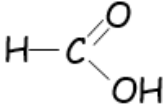
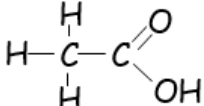
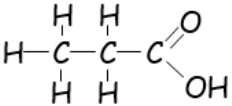
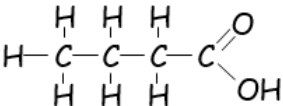
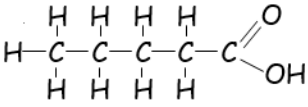
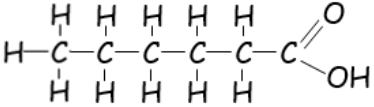
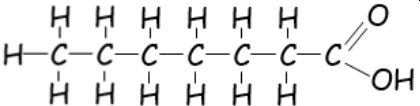
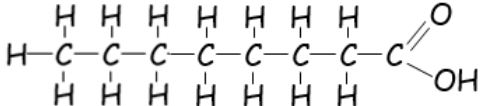


Lesson	National 5 Chemistry Unit 2.2b Carboxylic Acids								Traffic Light			
	Red	Amber	Green									
27	Carboxylic acids are used in the preparation of preservatives, soaps and medicines. Vinegar is a solution of ethanoic acid, with molecular formula CH <sub>3</sub> COOH. Vinegar is used in household cleaning products as it is a non-toxic acid so can be used safely in household situations.								☹	☺	☺	
28	Methanoic, ethanoic, propanoic and butanoic acid are miscible in water, thereafter the solubility decreases as size increases.								☹	☺	☺	
	<ul style="list-style-type: none"> <li>miscible means that the carboxylic acids mix with water and do not separate.</li> </ul>											
	Carboxylic Acid	Methanoic	Ethanoic	Propanoic	Butanoic	Pentanoic	Hexanoic	Heptanoic				Octanoic
No of Carbons	1	2	3	4	5	6	7	8				
Solubility	Very soluble in water							→	insoluble			
29	As increase in the size of an carboxylic acid increases the melting & boiling points								☹	☺	☺	
	<ul style="list-style-type: none"> <li>this is caused by the increasing strength of the intermolecular forces.</li> </ul>											
	Carboxylic Acid	Methanoic	Ethanoic	Propanoic	Butanoic	Pentanoic	Hexanoic	Heptanoic				Octanoic
	No of Carbons	1	2	3	4	5	6	7				8
	Melting Point	low										→
Boiling Point	low							→	High			
Strength of intermolecular forces	weaker							→	stronger			
30	Carboxylic acids can be identified by the carboxyl -COOH functional group.								☹	☺	☺	
31	Carboxylic acids have the general formula C <sub>n</sub> H <sub>2n+1</sub> COOH.								☹	☺	☺	
32 33	Straight-chain carboxylic acids can be drawn and named:								☹	☺	☺	
	 <p>methanoic acid</p>		 <p>ethanoic acid</p>		 <p>propanoic acid</p>		 <p>butanoic acid</p>					
	 <p>pentanoic acid</p>				 <p>hexanoic acid</p>							
	 <p>heptanoic acid</p>				 <p>octanoic acid</p>							
	Solutions of carboxylic acids have a pH less than 7 (like other acids)											
	<ul style="list-style-type: none"> <li>can react with metals, metal oxides, hydroxides and carbonates to form salts. <ul style="list-style-type: none"> <li>salts formed from straight-chain carboxylic acids can be named.</li> </ul> </li> </ul>											
	34	methanoic acid + magnesium → magnesium methanoate + hydrogen ethanoic acid + sodium oxide → sodium ethanoate + water propanoic acid + potassium hydroxide → potassium propanoate + water butanoic acid + lithium carbonate → lithium butanoate + water + CO <sub>2</sub>										☹

