

Rural Training Center – Thailand (RTC-TH)

REEEPP FOCUS

An innovative, non-traditional community-based environmental education program integrating math, science, geography, English language, and technology lessons for environmental stewardship using interactive experiential learning in outdoor settings at Ban Na Fa Elementary School, Nan Province, Thailand.

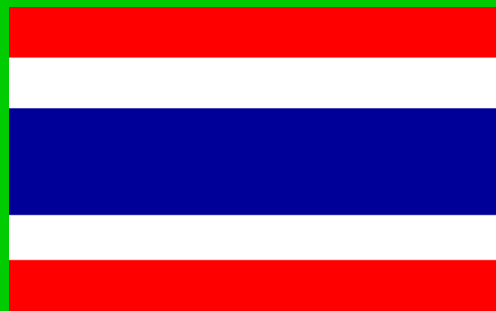


LEARNING ABOUT WILDFIRES



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Created by G.K. Lee for the RTC-TH REEEPP



This is an English Language Training module of **REEEPP**

Rural Environmental Education Enhancement Pilot Program
presented by
The Rural Training Center-Thailand



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What is a wildfire?



A wildfire is fire burning in a natural area. A natural area is a place with few people or few buildings.



Natural Areas and Fires

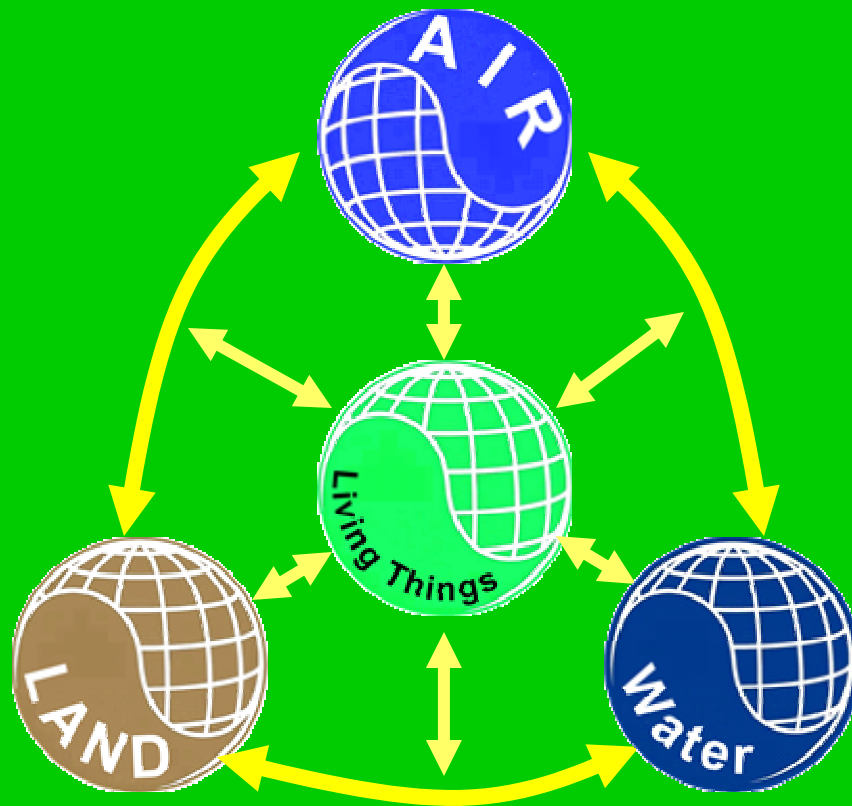


A forest is an example of a natural area. A forest fire is an example of a wildfire.

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Learning about Fires

Location Scale Time



Fire is not a living thing. But it has a “habitat.”

You can use the Geographic Systems Model to learn about wildfires.



