

# Kirkcaldy High School



**Chemistry**

**National 4**

**Unit 3 - Chemistry in Society**

**TUTORIAL ANSWERS**

## (a) Metals

1. Yes
2. Non-metals apart from carbon.
3. They conduct electricity, they are strong, they are malleable.
4. They are unreactive
5. Silver: heat, Copper: heat with carbon, Aluminium: electrolysis.
- 6.

(a) Calcium + Water  $\rightarrow$  Calcium Hydroxide + Hydrogen

(b) Magnesium + Hydrochloric acid  $\rightarrow$  Magnesium Chloride + Hydrogen

(c) Zinc + Oxygen  $\rightarrow$  Zinc oxide

7. Calcium, Magnesium, aluminium, zinc, lead, copper, silver
8. Oxygen and water
9. Rusting
10. Connection of iron to a more reactive metal (sacrificial protection). Paint or grease can be used as a barrier. Zinc can be used, termed galvanising, to create a physical and chemical barrier.
11. An alloy is a mixture of two or more elements, one of which is a metal
12. Brass which is used in electrical fittings, is 70 % copper and 30% zinc. 18 carat gold used in jewellery, is 75 % gold and 25 % copper and other metals. Steel, which is used for railway tracks and car body parts, is made from iron and carbon. Stainless steel used to produce cutlery, can be made from iron, carbon and chromium

## (b) Materials

1. Polymerisation
2. Polystyrene - used in drinking cups as it is an excellent heat insulator. Polyvinylchloride (PVC) - used in window frames as it is rigid and waterproof. Nylon - used for climbing ropes or bristles in toothbrushes as it is light and strong
3.
  - (a) Polyethene
  - (b) Polypropene
  - (c) Polyfluoroethene
  - (d) Polychloroethene
  - (e) Polytetrachloroethene
4. Carbon monoxide
5. A plastic that can be broken down in soil.
6. Thermosoftening (also called thermoplastics) are plastics which will soften when heated and can be reshaped. Thermosetting plastics are plastics that do not soften on heating. They are used when resistance to heat is important (*e.g.* kettles, plugs, laptop chargers etc)

## (c) Fertilisers

1. Nitrogen, potassium, phosphorus
2. Any soluble salt containing Nitrogen, potassium, or phosphorus (see p8 of the data book)
3. Any insoluble salt or one that does not contain Nitrogen, potassium, or phosphorus (see p8 of the data book)
4. increase nitrate or phosphate levels in the water encourage algae growth, which forms a bloom over the water surface/the formation of a bloom on the water surface reduce oxygen levels causing water plants to die
5. Advantage: Man-made fertilisers can be tailor-made to suit the nutrition requirements.  
Disadvantage: Mat-made fertilisers can be more expensive

## (d) Nuclear Chemistry

1. Elements are made by nuclear reactions in stars
2. Cosmic radiation, radioactive rocks, medical equipment

## (e) Chemical Analysis

1. Heating, heating with carbon, smelting, electrolysis
2. Filtration
3. Evaporation