

**Wah Yan College Kowloon**  
**F.5 Chemistry Scheme of Work (2017-2018)**

<b>Textbook</b>	<ol style="list-style-type: none"> <li>1. New 21st Century Chemistry 2C Topic 6 Microscopic World II (Compulsory Part) (2nd Edition) (WY)</li> <li>2. New 21st Century Chemistry 3A Topic 7 Fossil Fuels and Carbon Compounds (Compulsory Part) (2nd Edition) (WY)</li> <li>3. New 21st Century Chemistry 3B Topic 8 Chemistry of Carbon Compounds (Compulsory Part) (2nd Edition) (WY)</li> <li>4. New 21st Century Chemistry 3C Topic 9 Chemical Reactions and Energy (Compulsory Part) (2nd Edition) (WY)</li> <li>5. New 21st Century Chemistry 4A Topic 10 Rate of Reaction (Compulsory Part) (2nd Edition) (WY)</li> <li>6. New 21st Century Chemistry 4B Topic 11 Chemical Equilibrium (Compulsory Part) (2nd Edition) (WY)</li> </ol>
<b>Other Resources</b>	

◆ **Repertoire of Self-directed Learning Skills:** reading to learn, notes-taking, looking up words in the dictionary, pre-lesson preparation, group discussion, group presentation, initiative to ask questions, setting learning objectives and doing reflection, eLearning platform with instant feedback, flipped classroom, peer assessment, searching for information on the internet, project learning, training of higher-order thinking skills

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
<b>First Term (1/9/2017- 2/1/2018)</b>		Topic 6 Microscopic World II - Bond polarity and intermolecular forces					
	Week 1	24.1 Electron sharing in a covalent bond	<ul style="list-style-type: none"> <li>• Polar covalent bond</li> <li>• Uneven distribution of bonding electrons in a HCl molecule</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>	Setting learning objectives and doing reflection	7,10	
	Week 1	24.2 Electronegativity	<ul style="list-style-type: none"> <li>• What electronegativity is</li> <li>• Electronegativity of some common elements</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		7	• Checkpoint
	Week 1	24.3 How polar bonds and	<ul style="list-style-type: none"> <li>• Dipole moment</li> <li>• Polar molecules</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>	Training of higher-order	7,10	

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		shape affect the polarity of a molecule	<ul style="list-style-type: none"> <li>– H<sub>2</sub>O</li> <li>– NH<sub>3</sub></li> <li>– CHCl<sub>3</sub></li> <li>• Non-polar molecules</li> <li>– CO<sub>2</sub></li> <li>– BF<sub>3</sub></li> <li>– CCl<sub>4</sub></li> </ul>	<ul style="list-style-type: none"> <li>• Animations</li> </ul>	thinking skills		
	Week 1	24.4 Effect of a charged rod on polar and non-polar liquids	<ul style="list-style-type: none"> <li>• Using a charged rod to test whether molecules of a liquid are polar</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> <li>• Activity 24.1 — Testing liquids to find out if their molecules are polar</li> </ul>		7	<ul style="list-style-type: none"> <li>• Checkpoint</li> </ul>
	Week 1	24.5 Intermolecular forces	<ul style="list-style-type: none"> <li>• Permanent dipole permanent dipole attractions</li> <li>• Instantaneous Dipole induced dipole attractions</li> <li>• Van der Waals' forces</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Animations</li> </ul>	Notes-taking Reading to learn	7,10	<ul style="list-style-type: none"> <li>• Checkpoint</li> </ul>
	Week 1	24.6	<ul style="list-style-type: none"> <li>• Number of electrons in</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Checkpoint</li> </ul>

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		Factors affecting the strength of van der Waals' forces	<ul style="list-style-type: none"> <li>the atom or molecule</li> <li>• Shape of the molecule</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion</li> <li>• Animations</li> </ul>			
	Week 2	24.7 Hydrogen bonding	<ul style="list-style-type: none"> <li>• Special features of hydrogen bonding</li> <li>• Hydrogen bonding in <ul style="list-style-type: none"> <li>– liquid hydrogen fluoride</li> <li>– water</li> <li>– liquid ammonia</li> <li>– methanol</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Animations</li> </ul>		2,7,10	• Checkpoint
	Week 2	24.8 The density of water and ice	<ul style="list-style-type: none"> <li>• The open structure of ice due to hydrogen bonding</li> <li>• Explaining why ice is less dense than water in terms of the structure of ice</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		2,10	
	Week 2	24.9 * <b>Surface tension and viscosity of liquids</b>	<ul style="list-style-type: none"> <li>• Explaining the high surface tension of water in terms of hydrogen bonding</li> <li>• Factors affecting the viscosity of a liquid</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> <li>• Activity 24.2 — Investigating the surface tension and</li> </ul>		2,7,10	

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				viscosity of water			
	Week 2	24.10 * Intermolecular attractions in Alcohols	<ul style="list-style-type: none"> <li>• Comparing the boiling points of ethanol, methoxymethane and propane</li> <li>• Comparing the water solubility of ethanol, methoxymethane and propane</li> <li>• Comparing the viscosity of different alcohols</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> <li>• Activity 24.3 — Comparing the viscosity of alcohols with different numbers of hydroxyl groups</li> </ul>	Notes-taking Reading to learn	7,10	• Checkpoint
	Week 2	24.11 * Intermolecular attractions and properties of liquids	<ul style="list-style-type: none"> <li>• The evaporation rate of liquids with different strength of intermolecular attractions</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Animations</li> <li>• Activity 24.4 — Investigating the temperature changes caused by the evaporation of liquids with different strength of intermolecular</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Unit exercise</li> <li>• Topic exercise</li> <li>• Topic quiz</li> </ul>

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				attractions • Concept mapping			
		Topic 7 Fossil fuels					
	Week 3	25.1 Fossil fuels — A major energy source	• Formation of coal • Formation of petroleum and natural gas	• PowerPoint • Discussion	Setting learning objectives and doing reflection	2,10,18	
	Week 3	25.2 Importance of petroleum	• Main uses of refined petroleum • Economic importance of petroleum	• PowerPoint • Discussion		2,10,18	
	Week 3	25.3 Hydrocarbons	• Definition • Types of hydrocarbons	• PowerPoint		2,10	
	Week 3	25.4 What does petroleum contain?	• Hydrocarbons in petroleum – alkanes – cycloalkanes – aromatic hydrocarbons	• PowerPoint	Notes-taking Reading to learn	2,10	
	Week 3	25.5 Fractional distillation of petroleum	• How fractional distillation of petroleum is carried out in an oil	• Activity 25.1 — Fractional distillation		2,10,18	

