Summary:
The ability to apply knowledge of fuels, terrain, weather, and fire behavior begins with the language and terminology used in wildland fire.

Incident Position Description (IPD) Alignment:
This unit aligns with the following FFT2 IPD specific duties (https://www.nwcg.gov/positions/fft2/position-ipd):
- Apply the knowledge of fuels, terrain, weather, and fire behavior to decisions and actions.

Objectives:
Students will be able to:
- Describe basic terminology used in wildland fire.
- Describe the elements of the fire triangle.
- Describe the methods of heat transfer.

Unit at a Glance:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Method</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Introduction</td>
<td>Presentation</td>
<td>5 Minutes</td>
</tr>
<tr>
<td>Basic Fire Terminology</td>
<td>Group Activity</td>
<td>30 Minutes</td>
</tr>
<tr>
<td>The Fire Triangle</td>
<td>Presentation</td>
<td>15 Minutes</td>
</tr>
<tr>
<td>Methods of Heat Transfer</td>
<td>Presentation</td>
<td>10 Minutes</td>
</tr>
<tr>
<td><strong>Total Unit Duration</strong></td>
<td></td>
<td><strong>60 Minutes</strong></td>
</tr>
</tbody>
</table>

Materials:
- Notebooks for participants.
- Ability to display images and video on large screen.
- White board or easel access for group breakout.
Review unit objectives.
Pre-Video Discussion

- In this scenario, firefighters have arrived on scene of a new fire. They are gathering and communicating their situational awareness of the current fire behavior.
- This scenario is representative of a ground resource communicating with an air resource who is able to provide a bird's eye view of the situation.

Video Exercise

- Instruct participants to watch the video.
- Each individual should write down as many basic fire terms as possible.

- Play Video

  **Title** Basic Fire Terminology  
  **Summary** A simulated aerial flight of a fire and communication between ground and air resources.  
  **Time** (02:20)  
  **Audio**

Post-Video Discussion

This unit will discuss many of these terms in more detail.
Exercise

- Advise participants that the next few slides will introduce common terms that describe parts of a fire.
- Divide participants into groups.
- Task each group with replicating the slide image on a whiteboard or flip chart. A simple outline shape, like that of a mitten glove, is all this is required.
- Ensure that each group has designated the spot fires and island represented in the slide image before continuing.
- Task each group with listing each term and definition at its associated location on their whiteboard or flip chart image.
Fire Perimeter

The entire outer edge or boundary of a fire.

Point of Origin

The location where a competent ignition source came into contact with the material first ignited and sustained combustion occurred.

Head

The most rapidly spreading portion of a fire's perimeter, usually to the leeward or up slope.
Flanks

The parts of a fire's perimeter that are roughly parallel to the main direction of spread.
Rear or Heel

That portion of a fire edge opposite the head. Slowest spreading portion of a fire edge.
Finger

The long narrow extensions of a fire projecting from the main body.
Unburned indentations in the fire edge formed by fingers or slow burning areas.
Island

An unburned area within a fire perimeter.
Spot

Fire ignited outside the perimeter of the main fire by a firebrand.
Slide 14

Basic Fire Terminology: Suppression

- Anchor point
- Control line
- Fireline
- Mopup
- Contained
- Controlled
- Chain

Instruct participants to write down the term and definition as you provide it to them.

Validate term and definition by providing a simple description of where or how the term applies to the fire image on the slide.

Anchor Point
An advantageous location, usually a barrier to fire spread, from which to start constructing a fireline. The anchor point is used to minimize the chance of being flanked by the fire while the line is being constructed.

Control line
An inclusive term for all constructed or natural barriers and treated fire edges used to contain a fire.

Fireline
The part of a containment or control line that is scraped or dug to mineral soil.

Mopup
Extinguishing or removing burning material near control lines, felling snags, and trenching logs to prevent rolling after an area has burned, to make a fire safe, or to reduce residual smoke.

Contained
The status of a wildfire suppression action signifying that a control line has been completed around the fire, and any associated spot fires, which can reasonably be expected to stop the fire’s spread.

