**Possible UNIT 4 TIMETABLE – 2020 only**

* **The chapter numbers refer to the 5th Edition Pearson *Heinemann Chemistry 2* – both in the print version and the fully electronic and interactive *Pearson Lightbook Chemistry Victoria 21*.**
* **The pracs, exercises and demonstrations are all found in old editions of Pearson Heinemann *TRAB* or in the Student Workbook. For the present Study Design they are provided as pdfs with support materials etc for Lab technicians at pearsonplaces.com.au**
* **SW refer to the *Heinemann* *Student Workbook 2* – the worksheets listed are useful homework and revision. Fully worked solutions are available at peardonplaces.com.au**
* **Any prac could be used as the assessment task called *A report of a practical activity* and so can be done at any stage throughout the semester.**
* **Several pracs are listed and there are more in the 3rd Ed of the Student Workbook, the 4th Ed Heinemann *TRAB* and in the 3rd Ed Heinemann *TRB*. One could be selected each week according to your program.**
* ***You tube* and similar clips can be used throughout for interest, variation and clarification.**

**Penny Commons –** (adjusted for 2020 by Melissa MacEoin)

**\*Review questions throughout each chapter are most helpful as ‘checkpoint’ questions. Only end of Chapter Review questions have been listed here.**

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| **Week** | **Concepts** | **Text Ch** | **Minimum set text questions**  | **VCAA require at least 3 hours for pracs and investigations for each AoS.****Possible practical work may include class pracs plus demos****Worksheets from Student Workbook (SW)*****You tube* clips for interest and clarification SAC Dates and details** |
| **Unit 4: How are organic compounds categorised, analysed and used?****Area of Study 1: How can the diversity of carbon compounds be explained and categorised?** |
| 1 | Structure and nomenclature of organic compounds (largely revision Y11)* Carbon compounds
* Types of hydrocarbons: alkanes (including cyclohexane), alkenes, alkynes, benzene
* semi-structural (condensed) and skeletal formulas
 | 10.1 | 1, 7, 8 | SW worksheets 22, 23 |  |
| 2 | Functional groups: structures and naming (Revision Y11):* Alkanes (including cycloalkanes)
* Alkenes, alkynes, benzene
* haloalkanes,
* primary amines
* **primary amides** (no naming)
* alcohols (primary, secondary, tertiary)
* **aldehydes, ketones,**
* carboxylic acids and
* non-branched esters
* **(Note: Naming limited up to C8: noncyclic hydrocarbons, haloalkanes, 1oamines, alcohols (1o, 2o, 3o), carboxylic acids and non-branched esters. Up to 2 functional groups)**
 | 10.3 | 10, 11, 12, 13, 14, 15, 16a, d, 17, 18  | SW Worksheets 25 Prac: Modelling functional groups and organic reactionsYou tube:Silver mirror test for aldehydes: RSC<http://www.rsc.org/Education/EiC/issues/2007Jan/ExhibitionChemistry.asp> Video <https://www.youtube.com/watch?v=y-4qqcCxD6g>  |  |
| 3 | Properties of organic compounds* Physical properties
* trends of properties including boiling point, **viscosity) and flashpoint with reference to structure and bonding**

Reactions of alkenes, haloalkanes and alcohols* oxidation of 1o and 2o alcohols
* substitution reactions of haloalkanes
* addition reactions of alkenes
 | 11 | 1 - 8 | SW Worksheets 26, 27 Prac: Reactions and properties of some organic compoundsYou tube: Flashpoint testing (dangerous!)<https://www.youtube.com/watch?v=w_nVhkvPEpI>  |  |
| 4 | * hydrolysis of esters
* condensation reaction between carboxylic acid and alcohol to form ester
* Organic pathways: the pathways used to synthesise primary haloalkanes, primary alcohols, primary amines, carboxylic acids and esters
 | 11 | 9 – 16, 19 | Prac: Oxidation of alcohols Demo: Making a condensation polymer to form the amide nylon Prac: Preparing artificial fragrances and flavours (could be done in Year 11 as well) | **Outcome 1:** * **8% on total marks for the year**
* **VCAA offers range of possibilities**
* **Suggestions**
	+ **Annotations of at least two practical activities from a practical logbook (could use modelling and reactions ; different food pracs)**
	+ **OR Response to a set of structural questions (test)**
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| 5 | Spectroscopy* The electromagnetic spectrum
* IR Spectroscopy
* NMR spectroscopy – introduction
* Carbon 13 NMR
 | 12 | 1, 2, 3 | CEA Chemical detectives appExercise: Data analysis of organic compounds by IR SW worksheets 28, 29You tube: IR (RSC)<https://www.youtube.com/watch?v=DDTIJgIh86E>H-NMR (RSC)<https://www.youtube.com/watch?v=uNM801B9Y84> |
| 6 | Spectroscopy* Proton NMR
* Combined techniques
 | 12 | 5, 6, 12, 13, 14, 15 | Exercise: Interpretation of NMR spectra of a number of organic compounds – data analysisSW worksheets 30 |
| 7 | Chromatography (revision Y11)* Principles
* HPLC

