

# NATIONAL 4 CHEMISTRY

## SUMMARY NOTES

### Unit One: Chemical Changes and Structure

#### 1. Substances

##### Elements, Compounds and Mixtures

**Elements** are the simplest type of substance.

An element contains only ONE type of atom.

A **compound** is a substance with 2 or more elements chemically joined together.

##### **Naming compounds:**

Start with element furthest to left in Periodic Table.

If name ends in '\_ide', only 2 elements in compound (except if it's '\_\_\_\_\_ hydroxide').

If name ends in '\_ite' or '\_ate', compound contains 2 elements PLUS oxygen.

**Mixtures** are where 2 or more substances are present but are not chemically joined. These can be easily separated by filtration, distillation, evaporation or chromatography (separates colours).

A **solution** is made when a solid (solute) is dissolved in a liquid (solvent).

**Dilute** solution = lots of solvent : little solute.

**Concentrated** solution = little solvent : lots of solute

**Saturated** solution = no more solute can be dissolved in the solvent. A little more can be dissolved on heating though.

##### Identifying Chemical Changes

A **new substance** is always formed in a chemical reaction. This can be identified by:

- Change of appearance
- Gas forming
- Solid forming (precipitation)
- Energy (temperature) change

A physical change may include some of these but does not form a new substance so can be reversed. Physical changes include freezing, melting, boiling, making a solution.

### Energy changes

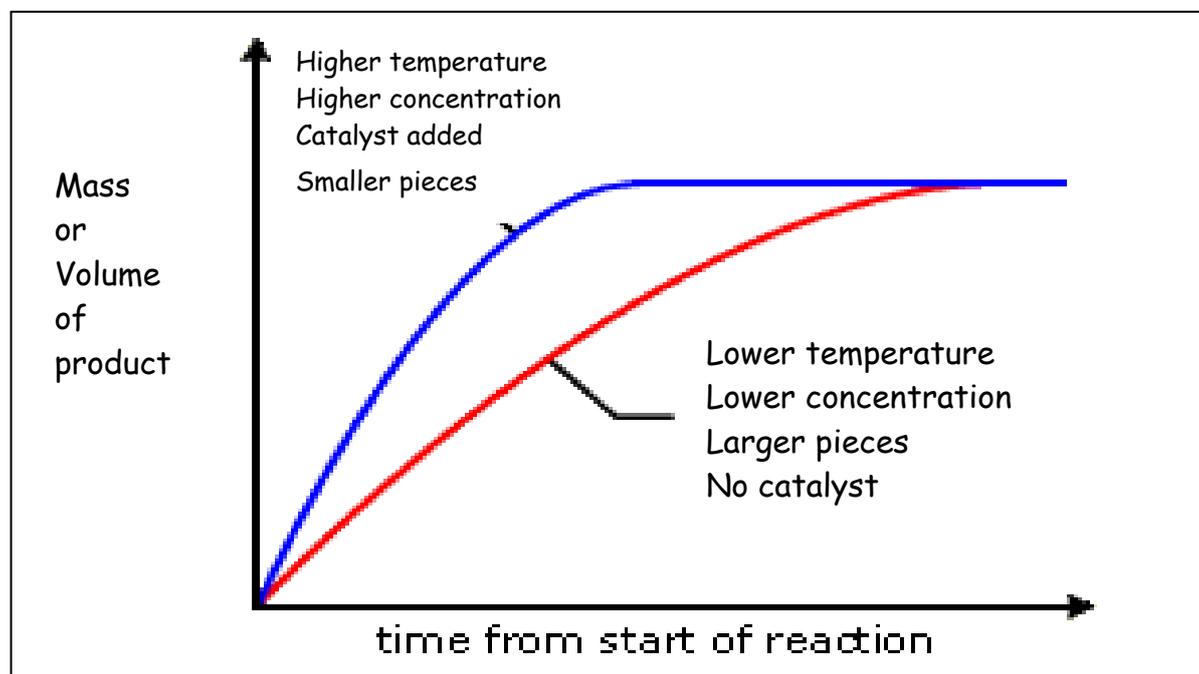
**Exothermic** reaction - a reaction in which energy is given out, usually in the form of heat. The reaction gets hotter.

**Endothermic** reaction - a reaction in which energy is taken in. The reaction gets colder.

## 2. Reaction Rates

Reaction rates can be increased by increasing the number of collisions by:

1. Increasing the temperature of the reactants.
2. Increasing the concentration of the reactants.
3. Increasing the surface area by decreasing particle size.
4. Adding a catalyst (which does not get used up and can be re-used).



The rate of a reaction can be followed by measuring the change in mass or concentration of a reactant or product over a given time.

Enzymes are biological catalysts.

Catalysts are very important in industry:

Catalytic converters use platinum and rhodium to convert poisonous gases into harmless ones in car engines, iron helps make ammonia for fertilisers, nickel helps turn oil into margarine, the enzyme **invertase** turns hard sucrose into soft glucose and fructose in sweets, **zymase** (in yeast) turns glucose into ethanol (alcohol).