**11 Possible UNIT 1 TIMETABLE**

* **The chapter numbers refer to the new 5th Edition Pearson *Heinemann Chemistry 1* – both in the print version and the fully electronic and interactive *Pearson Lightbook Chemistry Victoria 11*.**
* **The pracs, exercises and demonstrations are found in old editions of Pearson Heinemann *TRAB* or in the Student Workbook. For the present course, they are provided as pdfs with support materials etc for Lab technicians at pearsonplaces.com.au**
* **SW refer to the *Heinemann* *Student Workbook 1* – the worksheets listed are useful homework and revision. Fully worked solutions available at peardonplaces.com.au**
* **The Research and Practical investigations are fully explained in the 5th Edition Pearson *Heinemann Chemistry 1*. (Some resources provided at Developmental Workshops, in the Minutes from these Developmental Workshops and in the VCAA Advice to teachers)**
* **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.**
* **I have listed several pracs and there are more in the present 4th Ed Heinemann *TRAB* and in the 3rd Ed Heinemann *TRB*. You could possibly select one each week according to your program.**
* ***You tube* and similar clips can be used throughout for interest, variation and clarification.**

**Penny Commons**

**\*Review questions throughout each chapter are most helpful as checkpoint questions. I have only listed end of Chapter Review questions here.**

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| **Week** | **Concepts** | **Text Ch** | **\*Minimum set questions from textbook – Chapter review questions**  | **Possible practical work – 3½ – 5 hours (pracs, demos and exercises in TRAB Y11 or 12) including Worksheets from Student Workbook (SW)**  | **SAC Dates and details** |
| **Semester 1: Unit 1: How can the diversity of materials be explained?****Area of Study 1: How can knowledge of elements explain the properties of matter?** |
| 1 | **Nanoparticles and nanomaterials****Elements and the periodic table*** Elements
* Periodic table
* Compounds
 | 1 | 2,3, 5 | *You tube* clips for interest and clarificationPrac: Particle theory of matter in SWSW Worksheets 1, 2 |  |
| 2 | * Nuclear atom
* Electronic configuration
 | 1 | 6, 7, 8, 9, 10, 12, 14 – 20. | Prac: Flame colours of selected metals Prac: Oxidation states of transition metalsSW Worksheets 3 |  |
| 3 | * The modern periodic table
* Periodic properties
* Trends in properties
 | 2 | 1-4,5-8, 10-12 | Prac: Period 3 elements in SWExercise: The periodic tableExercise: Periodic variation in properties of the elementsExercise: An investigation of ionisation energiesSW Worksheets 4, 5 |  |
| 4 | **Metals*** Properties and the model
* Experimental determination of the relative reactivity of metals with water, acids and oxygen
* the extraction of a selected metal
* experimental modification of a selected metal
* properties and uses of metallic nanomaterials
 | 3 | 1, 3, 6-9, 11-17, 19-2326, 27, 30, 31,33, 34, 36 | Prac: Modelling metallic latticesPrac: Growing metal crystalsPrac: Modifying the properties of metalsPrac: Reactivity of metals with water, acids and oxygenSW Worksheets 6, 7, 8 |  |
| 5 | **Ionic compounds*** properties and model
* Electron transfer diagrams
* Chemical formulas
* Uses
* Experimental determination of the factors affecting crystal formation of ionic compounds
 | 4 | 1, 2, 5 – 12, 14 – 16, 18 - 20 | Prac: Investigating sodium chloridePrac: investigating ionic compoundsPrac: Crystal formation of ionic compoundsPrac: Growing crystals of ionic compoundsSW Worksheets 9, 10,  |  |
| 6 | **Quantifying atoms and compounds*** Masses of particles
* Relative isotopic and atomic masses using mass spectrometry
* The mole
 | 5 | 1 – 22,  | Prac: Mole simulation and applicationsSW Worksheets 11, 12 |  |
| 7 | * Practice mole concept calculations and complete all questions form chapters in text book
 | 5 |  | SW Worksheet 13 |  |
| 8 | * Molar mass
* Empirical and molecular formulas
* percentage composition
 | 5 | 24, 26 – 28,31 – 33, 35-37 | Prac: Chemical composition of a compound | **Possible SAC: Report of a practical activity: Chemical composition of a compound** |
| **Area of Study 1 Review questions 1-35 as revision of the whole area of study** |
| **Area of Study 2: How can the versatility of non-metal be explained?** |
| 9 | **Materials from molecules*** Covalent model
* Shapes of molecules
* Polarity of molecules
 | 6 | 5 – 12, 14, 15 | Prac: Making molecular modelsSW Worksheets 14, 15 |  |
| **Term 1 holidays – adjust timetable as needed** |
| 10 | * Properties of molecular substances
* Weak bonding between molecules