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			refinery <ul style="list-style-type: none"> <li>• Fractional distillation of crude oil in the laboratory</li> <li>• Properties of fractions of petroleum with different boiling point ranges</li> </ul>	of crude oil and studying the properties of its fractions <ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> <li>• 3D animations</li> </ul>			
	Week 3	25.6 Major uses of fractions of Petroleum	<ul style="list-style-type: none"> <li>• Major uses of fractions of petroleum</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		7,10,18	<ul style="list-style-type: none"> <li>• Practice 25.1</li> </ul>
	Week 4	25.7 Combustion of hydrocarbons	<ul style="list-style-type: none"> <li>• Exothermic and endothermic reactions</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		2,10	
	Week 4	25.8 Carbon dioxide and the greenhouse effect	<ul style="list-style-type: none"> <li>• What the greenhouse effect is</li> <li>• How carbon dioxide causes the greenhouse effect</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		7,10,18	<ul style="list-style-type: none"> <li>• Practice 25.2</li> </ul>
	Week 4	25.9 Major air pollutants from cars, factories, incinerators and	<ul style="list-style-type: none"> <li>• Carbon monoxide</li> <li>• Unburnt hydrocarbons</li> <li>• Suspended particulates</li> <li>• Oxides of nitrogen</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> <li>• Animations</li> </ul>		2,10,18	

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		power plants	<ul style="list-style-type: none"> <li>• Sulphur dioxide</li> <li>• Effects of the air pollutants to the environment and human health</li> </ul>				
	Week 4	25.10 Measures for reducing emission of air pollutants	<ul style="list-style-type: none"> <li>• Air pollution in Hong Kong</li> <li>• Using catalytic converters in exhaust systems of motor vehicles</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> <li>• Animations</li> </ul>		7,10,18	• Practice 25.3
	Week 4	25.11 Impact of using fossil fuels on our quality of life and the environment	<ul style="list-style-type: none"> <li>• How modern people use fossil fuels</li> <li>• Impact of using fossil fuels on the environment</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> <li>• Animations</li> <li>• Concept mapping</li> </ul>	Notes-taking Reading to learn	2,7,18	• Unit exercise
		Unit 26 Homologous series, structural formulae and naming of carbon compounds				2,10	
	Week 5	26.1 A look at molecules of compounds in petroleum	<ul style="list-style-type: none"> <li>• Boiling points of hydrocarbons in petroleum</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>	Setting learning objectives and doing	2,10	

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					reflection		
	Week 5	26.2 Chemistry of carbon compounds	<ul style="list-style-type: none"> <li>• Unique features of carbon</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		2,10	
	Week 5	26.3 Representing molecules of carbon compounds	<ul style="list-style-type: none"> <li>• Structural formulae</li> <li>• Condensed structural formulae</li> <li>• Skeletal formulae</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		2,7,10	<ul style="list-style-type: none"> <li>• Practice 26.1</li> </ul>
	Week 5	26.4 Molecular models	<ul style="list-style-type: none"> <li>• Ball-and-stick models</li> <li>• Space-filling models</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Animations</li> </ul>		2,10	
	Week 5	26.5 Functional groups	<ul style="list-style-type: none"> <li>• What a functional group is</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		2,10	
	Week 5	26.6 Homologous series	<ul style="list-style-type: none"> <li>• What a homologous series is</li> <li>• Characteristics of members in a homologous series</li> <li>• Some homologous series and the functional groups they contain</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 26.1 — Building molecular models of alkanols and alkanolic acids</li> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		2,10	
	Week 6	26.7 The alkanes	<ul style="list-style-type: none"> <li>• General formula of members of the alkane series</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 26.2 — Building molecular models</li> </ul>		2,10	



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			<ul style="list-style-type: none"> <li>• Six simple straight-chain alkanes</li> </ul>	of alkanes <ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>			
	Week 6	26.8 Naming straight chain and branched chain alkanes	<ul style="list-style-type: none"> <li>• Naming               <ul style="list-style-type: none"> <li>– straight-chain alkanes</li> <li>– branched-chain alkanes</li> <li>– cycloalkanes</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		2,7,10	<ul style="list-style-type: none"> <li>• Practice 26.2</li> </ul>
	Week 6	26.9 Naming alkenes	<ul style="list-style-type: none"> <li>• Naming alkenes with carbon chains containing up to 6 carbon atoms</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 26.3 — Building molecular models of alkenes</li> <li>• PowerPoint</li> </ul>		2,7,10	<ul style="list-style-type: none"> <li>• Practice 26.3</li> </ul>
	Week 6	26.10 Naming alkanols	<ul style="list-style-type: none"> <li>• Naming alkanols with carbon chains containing up to 6 carbon atoms</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		2,10	
	Week 6	26.11 Naming alkanolic acids	<ul style="list-style-type: none"> <li>• Naming alkanolic acids with carbon chains containing up to 6 carbon atoms</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		2,7,10	<ul style="list-style-type: none"> <li>• Practice 26.4</li> </ul>
	Week 6	26.12	<ul style="list-style-type: none"> <li>• Rise of melting and</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		2,7,10	<ul style="list-style-type: none"> <li>• Unit exercise</li> </ul>

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		Physical properties of alkanes	boiling points of alkanes with the increase of the number of carbon atoms in the alkane molecules • Solubility and density of alkanes	• Discussion • Concept mapping			
		Unit 27 Alkanes and alkenes					
	Week 7	27.1 Risks and benefits of fossil fuels to the society and Environment	• Benefits of using fossil fuels • Risks of using fossil fuels • Spillage of petroleum	• PowerPoint • Discussion	Setting learning objectives and doing reflection	2,10,18	
	Week 7	27.2 Important reactions of alkanes	• Combustion • Reaction with halogens — substitution reactions • Steps involved in the substitution of methane with chlorine	• Activity 27.1 — Investigating the properties of an alkane • PowerPoint • Discussion		2,7,10	• Practice 27.1
	Week 7	27.3 Demand for various fractions of Petroleum	• Percentages of various fractions obtained from the fractional distillation	• PowerPoint	Notes-taking Reading to learn	2,10,18	