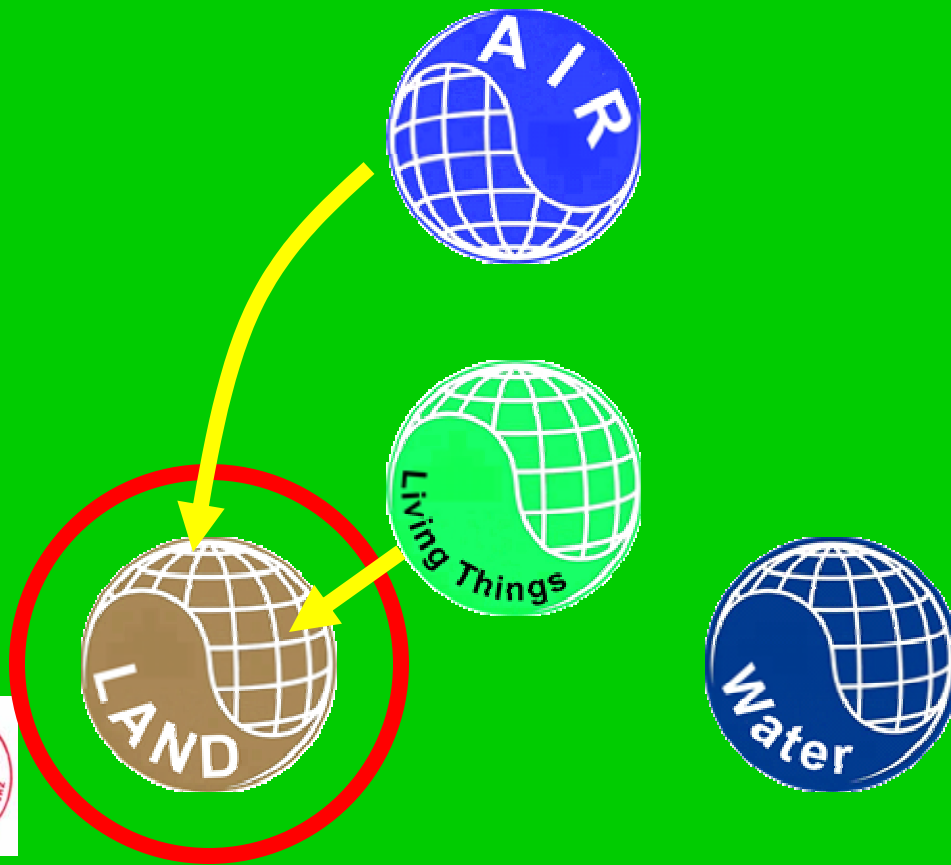
Location

Most wildfires occur on land in natural areas covered by vegetation.



Wildfires occur on land.

Land is where air can easily mix with living things. As living things dry out, they can easily burn.



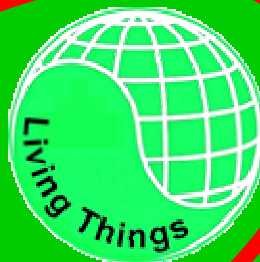
Scale

Wildfires start
at a point
location and
can spread to
cover
thousands of
rai of land.



Time

Wildfires can occur at any time of year, but most occur in the dry season. How fast the fire grows depends on a number of factors.



Three Basic Needs of Fires



Every fire needs air, fuel, and heat.



