**Controlling Chemical Reactions**

All reactions take place at different speeds. The speed at which a reaction occurs is called its rate of reaction.

Factors that Affect Rates of Reactions

1. Temperature

* Increasing the temperature at which a reaction occurs increases the rate of reaction.
* Why? As temperature increases, the speed at which molecules move increases – which increases the collisions and interactions between molecules.

2. Concentration

* Increasing the concentration of reactants increases the rate of reaction.
* Why? As concentration increases, more molecules are packed into a smaller space – meaning they are more likely to collide with each other.

3. Surface Area

* Surface area is the amount of area of a sample of matter that is able to react. To increase surface area, decrease the size of particles involved in the reaction.
* Increasing the surface area of reactants increases the rate of reaction.
* Why? Increasing the number of solid particles available to react increases the number of molecules available for collision.

4. Catalysts

* A catalyst is a substance that increases the rate of reaction without being consumed by the reaction.
* How? A catalyst decreases the amount of collision energy that molecules need to break bonds and form new molecules. A catalyst increases the fraction of collisions that are effective.