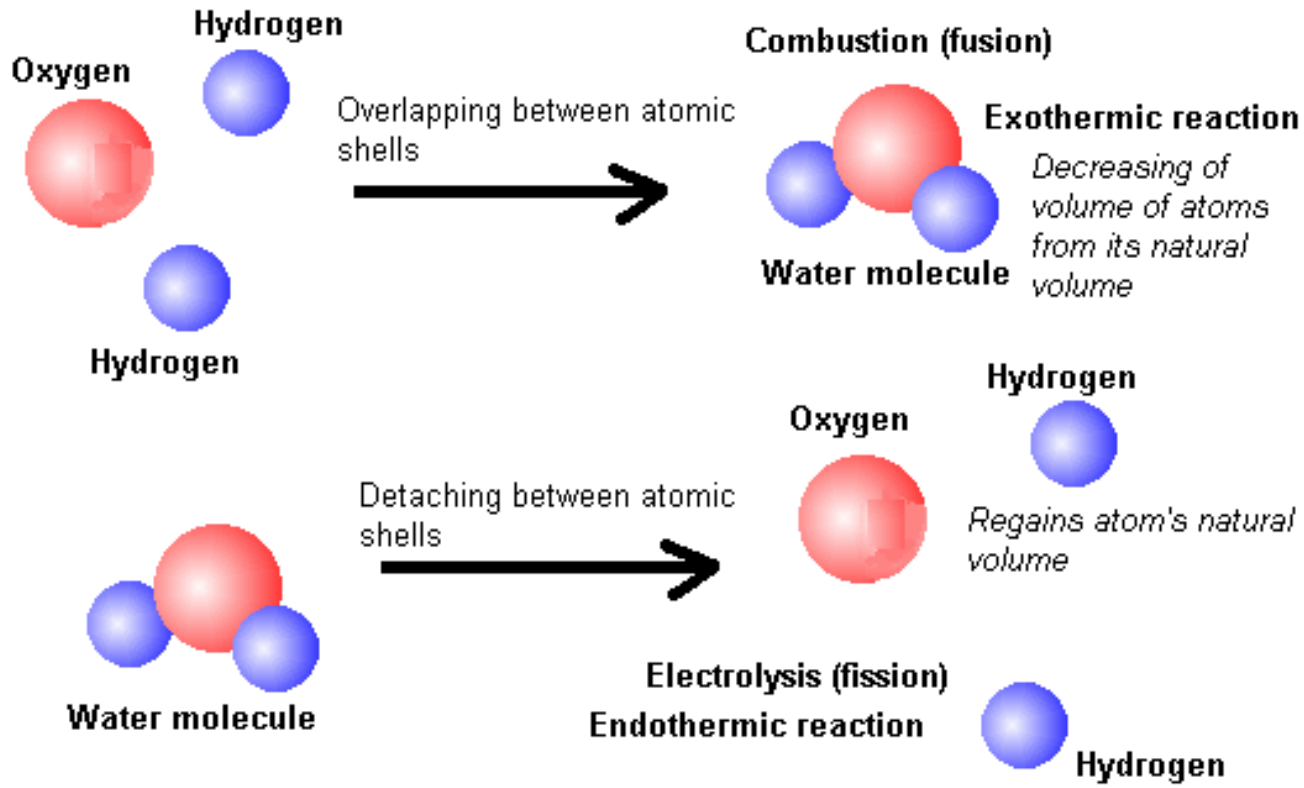
ENERGY EXCHANGE

- All chemical reactions ***release*** or ***absorb*** energy
- Energy can be in many forms:
  - ***Heat***
  - ***Light***
  - ***Sound***
  - ***Electricity***
  - ***Motion***



ENERGY EXCHANGE

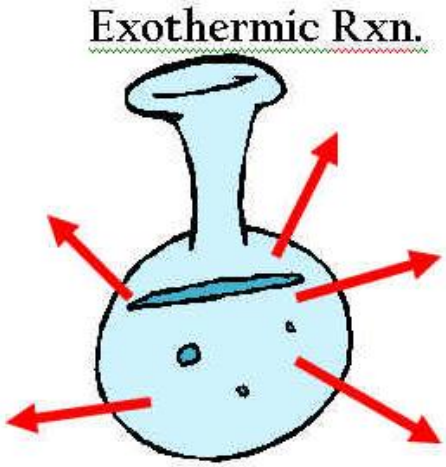
- Bond formation ***releases*** energy
- Breaking bonds ***requires*** energy