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			<p>of petroleum from different parts of the world</p> <ul style="list-style-type: none"> <li>• The supply and demand for various fractions</li> </ul>				
	Week 8	27.4 Cracking	<ul style="list-style-type: none"> <li>• Catalytic cracking</li> <li>• Cracking of tetradecane as an example</li> <li>• Importance of cracking <ul style="list-style-type: none"> <li>– Producing extra petrol</li> <li>– As a source of alkenes</li> </ul> </li> <li>• Cracking of medicinal paraffin in the laboratory</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 27.2 — Cracking of medicinal paraffin and testing the gaseous product</li> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		7,10,18	<ul style="list-style-type: none"> <li>• Practice 27.2</li> </ul>
	Week 8	27.5 The alkenes	<ul style="list-style-type: none"> <li>• Some straight-chain alkenes</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		2,10	
	Week 8	27.6 Physical properties of alkenes	<ul style="list-style-type: none"> <li>• Rise of melting and boiling points of alkenes with the increase of the length of carbon chain in the alkene molecules</li> <li>• Solubility of alkenes in water</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		2,10	

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	Week 8	27.7 Important reactions of alkenes	<ul style="list-style-type: none"> <li>• What an addition reaction is</li> <li>• Reaction with bromine solution</li> <li>• Reaction with cold acidified dilute potassium permanganate solution</li> <li>• Test for unsaturation</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 27.3 — Investigating the properties of an alkene</li> <li>• Activity 27.4 — Distinguishing between an alkane and an alkene</li> <li>• PowerPoint</li> </ul>		2,7,10	• Practice 27.3
	Week 8	27.8 Wind power — an alternative source of energy	<ul style="list-style-type: none"> <li>• Wind energy being a renewable energy source</li> <li>• Limitations of using wind energy</li> </ul>	• Concept mapping	Notes-taking Reading to learn	2,7,18	• Unit exercise
		Unit 28 Addition polymers					
	Week 9	28.1 Plastic items in modern homes	• Various uses of plastics in modern homes	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>	Setting learning objectives and doing reflection	2,10,18	
	Week 9	28.2 Why are plastics so useful?	• General properties of plastics	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		2,10,18	

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	Week 9	28.3 What is a polymer?	<ul style="list-style-type: none"> <li>• What a polymer is</li> <li>• Polymerization</li> <li>• Natural and man-made polymers</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		2,10	
	Week 9	28.4 Polymerization of ethene	<ul style="list-style-type: none"> <li>• Polymerization of ethene</li> <li>• What addition polymerization is</li> <li>• What addition polymers are</li> <li>• What a repeating unit is</li> <li>• Polythene being an addition polymer</li> <li>• Low density polythene and high density polythene</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		2,7,10	<ul style="list-style-type: none"> <li>• Practice 28.1</li> </ul>
	Week 10	28.5 Some common addition polymers	<ul style="list-style-type: none"> <li>• Polypropene (PP)</li> <li>• Polyvinyl chloride (PVC)</li> <li>• Polystyrene (PS)</li> <li>• Perspex</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 28.1 — Investigating the properties of some polymers</li> <li>• Activity 28.2 — Preparing polystyrene</li> </ul>	Notes-taking Reading to learn	2,7,10	<ul style="list-style-type: none"> <li>• Practice 28.2</li> </ul>

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				• PowerPoint			
	Week 10	28.6 Uses of some common addition polymers	<ul style="list-style-type: none"> <li>• Uses and properties of some common addition polymers <ul style="list-style-type: none"> <li>– low density polythene</li> <li>– high density polythene</li> <li>– polypropene</li> <li>– polyvinyl chloride</li> <li>– polystyrene</li> <li>– Perspex</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> <li>• Concept mapping</li> </ul>		7,10,18	<ul style="list-style-type: none"> <li>• Practice 28.3</li> <li>• Unit exercise</li> </ul>
		Unit 29 Naming and physical properties of carbon compounds					
	Week 11	29.1 Functional groups: centre of reactivity	<ul style="list-style-type: none"> <li>• What a functional group is</li> <li>• Functional groups which members of some homologous series contain</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 29.1 — Building molecular models of compounds in different homologous series</li> <li>• PowerPoint</li> </ul>	Setting learning objectives and doing reflection	7,10	• Practice 29.1
	Week 11	29.2 Naming alkanes and	<ul style="list-style-type: none"> <li>• Revising the naming of alkanes and alkenes</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		7,10	• Practice 29.2

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		alkenes	learnt in Topic 7				
	Week 11	29.3 IUPAC rules of naming carbon compounds	<ul style="list-style-type: none"> <li>The IUPAC rules of naming</li> <li>Names of parent chains</li> <li>Numerical prefixes</li> <li>Names of substituents</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		10	
	Week 11	29.4 Naming haloalkanes	<ul style="list-style-type: none"> <li>Naming haloalkanes containing the halogeno functional group: <ul style="list-style-type: none"> <li>- F</li> <li>- Cl</li> <li>- Br</li> <li>- I</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 29.3</li> </ul>
	Week 11	29.5 Naming alcohols	<ul style="list-style-type: none"> <li>Naming alcohols with the general formula <math>C_nH_{2n+1}OH</math></li> <li>Naming polyhydric alcohols</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 29.4</li> </ul>
	Week 11	29.6 Naming aldehydes and ketones	<ul style="list-style-type: none"> <li>Naming aldehydes (general formula RCHO where R is an alkyl or aryl group or hydrogen)</li> <li>Naming ketones (general formula RCOR<sub>1</sub>,</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 29.5</li> </ul>

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			where R and R1 are alkyl or aryl groups)				
	Week 11	29.7 Naming carboxylic acids	<ul style="list-style-type: none"> <li>Naming carboxylic acids (general formula RCOOH where R is an alkyl or aryl group or hydrogen)</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 29.6</li> </ul>
	Week 11	29.8 Naming esters	<ul style="list-style-type: none"> <li>Naming an ester based on the alcohol and carboxylic acid from which the ester is derived</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 29.7</li> </ul>
	Week 11	29.9 Naming amides	<ul style="list-style-type: none"> <li>Naming amides with an unsubstituted –NH<sub>2</sub> group</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		10	
	Week 11	29.10 Naming amines	<ul style="list-style-type: none"> <li>Naming primary amines</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 29.8</li> </ul>
	Week 12	29.11 Intermolecular forces and physical properties of carbon compounds	<ul style="list-style-type: none"> <li>Strength of intermolecular forces in a carbon compound depends on <ul style="list-style-type: none"> <li>– the functional group it contains</li> <li>– the length of its</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> <li>Discussion</li> </ul>	Training of higher-order thinking skills	10	



