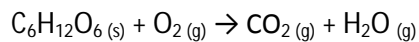


Introduction:

Consider a large piece of wood. Wood ( $C_6H_{12}O_6$ ) reacts with oxygen ( $O_2$ ) in a combustion reaction to produce Carbon dioxide and water:



Joey would like to completely convert this wood to  $CO_2$  and  $H_2O$ .  
What are some things he could do to speed up the chemical reaction?

accelerant / gasoline      drier wood  
higher temp / more heat

chop it into wood chips      start fire in different places

- put in more oxygen

How does each factor affect reaction rates?

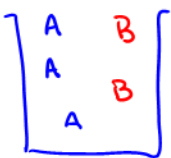
Temperature


- Increasing temperature causes reaction rates to increase
- This is because the higher temperature gives the molecules more energy and they move around faster. This increases the chance that the molecules will collide.
- Lowering the temperature will: decrease reaction rates, because molecules move around less.

Examples: - wood burns faster in hot fire  
- glowstick reactions are slower in cold water.

Concentration

- Concentration means: amount of molecule per unit volume.
  - Examples: small amount of flavour crystal in cup = low concentration
- A higher concentration of reactants will increase the rate of reaction.
- This is because the higher concentration increases the chance of a collision between reactants

Examples:   
low chance of collisions

  
much better chance of B colliding with A.

your stomach has concentrated HCl.  
- speeds up chemical digestion

## Surface Area

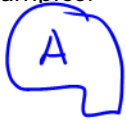
- Surface area is important when at least one reactant is a solid or if you have two liquids that cannot mix
- If there is more surface area, then the rate of reaction will increase because the chance of a collision between reactant molecules will increase.

Examples: - wood chips burn faster than a log

## Catalysts

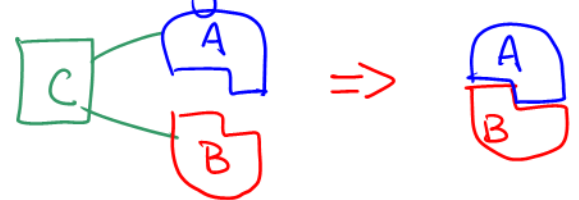
- A catalyst is a substance that increases the reaction rate, but is not part of the reaction.
  - The catalyst does not get used up by the reaction.
- increases the chance of a "correct collision"

Examples:



these reactants only combine if they fit together the right way.

A catalyst might make sure they come together

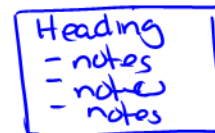
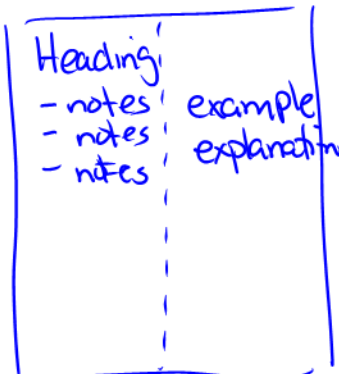
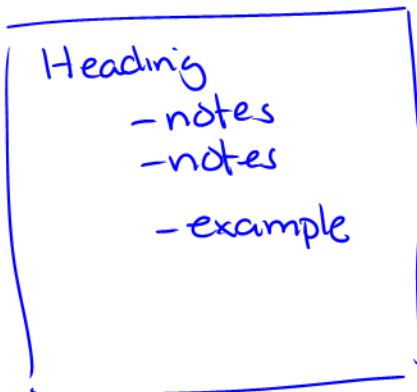


\* many catalysts are enzymes in biology

\* Catalytic Converter.  
- car's exhaust system  
- help poisonous gases  $\rightarrow$   $\text{CO}_2$

## Assignment

- p116-118 of your workbook
- Create a study guide for this section
  - Create notes and an example explaining the importance of the factor affecting reaction rate in your own words.
  - Your study guide should fit on a single side of a piece of paper



example on back