**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.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 clarification  Prac: Particle theory of matter in SW  SW 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 metals  SW Worksheets 3 |  |
| 3 | * The modern periodic table * Periodic properties * Trends in properties | | 2 | | 1-4,  5-8, 10-12 | | Prac: Period 3 elements in SW  Exercise: The periodic table  Exercise: Periodic variation in properties of the elements  Exercise: An investigation of ionisation energies  SW 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,  19-23  26, 27, 30, 31,33, 34, 36 | | Prac: Modelling metallic lattices  Prac: Growing metal crystals  Prac: Modifying the properties of metals  Prac: Reactivity of metals with water, acids and oxygen  SW 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 chloride  Prac: investigating ionic compounds  Prac: Crystal formation of ionic compounds  Prac: Growing crystals of ionic compounds  SW 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 applications  SW 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 models  SW 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 | | 7  8 | | 1-19  2, 4-9 | | Prac: Comparing the physical properties of different covalent lattices  SW Worksheets 16, 18  Prac: Buckyballs, nanotubes and other allotropes of carbon  SW 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 hydrocarbons  Exercise: Analysis of the physical properties of the first eight hydrocarbons  Exercise: Modelling and naming alkanes  Prac: 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 polymers  Prac: Making ghost buster slime  Prac: Making an Elastomer  Prac: Making a condensation polymer, the amide, nylon  SW 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 Design  SW 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 18  Semester 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 19  Semester 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 solution  Prac: Precipitation reactions  Prac: Purification of polluted water  SW Worksheets 28, 29, 30 | |  |
| **Term 2 holidays – adjust timetable as needed** | | | | | | | | |

**Possible UNIT 2 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.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 salt  Prac: Deriving a solubility curve  SW 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 acids  Prac: Reactions of hydrochloric acid  Prac: Amphiprotic substances in water  Prac: Beetroot – a natural indicator  Demo: Universal indicator colour display  SW 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 acids  Prac: Dilution  SW 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 reactions  Prac: The electrochemical series of metals  Prac: Reactivity series of metals  Prac: Corrosion 1  Prac: Corrosion 2  SW 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 reaction  SW 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 soup  Prac: Gravimetric determination of sulfur as sulfate in fertiliser  Prac: Chromatography of inks and smarties  Prac: Colorimetric determination of phosphorus content in lawn fertiliser  Exercise: UV-Vis spectroscopy – concentration of caffeine in a cola  SW 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 smarties  SW 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 solution  Prac: Analysis of brick cleaner  SW 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 water  Prac: Analysis of local water  Prac: Purification of polluted water  SW 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** | | | | | | |