School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
			carbon chain				
	Week 12	29.12 Physical properties of haloalkanes	<ul style="list-style-type: none"> <li>• Boiling point</li> <li>• Solubility in water</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		10	
	Week 12	29.13 Physical properties of alcohols	<ul style="list-style-type: none"> <li>• Boiling point</li> <li>• Solubility in water</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		10	
	Week 12	29.14 Physical properties of aldehydes and ketones	<ul style="list-style-type: none"> <li>• Boiling point</li> <li>• Solubility in water</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		10	
	Week 12	29.15 Physical properties of carboxylic acids	<ul style="list-style-type: none"> <li>• Boiling point</li> <li>• Solubility in water</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		10	
	Week 12	29.16 Physical properties of esters	<ul style="list-style-type: none"> <li>• Boiling point</li> <li>• Solubility in water</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		10	
	Week 12	29.17 Physical properties of amides	<ul style="list-style-type: none"> <li>• Boiling point</li> <li>• Solubility in water</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		10	
		29.18 Physical properties of amines	<ul style="list-style-type: none"> <li>• Boiling point</li> <li>• Solubility in water</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		10	
	Week 12	29.19 Common names of	<ul style="list-style-type: none"> <li>• Common names or trivial names of some</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Concept</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Unit exercise</li> </ul>

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
		carbon compounds	carbon compounds	mapping			
		Unit 30 Isomerism					
	Week 13	30.1 Isomerism	<ul style="list-style-type: none"> <li>• Structural isomerism</li> <li>• Stereoisomerism</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>	Setting learning objectives and doing reflection	10	
	Week 13	30.2 Structural isomerism	<ul style="list-style-type: none"> <li>• Chain isomerism</li> <li>• Position isomerism</li> <li>• Functional group isomerism</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 30.1 — Building molecular models of structural isomers</li> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Practice 30.1</li> </ul>
	Week 13	30.3 <i>Cis-trans</i> isomerism	<ul style="list-style-type: none"> <li>• <i>Cis-trans</i> isomerism exhibited by compounds containing a C=C bond</li> <li>• Explaining the difference in melting point / boiling point / water solubility of two <i>cis-trans</i> isomers</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 30.2 — Building molecular models of <i>cis-trans</i> isomers</li> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Practice 30.2</li> </ul>
	Week 13	30.4 * <b>Chirality</b>	<ul style="list-style-type: none"> <li>• What a chiral object is</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		10	
	Week	30.5	<ul style="list-style-type: none"> <li>• What enantiomers are</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>	Training of	10	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
	13	Enantiomers*	<ul style="list-style-type: none"> <li>• Characteristic of a simple chiral molecule</li> <li>• Looking at the chiral molecule of CHFCIBr and lactic acid</li> <li>• Identifying chiral carbons in chiral compounds</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion</li> <li>• Animation</li> </ul>	higher-order thinking skills		
	Week 13	30.6 * Test for chirality — plane of symmetry	<ul style="list-style-type: none"> <li>• Determining whether a molecule has a plane of symmetry</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 30.3 — Building models of some molecules and determining whether the molecules are chiral</li> <li>• PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Practice 30.3</li> </ul>
	Week 13	30.7 * Distinguishing the enantiomers of a chiral compound	<ul style="list-style-type: none"> <li>• How enantiomers of a chiral compound perturb plane-polarized light</li> <li>• Polarimeter for measurement of rotation of</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> <li>• Animation</li> <li>• Concept mapping</li> </ul>	Training of higher-order thinking skills	7,10	<ul style="list-style-type: none"> <li>• Practice 30.4</li> <li>• Unit exercise</li> </ul>

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
			plane polarised light				
	Week 14	Revision week					
	Week 14-16	Mid-Year Examination					
	Week 17-18	Christmas & New Year Holiday					
<b>Second Term (3/1/2018- 18/7/2018)</b>		Unit 31 Typical reactions of selected functional groups			Setting learning objectives and doing reflection		
	Week 19	31.1 Introduction	<ul style="list-style-type: none"> <li>Importance of planning synthetic routes for the synthesis of new molecules from readily available molecules</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> <li>Discussion</li> </ul>		10	
	Week 19	31.2 Important reactions of alkanes	<ul style="list-style-type: none"> <li>Combustion</li> <li>Reaction with halogens — substitution reactions</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		10	
	Week 19	31.3 Addition reactions of alkenes	<ul style="list-style-type: none"> <li>Addition of hydrogen to alkenes in the presence of catalysts</li> <li>Addition of halogens</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> <li>Discussion</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 31.1</li> </ul>

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
			to alkenes and test for unsaturation with aqueous bromine <ul style="list-style-type: none"> <li>• Addition of hydrogen halides to alkenes and using Markovnikov's rule to predict the major product</li> </ul>				
	Week 20	31.4 Substitution reactions of Haloalkanes	<ul style="list-style-type: none"> <li>• Hydrolysis of haloalkanes to form alcohols</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		10	
	Week 20	31.5 Reactions of alcohols	<ul style="list-style-type: none"> <li>• Primary, secondary and tertiary alcohols</li> <li>• Substitution reactions of alcohols with halides</li> <li>• Elimination reactions — dehydration of alcohols to form alkenes</li> <li>• Oxidation of alcohols</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 31.1 — Studying the properties of alcohols</li> <li>• Activity 31.2 — Oxidizing ethanol to ethanoic acid and testing the ethanoic acid produced</li> <li>• PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Practice 31.2</li> <li>• Practice 31.3</li> <li>• Practice 31.4</li> <li>• Practice 31.5</li> </ul>
	Week	31.6	<ul style="list-style-type: none"> <li>• Oxidation of aldehydes</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 31.3 —</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Practice 31.6</li> </ul>

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
	21	Reactions of aldehydes and Ketones	and ketones • Reduction of aldehydes and ketones	Studying the properties of propanal and propanone • PowerPoint			
	Week 21	31.7 Reactions of carboxylic acids	• Reaction with alkalis and hydrogencarbonates • Esterification / Condensation reaction • Reduction • Amides from carboxylic acids	• Activity 31.4 — Studying the reaction between ethanol and ethanoic acid • Activity 31.5 — Identifying unknown carbon compounds • PowerPoint		7,10	• Practice 31.7
	Week 22	31.8 Hydrolysis of esters	• Hydrolysis of esters in aqueous acid / alkali • Obtaining the products after the hydrolysis of an ester in alkaline solution	• PowerPoint		10	
	Week	31.9	• Hydrolysis of amides in	• PowerPoint		7,10	• Practice 31.8

