


Forensic Science

School Year 2021-2022 jwardisiani@pths209.org



Chapter 5 Introduction

Organic Chemistry Bell-Ringer

A 25 year old women is found in her apartment over the weekend. The victim was bound and tied. The temperature of the victim at autopsy was 76 degrees.

- How long was the victim been dead?

Elements and Compounds

- **Matter** is anything that has mass and occupies _____ space.
- An **Element** is the simplest substance known and provides the building blocks from which all matter is composed!
- At present, 109 elements have been identified, and of these 89 occur naturally on earth and the remainder have been created in the laboratory.
- These elements are arranged in the famous

“Periodic Table of Elements.”

From Atoms to Elements to Compounds

- The smallest particle of an element that can exist and still retain its identity as that element is the **ATOM!**
- **Compound** is defined as a pure substance composed of two or more elements.
- Subatomic Particles – Atoms – Elements – Compounds – Macromolecules – Cells – Tissues – Organs – Organ Systems



–Organism! (Physics, Chemistry and Biology)

Physical States

- ~~The 4 States of Matter!~~
- **Solid:** Both Shape and Volume.
- **Liquid:** Volume but no Shape!
- **Gas:** No definite Volume or Shape.



- **Plasma: Ionized Charged Particles!**

Increases in Kinetic Energy

- Solid – Liquid – Gas – Plasma.
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- **Sublimation** is defined as a physical change from the solid directly into the gaseous state.
 - So What does this have to do with Forensics?
 - Well...
 - From a chemistry perspective. Not all attempts at mixing substances is productive.
 - For Example: Oil and Water.

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- When ever a situation exists in which a substance can be distinguished by a visible boundary, different phases exist!

Selecting An Analytical Technique

- The proper selection of analytical techniques will allow the Forensic Scientist to identify or compare matter.
- These Analytical Groups are...

Organics and Inorganics

Organics and Inorganics

- They contain the element **Carbon**, usually combined with at least one of the following elements:

 - Hydrogen
 - Oxygen
 - Nitrogen
 - Sulfur
 - Phosphorous
 - Chlorine
 - Bromine
 - Just to name a few

- All other chemical substances fall into the Inorganic category.

Other Reasons For Selecting An Analytical Technique

- Qualitative or Quantitative determinations.
- Qualitative relates just to the identification of materials under study.
- Quantitative relates to the percent composition of the components of a mixture.
- For Example
- A qualitative identification of a powder may reveal the presence of Heroin and Quinine, whereas quantitative may conclude the presence of 10% Heroin and 90% Quinine.

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- Forensics ----- Quantitative then Qualitative.

Evaluation of Evidence @ the Crime Lab

- Most evidence received at the crime lab required identification of its organic components.
- These compounds may include the following commonly abused drugs.

Alcohol

Marijuana

Heroin

Amphetamines

Barbiturates

Synthetic Fibers


Petroleum Products

Paint

High Order Explosives

Testing Tools

- The study of the absorption of light by chemical substances is known as **Spectrophotometry**.
- This serves as a basic tool for the identification and characterization of **Organic Materials**.
- However its optimum use requires that the materials be relatively pure.
- This almost never happens□
- So, Forensic Scientist use the analytical technique known as Chromatography.

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- **Chromatography** is a means of separating and tentatively identifying the components of a mixture.

Thank you for

your attention

- **Questions or**



Comments? □□