Nat5 Traffic Lights	<h2 style="margin: 0;">Past Paper Question Bank</h2> <h3 style="margin: 0;">Unit 2.2b Carboxylic Acids</h3>	
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Outcome	<a href="#">Original Specimen Paper</a>	<a href="#">New Specimen Paper</a>	<a href="#">Nat5 2014</a>	<a href="#">Nat5 2015</a>	<a href="#">Nat5 2016</a>	<a href="#">Nat5 2017</a>	<a href="#">Nat5 2018</a>	<a href="#">Nat5 2019</a>	Nat5 2020	Nat5 2021						
27						mc13										
28								mc17								
29						L7b(ii)										
30	L6c L8d(ii)	L6d L8d(ii)		L13a		L7a	L13a(i)									
31			L8b(iii)													
32 33	L8d(i)	L8d(i)		L3b(i)		L7b(i)										
34																

MC Qu	Answer	% Correct	Reasoning																																																						
2017 MC 13	<b>C</b>	<b>81</b>	Vinegar is a dilute solution of ethanoic acid $\text{CH}_3\text{COOH}$																																																						
2019 MC 17	<b>B</b>	<b>-</b>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 10%;">Carboxylic acid</th> <th style="width: 10%;">Methanoic Acid</th> <th style="width: 10%;">Ethanoic Acid</th> <th style="width: 10%;">Propanoic Acid</th> <th style="width: 10%;">Butanoic Acid</th> <th style="width: 10%;">Pentanoic Acid</th> <th style="width: 10%;">Hexanoic Acid</th> <th style="width: 10%;">Heptanoic Acid</th> <th style="width: 10%;">Octanoic Acid</th> </tr> </thead> <tbody> <tr> <td>Formula</td> <td><math>\text{HCOOH}</math></td> <td><math>\text{CH}_3\text{COOH}</math></td> <td><math>\text{C}_2\text{H}_5\text{COOH}</math></td> <td><math>\text{C}_3\text{H}_7\text{COOH}</math></td> <td><math>\text{C}_4\text{H}_9\text{COOH}</math></td> <td><math>\text{C}_5\text{H}_{11}\text{COOH}</math></td> <td><math>\text{C}_6\text{H}_{13}\text{COOH}</math></td> <td><math>\text{C}_7\text{H}_{15}\text{COOH}</math></td> </tr> <tr> <td>Mass</td> <td>low</td> <td colspan="6" style="text-align: center;">—————→</td> <td>high</td> </tr> <tr> <td>Melting Point</td> <td>low</td> <td colspan="6" style="text-align: center;">—————→</td> <td>high</td> </tr> <tr> <td>Boiling Point</td> <td>low</td> <td colspan="6" style="text-align: center;">—————→</td> <td>high</td> </tr> <tr> <td>Solubility</td> <td>high</td> <td colspan="6" style="text-align: center;">←—————</td> <td>low</td> </tr> </tbody> </table>	Carboxylic acid	Methanoic Acid	Ethanoic Acid	Propanoic Acid	Butanoic Acid	Pentanoic Acid	Hexanoic Acid	Heptanoic Acid	Octanoic Acid	Formula	$\text{HCOOH}$	$\text{CH}_3\text{COOH}$	$\text{C}_2\text{H}_5\text{COOH}$	$\text{C}_3\text{H}_7\text{COOH}$	$\text{C}_4\text{H}_9\text{COOH}$	$\text{C}_5\text{H}_{11}\text{COOH}$	$\text{C}_6\text{H}_{13}\text{COOH}$	$\text{C}_7\text{H}_{15}\text{COOH}$	Mass	low	—————→						high	Melting Point	low	—————→						high	Boiling Point	low	—————→						high	Solubility	high	←—————						low
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Solubility	high	←—————						low																																																	