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
	22	Hydrolysis of amides	aqueous acid / alkali	• Concept mapping			• Unit exercise
		Unit 32 Synthesis of carbon compounds					
	Week 23	32.1 * <b>Planning a synthesis</b>	<ul style="list-style-type: none"> <li>• Deploying suitable reactions and functional group interconversions to alter the groups attached to a basic carbon skeleton</li> <li>• Percentage yield of a product</li> <li>• Choosing the reagents</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>	Setting learning objectives and doing reflection	7,10	• Practice 32.1
	Week 23	32.2 Two-step synthetic routes	<ul style="list-style-type: none"> <li>• Working backwards from the target molecule until a suitable starting material can be found</li> <li>• Simple two-step synthetic routes</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		7,10	• Practice 32.2
	Week 24	32.3 * <b>More complicated synthetic routes</b>	<ul style="list-style-type: none"> <li>• Synthetic routes with three or more steps</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>	Training of higher-order thinking skills	7,10	• Practice 32.3
	Week	32.4	<ul style="list-style-type: none"> <li>• Planning</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		10	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
	24	Laboratory preparation of simple carbon compounds*	<ul style="list-style-type: none"> <li>• Carrying out the reaction to obtain crude product</li> <li>• Separating the crude product from the reaction mixture</li> <li>• Purifying and drying the product</li> <li>• Measuring the percentage yield of the product</li> </ul>				
	Week 25-26	Lunar New Year Holiday					
	Week 27	32.5 Common separation and purification methods in carbon compound preparation	<ul style="list-style-type: none"> <li>• Common separation and purification methods for liquid products               <ul style="list-style-type: none"> <li>– distillation</li> <li>– fractional distillation</li> <li>– liquid-liquid extraction</li> </ul> </li> <li>• Common separation and purification method for solid products               <ul style="list-style-type: none"> <li>– re-crystallization</li> </ul> </li> </ul>	• PowerPoint	Notes-taking Reading to learn	10	
	Week 27	32.6 * Preparing 1-bromobutane in the	• Reaction of butan-1-ol with a mixture of sodium bromide and	• Activity 32.1 — Preparing and purifying	Training of higher-order thinking skills	7,10	<ul style="list-style-type: none"> <li>• Practice 32.4</li> <li>• Unit exercise</li> </ul>



School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
		laboratory	concentrated sulphuric acid • Separating the crude product from the reaction mixture • Purifying and drying the product • Calculating the percentage yield of the product	2-chloro-2-methylpropane • PowerPoint • Concept mapping			
		Unit 33 Important organic substances					
	Week 27	33.1 Introduction	• Raising the awareness of the importance of organic substances in daily life	• PowerPoint • Discussion	Setting learning objectives and doing reflection	2,10	
	Week 27	33.2 * Aspirin — a common painkiller	• Functional groups acetylsalicylic acid contains • Uses and problems of aspirin tablets	• PowerPoint • Discussion	Notes-taking Reading to learn	2,10	
	Week	33.3	• Detergents can decrease	• PowerPoint		2,10	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
	27	Detergents	surface tension of water • Soapy detergents • Soapless detergents				
	Week 27	33.4 How do detergents help water to clean?	• Structure of a typical anionic detergent	• Activity 33.1 — Investigating the properties of detergents • PowerPoint		10	
	Week 28	33.5 The wetting and emulsifying properties of detergents in relation to their structures	• The wetting property of detergents • The emulsifying property of detergents	• PowerPoint • Animation		10	
	Week 28	33.6 The cleaning action of detergents	• How does a detergent help to clean	• PowerPoint		7,10	• Practice 33.1
	Week 28	33.7 Making soaps and soapless detergents	• Making soaps from fats or oils in school laboratory • Manufacture of soapless detergents from hydrocarbons obtained	• Activity 33.2 — Preparing a soap and testing its properties • PowerPoint		10,18	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values# / Basic Law Education	Consolidation and Assessment
			from petroleum				
	Week 28	33.8 * <b>Fats and oils</b>	<ul style="list-style-type: none"> <li>• Structure of triglyceride, glycerol, fatty acid and its salt and equation for saponification</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Practice 33.2</li> </ul>
	Week 28	33.9 * <b>Polyesters</b>	<ul style="list-style-type: none"> <li>• Monomers for producing polyesters</li> <li>• Condensation polymerization</li> <li>• Uses of poly(ethylene terephthalate)</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		7,10,18	<ul style="list-style-type: none"> <li>• Practice 33.3</li> </ul>
	Week 28	33.10 * <b>Nylons</b>	<ul style="list-style-type: none"> <li>• Monomers for producing nylons</li> <li>• Condensation polymerization</li> <li>• Uses of nylons</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 33.3 — Preparing nylon</li> <li>• PowerPoint</li> <li>• Concept mapping</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Practice 33.4</li> <li>• Unit exercise</li> <li>• Topic exercise</li> </ul>
	Week 29	Uniform Test					
	Week 30 & 31	Easter Holiday					
		Topic 9 Chemical Reactions and Energy					

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
		Unit 34 Energy changes in chemical reactions					
	Week 32	34.1 What is energy?	<ul style="list-style-type: none"> <li>• Different forms of energy</li> <li>• Unit of energy</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>	Setting learning objectives and doing reflection	2,10	
	Week 32	34.2 Specific heat capacity	<ul style="list-style-type: none"> <li>• Calculations involving specific heat capacity and heat capacity</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Practice 34.1</li> </ul>
	Week 32	34.3 The system and the surroundings	<ul style="list-style-type: none"> <li>• Law of conservation of energy</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		2,10	
	Week 32	34.4 Internal energy of a system	<ul style="list-style-type: none"> <li>• Introducing the term 'enthalpy change'</li> <li>• Difference between enthalpy change and internal energy change is usually small in most cases</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		2,10	
	Week 33	34.5 Enthalpy change of an exothermic reaction	<ul style="list-style-type: none"> <li>• What an exothermic reaction is</li> <li>• Enthalpy level diagram</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 34.1 — Classifying whether</li> </ul>		10	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
			of an exothermic reaction	reactions are exothermic or endothermic • PowerPoint			
	Week 33	34.6 Enthalpy change of an endothermic reaction	<ul style="list-style-type: none"> <li>• What an endothermic reaction is</li> <li>• Enthalpy level diagram of an endothermic reaction</li> </ul>	• PowerPoint		7,10	• Practice 34.2
	Week 33	34.7 Enthalpy changes during physical and chemical changes	<ul style="list-style-type: none"> <li>• Enthalpy change during the melting of ice</li> <li>• Enthalpy change during the combustion of methane</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		2,7,10	• Practice 34.3
	Week 33	34.8 Thermochemical equations	• Writing and interpreting Thermochemical equations	• PowerPoint		7,10	• Practice 34.4
	Week 33	34.9 Explaining energy changes — breakage and formation of chemical bonds	• Exothermic reaction — the amount of energy released in the bond-forming step is greater than the amount of energy used in the bond-breaking step	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		7,10	• Practice 34.5

