

Collision Theory

The **rate of reaction** has a list of factors: **temperature**, **concentration** and **surface area**. If the temperature is increased, the reaction would be faster. If the concentration of the reactants is increased (or the **pressure** is increased), the reaction would be much faster. If there is a larger surface area (the solid pieces are smaller), there is a quicker reaction. Collision theory explains about how the rate of reaction depends on two key points:

- how often the reacting particles collide.
- how much **energy is transferred** during a collision.

When the temperature increases, the particles are going to move quicker, therefore will collide more often. If a solution is more concentrated, this means there are more particles of the reactant knocking with other particles. This makes collisions more likely.

If the reactants are a solid and broken up into smaller pieces (this means that the surface area increases), the particles will have more area to work around, therefore resulting in **more frequent successful collisions**.

Reactions can only take place if the particles have enough energy to collide with other particles. Temperature doesn't only increase the number of collisions but also increases the energy of collisions. **Activation energy** is the minimum energy required for particles to react.

Proportionality comes in with the rate of reaction. There is **direct proportion** between the rate of reaction and frequency of successful collisions. **If the rate of reaction is doubled**, then **the number of collisions is doubled** and the pattern continues.