Nat5	Answer	Reasoning						
2014 8b(iii)	$C_nH_{2n+1}COOH$ or $C_nH_{2n+1}CO_2H$	<table border="1"> <tr> <td> <math display="block">\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C} \\ \backslash \\ \text{OH} \end{array}</math>           methanoic acid HCOOH         </td> <td> <math display="block">\begin{array}{c} \text{H} &amp; \text{O} \\   &amp; \parallel \\ \text{H}-\text{C}- &amp; \text{C} \\   &amp; \backslash \\ \text{H} &amp; \text{OH} \end{array}</math>           ethanoic acid CH<sub>3</sub>COOH         </td> <td> <math display="block">\begin{array}{c} \text{H} &amp; \text{H} &amp; \text{O} \\   &amp;   &amp; \parallel \\ \text{H}-\text{C}- &amp; \text{C}- &amp; \text{C} \\   &amp;   &amp; \backslash \\ \text{H} &amp; \text{H} &amp; \text{OH} \end{array}</math>           propanoic acid C<sub>2</sub>H<sub>5</sub>COOH         </td> </tr> <tr> <td>where n=0: C<sub>n</sub>H<sub>2n+1</sub>COOH</td> <td>where n=1: C<sub>n</sub>H<sub>2n+1</sub>COOH</td> <td>where n=2: C<sub>n</sub>H<sub>2n+1</sub>COOH</td> </tr> </table>	$\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C} \\ \backslash \\ \text{OH} \end{array}$ methanoic acid HCOOH	$\begin{array}{c} \text{H} & \text{O} \\   & \parallel \\ \text{H}-\text{C}- & \text{C} \\   & \backslash \\ \text{H} & \text{OH} \end{array}$ ethanoic acid CH <sub>3</sub> COOH	$\begin{array}{c} \text{H} & \text{H} & \text{O} \\   &   & \parallel \\ \text{H}-\text{C}- & \text{C}- & \text{C} \\   &   & \backslash \\ \text{H} & \text{H} & \text{OH} \end{array}$ propanoic acid C <sub>2</sub> H <sub>5</sub> COOH	where n=0: C <sub>n</sub> H <sub>2n+1</sub> COOH	where n=1: C <sub>n</sub> H <sub>2n+1</sub> COOH	where n=2: C <sub>n</sub> H <sub>2n+1</sub> COOH
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2015 3b(i)	Butanoic acid	<table border="1"> <tr> <td> <math display="block">\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C} \\ \backslash \\ \text{OH} \end{array}</math>           methanoic acid         </td> <td> <math display="block">\begin{array}{c} \text{H} &amp; \text{O} \\   &amp; \parallel \\ \text{H}-\text{C}- &amp; \text{C} \\   &amp; \backslash \\ \text{H} &amp; \text{OH} \end{array}</math>           ethanoic acid         </td> </tr> <tr> <td> <math display="block">\begin{array}{c} \text{H} &amp; \text{H} &amp; \text{O} \\   &amp;   &amp; \parallel \\ \text{H}-\text{C}- &amp; \text{C}- &amp; \text{C} \\   &amp;   &amp; \backslash \\ \text{H} &amp; \text{H} &amp; \text{OH} \end{array}</math>           propanoic acid         </td> <td> <math display="block">\begin{array}{c} \text{H} &amp; \text{H} &amp; \text{H} &amp; \text{O} \\   &amp;   &amp;   &amp; \parallel \\ \text{H}-\text{C}- &amp; \text{C}- &amp; \text{C}- &amp; \text{C} \\   &amp;   &amp;   &amp; \backslash \\ \text{H} &amp; \text{H} &amp; \text{H} &amp; \text{OH} \end{array}</math>           butanoic acid         </td> </tr> </table>	$\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C} \\ \backslash \\ \text{OH} \end{array}$ methanoic acid	$\begin{array}{c} \text{H} & \text{O} \\   & \parallel \\ \text{H}-\text{C}- & \text{C} \\   & \backslash \\ \text{H} & \text{OH} \end{array}$ ethanoic acid	$\begin{array}{c} \text{H} & \text{H} & \text{O} \\   &   & \parallel \\ \text{H}-\text{C}- & \text{C}- & \text{C} \\   &   & \backslash \\ \text{H} & \text{H} & \text{OH} \end{array}$ propanoic acid	$\begin{array}{c} \text{H} & \text{H} & \text{H} & \text{O} \\   &   &   & \parallel \\ \text{H}-\text{C}- & \text{C}- & \text{C}- & \text{C} \\   &   &   & \backslash \\ \text{H} & \text{H} & \text{H} & \text{OH} \end{array}$ butanoic acid		