**Carbon lattices and carbon nanomaterials*** Diamond and graphite
* Graphene and fullerenes
 | 78 | 1-192, 4-9 | Prac: Comparing the physical properties of different covalent lattices SW Worksheets 16, 18Prac: Buckyballs, nanotubes and other allotropes of carbonSW Worksheet 19 |  |
| 11 | **Organic compounds*** Crude oil
* Hydrocarbons
* Homologous series
* Functional groups
* Naming of organic compounds
 | 9 | 3-6, 8, 9, 11, 12,  | Prac: Investigating hydrocarbonsExercise: Analysis of the physical properties of the first eight hydrocarbonsExercise: Modelling and naming alkanesPrac: Modelling functional groups (Year 12 as well)SW Worksheet 20, 21 |  |
| 12 | * Empirical and molecular formula calculations
* Chemical and physical properties of hydrocarbons, alcohols, carboxylic acids and simple esters
 | 9 | 14-17, 18-20, 23, 24, 25, 27 | Prac: Preparing artificial fragrances and flavours (Year 12 as well)SW Worksheets 17, Prac: Reactions and properties of some organic compounds (maybe Year 12) |  |
| 13 | **Polymers*** Formation of addition polymers
* Differences between thermoplastic and thermosetting
* Designed polymers
* Advantages and disadvantages of the use of polymers
 | 10 | 1-11, 13, 15, 18, 22 | Prac: Modelling polymersPrac: Making ghost buster slimePrac: Making an ElastomerPrac: Making a condensation polymer, the amide, nylonSW worksheet 22, 23,  |  |
| **Area of Study 2 Review questions 1-35 as revision of the whole area of study** |
| **Area of Study 3: Research investigation** |
| 14 | **Research investigation***(could be moved according to your program)* | 11 | 1, 3, 4, 7, 8,  | **4-6 hours** research based on one of the options in the Study DesignSW Worksheets Skills practice worksheets | **Present as digital scientific poster (practise for Year 12)** |
| 15 | Revision |  |  | SW Worksheet 24 |  |
| 16 | Exams |  |  |  |  |
| 17 | Exams: **Test: MC and extended answer covering all topics in Unit 1** |
| **Semester 2: Unit 2: What makes water such a unique chemical?****Area of Study 1: How do substances interact with water?** |
| Semester 1 Week 18Semester 2 Week 1 | Properties of water* Trends in MP and BP of Group 16 hydrides
* Specific heat capacity and latent heat of water
 | 12 | 2-6, 7, 8, 11, 12, 13-18, 20 | **Investigation: Properties of water (*Maybe useful in the Practical investigation)***SW Worksheets 25, 26, 27 |  |
| Semester 1 Week 19Semester 2 Week 2 | Water as a solvent* The solution process
* Precipitation reactions
* Ionic equations
* Importance of solvent properties in biological, domestic or industrial contexts
 | 13 | 1-4, 6-8, 10, 11, 12, 13, 16, 17, 18, 21, 23-25 | Prac: Effect of polarity on solubility Prac: Stalagmite from a supersaturated solutionPrac: Precipitation reactionsPrac: Purification of polluted waterSW Worksheets 28, 29, 30 |  |
| **Term 2 holidays – adjust timetable as needed** |

