
Facts about Fire

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- Fire is uncontrolled burning. All fires start with ignition, which occurs when sufficient levels of fuel, heat, and oxygen exist simultaneously. Ignition occurs when the temperature rises high enough to produce a flame. A chemical reaction takes place when the “fire triangle” is present.
 - Oxygen
 - Fuel
 - Heat

- Any combustible/flammable substance is considered to be a fuel. Fuels come in many forms:
- Gases (for example, methane, propane) are the easiest to burn because gas and oxygen can mix easily, and the resulting heat from combustion leads to further burning.
- Liquids (for example, gasoline, diesel fuel, kerosene) ignite above the surface of the fuel in the vapor created when heat is applied.
- Solids (for example, wood, coal, plastics, paper, and cotton) burn when heat from a fire decomposes the fuel into vapor that mixes with oxygen.
- Fuels are everywhere in the home—in bedding, furniture, curtains, walls, floors, etc. When all the fuel is used up, a fire will go out.
- Oxygen must be present for combustion to occur. A colorless gas, oxygen comprises nearly 21 percent of Earth’s atmosphere. The combustion of fuel and oxygen gives off heat. More available oxygen accelerates combustion. If the oxygen is removed, the fire will go out.
- Heat is essential to fire, and it must be high enough to spark ignition. During a fire, heat moves away from the flame and into an adjacent area where there is fresh fuel. Remove the heat and the fire will go out.
- Principles of physics, chemistry, and fluid flow are at work in fire. Smoldering occurs when burning is slow, without flames. When burning is extremely fast, as when a gas leak mixes with air, an explosion can occur. Fire that is burning faster than smoldering, but slower than an explosion, is a flaming fire. A continuous chemical reaction between particles of fuel and oxygen, fire spreads because of heat transfer. The chemical reaction will cease and the fire will go out if the fuel or heat or oxygen is removed.
- Heat transfer—the movement of heat—is important in a fire. Movement occurs in three ways: conduction, convection, and radiation.
- Conduction—Heat is transferred through a solid surface from a heated to an unheated area (for example, a hand touching a hot solid surface).
- Convection—Heat is transferred by moving particles of liquids or gases, from a heat source to a cooler area (for example, heat from boiling water in a flow of steam).
- Radiation—Heat is transferred by electromagnetic waves (for example, heat from

a space heater that can be felt without touching the heater).

- During a fire, a plume of hot, smoky air rises from the flames. In an enclosed space, like a room, hot smoke transfers heat to the ceiling and walls by convection. The fire radiates heat to other parts of the room. Hot smoke radiates heat downward toward the floor and the entire room is involved very quickly.
- As the smoky gas layer becomes hotter, it radiates more and more heat to the rest of the materials in the room and everything that can burn suddenly ignites. This is called flashover. At this point, the fire spreads to other rooms and is extremely difficult to control.

Fire Prevention

- Home fires are almost always preventable. Everyone must constantly be aware of the possibility of fire in the home and take positive measures to practice fire prevention daily. Children must know that matches and lighters are tools for adults. (Research by the National Fire Protection Association (NFPA) shows that children associate tools with adults.)
- Instruct children to tell an adult right away if they find matches or lighters or see someone playing with fire, matches, or lighters.
- Children should also know that candles are a frequent cause of devastating fires in homes. Candles must be kept well away from any combustible/flammable items or materials and must never be left unattended. The increasing popularity of candle usage has led to a dramatic increase in the number of tragic fires. In case of a power outage, families should use flashlights for emergency lighting, not candles.