

# 2 – 2 Rates of Chemical Reactions



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# Activation Energy

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- Activation Energy – the minimum amount of energy that is needed to start a reaction.
  - The atoms must be moving fast enough to break the old bonds when they collide.
  - When you want to burn something, you must first add a spark ( heat energy ) to ignite it.



# Reaction Rate

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- Rate of Reaction – how fast a reaction occurs after it has started.
  - Measure how fast a reactant is consumed.
  - Measure how fast a product is created.
- It is important to the food industry.
  - They do not want food spoiling on the shelves in the store.



# Factors affecting rate of reaction

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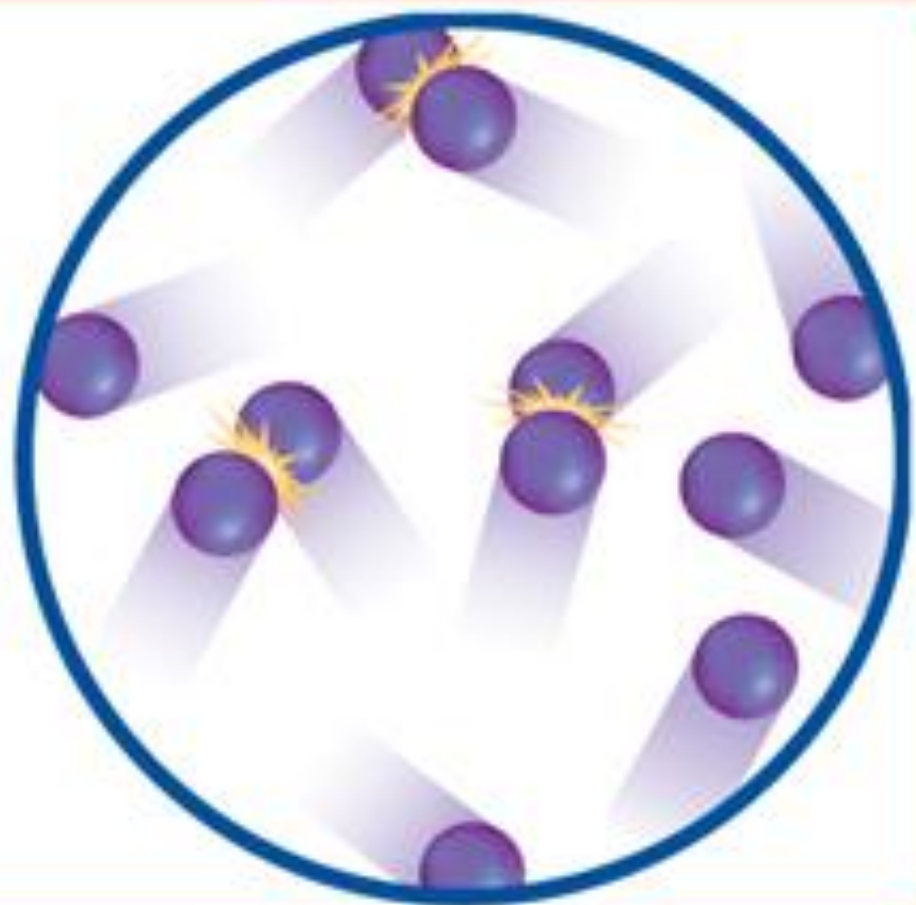
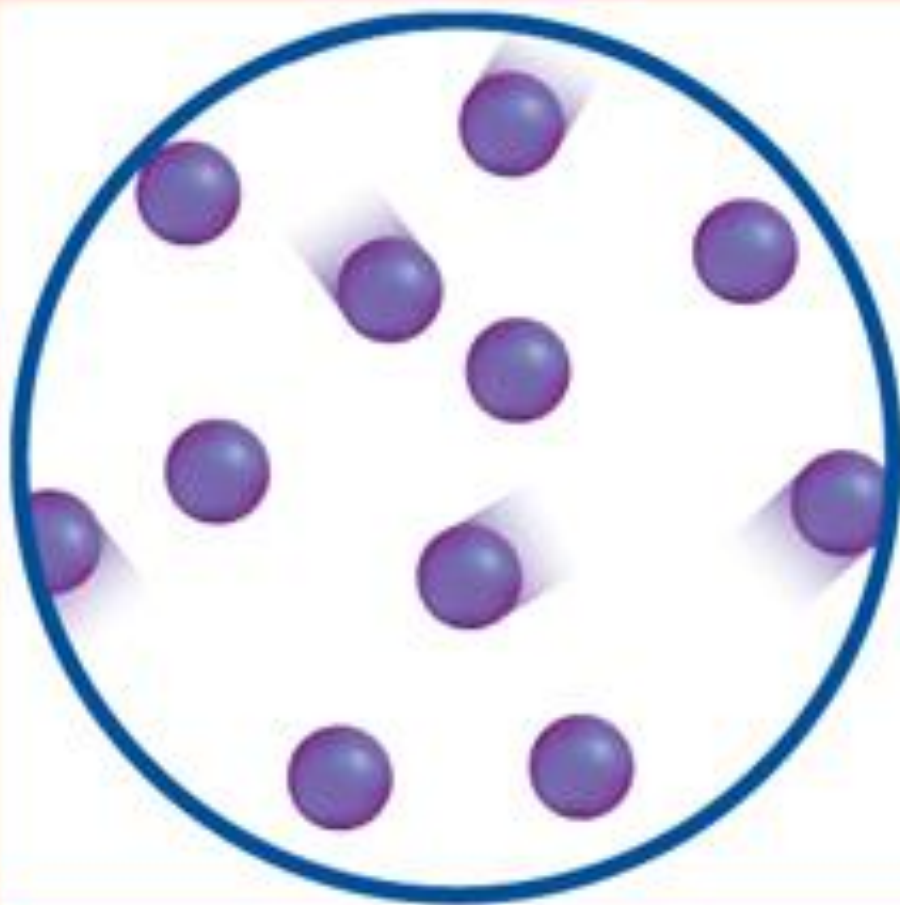
1. Temperature
2. Concentration
3. Surface Area



