Worksheet 4.3

Three other liquids

NAME: **CLASS:**

INTRODUCTION

Three other liquids, apart from water, that are commonly used by us are ethanol, acetic acid and kerosene. The properties of these three liquids are given in the table below.

	Ethanol	**Acetic acid**	**Kerosene**
Chemical formula	CH_3CH_2OH	CH_3COOH	complex mixture of long-chain hydrocarbons such as $C_{12}H_{26}$
Melting point	–114°C	16.7°C	approx. –25°C
Boiling point	78.3°C	118°C	approx. 200°C
Solubility in water	very soluble	very soluble	insoluble
Acid/base properties	neutral	weak acid	insoluble in water
Density at 25°C, 1 atm	0.785 g mL^{-1}	1.044 g mL^{-1}	approx. 0.78 g mL^{-1}
Flammability	highly flammable	flammable	flammable

No.	Question	Answer
1	Draw a line structure of the molecules making up each of the three liquids (for kerosene, draw a typical molecule).	
2	What type or types of intermolecular forces exist between the molecules of these three liquids?	
3	Explain why acetic acid has a higher boiling point than ethanol.	
4	Propose a reason for why kerosene has a higher boiling point than the other two liquids.	

5	Explain why kerosene is not soluble in water, yet acetic acid is.	
6	Propose an explanation for why acetic acid acts as a weak acid in water, but ethanol is neutral. (Hint: Acids form H^+ ions in water.)	
7	Suggest why acetic acid is more dense than ethanol.	
8	The proof of an alcoholic drink is twice the percentage, by volume, of alcohol (ethanol). For instance 90 proof whiskey contains 45% by volume of ethanol. Use these figures to show that in a 30 mL 'shot' of 90 proof whiskey there is 13.5 mL of ethanol.	
9	Write balanced equations to represent the burning of each of the three liquids.	
10	In terms of the liquid's properties explain why: **a** ethanol is used in the home for cleaning purposes **b** acetic acid is one of the key ingredients in tomato sauce **c** kerosene is also used as a cleaning agent in the home **d** kerosene is used as a fuel for jet engines.	