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2015 13a	Carboxyl group	The carboxyl group -COOH is the functional group found in carboxylic acids. Succinic acid contains two carboxyl groups. $\begin{array}{c} \text{O} \\ \parallel \\ -\text{C}-\text{OH} \end{array}$ carboxyl group						
2017 7a	Carboxyl group	<table border="1"> <tr> <td>-O-H</td> <td> <math display="block">\begin{array}{c} \text{O} \\ \parallel \\ -\text{C}-\text{OH} \end{array}</math> </td> </tr> <tr> <td>hydroxyl group</td> <td>carboxyl group</td> </tr> </table>	-O-H	$\begin{array}{c} \text{O} \\ \parallel \\ -\text{C}-\text{OH} \end{array}$	hydroxyl group	carboxyl group		
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2017 7b(i)	$\begin{array}{c} \text{H} & \text{H} & \text{H} & \text{O} \\   &   &   & \parallel \\ \text{H}-\text{C}- & \text{C}- & \text{C}- & \text{C} \\   &   &   & \backslash \\ \text{H} & \text{H} & \text{H} & \text{OH} \end{array}$	<table border="1"> <tr> <td> <math display="block">\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C} \\ \backslash \\ \text{OH} \end{array}</math>           methanoic acid         </td> <td> <math display="block">\begin{array}{c} \text{H} &amp; \text{O} \\   &amp; \parallel \\ \text{H}-\text{C}- &amp; \text{C} \\   &amp; \backslash \\ \text{H} &amp; \text{OH} \end{array}</math>           ethanoic acid         </td> </tr> <tr> <td> <math display="block">\begin{array}{c} \text{H} &amp; \text{H} &amp; \text{O} \\   &amp;   &amp; \parallel \\ \text{H}-\text{C}- &amp; \text{C}- &amp; \text{C} \\   &amp;   &amp; \backslash \\ \text{H} &amp; \text{H} &amp; \text{OH} \end{array}</math>           propanoic acid         </td> <td> <math display="block">\begin{array}{c} \text{H} &amp; \text{H} &amp; \text{H} &amp; \text{O} \\   &amp;   &amp;   &amp; \parallel \\ \text{H}-\text{C}- &amp; \text{C}- &amp; \text{C}- &amp; \text{C} \\   &amp;   &amp;   &amp; \backslash \\ \text{H} &amp; \text{H} &amp; \text{H} &amp; \text{OH} \end{array}</math>           butanoic acid         </td> </tr> </table>	$\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C} \\ \backslash \\ \text{OH} \end{array}$ methanoic acid	$\begin{array}{c} \text{H} & \text{O} \\   & \parallel \\ \text{H}-\text{C}- & \text{C} \\   & \backslash \\ \text{H} & \text{OH} \end{array}$ ethanoic acid	$\begin{array}{c} \text{H} & \text{H} & \text{O} \\   &   & \parallel \\ \text{H}-\text{C}- & \text{C}- & \text{C} \\   &   & \backslash \\ \text{H} & \text{H} & \text{OH} \end{array}$ propanoic acid	$\begin{array}{c} \text{H} & \text{H} & \text{H} & \text{O} \\   &   &   & \parallel \\ \text{H}-\text{C}- & \text{C}- & \text{C}- & \text{C} \\   &   &   & \backslash \\ \text{H} & \text{H} & \text{H} & \text{OH} \end{array}$ butanoic acid		
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2017 7b(ii)	Answer to include:	Propanoic acid has three carbons and butanoic acid has four carbons. As number of carbons increases, melting point increases.						
2018 13a(i)	Carboxyl group	<table border="1"> <tr> <td>-O-H</td> <td> <math display="block">\begin{array}{c} \text{O} \\ \parallel \\ -\text{C}-\text{OH} \end{array}</math> </td> </tr> <tr> <td>hydroxyl group</td> <td>carboxyl group</td> </tr> </table>	-O-H	$\begin{array}{c} \text{O} \\ \parallel \\ -\text{C}-\text{OH} \end{array}$	hydroxyl group	carboxyl group		
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hydroxyl group	carboxyl group							

