



Components

	NAME	DESCRIPTION	AUDIENCE
	<i>Element fingerprints</i> teachers guide	This guide describes how to use applications of trace elemental analysis to elaborate on students' understanding of atoms and elements.	teachers
	<i>Forensics, fakes and fingerprinting</i> fact sheet	This fact sheet describes some applications of ICP-MS, a method of analysing amounts of trace elements in a product. It draws on current research from The University of Western Australia.	students

Purpose

To **Elaborate** on concepts of atoms and elements by looking at applications of ICP-MS, a method of elemental analysis.

Outcomes

Students:

- understand that atoms can be separated based on their atomic structure;
- realise that science is an on-going human endeavour;
- describe practical applications of atomic theory; and
- research current science.

Activity summary

ACTIVITY	POSSIBLE STRATEGY
Students read the first page of the fact sheet, <i>Forgeries, fakes and fingerprinting</i> . Conduct a class discussion that links information to Anna's research featured in the video, <i>Atoms and elements 1: Fingerprinting bullets</i> .	working individually or whole class
Split class into four groups. To each group, assign one of the fingerprinted substances (diamonds, micro debris, oriental porcelain or tea) discussed in the fact sheet, <i>Forgeries, fakes and fingerprinting</i> . Students read the relevant section.	small groups
Students discuss information they've read and prepare a short presentation to inform the class about their topic. Suggested discussion points are in Teacher notes below.	small groups

Teacher notes

The following questions may be used to give students a starting point for their group discussion and presentation:

- Which substance was studied?
- Why did scientists fingerprint it?
- How did scientists analyse it?
- What were the scientists' findings?
- Why is there variation in trace elements found in this substance?
- What is the impact of this research?

This activity may be extended by asking students to use the Internet to research other applications of ICP-MS in forensics.

A good starting point for students' research is the website <http://www.tswanalytical.com.au/foodforensic.html>. TSW Analytical has a strong partnership with the Centre for Forensic Science at The University of Western Australia.

Follow the links to read case studies on wine, pork meat, kiwi fruit or coffee.

Students individually, in pairs, or small groups, may present their findings to the class, or prepare a written report. Use the above questions as a guide.

Technical requirements

The teachers guide and fact sheet require Adobe Reader (version 5 or later), which is a free download from www.adobe.com.

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Associated SPICE resources

Atoms and elements 4: Element fingerprints may be used in conjunction with related SPICE resources to teach the topic of atomic structure.

DESCRIPTION	LEARNING PURPOSE
<i>Atoms and elements (overview)</i>	
<i>Atoms and elements 1: Elementary forensics</i> A video shows how a forensic scientist uses knowledge of differences between elements to characterise bullets.	Engage
<i>Atoms and elements 2: Looking at atoms</i> Students use an interactive learning object to explore how advances in scientific understanding have lead to knowledge of atomic structure that explains differences between elements.	Explore
<i>Atoms and elements 3: Creating atoms</i> Students use an interactive learning object to create elements from protons, electrons and neutrons.	Explain
<i>Atoms and elements 4: Element fingerprints</i> Students research trace element analysis and its applications in forensic science.	Elaborate