

Workbook Answer key

8.6 The Group 1 elements

1a A, O

b A, O

c O

d O

e O

f O

2a i lithium + water \rightarrow lithium **hydroxide** + hydrogen

ii sodium + water \rightarrow sodium **hydroxide** + hydrogen

iii potassium + water \rightarrow potassium **hydroxide** + hydrogen

b As you move down the group, the reactions of Group 1 metals with water become more vigorous.

3a Top to bottom: 0.53 g/cm^3 , 21.43 g/cm^3 , 0.86 g/cm^3 , 20 g/cm^3 .

b A, C, both of these metals have low densities.

8.7 The Group 2 elements

1 Second group (column) on the periodic table shaded in.

2a Bubbles more vigorously (more than calcium but less than barium). Colourless solution formed.

b calcium + water \rightarrow calcium hydroxide + hydrogen

c barium + water \rightarrow barium hydroxide + hydrogen

3a calcium chloride + water + hydrogen

b calcium + hydrochloric acid \rightarrow calcium chloride + water + hydrogen

10.1 The reactions of metals with oxygen

- 1 oxygen, oxides, iron oxide, element, compound
- 2a lithium, potassium, sodium
- b gold, platinum
- c potassium, sodium, lithium, platinum/gold
- 3a oxygen
- b iron oxide
- c potassium
- d lead oxide
- e oxygen
- f zinc

10.2 The reactions of metals with water

- b
 - i It was easy for Mr Figo to cut the potassium.
 - ii The potassium was very reactive.
 - iii The potassium reacted around quickly.
 - iv There was a small amount of potassium.
 - v The Universal Indicator solution changed colour from green to blue.
- 2a T
- b F – Calcium reacts with water to make calcium hydroxide and hydrogen gas.
- c T
- d F – sodium + water \rightarrow sodium hydroxide + hydrogen

10.3 The reactions of metals with acids

1a copper and gold

b magnesium

c magnesium, zinc, iron, copper/gold

2a Place a lit splint into the gas. If the splint goes out and makes a squeaky pop, the gas is hydrogen.

b i hydrogen

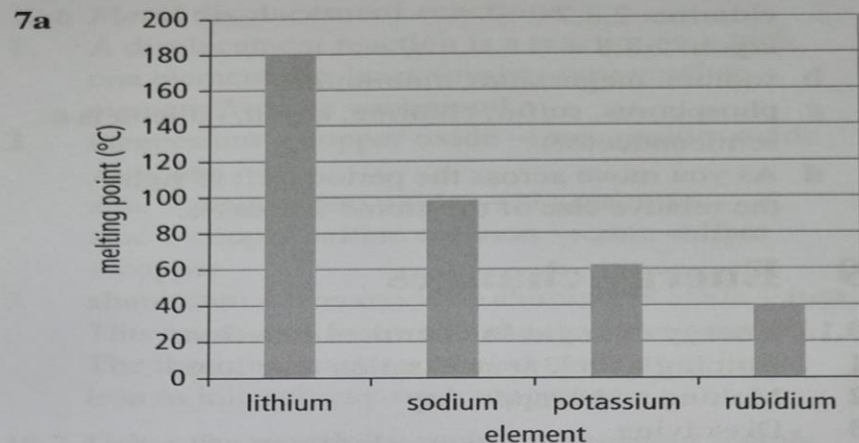
ii zinc sulfide

iii hydrochloric acid, hydrogen

iv zinc, hydrogen

Textbook Answer key

8.12 Review



- b** As you move down the group, the melting point decreases.
- 8a** The bubbles show that hydrogen is being produced.
- b** The sodium hydroxide that is formed is alkaline.
- c** sodium + water → sodium hydroxide + hydrogen
- d**
- Hydrogen is produced. An alkaline solution is produced.
 - The reaction of potassium is more vigorous.
- e** As you move down Group 1, the reactions become more vigorous.
- 9a** The relative size of the atom increases down the group.
- b** The number of electron shells increases (as you move down the group), increasing the relative size of the atom.
- 10a** As you move down Group 2 (beryllium to strontium), the boiling point decreases.
- b** Barium would have a lower boiling point.
- c** Prediction: the melting point would decrease as you move down the group. Reason: the boiling point decreases, suggesting that the melting point would too.

- 11a** variable to change: element
variable to observe: how vigorous the reaction is
- b** the amount of element used, the temperature of the water
- c** Collect data about the reactions and the amount of chemicals to use. Carry out a risk assessment.
- d** The reaction of strontium with water is very vigorous and can be dangerous.
- 12a** Two of: fluorine, chlorine, bromine, iodine, astatine.
- b** do not conduct electricity or conductors of heat
- c**
- bromine
 - As you move down the group the boiling point increases.
 - Approximately -101°C
- d** See images on page 161.
- 13a** magnesium: 2,8,2
aluminium: 2,8,3
silicon: 2,8,4
phosphorus: 2,8,5
sulfur: 2,8,6

10 The reactivity series

10.1 The reactions of metals with oxygen

- 1 Bright white flame and crackling sounds.
- 2 iron oxide
- 3 zinc + oxygen \rightarrow zinc oxide
- 4 magnesium, iron, copper

10.2 The reactions of metals with water

- 1 potassium, sodium, lithium, calcium
- 2 Products: potassium hydroxide and hydrogen
Potassium + water \rightarrow potassium hydroxide + hydrogen
- 3 Gold does not react with cold water.

10.3 The reactions of metals with acids

- 1 potassium, sodium, lithium, calcium.
- 2 Products: magnesium chloride and water
magnesium + hydrochloric acid \rightarrow
magnesium chloride + water
- 3 Collect the hydrogen in a test tube. Put a lit splint into the test tube. The splint makes a squeaky pop and goes out.
- 4 To ensure that there is the same amount of metal free to react, allowing him to compare the results.

10.9 Review

- 3a hydrogen
 - b Add Universal Indicator, the solution would turn blue/purple.
 - c lithium hydroxide
 - d potassium + water \rightarrow potassium hydroxide
 - e potassium, lithium, magnesium
 - f sodium
 - g Potassium and lithium react violently with dilute acids.
- 4a
- i the metal
 - ii Amount of dilute hydrochloric acid and the amount of metal added.
 - iii To ensure that they are the only variables influencing the results (to make it a fair test).

- d To determine whether the type of acid affects the reaction.
- e Collect the gas produced in a test tube. Place a lit splint inside. If the splint makes a squeaky pop and goes out, there is hydrogen present.