**A LEVEL CHEMISTRY SUMMER TASK**

**Spectroscopic techniques to identify compounds**

Chemical analysis has many applications in manufacturing, particularly in product quality control, monitoring of production processes and drug development processes in the pharmaceutical industry. It is also a key component in healthcare (in the diagnosis of disease), forensic science (analysing substances found at crime scenes), and public health (testing drugs, food, air quality, water quality and monitoring industrial waste).

The analytical process encompasses a range of skills including sampling techniques, separation and isolation of components, estimating error limits, data manipulation and interpretation and communication of results. Increasingly, analytical procedures utilise complex electronic equipment and computer-aided interpretation of results.

**In this project you will investigate spectroscopic methods used to analyse substances.**

**WEEK 1: MASS SPECTROMETRY**

**Research and answer the following key questions:**

* What is mass spectroscopy?
* What are some real life applications of this process?
* **Describe and explain how time of flight (TOF) mass spectrometry works.**

**USEFUL WEBSITES:**

<https://www.explainthatstuff.com/how-mass-spectrometers-work.html>

<https://filestore.aqa.org.uk/resources/chemistry/AQA-7404-7405-SG-TOFMS.PDF>

<http://www.scienceskool.co.uk/tof-mass-spec.html>

<https://www.technologynetworks.com/analysis/lists/eight-emerging-applications-of-mass-spectrometry-288234>

MS video: <https://www.youtube.com/watch?v=J-wao0O0_qM>

**WEEK 2: IR SPECTROSCOPY**

**Research and answer the following key questions:**

* What is infrared spectroscopy and what is it used for?
* How does IR spectroscopy work to create an infrared spectrum?
* How can different organic compounds be identified using infrared spectroscopy [you must refer to functional groups in your explanations]
* Evaluate the advantages and disadvantages of IR spectroscopy as an analytical technique

**USEFUL WEBSITES:**

<https://www.chemguide.co.uk/analysis/irmenu.html>

<https://edu.rsc.org/resources/infrared-ir-spectroscopy/4010243.article>

<http://alevelchem.com/aqa_a_level_chemistry/unit3.2/sub3211/02.htm>

IR Video: <https://www.youtube.com/watch?v=DDTIJgIh86E>

**FINAL TASK**

Using your knowledge and research from week 1 and 2 write an essay to answer the following question:

**How are spectroscopic techniques used to identify unknown compounds?**

You will hand in this task when you begin your a Level Chemistry course in September.

*Your essay should be no more than 2000 words*

Checklist/ key Info to include:

* Describe what is meant by chemical analysis and spectroscopic techniques
* Explain why spectroscopic techniques are important in everyday life (list some uses)
* Explain how mass spectroscopy and infrared spectroscopy work and how they can used to identify unknown compounds
* Evaluate the advantages and disadvantages of the spectroscopic technique researched
* Explain why a combination of techniques is required to accurately identify unknown compounds

**If you have any question about the Chemistry course or summer task please email Miss Thompson (**[**cthompson@toothillschool.co.uk**](mailto:cthompson@toothillschool.co.uk)**)**