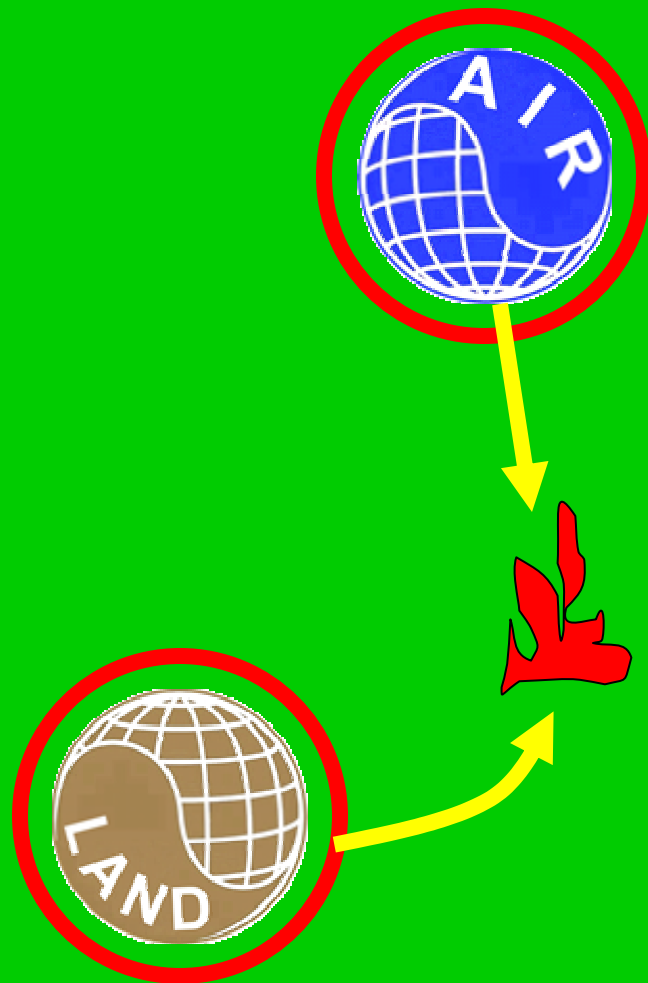
Air comes from the atmosphere and lithosphere.



Fuel comes from living things or the biosphere.



Air Sources

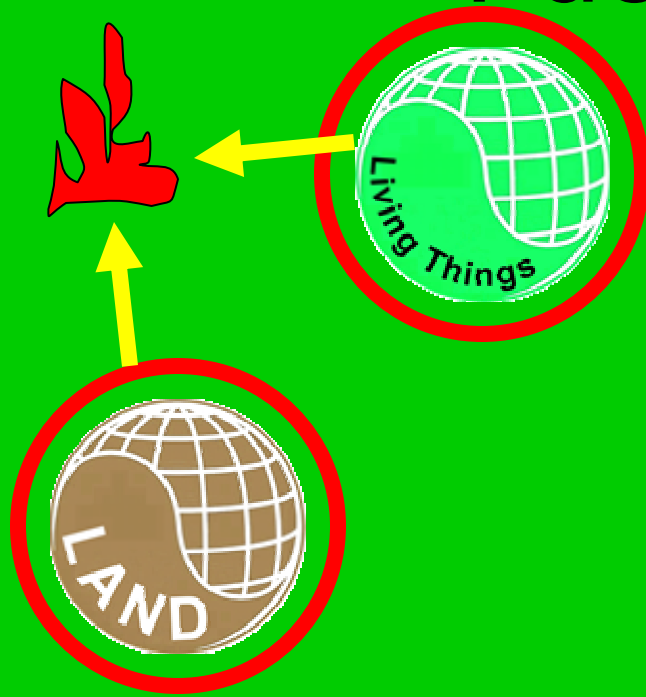


Air comes from the atmosphere in the general area of the fire.

A small amount of air comes from the spaces between the soil particles.



Fuel Sources



Fuel comes from living things (or the biosphere) as well as organic materials in the soil.

Soils without significant amounts of organic materials to fuel for fires is called “bare soil” or “mineral soil.”