Nat5 Traffic Lights		Past Paper Question Bank Unit 2.2b Carboxylic Acids										JABchem				
Outcome	<a href="#">Int2 2000</a>	<a href="#">Int2 2001</a>	<a href="#">Int2 2002</a>	<a href="#">Int2 2003</a>	<a href="#">Int2 2004</a>	<a href="#">Int2 2005</a>	<a href="#">Int2 2006</a>	<a href="#">Int2 2007</a>	<a href="#">Int2 2008</a>	<a href="#">Int2 2009</a>	<a href="#">Int2 2010</a>	<a href="#">Int2 2011</a>	<a href="#">Int2 2012</a>	<a href="#">Int2 2013</a>	<a href="#">Int2 2014</a>	<a href="#">Int2 2015</a>
27																
28																
29																
30				L1b			L5a								mc13	L8a
31																
32 33	L14a		L5b(iv)			L10a				L10c				L9b(i)		
34													mc14			

Int2	Answer	% Correct	Reasoning						
2012 MC 14	<b>C</b>	<b>48</b>	All three carboxyl COOH groups will be neutralised by the alkali sodium hydroxide. The hydroxyl -OH group does not react with the alkali sodium hydroxide.						
2014 MC 13	<b>A</b>	<b>75</b>	A carboxylic acid can be identified from the carboxyl group (-COOH) and '-oic' name ending. <table border="1" style="width: 100%; text-align: center;"> <tr> <td>methanoic acid</td> <td>ethanoic acid</td> <td>propanoic acid</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>	methanoic acid	ethanoic acid	propanoic acid			
methanoic acid	ethanoic acid	propanoic acid							

Int2	Answer	Reasoning				
2000 14a	$\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{C}=\text{O} \\   \quad \diagdown \\ \text{H} \quad \text{O}-\text{H} \end{array}$	Ethanoic acid as is an carboxylic acid with <ul style="list-style-type: none"> <li>• 2 carbons in the main chain</li> <li>• a -COOH carboxyl functional group</li> </ul>				
2002 5b(iv)	$\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{C}=\text{O} \\   \quad \diagdown \\ \text{H} \quad \text{O}-\text{H} \end{array}$	Ethanoic acid has two carbons and a carboxyl -COOH functional group				
2003 1b	$\begin{array}{c} \text{O} \\    \\ -\text{C} \\ \diagdown \\ \text{O}-\text{H} \end{array}$	The carboxyl group (-COOH) is found in carboxylic acids.				
2005 10a	$\begin{array}{c} \text{H} \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}=\text{O} \\   \quad   \quad \diagdown \\ \text{H} \text{H} \quad \text{O}-\text{H} \end{array}$	Propanoic acid has 3 carbons and the -COOH functional group must be on carbon number 1				
2006 5a	Carboxyl group	Alcohols have the hydroxyl functional group of -OH Carboxylic acids have the carboxyl functional group of -COOH				
2009 10c	$\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{C}=\text{O} \\   \quad \diagdown \\ \text{H} \quad \text{O}-\text{H} \end{array}$	Ethanoic acid has two carbons and a carboxyl -COOH functional group				
2013 9b(i)	Butanoic acid	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="padding: 5px;">methanoic acid <math>\text{H}-\text{C}=\text{O}</math> <math>\quad \diagdown</math> <math>\quad \text{OH}</math></td> <td style="padding: 5px;">ethanoic acid <math>\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{C}=\text{O} \\   \quad \diagdown \\ \text{H} \quad \text{OH} \end{array}</math></td> </tr> <tr> <td style="padding: 5px;">propanoic acid <math>\begin{array}{c} \text{H} \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}=\text{O} \\   \quad   \quad \diagdown \\ \text{H} \text{H} \quad \text{OH} \end{array}</math></td> <td style="padding: 5px;">butanoic acid <math>\begin{array}{c} \text{H} \text{H} \text{H} \\   \quad   \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}=\text{O} \\   \quad   \quad   \quad \diagdown \\ \text{H} \text{H} \text{H} \quad \text{OH} \end{array}</math></td> </tr> </table>	methanoic acid $\text{H}-\text{C}=\text{O}$ $\quad \diagdown$ $\quad \text{OH}$	ethanoic acid $\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{C}=\text{O} \\   \quad \diagdown \\ \text{H} \quad \text{OH} \end{array}$	propanoic acid $\begin{array}{c} \text{H} \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}=\text{O} \\   \quad   \quad \diagdown \\ \text{H} \text{H} \quad \text{OH} \end{array}$	butanoic acid $\begin{array}{c} \text{H} \text{H} \text{H} \\   \quad   \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}=\text{O} \\   \quad   \quad   \quad \diagdown \\ \text{H} \text{H} \text{H} \quad \text{OH} \end{array}$
methanoic acid $\text{H}-\text{C}=\text{O}$ $\quad \diagdown$ $\quad \text{OH}$	ethanoic acid $\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{C}=\text{O} \\   \quad \diagdown \\ \text{H} \quad \text{OH} \end{array}$					
propanoic acid $\begin{array}{c} \text{H} \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}=\text{O} \\   \quad   \quad \diagdown \\ \text{H} \text{H} \quad \text{OH} \end{array}$	butanoic acid $\begin{array}{c} \text{H} \text{H} \text{H} \\   \quad   \quad   \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}=\text{O} \\   \quad   \quad   \quad \diagdown \\ \text{H} \text{H} \text{H} \quad \text{OH} \end{array}$					
2015 8a	Carboxyl	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="padding: 10px;"><math>-\text{O}-\text{H}</math></td> <td style="padding: 10px;"><math>\begin{array}{c} \text{O} \\    \\ -\text{C}-\text{OH} \end{array}</math></td> </tr> <tr> <td style="padding: 5px;">hydroxyl group</td> <td style="padding: 5px;">carboxyl group</td> </tr> </table>	$-\text{O}-\text{H}$	$\begin{array}{c} \text{O} \\    \\ -\text{C}-\text{OH} \end{array}$	hydroxyl group	carboxyl group
$-\text{O}-\text{H}$	$\begin{array}{c} \text{O} \\    \\ -\text{C}-\text{OH} \end{array}$					
hydroxyl group	carboxyl group					

