THE PRIORY ACADEMY LSST

Sixth Form Induction Day

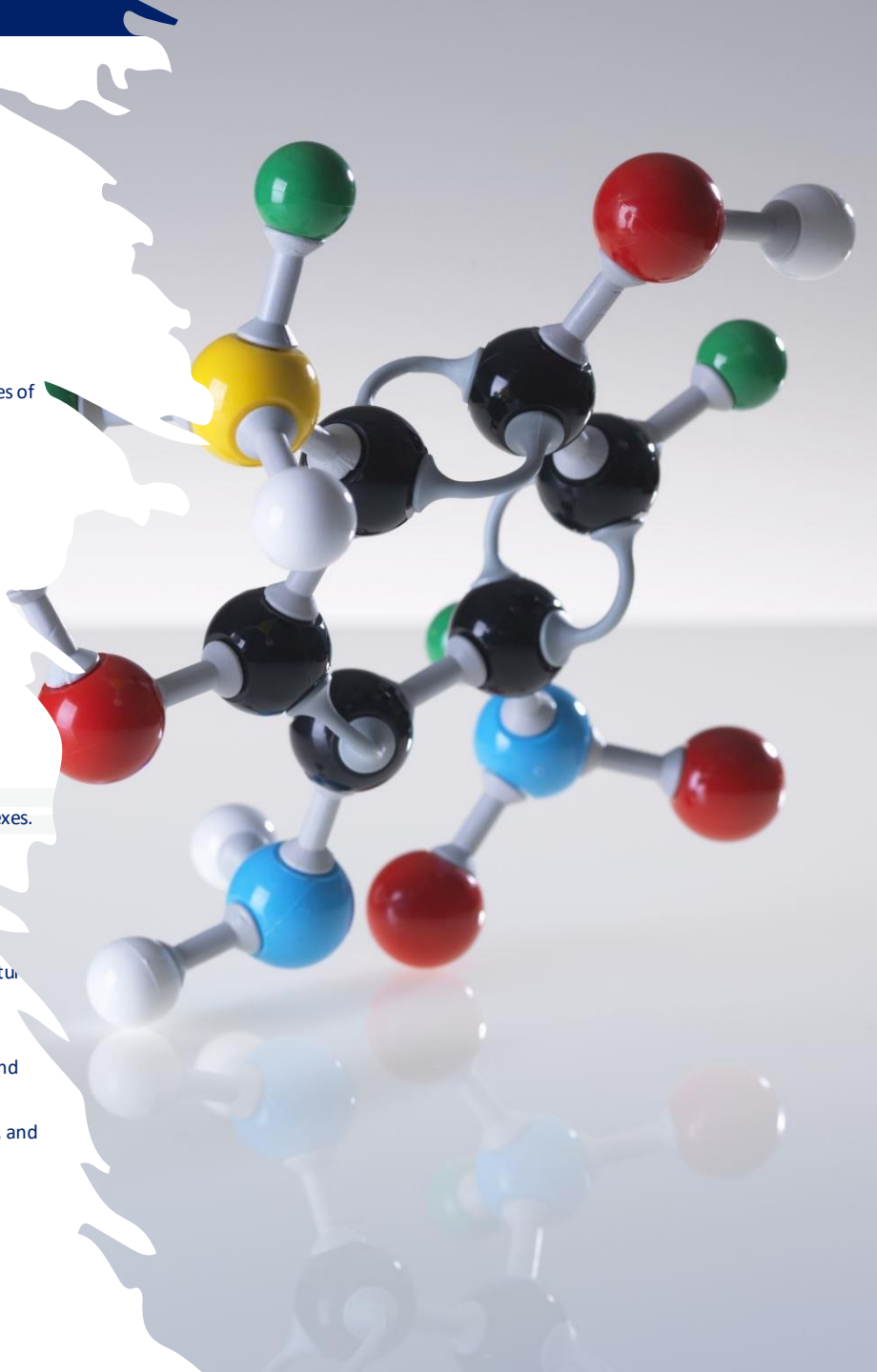
Chemistry Taster Session

THE PRIORY FEDERATION OF ACADEMIES TRUST

A level Chemistry

The Three Areas of the course

1. **Physical Chemistry**:
   - **Atomic Structure:** Understanding the structure of atoms, electronic configurations, and the periodic table.
   - **Bonding:** Types of chemical bonds (ionic, covalent, metallic), intermolecular forces, and shapes of molecules.
   - **Energetics:** Enthalpy changes, calorimetry, Hess's Law, and Born-Haber cycles.
   - **Kinetics:** Reaction rates, collision theory, and factors affecting the rate of reaction.
   - **Equilibria:** Dynamic equilibrium, Le Chatelier's Principle, and equilibrium constants.
   - **Thermodynamics:** Gibbs free energy, entropy, and feasibility of reactions.
   - **Electrochemistry:** Redox reactions, electrode potentials, and electrochemical cells.
2. **Inorganic Chemistry**:
   - **Periodic Table:** Trends in the periodic table, group chemistry (e.g., Group 2, Group 7), and transition metals.
   - **Coordination Chemistry:** Complex ions, ligand exchange, and color of transition metal complexes.
   - **Reactivity:** Reactions of elements and their compounds, especially within groups and periods.
3. **Organic Chemistry**:
   - **Fundamentals:** Structure and bonding in organic molecules, functional groups, and nomenclatu
   - **Hydrocarbons:** Alkanes, alkenes, alkynes, and aromatic compounds.
   - **Functional Group Chemistry:** Alcohols, carboxylic acids, esters, aldehydes, ketones, amines, and amides.
   - **Mechanisms:** Reaction mechanisms including nucleophilic substitution, electrophilic addition, and elimination.
   - **Synthesis:** Organic synthesis routes, retrosynthesis, and multistep synthesis.
   - **Spectroscopy:** Infrared (IR) spectroscopy, mass spectrometry (MS), and nuclear magnetic resonance (NMR) spectroscopy for structural determination.



