

Bell-Ringer

- Forensic Science
- The density of an unknown metal needs to be determined.
- The mass of the metal is 1.5 grams and the volume displaced is 2.0 ml.
- Based on the above information calculate the density of this metal.

Determining Where and How the Fire Started

Forensic Sciences

A stylized graphic of fire or smoke, consisting of several thick, wavy, light gray lines that curve upwards and to the right, positioned in the lower right quadrant of the slide.

Introduction

- A fire scene is a dangerous place and one fire investigators must approach with great caution.
- Collapsing floors and falling beams aren't uncommon.
- Broken glass, sharp nails, smoldering materials, noxious gases, and asbestos (in older buildings) are other common hazards. Before an investigation can proceed, a structural engineer must give the okay.

Continued

- The investigation and collection of evidence must begin as soon as possible after the fire has been extinguished and the engineer has declared the structure safe to enter.
- **Time is the Enemy:** Many of the volatile substances that cause or accelerate a fire rapidly dissipate.

The Source of the Fire

- Locating where the fire began is the cornerstone of fire and arson investigation.
- Evaluating materials found where the fire started helps investigators determine whether it was accidental or incendiary.

Point of Origin

- A point of origin near an overload wall outlet points toward an accidental fire, but finding a point of origin in a corner of a warehouse, far removed from a electrical source and near a charred gasoline can, suggest the work of an arsonist.
- Of course, and arsonist might purposely overload a wall outlet in the hopes that a fire would start.
- But this method is unpredictable, so must arsonists resort to more direct methods for starting fires.

Using Other Peoples Eyes and Ears!

- While members of his or her team inspect and collect samples from the scene, the chief fire investigator or fire marshal interviews witnesses, who can provide many important clues.
- Someone may have seen the fire in its earliest stages, and that person's description may lead investigators to the point or points of origin.

Continued

- Many accelerants and combustible materials produce characteristic flame and smoke color, so witness description of what the fire looked like many help determined its cause.
- For example, gasoline produces a yellow flame and white smoke.

Investigators may use witnesses reports to help...

- Locate the point of origin
- Determine whether the fire was accidental or intentional
- Figure out whether the arsonist used an accelerant.

Finding Where It All Started!

- Locating a fire point of origin requires an understanding of how fire moves through a structure.
- Fires typically spread sideways and up from the point of origin, but the pattern can be influenced by structural and decorative elements of the building - stairwells may pull the fire in one direction, and the chemical in synthetic carpet may cause unusual burn patterns.

Continued

- Usually, however, the largest amount of damage occurs near the point of origin.
- Investigators often find and igniters or accelerants that were used in this area.
- Drafts from open windows or stairwells, or materials used to construct or decorate the building are among the many factors that can influence and confuse efforts to determine the area of greatest damage, another indicator of the origin of the fire.

Therefore!

- After locating the point of origin, and investigator sometimes can retrace the fires path even when the structure is severely damaged.
- Conversely, back-tracking along the fires route may lead to the point of origin.
- Investigators can also find the point of origin by looking for "V" pattern of burned material.

V-Shaped Patterns

- Fire tends to rise and spread so that it burns a wall or other vertical surface in a V-Shape, with the foot or bottom of the V pointing to the origin of the fire.
- Stored fuels and other flammable liquids likewise can interfere not only with the search for arson related accelerants, simply because they too are accelerants.
- Similarly, an arsonist may have started multiple fire within a building or sloshed a path of gasoline or another accelerant throughout or around the structure, thus creating a fire with multiple points of origin.

