



AFRICA FIRE MISSION

Fire Behavior

During this lesson we will learn about several different characteristics of fire behavior, and why they are important in firefighting and fire prevention.

Why is learning about the behavior of fire important?

- Because it teaches us how to prevent fires, and their spread.
- It enables us to battle fire in a better and safer manner.
- Knowledge of fire behavior can help firefighters to find clues to the cause and origin of a fire.

The Fire Triangle

- There are three components that work together to create a fire.
- When each of these components comes together, they are referred to as a triangle.
- To create a fire, each component must be in the correct amount.
- If any one of the components of the triangle is taken away, the triangle collapses and the fire goes away.

Components of the Fire Triangle

- Heat
- Fuel
- Oxygen

Fuel

Fuels can be found in three different forms. A fuel can change forms, depending on the temperature.

- Solid
- Liquid
- Gas

Can you think of examples of each?



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Any fuel must be heated and turned to a gas in order to burn.

Solids

- Solids must be heated to be turned to a gas
- The more surface area a solid has exposed to heat, the easier it is to burn. Which is easier to burn? A block of wood, or the same block of wood turned to shavings? The shavings, because the surface area exposed to heat is larger.

Liquids

- To burn, liquids must be heated, boil, and turn to a vapor (gas)
- Not all liquids will burn when they turn to a gas. What is an example? (water)
- Remember that the vapors must mix with oxygen in the correct combination to burn.

Gases

- Gases that are flammable are ready to burn
- Not all gases will burn. What is an example? (Carbon dioxide, what our bodies give off when we breathe out)

Smoke-Smoke is a special example of fuel. It has unburned gases in it from a fire. When it is heated and trapped in a building, it is dangerous when mixed with the proper amount of oxygen.

Classes of Fuels

Fuels are organized into classes. They are classified based on how fires can be combatted in each class.

Class A Fuels

- Wood
- Paper
- Plastic
- Rubbish



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Class B Fuels

- Flammable liquids
- Flammable gases
- Greases

Class C

- Energized electrical equipment

Why is it different to battle these fires in a different manner?

Heat

Sources of Heat

Chemical Reactions

- A fire is a chemical reaction that continuously gives off heat
- Some types of chemical reactions generate enough heat to produce a fire.
- Spontaneous combustion is a biological and chemical reaction which produces enough heat to produce a fire

Where can spontaneous combustion be found?

Electrical Heat Sources

- The movement of electricity through wires produces heat.
- Overheating of wires is caused by:
 - Too much electricity through inadequately sized wires
 - Too much electrical equipment installed on the wires
 - Faulty wires
 - A faulty wiring connection
 - Faulty electrical equipment
- Lightning is an electrical heat source
- Static electricity is an electrical heat source

How can static electricity be produced? How can it be prevented?

Mechanical Heat Sources



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- Friction is a mechanical heat source. An example is two pieces of metal rubbing together and heating rapidly. The same two pieces of metal rubbing together could also give off sparks.
- Compression is another mechanical heat source. As a fuel is compressed it is heated. An example of this is in a diesel engine, when the diesel fuel is compressed until it heats and explodes, forcing the piston to move.

Heat Transfer

Heat from a heat source travels to start other objects on fire. This is called heat transfer. Heat transfer occurs in 3 ways.

Convection-Heat is moved by heated air, heated fire gases or flame contact

Conduction-The heat is moved through solid objects.

An example is metal pipes or the metal in the homes of the slums.

Radiation-Heat is moved through a space.

An example of radiation is the sun

Questions?