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The exams in detail

Assessments

Paper 1	Paper 2	Paper 3
What's assessed • Relevant Physical chemistry topics (sections 3.1.1 to 3.1.4, 3.1.6 to 3.1.8 and 3.1.10 to 3.1.12) • Inorganic chemistry (Section 3.2) • Relevant practical skills	**What's assessed** • Relevant Physical chemistry topics (sections 3.1.2 to 3.1.6 and 3.1.9) • Organic chemistry (Section 3.3) • Relevant practical skills	**What's assessed** • Any content • Any practical skills
How it's assessed • written exam: 2 hours • 105 marks • 35% of A-level	**How it's assessed** • written exam: 2 hours • 105 marks • 35% of A-level	**How it's assessed** • written exam: 2 hours • 90 marks • 30% of A-level
Questions 105 marks of short and long answer questions	**Questions** 105 marks of short and long answer questions	**Questions** 40 marks of questions on practical techniques and data analysis 20 marks of questions testing across the specification 30 marks of multiple choice questions

Required Practicals

In addition to the theoretical content and various practical sessions throughout the year, there are 6 practicals (per year) which are assessed – this does not contribute to your overall score however you can pass or fail them and we have to give a practical endorsement at the end of the year to sign you off as a competent chemist.

AND they will be assessed in the exams.

All required practicals will be completed on a standard sheet and kept at school in folders.

https://pfoa.sharepoint.com/sites/lsst/staff/science/Chemistry/Forms/AllItems.aspx?viewid=01a631f6%2D0bdd%2D42db%2D8b3d%2D54675ff6fc46&id=%2Fsites%2Flsst%2Fstaff%2Fscience%2FChemistry%2FRequired%20practicals%2FMethod%20sheets

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The Importance of Folders in Chemistry

So there's a lot of content at sixth form and chemistry is no different to any other subject in this regard.

Essentially you are expected to have a folder at home.