Controlled
The completion of control line around a fire, any spot fires, and any interior islands to be saved. Burn out any unburned area adjacent to the fire side of the control lines. Cool down all hotspots that are immediate threats to the control line, until the lines can reasonably be expected to hold under the foreseeable conditions.
Unit 1: Basic Concepts of Wildland Fire

Chain

Unit of measure in land survey, equal to 66 feet (20 M) (80 chains equal 1 mile). Commonly used to report fire perimeters and other fireline distances. Popular in fire management because of its convenience in calculating acreage (example: 10 square chains equal one acre).
Exercise

- Advise participants that slides 16-25 are common terms associated with fire behavior. Participants can remain in same group breakouts from parts of a fire exercise.
- Inform participants that in addition to being able to describe the various parts of a fire, it’s also important to be able to describe the character of the fire behavior.
- Task each group with listing the term from the slide on a white board or flip chart.
- Provide participants with the definition provided in the unit guide.
Smoldering

Fire burning without presence of flame or direct flame and barely spreading.
Creeping

Fire burning with a low flame and slowly spreading.
Running

Behavior of a fire spreading rapidly with a well-defined head.
Spotting

Behavior of a fire producing sparks or embers that are carried by the wind and which start new fires beyond the zone of direct ignition by the main fire.
Torching

The burning of the foliage of a single tree or a small group of trees, from the bottom up.
Flare-Up

Any sudden acceleration in the rate of spread or intensification of the fire. A flare-up is of relatively short duration and does not change existing control plans.
Fire Whirl

Spinning vortex column of ascending hot air and gases rising from a fire and carrying aloft smoke, debris, and flame.
Backing

That portion of the fire with slower rates of fire spread and lower intensity, normally moving into the wind and/or down slope.
Flaming Front

That zone of a moving fire where the combustion is primarily flaming.
Crowning

A fire that advances from top to top of trees or shrubs more or less independent of a surface fire.

Play Video

- **Title**: Crown Fire
- **Summary**: A wildfire crowning.
- **Time**: (00:12)
- **No Audio**
Knowledge Check

Basic Terminology Used in Wildland Fire

Identify this fire behavior.

Question: Identify this fire behavior.

Answer: Torching

Play Video

Title Torching Tree
Summary A pine tree torching.
Time (00:18)
No Audio
Three elements comprise the fire triangle: oxygen, heat, and fuel.

These three elements must be present and combined before combustion can occur and continue.
• The air we breathe contains 21%.
• Approximately 16% is required for combustion.

- The most abundant chemical element on earth is oxygen.
- Oxygen supports the chemical processes that occur during a wildfire.
- When fuel burns, it reacts with oxygen from the surrounding air, releasing heat, and generating combustion products such as gases, smoke, and embers. This process is known as oxidation.
Heat

- Natural
- Human caused

- A heat source is responsible for initial ignition of a wildfire and is also needed to maintain the fire and enable it to spread.
- Lightning is the most common natural source of heat.
- Humans can cause heat leading to wildland fires.

**Question:** Where does human-caused heat come from?

*Answers: Abandoned campfires, arson, matches, dragging chains, burning trash, etc.*
Fuel

• Grass
• Shrub
• Timber
• Slash
• Artificial materials

Fuel is the material that is burning.

Fuel can be any kind of combustible material, especially petroleum-based products, and wildland fuels.

Note to Instructor

The fuel types listed on this slide will be discussed in detail in Unit 2.
Breaking the Fire Triangle:
Removal of one or more elements of the triangle

Heat  Oxygen  Fuel

**Question:** How might you break the fire triangle from the fuel element?

*Answer:* Removal of fuel by clearing space.

**Question:** How might you break the fire triangle from the oxygen element?

*Answer:* Removal of oxygen by restricting the oxygen supply.

**Question:** How might you break the fire triangle from the heat element?

*Answer:* Removal of heat by applying water, dirt, or other methods.
Methods of Heat Transfer

The process by which heat is imparted from one body to another, through conduction, convection, and radiation.

Note to Instructor

The methods of heat transfer will be discussed in detail on slides 34-36.
Video Introduction

The video combines the elements of the fire triangle with the concepts of heat transfer.

Play Video

Title Fire Triangle and Heat Transfer
Summary An introduction to combustion and heat transfer through conduction, convection, and radiation.
Time (07:05)
Audio
• Think of conduction as a spoon in a hot drink. Heat is conducted from one fuel particle to another in the same way, through direct contact.

• Since wood is a poor conductor (meaning heat will not travel through it easily), this process is less of a factor to fire behavior.
Convection occurs when lighter warm air moves upward.

Think of convection as a smoke column above the fire. The hot gases and embers which compose the smoke column move and can dry and ignite other fuels.
Radiation
Transfer of heat in a straight line through a gas or vacuum other than by heating of the intervening space.

- Radiant heat warms you as you stand close to a campfire or stand in the sunlight.
- Radiant heat can dry surrounding fuels and sometimes ignite them.
Question: Describe what the term Anchor Point means.

Answer: An advantageous location, usually a barrier to fire spread, from which to start constructing a fireline.
Question: Identify the elements of the fire triangle.

Answer: Oxygen, Heat, Fuel
Question: Describe the methods of heat transfer.

Answer: Conduction is direct contact. Convection is the movement of air. Radiation is the transfer of heat.
Review unit objectives.