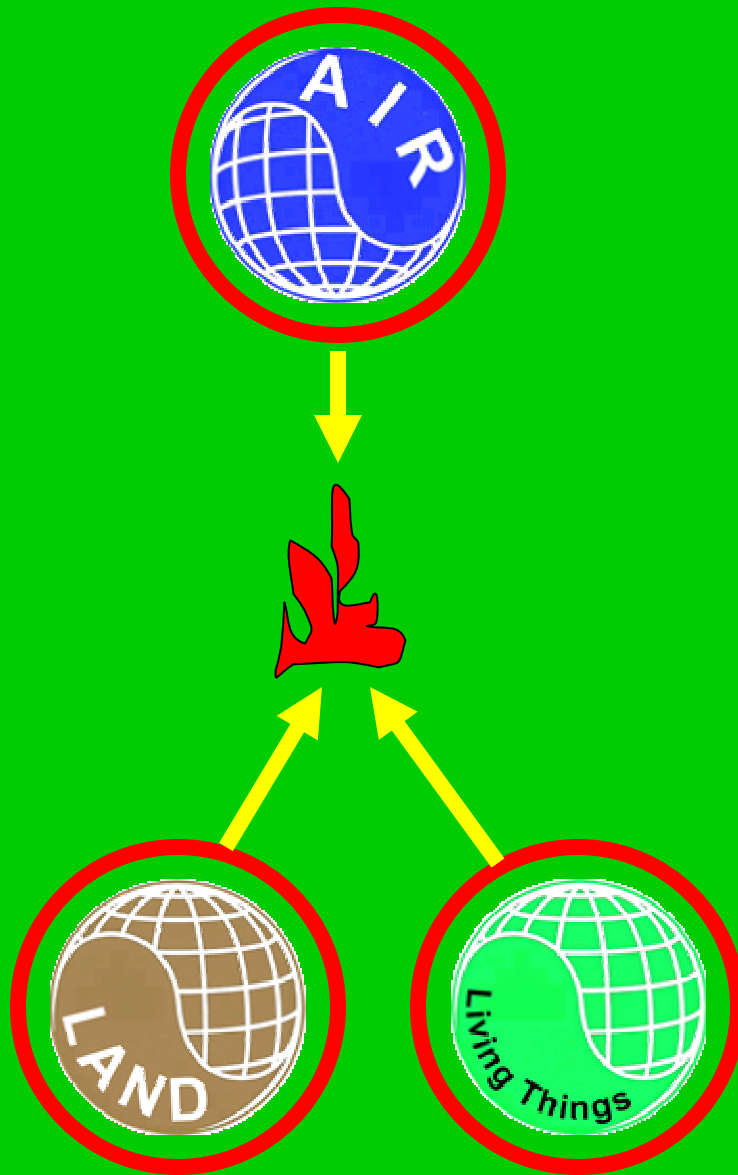
Heat Sources

Heat can come from different places:

Lightning or sunlight from the sky.

Volcanic eruptions from the land.

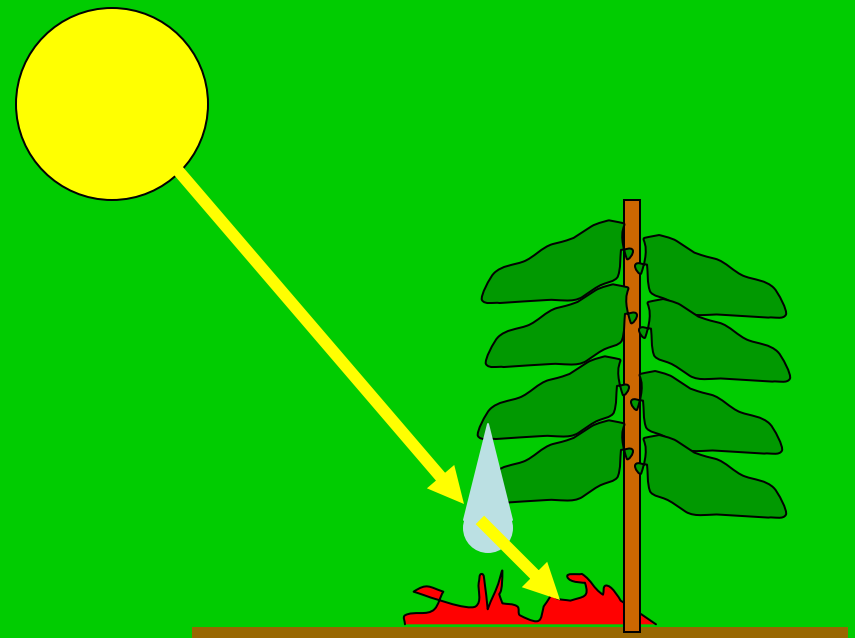
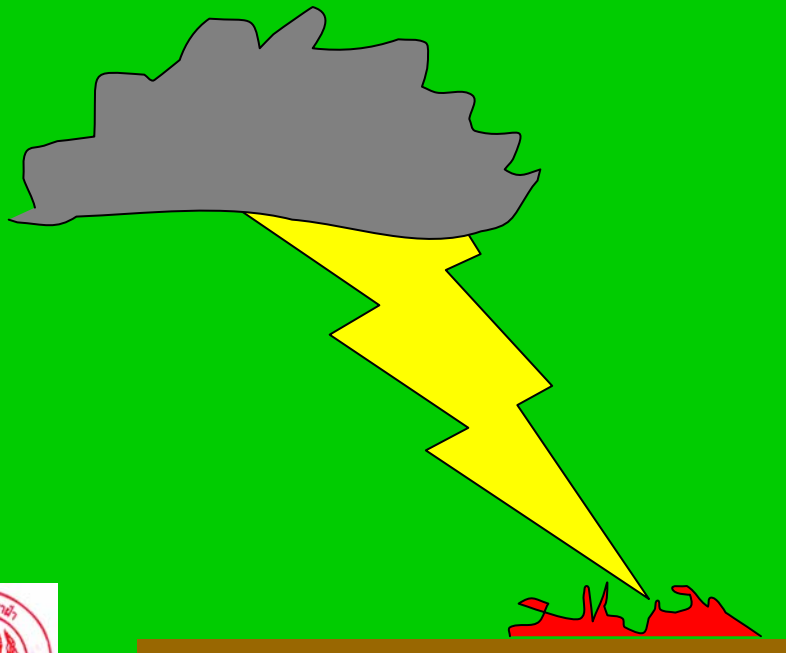
People and decomposing organics can start fires.