It should be a large one to contain the work and serves as your store of work files and course materials for the longer term. In the short day to day term, you might only bring your day work / day folder / chemistry book to the academy.

The organisation of this folder is very much down to individual taste, however there are some important things to consider when setting up your folders to ensure success.

1. **Categorisation – see next slide for example.**
   - **Topics/Modules:** Within each subject folder, create subfolders for different topics or modules.
   - **Or Types of Materials:** Categorise materials into notes, homework, study work, past papers, and practical notes.
   - YOU MUST HAVE SOME FORM OF ORGANISATION. STUFFING NOTES IN THERE ANYWHERE AS YOU FIND THEM IS UNACCEPTABLE.
2. **Labelling:**
   - **Clear Labels:** Use clear and specific labels for each folder and subfolder to make retrieval easy.
   - **Colour Coding:** Consider using color-coded folders or labels to visually distinguish between subjects or types of materials.
3. **Digital Organisation:**
   - **Digital Folders:** if using digital stuff, use folders on your computer or cloud storage for electronic resources and backups.
   - **File Naming:** Adopt a consistent file naming convention to ensure you can easily find and identify digital documents.
4. **Regular Maintenance:**
   - **Review:** Set aside time each week to **file new materials** and **review** your folders.

By maintaining well-organised folders, you create a structured and efficient learning tool that can significantly enhance your academic success so… worth it.

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Folders

A suggestion / exemplar

Section 1 - Topic notes & checklists

Section 2 - Homework

Section 3 - Study work

Section 4 - Practical work

Section 5 - Assessment

Section 6 - Exam practice & revision

Alternately students have found some success ordering their folders by topic. The important thing is that one should be able to find a piece of homework for example without having to search the whole folder and to this end some form of efficient categorization is necessary.

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Really Simple Activity 15mins

- **Materials Needed:**
- Potassium chromate solution (K_2CrO_4)
- Hydrochloric acid (HCl) or any strong acid
- Sodium hydroxide (NaOH) or any strong base
- Distilled water
- Test tubes or a beaker
- Dropper or pipette
- pH meter or pH paper (optional for measuring pH)

Procedure:

1. **Preparation of Potassium Chromate Solution:**
   - Dissolve a small amount of potassium chromate in distilled water to prepare a solution of a known concentration.
2. **Observation of Colour Change:**
   - Pour the potassium chromate solution into a test tube or beaker.
   - Note the initial colour of the solution, which should be yellow.
3. **Addition of Acid:**
   - Using a dropper or pipette, add a few drops of hydrochloric acid (HCl) to the potassium chromate solution.
   - Observe the colour change. The solution will turn from yellow to orange or red as the pH decreases (becomes more acidic).
4. **Addition of Base:**
   - Using a different dropper or pipette, add a few drops of sodium hydroxide (NaOH) to the acidic potassium chromate solution.
   - Observe the colour change again. The solution will revert back to yellow as the pH increases (becomes more basic).

Okay then. Can you remember how to …

1. Work out the empirical formula of:

a) 10g Ca and 17.8g Cl.

b) 2.8g Li, 2,4g C and 9.6g O

2. Balance the following equations:

a) $Fe + O_2 \rightarrow Fe_2O_3$

b) $FeBr_3 + H_2SO_4 \rightarrow Fe_2(SO_4)_3 + HBr$

c) $C_4H_{10}O + O_2 \rightarrow CO_2 + H_2O$

3. Iron is extracted from iron oxide using the following method:

$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$

a) Calculate the theoretical yield of iron obtained from 320 tonnes of iron oxide

b) The actual yield of iron is 89.6 tonnes. Calculate the % yield.

4. Name the following molecules:

- CH_4
- C_2H_6
- C_3H_8
- C_4H_{10}
- C_2H_4
- CH_3OH
- C_2H_5OH
- CH_3COOH
- CH_3CH_2COOH
- $C_6H_{12}O_6$
- $CH_3CH_2CH_3$
- CH_3COCH_3
- $C_4H_8O_2$