ScienceCraft

Forensics

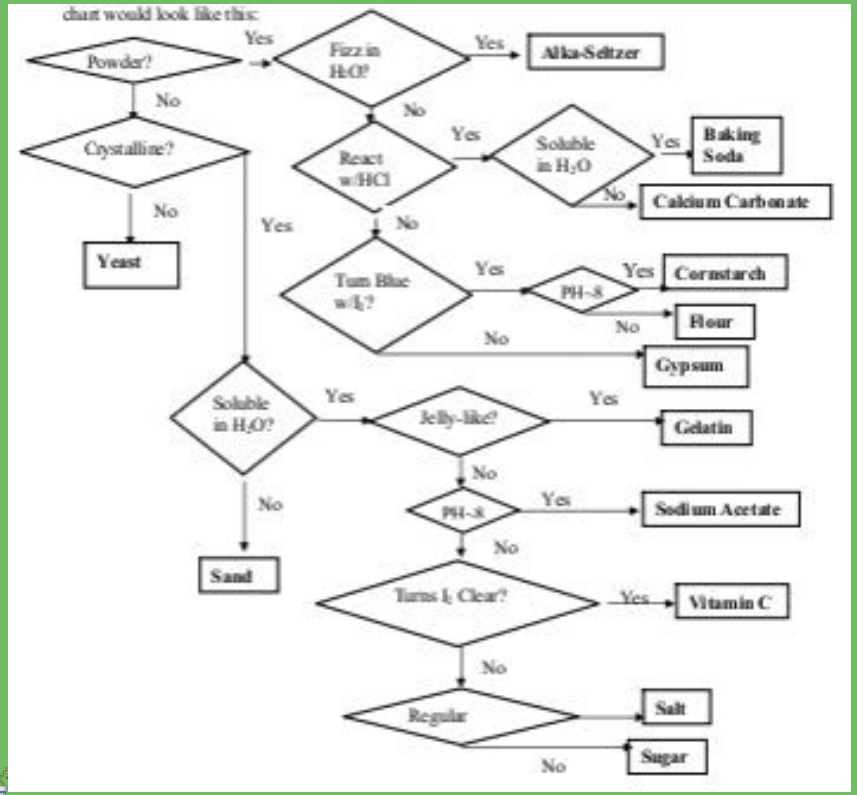
What is Forensics?

- Application of science to law
- Today we're discussing forensic science and crime scene analysis
- Types of evidence that you'd find at a crime scene
- How to evaluate this evidence to find out who did it!

Types of Physical Evidence

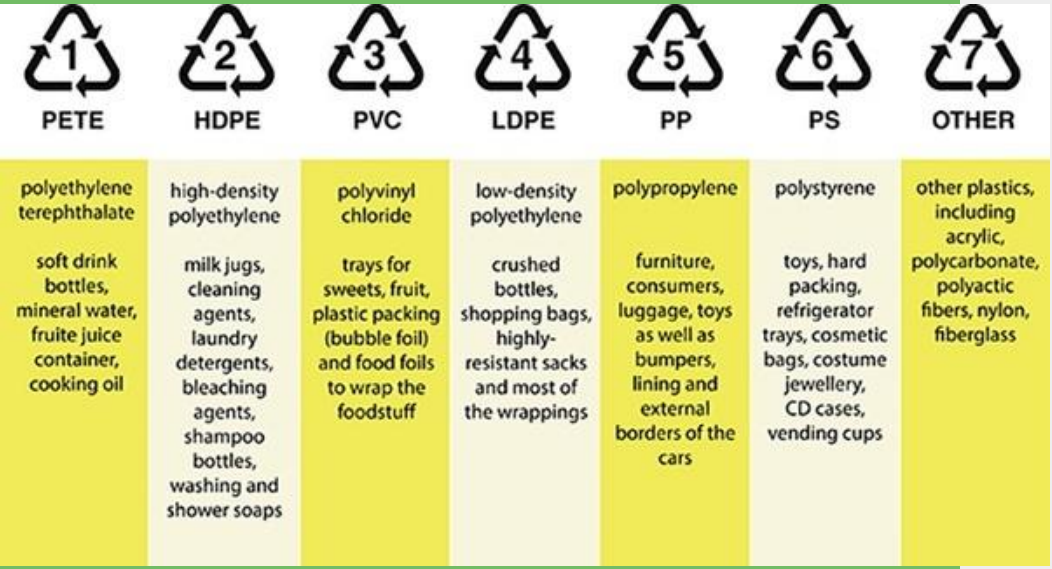
- There are a lot of types of evidence. For today, we'll focus on a few main ones:
- Powders
- Plastics
- Metals
- Liquids
- Metals
- Fibers
- Plant or animal material

