

CHEMISTRY

Learning objectives I can:	I can do this very well	I can do this quite well	I need to do more work on this
5.1 Describe how ethanol is produced during the fermentation of carbohydrates, including: a that the fermentation mixture is kept warm and under anaerobic conditions b that yeast provides an enzyme for this reaction			
5.2 Prepare a solution of ethanol by fermentation			
5.3 Recall that different percentages of ethanol are present in various drinks			
5.4 Demonstrate an understanding of the social issues and possible harmful effects of ethanol in alcoholic drinks			
5.5 Explain how to obtain a concentrated solution of ethanol by fractional distillation of the fermentation mixture			
HSW 4 There are some questions that science cannot currently answer and some that science cannot address			
H 5.6 Recall how ethanol can also be manufactured by reacting ethene (from cracking of crude oil fractions) with steam			
H 5.7 Evaluate the factors which are relevant to the choice of method used in the manufacture of ethanol, including: a the relative availability of sugar cane or sugar beet and crude oil b the quality of the final product and whether it needs further processing			
H 5.8 Recall that dehydration of ethanol results in the formation of ethene			
HSW 13 How and why decisions about science and technology are made, including those that raise ethical issues, and about the social, economic and environmental effects of such decisions			
H 5.9 Define homologous series as a series of compounds which: a have the same general formula b show a gradual variation in physical properties as exemplified by their boiling points c have similar chemical properties			
5.10 Recall the names, formulae and structures of members of the following homologous series: a alkanes, up to 4 carbon atoms per molecule b alkenes, up to 3 carbon atoms per molecule H c alcohols, up to 3 carbon atoms in length d carboxylic acids, up to 3 carbon atoms per molecule			
HSW 1 The analysis of scientific data			
5.11 Demonstrate an understanding that ethanol can be oxidised to form ethanoic acid, and that this reaction occurs in open bottles of wine and in the production of ethanoic acid in vinegar			
5.12 Describe the use of vinegar as a flavouring and as a preservative			
5.13 Demonstrate an understanding that ethanoic acid is a typical acid, including: a its reaction with metals b its reaction with bases and carbonates to form salts (ethanoates) c its typical effect on indicators			
HSW 11 Presenting information, using scientific, technical language, conventions and symbols			
5.14 Describe the reaction of ethanol with ethanoic acid to produce an ester, ethyl ethanoate and water H including writing			

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an equation for this reaction using molecular and structural formulae			
5.15 Describe uses of: a esters as flavourings and perfumes, as they are pleasant-smelling			
b polyesters as fibres to make fabric and as plastics for making bottles (no consideration of the formation of polyester is required)			
5.16 Demonstrate an understanding that polyesters can be recycled to form fleece that is used to make clothing			
HSW 12 The use of contemporary science and technological developments and their benefits, drawbacks and risks			
5.17 Recall that oils and fats are esters			
5.18 Describe the breaking down of oils and fats, by boiling with concentrated alkali solution to produce soaps, which are sodium or potassium salts of long carbon chain carboxylic acids			
H 5.19 Demonstrate an understanding of how a soap removes dirt or grease, including: a that part of the soap anion is hydrophobic and dissolves in dirt or grease			
b that the other part is hydrophilic and dissolves in water			
H 5.20 Demonstrate an understanding that liquid oils can be converted to solid fats by catalytic hydrogenation, which removes the C=C unsaturation and that this process is used to manufacture margarine			