Heat from the Atmosphere

Lightning or sunlight from the sky.



Lightning can start a wildfire.



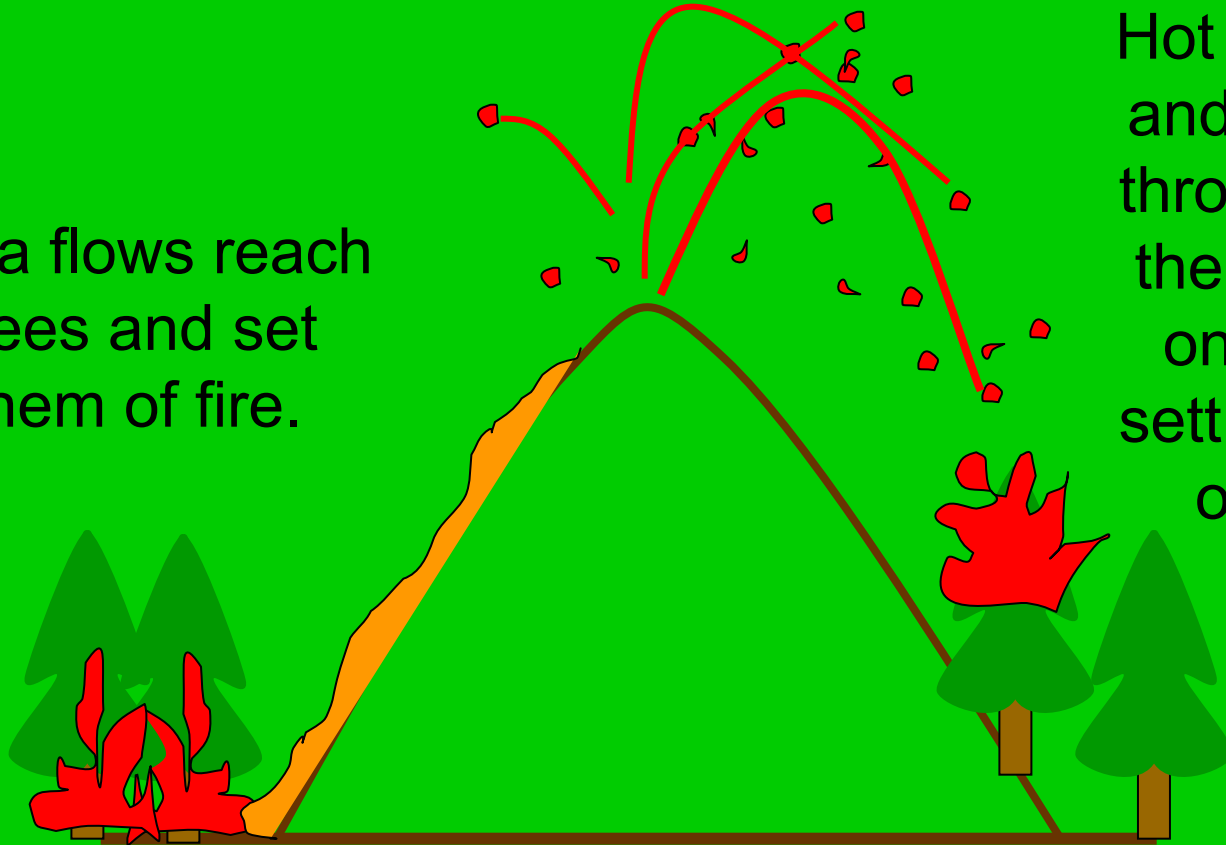
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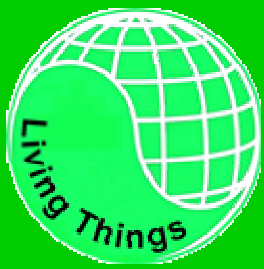


