

# Kirkcaldy High School



**Chemistry**

**National 4**

**Unit 1 - Chemical Changes and  
Structure**

**TUTORIAL ANSWERS**

## (a) Reaction Rates

1. Increase temperature, increase concentration, decrease particle size (increase surface area), add a catalyst.
2. a - the slope is steeper
3. Increase temperature, increase concentration, decrease particle size (increase surface area), add a catalyst.
4. Decrease temperature, decrease concentration, increase particle size (decrease surface area), remove catalyst.
5. 12-14 s
6. Rate =  $\frac{\Delta\text{quantity}}{\Delta\text{time}}$

## (b) Atomic Structure and Bonding

1. Metals are to the left of the staircase, non-metals to the right?
2. Atoms are electrically neutral as the number of positive protons equals the number of negative electrons.
3. Mass number = number of protons + number of neutrons
4. 7
5. Lithium
6. Covalent bonds are formed when two non-metal atoms share electrons
7. Ionic bonds are formed between a metal and a non-metal atom
8.  $\text{Na}_2\text{O}$ ,  $\text{MgCl}_2$

## (c) Energy Changes of Chemical Reactions

1. Exothermic reactions release energy, endothermic reactions take in energy

2. Write the state symbols for

(a) (s)

(b) (l)

(c) (g)

(d) (aq)

3. The reactants are what you start with, the products are what you make

4.

(a) Oxygen(g) + Iron(s) → Iron Oxide(s)

(b) Silver(s) + Chlorine(g) → Silver Chloride(s)

(c) hydrochloric acid(aq) + sodium hydroxide(aq) → sodium chloride(aq) + water(l)

## (d) Acids and Bases

1. Below 7
2. Above 7
3. 7
4. Hydrochloric acid, Nitric acid, Sulfuric acid
5. When a base is added to an acid, neutralisation will take place. Neutralisation results in the pH of a solution moving towards pH 7
6. A salt and water
7. It will end with Chloride, Nitrate, or Sulfate
8.
  - (a) Sodium hydroxide + Hydrochloric acid  $\rightarrow$  sodium chloride + water
  - (b) Potassium hydroxide + sulfuric acid  $\rightarrow$  potassium sulfate + water
  - (c) Magnesium hydroxide + nitric acid  $\rightarrow$  magnesium nitrate + water
9. Sodium chloride, potassium sulfate, magnesium nitrate