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
			<ul style="list-style-type: none"> <li>Endothermic reaction — the amount of energy released in the bond-forming step is less than the amount of energy used in the bond-breaking step</li> </ul>				
	Week 33	34.10 Standard conditions for measuring enthalpy changes	<ul style="list-style-type: none"> <li>What the standard conditions are</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 34.6</li> </ul>
	Week 34	34.11 Standard enthalpy change of reaction	<ul style="list-style-type: none"> <li>Definition of standard enthalpy change of reaction</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		10	
	Week 34	34.12 Standard enthalpy change of formation	<ul style="list-style-type: none"> <li>Definition of standard enthalpy change of formation</li> <li>Enthalpy level diagram representing standard enthalpy change of formation</li> <li>Standard enthalpy changes of formation of some common substances</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> <li>Discussion</li> </ul>		10	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
			<ul style="list-style-type: none"> <li>• Making use of enthalpy change of formation to compare the stability of a compound and its constituent elements</li> </ul>				
	Week 34	34.13 Standard enthalpy change of combustion	<ul style="list-style-type: none"> <li>• Definition of standard enthalpy change of combustion</li> <li>• Enthalpy level diagram representing standard enthalpy change of combustion</li> <li>• Standard enthalpy changes of combustion of some common substances</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Practice 34.7</li> </ul>
	Week 34	34.14 Standard enthalpy change of neutralization	<ul style="list-style-type: none"> <li>• Definition of standard enthalpy change of neutralization</li> <li>• Standard enthalpy change of neutralization involving a strong acid and a strong alkali</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		10	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
			<ul style="list-style-type: none"> <li>Standard enthalpy change of neutralization involving either a weak acid or a weak alkali or both</li> </ul>				
	Week 34	34.15 Determining enthalpy changes of chemical reactions	<ul style="list-style-type: none"> <li>Experiment and calculation for determining the enthalpy change of neutralization between hydrochloric acid and sodium hydroxide solution</li> <li>Sources of inaccuracy in the experiment</li> <li>Determining the heat capacity of the polystyrene calorimeter</li> </ul>	<ul style="list-style-type: none"> <li>Activity 34.2 — Determining the enthalpy change of a reaction</li> <li>Activity 34.3 — Determining the enthalpy changes of neutralization</li> <li>PowerPoint</li> <li>Discussion</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 34.8</li> </ul>
	Week 34	34.16 Determining enthalpy changes of combustion	<ul style="list-style-type: none"> <li>Determining the enthalpy change of combustion of ethanol</li> </ul>	<ul style="list-style-type: none"> <li>Activity 34.4 — Determining the enthalpy changes of combustion of some alcohols</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 34.9</li> <li>Unit exercise</li> </ul>



School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
				<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Concept mapping</li> </ul>			
		Unit 35 Hess's Law and its applications					
	Week 35	35.1 Hess's Law	<ul style="list-style-type: none"> <li>• Definition of Hess's Law</li> <li>• Introducing Hess's Law via the oxidation of nitrogen to nitrogen dioxide</li> <li>• Enthalpy change cycle relating the enthalpy changes of processes involved in the reaction between gaseous nitrogen and oxygen to form nitrogen dioxide gas</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>	Setting learning objectives and doing reflection	7,10	<ul style="list-style-type: none"> <li>• Practice 35.1</li> </ul>
	Week 35	35.2 Using Hess's Law to determine enthalpy changes that cannot be easily obtained by experiment	<ul style="list-style-type: none"> <li>• Applying Hess's Law and making use of the enthalpy changes of Haber process (making ammonia through the reaction between</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Practice 35.2</li> </ul>

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
			<p>nitrogen and hydrogen) and the formation of ammonia through the reaction between hydrazine and hydrogen, determine the enthalpy change of formation of hydrazine</p> <ul style="list-style-type: none"> <li>• Enthalpy change cycle used for determining <math>\Delta H</math></li> </ul>				
	Week 35	35.3 Determining the enthalpy change of formation of magnesium hydroxide from enthalpy changes of other reactions	<ul style="list-style-type: none"> <li>• Determining the enthalpy change of the reaction between magnesium and hydrochloric acid</li> <li>• Determining the enthalpy change of the reaction between magnesium hydroxide and hydrochloric acid</li> <li>• Calculating the enthalpy change of formation of magnesium hydroxide</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 35.1 — Determining the enthalpy change of formation of magnesium oxide</li> <li>• Activity 35.2 — Determining the enthalpy change of thermal decomposition of potassium hydrogencarbonat</li> </ul>	Training of higher-order thinking skills	7,10	<ul style="list-style-type: none"> <li>• Practice 35.3</li> </ul>

