

4.1 What are chemical reactions?

1. Substances, rearrange, differently, reverse, energy, reactants, products.

2.

Description of reaction	Reactant name(s)	Product name(s)
Magnesium reacts with oxygen to make magnesium oxide.	magnesium oxygen	magnesium oxide
Iron reacts with sulfur to make iron sulfide.	iron sulfur	iron sulfide
Magnesium reacts with hydrochloric acid to make magnesium chloride and hydrogen.	magnesium hydrochloric acid	magnesium chloride hydrogen
Sodium hydroxide reacts with copper sulfate to make copper hydroxide and sodium sulfate.	sodium hydroxide copper sulfate	copper hydroxide sodium sulfate
On heating, copper carbonate makes copper oxide and carbon dioxide.	copper carbonate	copper oxide carbon dioxide

4.2 Atoms in chemical reactions

1. True- **a, c, d.**

False- **b, e.**

Corrected versions of false statements:

b. In a chemical reaction, the total mass of products is equal to the total mass of reactants

e. A water molecule has two hydrogen atoms joined to one oxygen atom.

2. **a. 2**

b. 2

c. 2

d. 2

e. The number of atoms of each element is the same in the reactants and products.

4.5 Corrosion reactions

1. On the surface of, damage, slowly, oxygen, rust, exposes, can.
2. Physical properties – for example, melting point, properties you can observe or measure without changing a substance;
chemical properties – how the substance takes part in chemical reactions, for example, how quickly a substance corrodes or if it burns, you can only find out about these by doing chemical reactions.
3. Oil or grease – stops air and water touching surface;
alloy – does not react with oxygen at all;
painting – stops air and water touching surface;
covering with zinc – stops air and water touching surface.

5.1 Acids and alkalis

1. Acidic substances, for example – lemons, limes, vomit;
alkaline substances, for example – toothpaste, soap.
2. a. Corrosive – hazard symbol showing drips onto hand and flat surface.
Reduce risks by wearing eye protection and gloves.
3. Acidic; reason – indicator becomes the same colour as its colour in hydrochloric acid.

5.2 The pH scale

1. True- **a, d, f.**

False- **b, c, e.**

Corrected versions of false statements:

b. An alkaline solution has a pH greater than 7.0.

c. The more acidic a solution, the lower its pH.

e. You can use litmus paper to find out whether a solution is acidic or alkaline/you can use universal indicator to find out the pH of a solution.

2. **a.** Making fertilisers.

b. 2%

5.3 Neutralisation reactions

1. True- **a, e, f.**

False- **b, c, d.**

Corrected versions of false statements:

b. If you add water to an acid, its concentration decreases;

c. Alex has an alkali of pH 12. He adds acid. The pH decreases;

d. If your soil is too acidic for a certain crop, add alkali to the soil to increase its pH

2. Purple, alkaline, decreases, 7, neutralised, decreases, red.

6.1 Models of the Earth

1. From top – crust, mantle, outer core, inner core.
2.
 - a. I
 - b. C, M, I
 - c. O
 - d. O, I
 - e. M, O
 - f. C
 - g. C
3. Ships appear to sink as they go over the horizon, observations from space, the shadow of the Earth on the Moon is round.

6.2 Plate tectonics

1. Evidence for plate tectonics – scientists found fossils of the same animal in Africa and South America; scientists found fossils of the same plants in Africa and South America; shapes of Africa and South America look as if they fit together.
Reasons that other scientists rejected the idea of plate tectonics at first – scientists did not know *how* the continents could move; scientists did not trust Wegener (the scientist who suggested the hypothesis) because he mainly studied the weather, not rocks.

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2. a. Chemical reaction [1]

b. Reactants [1]

c. Products [1]

d. Combustion [1]

e. Corrosion [1]

3. a. Hydrogen and chlorine [1]

b. Hydrogen chloride [1]

c. Green [1]

d. 2 [1]

e. 2 [1]

f. There are two chlorine atoms and two hydrogen atoms in both the reactants and products. Since the numbers of atoms does not change, the mass also does not change. [2]

5. a. Oxygen and water [2]

b. Corrosion [1]

c. For example, paint the sign [1]

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1. Less than, more than, equal to [3]
2. a. Orange juice - acidic; milk - neutral; cola drink - acidic; sweat - acidic; indigestion medicine - alkaline [5]
 - b. Indigestion medicine [1]
 - c. One from - orange juice, cola drink [1]
3. a. Acidic - red; alkaline - blue [2]
 - b. From red [1] to blue [1]

6. a. Cassava [1]
 - b. Pineapple and cassava [2]
 - c. One from: pineapple, banana, sugar cane, maize, cassava [1]
 - d. i. Maize and cassava [2]
 - ii. Acid [1]

8. a. i. 7 [1]
 - ii. 4.5 [1]
 - iii. 22 minutes [1]
- b. More [1]
- c. 13 minutes [1] (from 1 minute to 14 minutes after she ate the sweet)
- d. Alkaline [1]

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- 1. a.** From top – crust, mantle, outer core, inner core [4]
- b.** Crust – solid; inner core – solid; mantle – solid; outer core – liquid [4]
- c.** Mantle [1]

- 3.** Twelve, solid, mantle, mantle, flows, centimetres [6]

- 6. a.** Their shapes look as though they fit together [1]
 - b.** Similar rocks at the edges of both continents [1] and fossils of the same animal species have been found at the edges of both continents [1]
- 7.** B, A, F, C, E, D [5]