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| **Week** | **Concepts** | **Text Ch** | **\*Minimum set questions from textbook – Chapter review questions**  | **Possible practical work – 3½ – 5 hours (pracs, demos and exercises in TRAB Y11 or 12) including Worksheets from Student Workbook (SW)** | **SAC Dates and details** |
| **Semester 2: Unit 2: What makes water such a unique chemical?****Area of Study 1: How do substances interact with water?** |
| 3 | **Measurement of solubility and concentration** *(from AoS 2 but needs to be before acids and pH)** Solubility and solubility tables
* Solubility curves
* Units of concentration
 | 14 | 1-7, 8, 10, 12, 13-15, 16-18, 20, 21 | Prac: Determination of the solubility of a saltPrac: Deriving a solubility curveSW Worksheets 31,  |  |
| 4 | Acid-base reaction in water* Lowry-Bronsted theory
* Reactions involving acids and bases and equation writing
* Ionic product of water, pH
 | 15 | Because this is all the acid base material in the course, it needs to be well understood and remembered: 1-7 | Prac: Relative strengths of acidsPrac: Reactions of hydrochloric acidPrac: Amphiprotic substances in waterPrac: Beetroot – a natural indicatorDemo: Universal indicator colour displaySW Worksheets 32, 33,  | **Report of a practical activity: Reactions of hydrochloric acid** |
| 5 | * Strengths of acids and base (No Ka )
* Dilutions of solutions
* Strong and weak acids and bases and dilute and concentration solutions
* Selected acid-base issue – Ocean acidity
 | 15 | 8-33 | Prac: Strong and weak acidsPrac: DilutionSW worksheets 34, 35,  |  |
| 6 | **Redox reactions in water*** Oxidation and reduction
* Writing equations
* Reactivity series
* Selected redox issue - Corrosion
 | 16 | 1, 2, 4, 5, 6, 7-10, 11, 13, 15, 16, 18, 22, 25, 26 | Demo: Oxidation-reduction reactionsPrac: The electrochemical series of metalsPrac: Reactivity series of metalsPrac: Corrosion 1Prac: Corrosion 2SW Worksheets 37, 38, 39 |  |
| **Area of Study 1 Review questions 1-35 as revision of the whole area of study** |
| **Semester 2: Unit 2: What makes water such a unique chemical?****Area of Study 2: How are substances in water measured and analysed?** |
| 7 | **Water sample analysis*** Water distribution and availability
* Sampling protocols
* Selected water sample and contaminant
 | 17 | 7, 9 | **Investigation: Analysis of local water *(maybe more useful in the Practical Investigation)***SW Worksheets 40, 41, 42 |  |
| 8 | **Analysis of salt in water*** Sources of salts
* Mass-mass stoichiometry
 | 18 | 3,12-15 | Prac: Products of a decomposition reactionSW Worksheets 36, 43, 44 |  |
| 9 | * Gravimetric analysis
* Colorimetry and UV-Vis spectroscopy
 | 18 | 5, 6, 7-11, 17, 19, 20 | Prac: Gravimetric analysis of chicken soupPrac: Gravimetric determination of sulfur as sulfate in fertiliserPrac: Chromatography of inks and smartiesPrac: Colorimetric determination of phosphorus content in lawn fertiliserExercise: UV-Vis spectroscopy – concentration of caffeine in a colaSW Worksheets 45,  |  |
| 10 | * AAS and calibration
 | 18 | 25, 27-29 | Exercise: AAS - Determination of concentration of iron in a breakfast cereal SW Worksheets 46, 47,  |  |
| 11 | **Analysis for organic compounds*** Organic contaminants in water
* Chromatography and HPLC
 | 19 | 1, 3, 5, 7,10, 11, 15, 16, 17, 18, 20, 21, 25 | Prac: Chromatography of inks and smartiesSW Worksheets 48 |  |
| 12 | **Analysis for acids and bases*** Sources of acids and bases in waterways
* Volume-volume stoichiometry
* Volumetric analysis including standard solutions and dilutions
 | 20 | 3, 4, 5-7, 8-11, 12-18 | Prac: Preparation of a standard solutionPrac: Analysis of brick cleanerSW Worksheets 49, 50, 51 |  |
| **Term 3 holidays – adjust timetable as needed** |
| 13 | * Practice of stoichiometry
 |  |  |  |  |
| **Area of Study 2 Review questions 1-35 as revision of the whole area of study** |
| **Area of Study 3: Practical investigation** |
| 14 | **Practical investigation***(could be moved according to your program – it may suit you to do it near the beginning of the Unit to avoid overlap with student’s Year 12 exams)* | 21 | 1, 2, 3, 5, 7, 9, 12, 13 | **4-6 hours** research based on one of the options in the Study Design**Some useful material could be found in the investigations listed above.**Prac: Properties of waterPrac: Analysis of local waterPrac: Purification of polluted waterSW Worksheets 52, skills worksheets | **Present as digital scientific poster for practice for Year 12 (OR other presentations)**  |
| 15 | Complete all assessment tasks and content |  |  |  |  |
| 16 | Revision |  |  |  |  |
| 17 | Exams /Year 12 exams for those doing a Unit 3 or 4 subject. All Year 11 material needs to be completed before these Year 12 exams start. | **Test: MC and extended answer covering all topics in Unit 2** |