**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 reactions  You 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 compounds  You 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)** |
| 5 | Spectroscopy   * The electromagnetic spectrum * IR Spectroscopy * NMR spectroscopy – introduction * Carbon 13 NMR | 12 | 1, 2, 3 | CEA Chemical detectives app  Exercise: Data analysis of organic compounds by IR  SW worksheets 28, 29  You 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 analysis  SW 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 31  Prac: Chromatography of a vegetable extract  You 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 32  Prac: Analysis of aspirin tablets  Prac: Analysis of ascorbic acid in vitamin C tablets  Prac: 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 carbohydrates  Prac: Testing for proteins  Prac: Breaking down the starch polymer  Prac: Reactions of carbohydrates  Prac: Tests for fatty acids and glycerol  Demo: Detection of unsaturated fats  You tube: Fatty acids  <https://www.youtube.com/watch?v=UnZadq2kB0g> | **Outcome 2:**   * **6% on total marks for the year** * **VCAA offers range of possibilities** |
| 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, 42  Prac: Calibration of a calorimeter  Prac: Heat of solution of the dissolution of potassium nitrate  Prac: 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** |
| 17 | Revision |  |  |  |  |