Volumetric analysis* Principles of volumetric analysis (Revision Y11)
 | 13 | 1, 3, 5, 6, 7, 9, 10, 11 | SW Worksheets 31Prac: Chromatography of a vegetable extractYou tube: HPLC (RSC)<https://www.youtube.com/watch?v=kz_egMtdnL4> |
| 8 | * Acid base titrations (Revision Y11)
* Redox titrations
 | 14 | 3, 4, 6, 8, 9, 10, 11 – 16 | SW Worksheets 32Prac: Analysis of aspirin tabletsPrac: Analysis of ascorbic acid in vitamin C tabletsPrac: Determination of the ethanoic acid concentration of vinegar |
| **Area of Study 1 Review questions do all (except 14, 30c,d,e 31a,b, d, e, 32f) as revision of the whole area of study** |

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|  **Unit 4: How are organic compounds categorised, analysed and used?****Area of Study 2: What is the chemistry of food?** |
| 9 | Food molecules* Proteins: formation, structure, essential amino acids
* Carbohydrates: formation, structure, **storage of excess as glycogen,**
* Fats and oils: formation, structure, differences between sat and unsat fatty acids
 | 15 | 3, 4, 5, 6, 9, 10, 11, 14, 20, 21, 25, 26 | SW Worksheets 33, 34, 35, 36, 37 Prac: Modelling proteins, fats and fatty acids and carbohydratesPrac: Testing for proteinsPrac: Breaking down the starch polymerPrac: Reactions of carbohydratesPrac: Tests for fatty acids and glycerolDemo: Detection of unsaturated fatsYou tube: Fatty acids<https://www.youtube.com/watch?v=UnZadq2kB0g> | **Outcome 2:** * **6% on total marks for the year**
* **VCAA offers range of possibilities**
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| 10 | Metabolism of food* Metabolism of food
* Enzymes: models, acid base properties, enzyme activity, **difference between denaturation and hydrolysis**
* Carbohydrates: digestion starch compared to **cellulose, lactose intolerance**
* Fats and oils: hydrolysis
 | 16 | 1a-f, 3, 4, 5, 6, 8, 9, 10, 11, 12, 15, 16, 18, 19, 21 | SW Worksheets 38, 39 (not induced fit)Prac: Action of enzymes  |
| 11 | The energy content of food* **Comparison of energy content of proteins, carbohydrates and fats/oils**
* **Glucose as primary energy source and cellular respiration**
* Calorimetry: solution and bomb, calibration, **analysis of temperature-time graphs from solution calorimetry**
 | 17 | 1, 2, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 18, 19, 20, 22, 24, 25 | SW Worksheets 38, 42Prac: Calibration of a calorimeterPrac: Heat of solution of the dissolution of potassium nitratePrac: Energy content of a biscuit/peanut SW Worksheets  |
| **Area of Study 2 Review questions do all (except 13, 14, 15, 17, 18, 19, 21d, 28b, d, 29c, 30d, 32, 33) as revision of the whole area of study** |
| **This following period for the Practical Investigation is moveable. Needs 7-10 hours (not all class time).** |
| 12 |  |  |  |  |  |
| 13 |  |  |  |  |  |
| 14 |  |  |  |  |  |
| 15 | Revision |  |  |  |  |
| 16 | Revision |  |  |  | **Outcome 3:*** **6% of total marks for year**
* **Scientific poster or practical report. max 600 words**
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| 17 | Revision |  |  |  |  |