Name and class ..... Date: .....

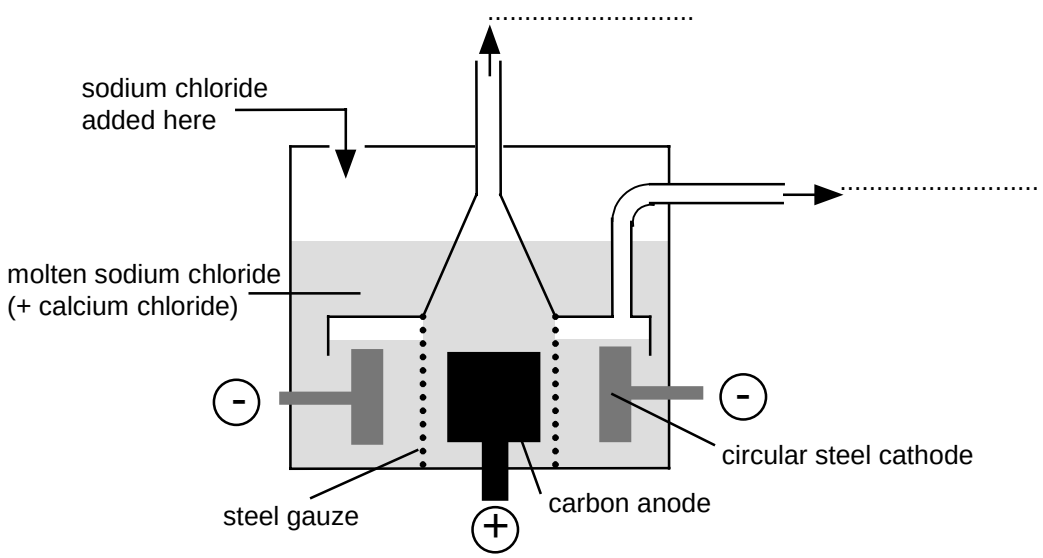
LONGMAN GCSE CHEMISTRY WORKSHEETS

2: Some sodium chemistry

This sheet looks at some of the chemistry of sodium. Don't worry if some of it is unfamiliar to you. You should be able to answer all the questions based on chemistry you already know.

The manufacture of sodium from sodium chloride

Sodium is manufactured by electrolysing molten sodium chloride. Calcium chloride is added to lower the melting point of the sodium chloride from 801°C to about 600°C.



1 The products of the electrolysis are sodium and chlorine. Complete the labelling on the diagram to show where they are formed.

2 Write the electrode equation (including state symbols) to show the formation of the sodium.

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3 The electrolysis cell is designed to keep the sodium and chlorine apart when they are formed. Explain why this is necessary.

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4 Explain why sodium chloride has a high melting point. (Hint: think about its structure.)

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Some uses of sodium

5 Some forms of street lighting use sodium vapour which an electric current is passed through. What colour light would you expect these lamps to give? (Hint: think about the flame test colour of sodium.)

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6 Sodium is also used to extract the metal titanium from one of its compounds, titanium(IV) chloride, $TiCl_4$.

(i) Write an equation for the reaction between sodium and titanium(IV) chloride. (You may omit the state symbols.)

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(ii) Suggest a method of separating the titanium metal from the other product of the reaction.

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Sodium as a metal

Sodium is held together by metallic bonds. It is a good conductor of heat and electricity, although its melting point is low for a metal.

7 Using sodium as an example, explain what is meant by a metallic bond.

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8 Explain why sodium's metallic bonds means that it can conduct electricity.

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9 Metals form positive ions. Describe any reaction in which sodium forms sodium ions. You should state what it reacts with, what you would see, and write an ionic equation for the reaction.

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