Heat from volcanic eruptions

Lava flows reach
trees and set
them of fire.

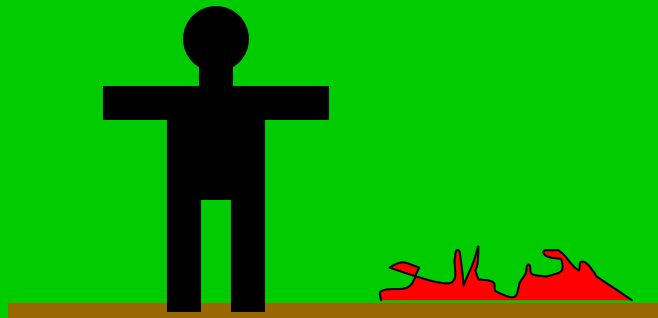
Hot lava ash
and cinders
thrown up in
the air land
on plants
setting them
on fire.





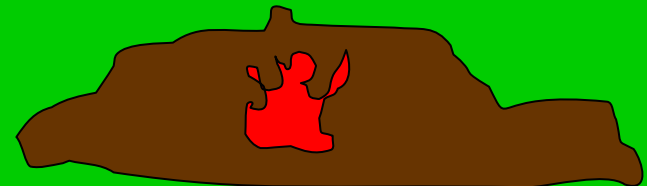
Living Things Start Fires

People can start fires.



People are the main cause of wildfires in Nan Province.