# Temperature

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- Temperature is a measure of how fast the atoms are moving.
- Cooling a reaction will slow down the reaction ( particles slow down )
  - Keeping food in the refrigerator.
- Heating a reaction will speed up the reaction ( particles speed up )
  - Placing food in the oven.

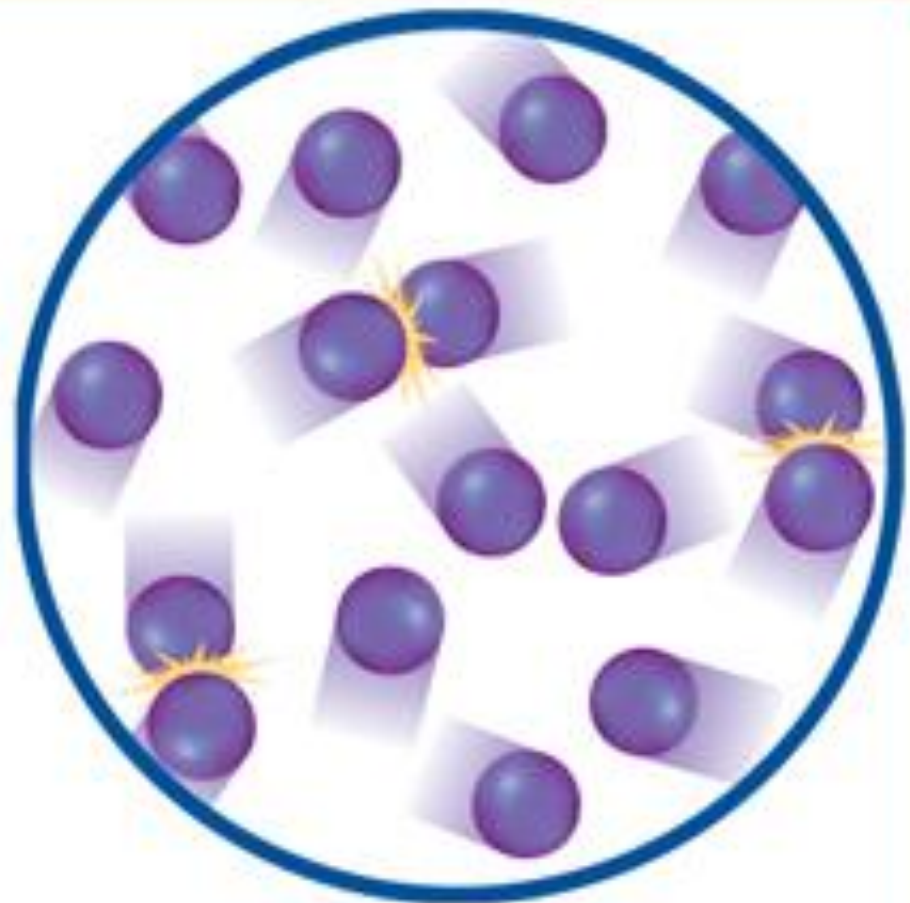
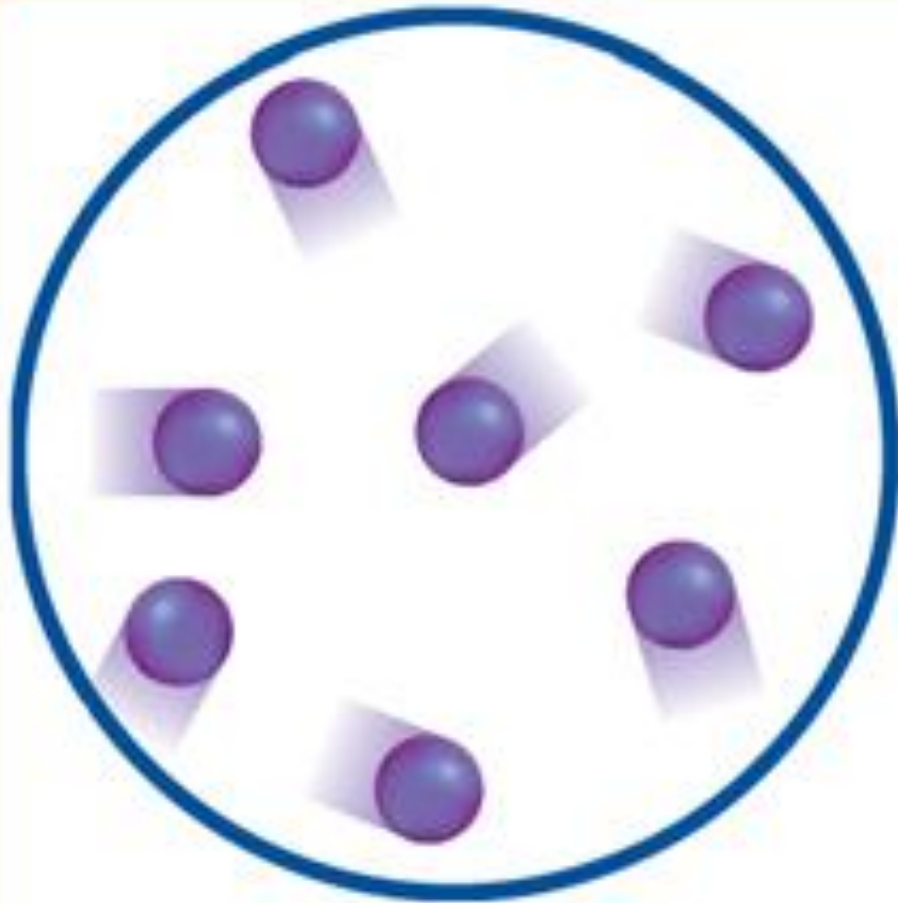




# Concentration affecting rate of reaction

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- Concentration – the amount of substance present in a certain volume.
- If you add more particles, they will be closer together.
- Being closer together increases the chances of a collision occurring.







# Surface area affecting reactions

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- Reactions can only take place on the surface of the object.
- If you increase the surface area, there are more atoms available to collide with and speed the reaction along.



# Slowing a reaction

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- Inhibitor – a substance that slows down a chemical reaction.
  - Useful in medications to make them last longer.
  - Placed in some dried foods to extend their shelf life.



# Speeding up reactions

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- Catalyst – a substance that speeds up a chemical reaction.
  - The Platinum group ( from the beginning of the year ) acts as good catalysts.
  - They are not changed by the chemical reaction.



# Catalytic Converters

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- Catalytic converters are placed in the exhaust systems of vehicles to complete the burning process.
  - Reduces the amount of hydrocarbons
  - Reduces the amount of carbon monoxide
  - Use a catalyst to accomplish this



# Enzymes

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- Enzyme – catalysts that are large protein molecules which speed up reactions needed for your cells to work properly.
  - Catalysts in the body.