Powders



- ✘ A lot of powders can look similar and be used for very different things
- ✘ You can't always tell what something is just by looking
- ✘ In order to do that, you have to observe its reactions to different situations (water, iodine, pH, etc)
- ✘ Flame test: powder is placed in the flame of a gas burner to observe the flame's color

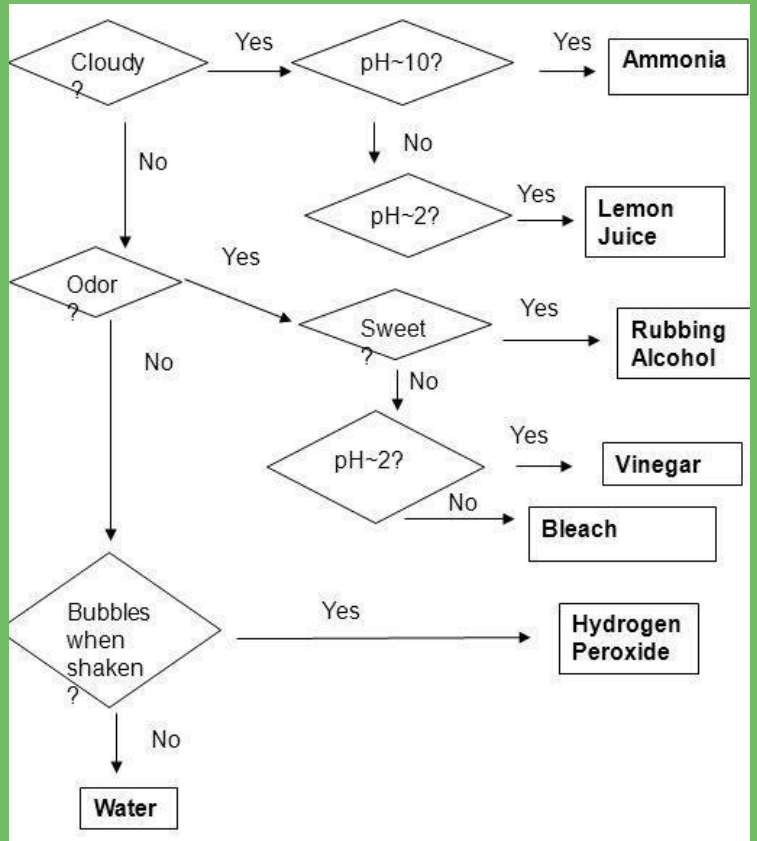
Plastics



1 PETE	2 HDPE	3 PVC	4 LDPE	5 PP	6 PS	7 OTHER
polyethylene terephthalate soft drink bottles, mineral water, fruite juice container, cooking oil	high-density polyethylene milk jugs, cleaning agents, laundry detergents, bleaching agents, shampoo bottles, washing and shower soaps	polyvinyl chloride trays for sweets, fruit, plastic packing (bubble foil) and food foils to wrap the foodstuff	low-density polyethylene crushed bottles, shopping bags, highly-resistant sacks and most of the wrappings	polypropylene furniture, consumers, luggage, toys as well as bumpers, lining and external borders of the cars	polystyrene toys, hard packing, refrigerator trays, cosmetic bags, costume jewellery, CD cases, vending cups	other plastics, including acrylic, polycarbonate, polyactic fibers, nylon, fiberglass

- Plastics are compounds made of carbon, hydrogen, oxygen, nitrogen, chlorine, and sulfur
- Different types of plastic are used for different things
- If you know the type of plastic, you can figure out what it was used for
- Burning plastic (safely!) can determine what type it is: the flame will sometimes turn colors and the ignition points can change

Liquids and Metals



- ✘ Liquids and metals can be similar to powders in that they can often look similar
- ✘ Metals have different colors, densities, malleability, etc. They are all relatively conductive
- ✘ Liquids can have similar looks and wildly different properties- some are acidic, some are basic, etc.
- ✘ Both liquids and metals can be identified through direct observation

Fibers

Animal Fibers

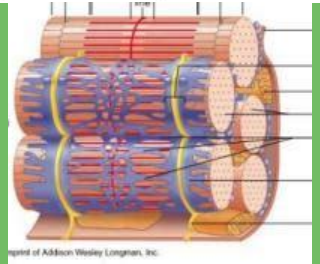
Fiber	Smell	Flame	Withdrawn
Wool	Burning Hair	Small flickering flame, brittle ash, no smoldering	Self-extinguishing
Silk	Burning Feathers	Calm, no smoldering, black beads, crushable	Self-extinguishing