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
				e • PowerPoint			
	Week 35	35.4 Determining the standard enthalpy change of formation of a compound from standard enthalpy changes of combustion	• $\Delta H_f$ [compound] = $\Sigma \Delta H_c$ [constituent elements] - $\Delta H_c$ [compound]	• PowerPoint	Training of higher-order thinking skills	7,10	• Practice 35.4
	Week 35	35.5 Determining the standard enthalpy change of a reaction from standard enthalpy changes of formation	• $\Delta H_r = \Sigma \Delta H_f$ [products] - $\Sigma \Delta H_f$ [reactants]	• PowerPoint • Concept mapping	Training of higher-order thinking skills	7,10	• Practice 35.5 • Unit exercise • Topic exercise
		Topic 10 Rate of Reaction					
		Unit 36 An introduction to rate of reaction					
	Week 36	36.1 Fast and slow reactions	• Examples of fast and slow reactions	• PowerPoint • Discussion	Setting learning	2,10	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
					objectives and doing reflection		
	Week 36	36.2 The rate of a reaction	<ul style="list-style-type: none"> <li>Determining the rate of a reaction by measuring – the change in concentration (or amount) of a reactant per unit time, or– the change in concentration (or amount) of a product per unit time</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		10	
	Week 36	36.3 Instantaneous rate of reaction	<ul style="list-style-type: none"> <li>Determining the instantaneous rate of reaction by measuring the slope of the tangent to a concentration-time curve at a particular time</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> <li>Discussion</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 36.1</li> </ul>
	Week 36	36.4 Methods for following the progress of a reaction	<ul style="list-style-type: none"> <li>Methods using a variety of physical properties of the reaction mixture</li> <li>Titrimetric analysis</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> <li>Discussion</li> </ul>	Notes-taking Reading to learn	10	
	Week 36	36.5 Following the progress of a reaction by measuring	<ul style="list-style-type: none"> <li>Following the progress of the reaction between magnesium and dilute</li> </ul>	<ul style="list-style-type: none"> <li>Activity 36.1 — Following the progress</li> </ul>		10	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
		the change in volume of a gaseous product	hydrochloric acid by measuring the volume of hydrogen produced	of a reaction by measuring the change in volume of a gaseous product. • PowerPoint			
	Week 36	36.6 Following the progress of a reaction by measuring the change in mass of the reaction mixture	• Following the progress of the reaction between calcium carbonate and dilute hydrochloric acid by measuring the loss in mass of the reaction mixture	• PowerPoint		10	
	Week 36	36.7 Following the progress of a reaction by measuring the change in pressure of the reaction mixture	• Following the progress of the reaction between magnesium and dilute hydrochloric acid using a pressure sensor	• PowerPoint		7,10	• Practice 36.2
	Week 36	36.8 Following the progress of a reaction by measuring the	• Following the progress of the oxidation of oxalate ions by permanganate ions using a colorimeter	• PowerPoint		10	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
		change in colour intensity of the reaction mixture	<ul style="list-style-type: none"> <li>Basic components of a colorimeter</li> </ul>				
	Week 36	36.9 Following the progress of a reaction by measuring the change in turbidity of the reaction mixture	<ul style="list-style-type: none"> <li>Following the progress of the reaction between sodium thiosulphate solution and dilute sulphuric acid by measuring the time to reach an opaque stage</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 36.3</li> </ul>
	Week 36	36.10 * <b>Following the progress of a reaction using titrimetric analysis</b>	<ul style="list-style-type: none"> <li>Following the progress of the alkaline hydrolysis of ethyl ethanoate</li> <li>Common quenching techniques</li> <li>Advantages and disadvantages of using titrimetric analysis</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> <li>Discussion</li> <li>Concept mapping</li> </ul>	Training of higher-order thinking skills	7,10	<ul style="list-style-type: none"> <li>Unit exercise</li> </ul>
		Unit 37 Factors affecting the rate of a reaction					
	Week 37	37.1 Factors affecting the rate of a reaction	<ul style="list-style-type: none"> <li>Concentration</li> <li>Surface area</li> <li>Temperature</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> <li>Discussion</li> </ul>	Setting learning objectives and	10	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
			<ul style="list-style-type: none"> <li>• Catalyst</li> </ul>		doing reflection		
	Week 37	37.2 Studying the effect of change in concentration of a reactant on the rate of a reaction	<ul style="list-style-type: none"> <li>• Effect of varying the concentration of permanganate ions on the rate of its reaction with oxalate ions in an acidic solution</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 37.1 — Investigating the effect of varying the concentration of hydrochloric acid on the rate of its reaction with magnesium</li> <li>• Activity 37.2 — Investigating the effect of varying the concentration of hydroxide ion on the rate of its reaction with phenolphthalein</li> <li>• PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Practice 37.1</li> </ul>
	Week	37.3	<ul style="list-style-type: none"> <li>• Comparing the rate</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 37.3 —</li> </ul>		7,10	<ul style="list-style-type: none"> <li>• Practice 37.2</li> </ul>

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
	37	Studying the effect of change in surface area of a solid reactant on the rate of a reaction	of reaction of dilute hydrochloric acid with powdered calcium carbonate / calcium carbonate lumps	Investigating the effect of varying the surface area of marble chips on the rate of their reaction with dilute hydrochloric acid • PowerPoint • Discussion			
	Week 37	37.4 Studying the effect of change in temperature on the rate of a reaction	• Effect of varying the temperature on the rate of a reaction	• Activity 37.4 — Investigating the effect of varying the temperature on the rate of the reaction between sodium thiosulphate solution and dilute sulphuric acid		7,10	• Practice 37.3



School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
				<ul style="list-style-type: none"> <li>• Activity 37.5 — Investigating the effect of varying the temperature on the rate of the reaction between ingredients of Alka Seltzer tablet</li> <li>• PowerPoint</li> <li>• Discussion</li> </ul>			
	Week 37	37.5 Studying how the presence of a catalyst affects the rate of a reaction	<ul style="list-style-type: none"> <li>• What a catalyst is</li> <li>• Positive and negative catalysts</li> </ul>	<ul style="list-style-type: none"> <li>• Activity 37.6 — Catalyzing the decomposition of hydrogen peroxide in solution</li> <li>• PowerPoint</li> </ul>		10	
	Week 37	37.6 Reaction rate and effective collisions	<ul style="list-style-type: none"> <li>• Why does reaction rate increase with the concentration of reactants?</li> <li>• Why does reaction rate</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>	Notes-taking Reading to learn	10	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
			increase with the surface area of a solid reactants? • Why does reaction rate increase with temperature?				
	Week 37	37.7 Why does reaction rate increase with the concentration of reactants?	• Industrial catalysts • Catalytic converters in car exhaust systems • Hydrogenation of unsaturated vegetable oils	• PowerPoint		7,10	• Practice 37.4
	Week 37	37.8 Why does reaction rate increase with the surface area of a solid reactant?		• PowerPoint		10	
	Week 37	37.9 Why does reaction rate increase with the temperature?		• PowerPoint		7,10	• Practice 37.5
	Week 37	37. 10 * <b>Applications of catalysts</b>		• PowerPoint • Discussion	Notes-taking Reading to learn	2,10	
	Week 37	<b>37.11 *</b> <b>Enzymes</b>	• Yeast and fermentation • Uses of enzymes in industries	• PowerPoint • Discussion • Concept		2,7,10	• Unit exercise

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
				mapping			
		Unit 38 Gas volume calculations					
	Week 38	38.1 The relationship between gas volume and moles: Avogadro's Law	<ul style="list-style-type: none"> <li>Equal volumes of gases at the same temperature and pressure contain equal numbers of particles</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>	Setting learning objectives and doing reflection	10	
	Week 38	38.2 Molar volume of a gas	<ul style="list-style-type: none"> <li>Calculations involving mass, number of moles and volume of a gas</li> </ul>	<ul style="list-style-type: none"> <li>Activity 38.1 — Determining the molar volume of carbon dioxide</li> <li>PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 38.1</li> <li>Practice 38.2</li> </ul>
	Week 38	38.3 Calculations from chemical equations	<ul style="list-style-type: none"> <li>Steps for calculating the quantities of reactants or products in a reaction</li> <li>Calculations involving masses and gas volumes</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 38.3</li> </ul>
	Week 38	38.4 Gas volume – gas volume calculations from chemical equations	<ul style="list-style-type: none"> <li>Calculations involving gas volumes</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> <li>Concept mapping</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Practice 38.4</li> <li>Unit exercise</li> <li>Topic exercise</li> </ul>