EXERGONIC REACTIONS

- Reactions that ***release*** energy

- If the energy released is ***heat energy***, the reaction is ***exothermic***

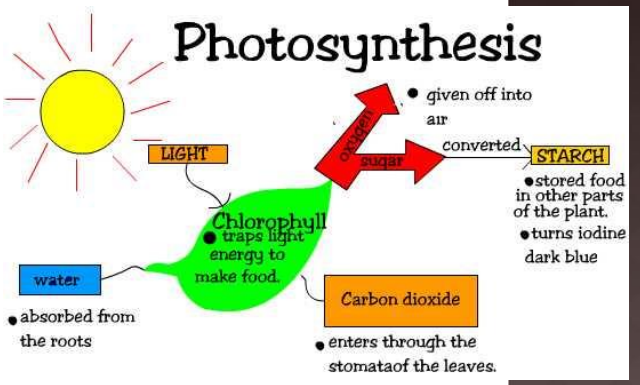


- Exothermic reactions ***feel hot***

- **Ex**: *hand warmers, glow sticks*

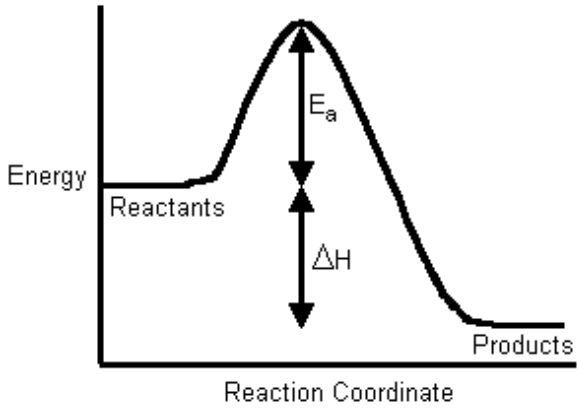
ENDERGONIC REACTIONS

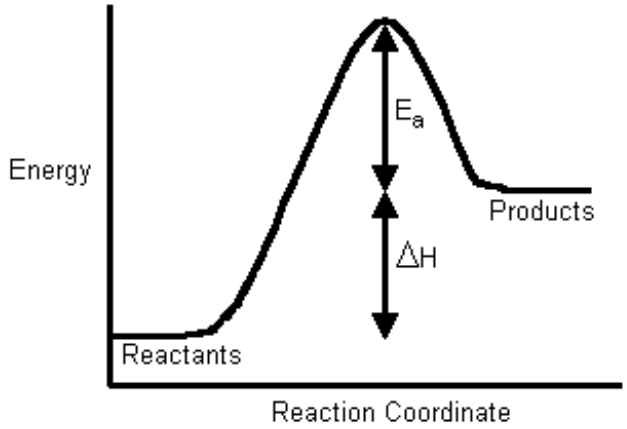
- Reactions that ***absorb*** (require) energy
- If the energy absorbed is heat energy, the reaction is ***endothermic.***
- Endothermic reactions ***feel cold***
- **Ex:** *Photosynthesis, ice packs*



ACTIVATION ENERGY

- ***All*** reactions take energy to get started!!!
- The energy it takes to get a reaction started is called the ***activation*** energy (E_a)



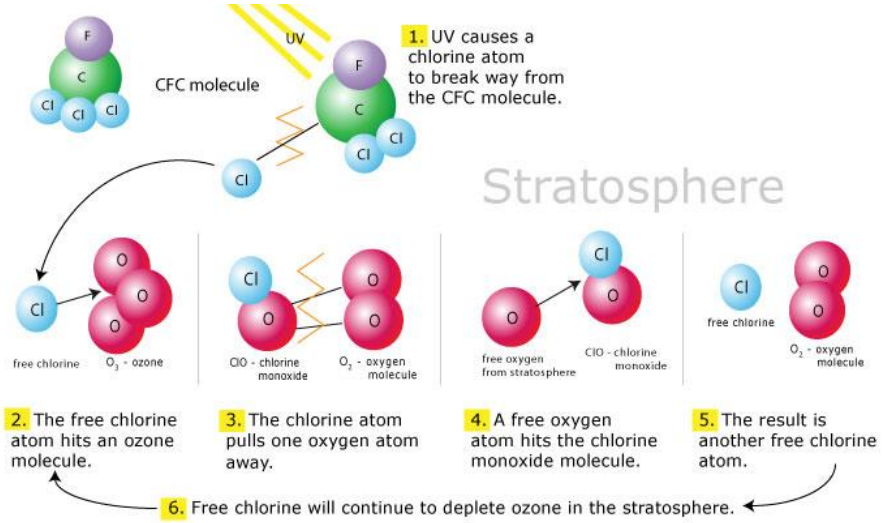


CATALYSTS & INHIBITORS

- A ***catalyst*** is a substance that ***speeds up*** the reaction
- An ***inhibitor*** is a substance that ***slows down*** a reaction

MORE ON CATALYSTS

- A *catalyst* does not ***change*** during the reaction
- ***Lowers*** the activation energy.
- **Ex.** CFC's in Ozone depletion.



FACTORS THAT AFFECT REACTION RATES

Unit 5

COLLISION THEORY

- In order to react, reactants must
  - ***Collide***
  - Collide with enough ***energy***
  - Collide with the correct ***orientation***

COLLISION THEORY

The rate of a reaction is affected by four factors:

Concentration

Surface Area

Temperature

Catalyst

CONCENTRATION

- A measure of the amount of a substance in a given unit of volume
- High concentration = ***more collisions***
- Result: ***More products formed in less time***

SURFACE AREA

- Amount of surface ***exposed***
- Increases rate of reaction by breaking into ***smaller*** pieces (*increases collisions*)

Ex: burning wood logs vs. saw dust

Which burns faster?

TEMPERATURE

- Higher temperature =

1. Increased energy

2. Increased speed

3. Increased collisions

Result: ***increased*** rate of reaction

CATALYST

- Not changed by the chemical reaction
- ***Speeds up*** the reaction by lowering the activation energy