FIRE SCIENCE

Fire Science Vocabulary

- **Fire** - Produced when a substance undergoes rapid oxidation involving heat and light.
- **Fire Triangle** – Shows the three elements needed to produce and sustain a fire.
- **Flash Point** – The lowest temperature to which a substance must be heated in order for the substance to give off vapors which will burn when exposed to a flame or ignition source.
- **Point of Origin** – The location where the fire started.
- **Burn patterns** –Noticeable patterns created by the fire as it burns.
- **Accelerants** – Substances, such as gasoline, paint thinner, and alcohol, that accelerate the burning process.
- **Arson** – A fire started deliberately

Fire Triangle

The **FIRE TRIANGLE** represents the **three** elements needed for fire to occur: heat, fuel, and oxygen.

★ ***Fill in the fire triangle.***

Can be any **combustible material** in **any state of matter** - solid, liquid, or gas. Most solids and liquids become a **vapor or gas** before they will burn.
Examples: Clothing, furniture, curtains, and flammable liquids

The energy necessary **to increase the temperature of the fuel** to a point where sufficient vapors are given off for **ignition** to occur**.**
Examples: Stoves, heating appliance, fireplaces, and damaged wiring

The air we breathe is about **21% oxygen**. Fire requires an atmosphere with at least **16% oxygen.**

Fire Science Vocabulary

Point of Origin – Burn patterns and other damage can help determine the point of origin, or the location where the fire started.

Char Patterns – Created by very hot fires that burn very quickly and move fast along its path, so that there can be sharp lines between what is burned and what isn't.

V-Patterns - Fire burns up, in a V-shaped pattern, so a fire that starts at an outlet against a wall leaves a char pattern that points to the origin.

Heat Shadows - Occur when heavy furniture shields part of a wall; can help determine the origin point.

Glass - Glass fragments, windows, and light bulbs can provide clues to a fire.

Chimney Effect - Since fire burns upwards, there can be a "chimney effect" where the fire ignites at a point, the superheated gases rise upward and form a fireball, which continues straight up to burn a hole in the ceiling.

Color of smoke – Determine what type material was burning

Color of flames – Indicates at what temperature the fire was burning.

Accident or Arson?

Accidental Nature

- Heating System
- Electrical appliances
- Lightning
- Children playing with matches
- Smoking

Non-Accident

- Odors – Gas – Kerosene
- Furnishing – Removal of personal objects and valuables
- Clothing – Check debris for buttons, zippers, etc
- Locked windows, blocked doors
- Two or more points of origin
- Look for inverted v-patterns (can be a sign that an accelerant was used)
- Floors charred –Can indicate use of an accelerant
- Trailers that lead the fire from one place to another

Accident or Arson?

1. Work from the least damaged areas to the most heavily damaged areas.
2. Document with notes, photographs, and videos.
3. Collect evidence (accelerant samples, fire items, and other crime scene evidence.)
4. Interview witnesses
5. Determine the point of origin.
6. Determine the heat source(s).
7. Hypothesize the reasons for the fire.

Did you know? Heat is more threatening than flames!

A fire's heat alone can kill. Room temperatures in a fire can be 100 degrees at floor level and rise to 600 degrees at eye level. Inhaling this supper hot air will scorch your lungs and can melt clothes to your skin. In five minutes a room can get so hot that everything in it ignites at once: this is called flashover.

What evidence can you find in each picture that would provides clues about the fire?