Nat5 Traffic Lights		Past Paper Question Bank Unit 2.2b Carboxylic Acids												Copyright JABchem		
Outcome	<a href="#">2000 Credit</a>	<a href="#">2001 Credit</a>	<a href="#">2002 Credit</a>	<a href="#">2003 Credit</a>	<a href="#">2004 Credit</a>	<a href="#">2005 Credit</a>	<a href="#">2006 Credit</a>	<a href="#">2007 Credit</a>	<a href="#">2008 Credit</a>	<a href="#">2009 Credit</a>	<a href="#">2010 Credit</a>	<a href="#">2011 Credit</a>	<a href="#">2012 Credit</a>	<a href="#">2013 Credit</a>		
27																
28																
29																
30																
31																
32 33								11a						15c		
34																

SG Credit	Answer	Reasoning
2007C 11a	Any structure of butanoic acid with formula $C_3H_7COOH$	$  \begin{array}{ccccccc}  & H & H & H & & & \\  &   &   &   & & & \\  H & - C & - C & - C & - C & & \\  &   &   &   & // & \backslash & \\  & H & H & H & & O & - H  \end{array}  $
2013C 15c	Diagram showing:	$  \begin{array}{ccccccc}  & H & H & H & O & & \\  &   &   &   &    & & \\  H & - C & - C & - C & - C & - O & - H \\  &   &   &   & & & \\  & H & H & H & & &   \end{array}  $

Nat5 Traffic Lights	<h2 style="margin: 0;">Past Paper Question Bank</h2> <h3 style="margin: 0;">Unit 2.2b Carboxylic Acids</h3>	Copyright <b>JABchem</b>
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Outcome	<a href="#">2000</a> <small>General</small>	<a href="#">2001</a> <small>General</small>	<a href="#">2002</a> <small>General</small>	<a href="#">2003</a> <small>General</small>	<a href="#">2004</a> <small>General</small>	<a href="#">2005</a> <small>General</small>	<a href="#">2006</a> <small>General</small>	<a href="#">2007</a> <small>General</small>	<a href="#">2008</a> <small>General</small>	<a href="#">2009</a> <small>General</small>	<a href="#">2010</a> <small>General</small>	<a href="#">2011</a> <small>General</small>	<a href="#">2012</a> <small>General</small>	<a href="#">2013</a> <small>General</small>		
27																
28																
29																
30																
31																
32 33								11b								
34																

SG General	Answer	Reasoning
2007 <b>11b</b>	$C_2H_4O_2$	Ethanoic acid has 2 carbon atoms, 4 hydrogen atoms and 2 oxygen atoms within its molecules.