

Subject	Year	Term
Chemistry	12	4
Topic		
4.2.4 Analytical techniques		
Content (Intent)		
Prior Learning (Topic) C7 Organic chemistry KS5 Y12 2.2.2 Bonding and structure 4.1.1 Basic Concepts, 4.2.1 Alcohols 4.2.2 Haloalkanes		
<p>Infrared spectroscopy</p> <p>(a) infrared (IR) radiation causes covalent bonds to vibrate more and absorb energy</p> <p>(b) absorption of infrared radiation by atmospheric gases containing C=O, O–H and C–H bonds (e.g. CO₂, H₂O and CH₄), the suspected link to global warming and resulting changes to energy usage</p> <p>(c) use of an infrared spectrum of an organic compound to identify:</p> <ul style="list-style-type: none"> (i) an alcohol from an absorption peak of the O–H bond (ii) an aldehyde or ketone from an absorption peak of the C=O bond (iii) a carboxylic acid from an absorption peak of the C=O bond and a broad absorption peak of the O–H bond <p>(d) interpretations and predictions of an infrared spectrum of familiar or unfamiliar substances using supplied data</p> <p>(e) use of infrared spectroscopy to monitor gases causing air pollution (e.g. CO and NO from car emissions) and in modern breathalysers to measure ethanol in the breath</p> <p>Mass spectrometry</p> <p>(f) use of a mass spectrum of an organic compound to identify the molecular ion peak and hence to determine molecular mass</p> <p>(g) analysis of fragmentation peaks in a mass spectrum to identify parts of structures.</p> <p>Combined techniques</p> <p>(h) deduction of the structures of organic compounds from different analytical data including:</p> <ul style="list-style-type: none"> (i) elemental analysis (see also 2.1.3c) (ii) mass spectra (iii) IR spectra. 		
Future Learning (Topic) Y13 6.3.1 Chromatography and qualitative analysis 6.3.1 Spectroscopy		
How will knowledge and skills be taught? (Implementation)	How will your understanding be assessed & recorded (Impact)	
Presentation, notes, worked examples, molymods, model answers and exam style questions.	- 1 x standard homework (Grade given. Written feedback. Response expected.)	
How can parents help at home?		
Look at the topic specific resources on the VLE		

Use appropriate websites: MachedGuy, Allery Chemistry, Chemistry World – by Royal Society of Chemistry, ChemGuide.

Take an interest! Ask your children what they have learnt and be curious about their learning.

Helpful further reading/discussion

Reading

Textbook pages 252-266
The Science of Everyday Life
by Marty Jopson
Why Chemical Reactions
Happen by Keeler and
Wothers

Vocabulary Lists

Infrared
Absorption
Atmospheric gases
Peak
Mass spectrometry
Elemental analysis

Careers Links

Analytical chemist
Chemical engineer
Clinical biochemist
Forensic scientist
Pharmacologist
Process chemist
Quality control analyst
Research scientist
Science writer
Site chemist
Teacher or lecturer
Degrees;
Chemistry
Biochemistry
Biomedical science
Biological sciences
Medicine
Research chemist
Veterinary medicine