Vegetable Fibers

Fiber	Smell	Flame	Withdrawn
Rayon	Burning Wood	Rapid burning flame, slow burning embers, no ash	Continues to burn
Cotton	Burning Paper	Flame amber or yellow, slow burning, fluffy, greyish ash	Continues to burn

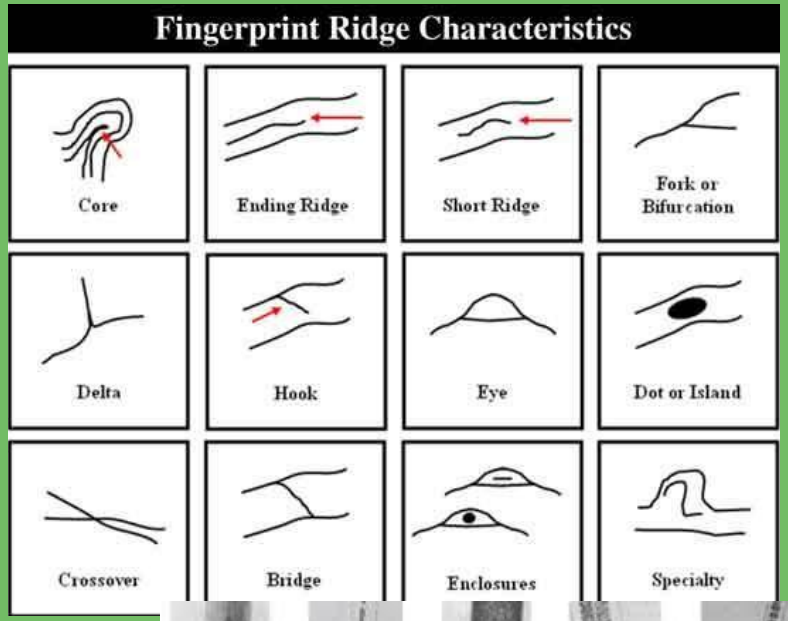
Synthetic Fibers

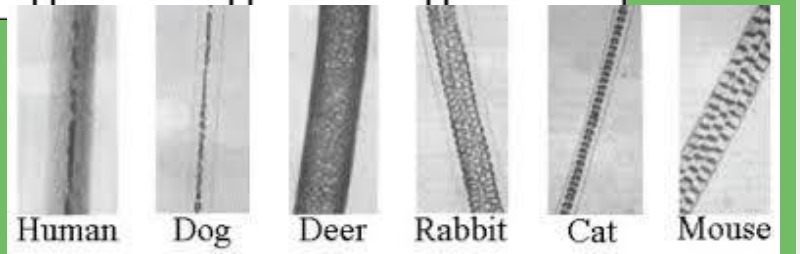
Fiber	Smell	Flame	Withdrawn
Nylon	celery	Orange, hard bead produced	Self-extinguishing
Acrylic	pungent	Burn quickly, hard black bead that can be partially crushed	Continues to melt
Polyester	sweet/chemical	Burns quickly, hard cream or black colored bead that cannot be crushed	Continues to burn



- There are often fibers found at crime scenes- these can include wool, cotton, flax, and man-made fibers such as blends
- Each type of fiber reacts differently to flame- yes, you burn a lot of things in forensics.
- Safe smelling: NEVER lean right over ANYthing you are trying to smell. You might inhale acid. Instead, fan your hand over the item and waft the scent to your nose. BE SAFE IN LABS!

Living Material





- There are several types of living material you might have to identify. These include hair and blood, among others.
- Hair looks different depending on the species it comes from! They have different sizes and structures that provide shape and color
- Blood is typed using four “antigens” called A, B, O, and +/-. There are four types of blood using different combinations of these antigens, A, B, AB, and O +/-.

How to analyze a crime scene

- ✘ Step 1: ALWAYS look around. Identify any evidence you see, no matter how small or insignificant it seems.
- ✘ Step 2: Label every piece of evidence and make notes on where it was found. Take pictures!
- ✘ Step 3: If moving the evidence is possible, begin to SAFELY put it into evidence bags to bring back to the lab
- ✘ Reminder: NEVER touch anything without gloves.

In conclusion, Forensics is the application of scientific concepts to investigation and the law.

There are many types of evidence that forensic scientists study, including powders, plastics, liquids, metals, fibers, DNA, fingerprints, hair, and more!

Any Questions?

Kahoot time!