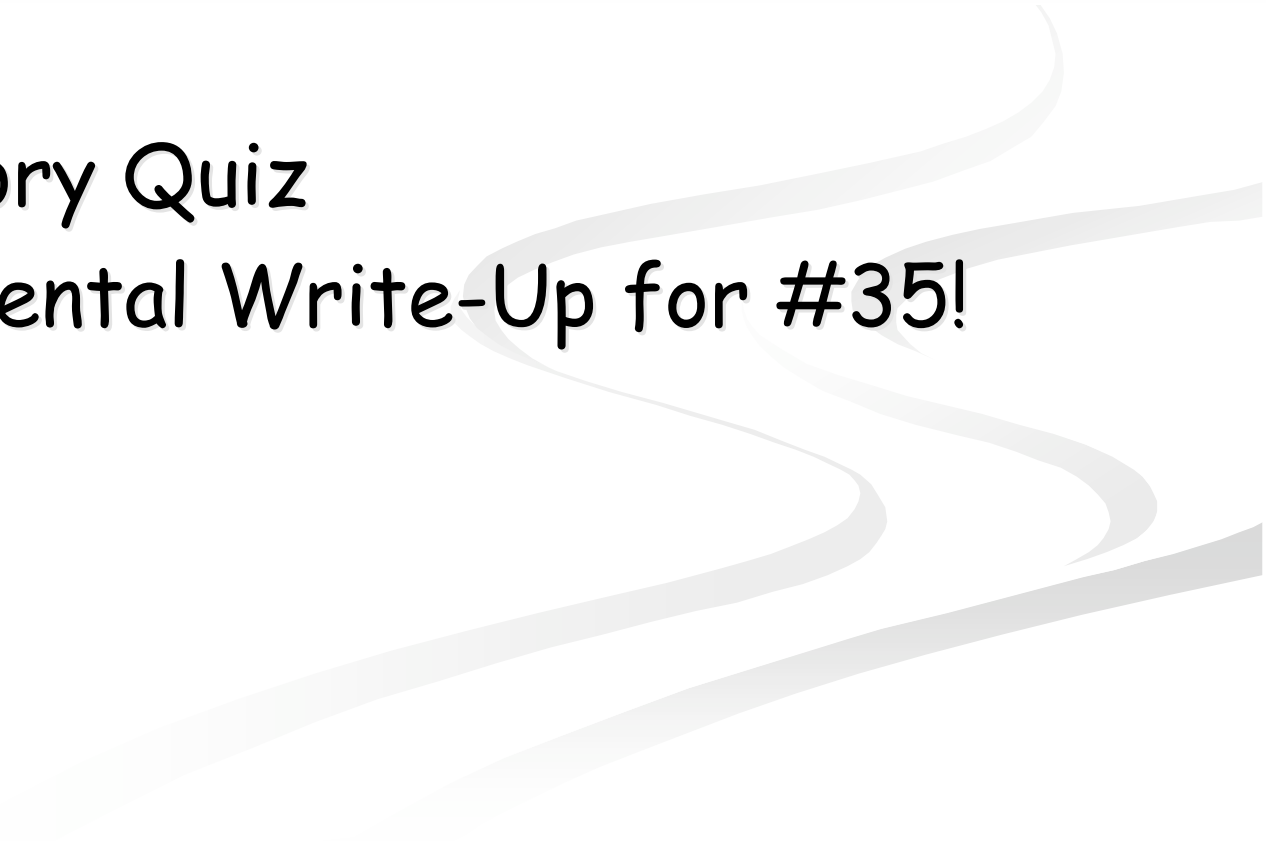
Investigation

- Investigators estimate the intensity of the fire at any particular location by assessing the fire's effect on structural materials.
- Steel beams buckle when-ever the fire is extremely intense, and glass melts around 1,500 degrees Fahrenheit.
- Cracking or flaking (spalling) on walls and floors indicate areas of heat.
- Similarly, wooden beams, floors and walls may char, leaving a pattern that looks like alligator skin.

So...

- When this happens, smaller scales tend to be near the hottest point of the fire.
- If the building is equipped with a smoke detectors, the time at which each alarm was set off can help investigators determine the path that the fire took through the structure and locate the point of origin.

Thank You For Your Attention

- Please turn in the following:
 - A) Bell-Ringer
 - B) Journal
 - C) Laboratory Quiz
 - D) Experimental Write-Up for #35!
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- A decorative graphic consisting of several overlapping, wavy, light gray lines that sweep across the bottom right portion of the slide.