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values# / Basic Law Education	Consolidation and Assessment
		Topic 11 Chemical Equilibrium					
		Unit 39 An introduction to chemical equilibrium					
	Week 38	39.1 Irreversible and reversible reactions	<ul style="list-style-type: none"> <li>• What irreversible reactions and reversible reactions are</li> <li>• Examples of reversible reactions – aqueous solution containing cobalt(II) ions – esterification</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>	Setting learning objectives and doing reflection	7,10	• Checkpoint
	Week 38	39.2 Equilibrium	<ul style="list-style-type: none"> <li>• Introducing static equilibrium and dynamic equilibrium</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		10	
	Week 38	39.3 Chemical equilibrium for a reversible reaction	<ul style="list-style-type: none"> <li>• Variation of concentrations and reaction rates with time during the course of a reversible reaction</li> <li>• Rate of forward reaction = rate of backward reaction at equilibrium</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> </ul>		10	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
	Week 38	39.4 The importance of a closed system	<ul style="list-style-type: none"> <li>Explaining the importance of a closed system when establishing a state of equilibrium</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> <li>Discussion</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Checkpoint</li> </ul>
	Week 38	39.5 Equilibrium established from either direction of a reaction	<ul style="list-style-type: none"> <li>Using an example to illustrate that equilibrium can be reached from either direction of a reaction</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> <li>Discussion</li> </ul>	Training of higher-order thinking skills	10	
	Week 38	39.6 Effect of changing conditions on chemical equilibrium systems	<ul style="list-style-type: none"> <li>Effect of concentration changes on the chromate / dichromate system</li> </ul>	<ul style="list-style-type: none"> <li>Activity 39.1 — Investigating the effects of concentration changes on two chemical equilibrium systems</li> <li>PowerPoint</li> </ul>	Training of higher-order thinking skills	10	
	Week 38	39.7 Characteristics of a system in dynamic equilibrium	<ul style="list-style-type: none"> <li>Summarizing the characteristics of a system in dynamic equilibrium</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		10	
	Week 38	39.8 The equilibrium constant	<ul style="list-style-type: none"> <li>Illustrating that the equilibrium constant, <math>K_c</math>,</li> </ul>	<ul style="list-style-type: none"> <li>PowerPoint</li> </ul>		10	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
			for a specific reaction always has the same value at a given temperature by using an example				
	Week 38	39.9 The equilibrium law	<ul style="list-style-type: none"> <li>• Writing the expression for equilibrium constant, <math>K_c</math>, from equilibrium concentrations</li> <li>• Units of equilibrium constant</li> <li>• Relationship of equilibrium constant to the chemical equation</li> </ul>	• PowerPoint		7,10	• Checkpoint
	Week 39	39.10 Calculating equilibrium constants	• Calculating equilibrium constants from equilibrium concentrations	• PowerPoint		7,10	• Checkpoint
	Week 39	39.11 * <b>What does the equilibrium constant tell us?</b>	<ul style="list-style-type: none"> <li>• Judging the extent of a reaction</li> <li>• Predicting the direction of a reaction by comparing <math>Q_c</math> and <math>K_c</math></li> <li>• Calculating equilibrium concentrations</li> </ul>	<ul style="list-style-type: none"> <li>• PowerPoint</li> <li>• Discussion</li> </ul>		7,10	• Checkpoint
	Week	39.12	• Writing an expression	• PowerPoint		10	

School Term	Weeks	Topics/ Extended Parts*	Learning Objectives/ Teaching Focus	Teaching and Learning Activities	Self-directed Learning Skills*	Values <sup>#</sup> / Basic Law Education	Consolidation and Assessment
	39	Equilibrium systems involving components in more than one state*	for equilibrium constant of an equilibrium system involving components in more than one state				
	Week 39	39.13 * Determining the equilibrium constant for an esterification reaction experimentally	<ul style="list-style-type: none"> <li>Determining the equilibrium constant, <math>K_c</math>, for an esterification reaction — the reaction between ethanoic acid and propan-2-ol</li> </ul>	<ul style="list-style-type: none"> <li>Activity 39.2 — Determining the equilibrium constant, <math>K_c</math>, for an esterification reaction between ethanoic acid and propan-1-ol</li> <li>PowerPoint</li> <li>Concept mapping</li> </ul>		7,10	<ul style="list-style-type: none"> <li>Checkpoint</li> <li>Unit exercise</li> </ul>
	Week 39	Revision Week					
	Week 40 to 42	Final Examination					

\* The extended parts should be marked with asterisks. These parts should be more challenging and can be covered when the students can master the knowledge and skills covered in the conventional topics.

# **Core Values of Wah Yan College, Kowloon**

- I. Love and care
- II. Strive for excellence
- III. Respect and Justice
- IV. Responsibility
- V. Faith

**Sustaining values**

	Life	Family	Love	Justice	Truth
I. Love and care	1. Accept & feel positive about himself 2. Appreciation & Gratitude 3. Empathy & Compassion 4. Positive and grateful 5. Kind and humble	6. Love your family 7. Loyalty and fidelity 8. Family as a basic unit of society; marriage is the foundation of a family	9. Forgiveness & Reconciliation 10. Care for the poor and the needy 11. Service to others		
II. Strive for excellence	12. Reflective 13. <b>Strive for excellence</b> (Magis & fighting spirit), 14. Reflection (Examen), 15. Discern right from wrong (Ignatian Spirituality), 16. Men of Human Excellence (Competence, Commitment, Compassion, Conscience) 17. Perseverance 18. Curiosity & willingness to				



	learn 19. Value imagination and creativity				
III. Respect and Justice	20. Life is valuable and respectable 21. Manners and etiquette 22. Openness to good in all things 23. Honesty and integrity 24. Faithfulness	25. Mutual respect between a man and a woman	26. Love your neighbours 27. Respect for himself & others	28. Respect the rights of others, equity, the common good, human dignity	
IV. Responsibility	29. Freedom & Self-discipline 30. Responsible with public property 31. <b>Responsibility</b>		32. Care for the environment	33. Social Identities: citizen identity, national identity and global citizen identity	
V. Faith					34. Appreciate religious liturgies 35. Explore & practise one's faith 36. Sacrifice 37. Experience of God 38. The meaning of life 39. Truth about God, 40. Evangelization