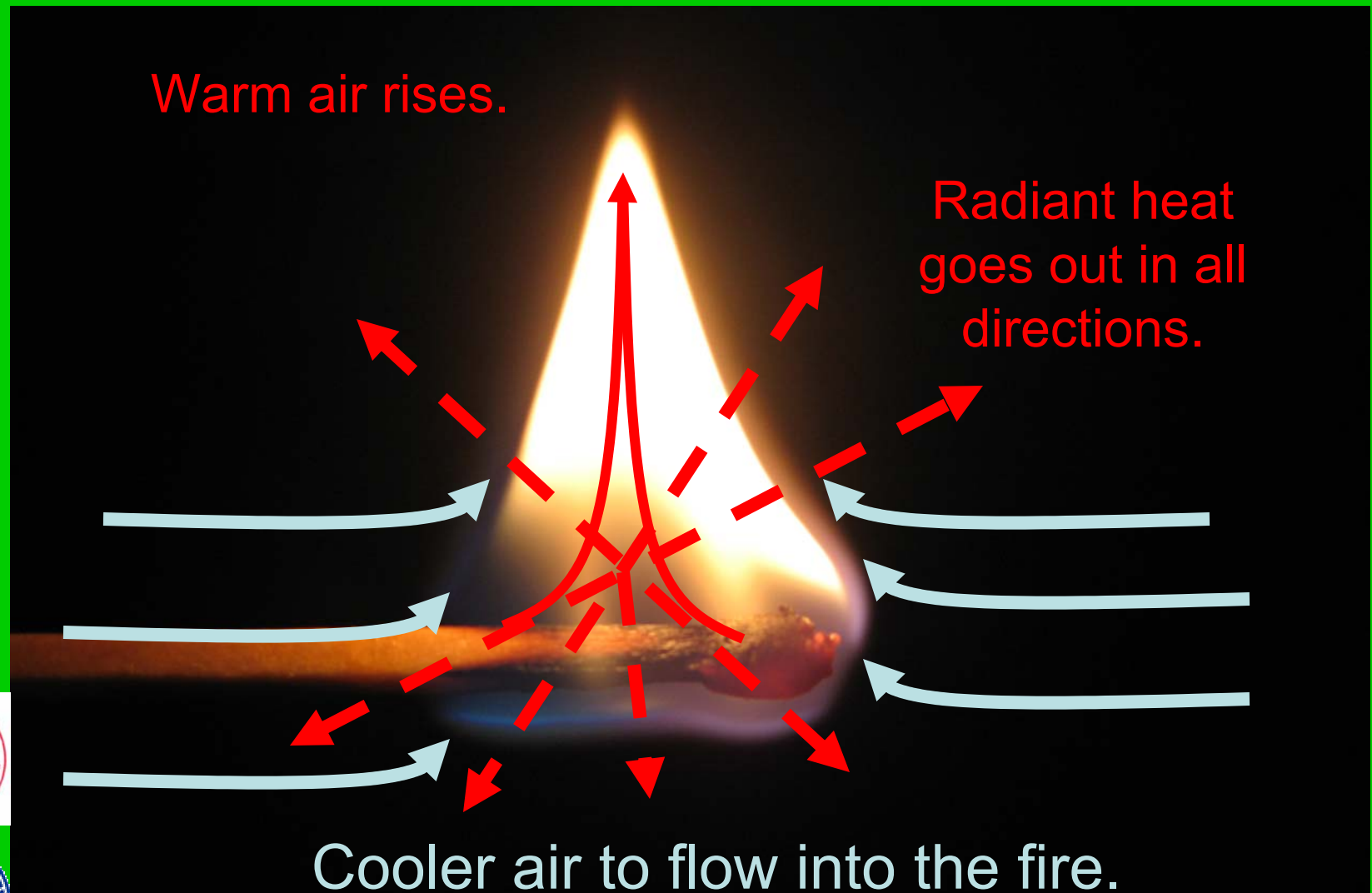
Heat from decaying plant materials can start a fire.



Compost pile



Fire Behavior





Weather and Fire

There is an increased danger of wildfires when:

- Temperatures are high
- Relative humidity is low
- Rainfall is low
- Winds are strong





Fire Season in Nan

The hot season is when:

- Temperatures are high
- Relative humidity is low
- Rainfall is low





Fire and Fuels

Fuel texture and moisture content of the fuel materials affect wildfires.

Fuel for Fire: Plants are the common fuel for wildfires.

Fuel Texture: The size and type of plants affect fire. Smaller, finer texture plants (grass) are easier to burn than larger, coarser plants (trees).

Fuel Moisture: The heat of the dry season removes water from plants. As plants dry out, they are easier to burn.





Land and Fire

The surface cover of the land and the slope of the land affects fires.

Surface Cover: Land covered with dry vegetation will burn easier than land with green vegetation or land with no vegetation.

Surface Slope: Fire will spread faster on sloping land than flat or level land.





Slope and Fire Behavior

Surface Slope: Fire will spread faster on sloping land than flat or level land.

Warm air rises

Cool air flows
into the fire
and pushes
the fire up the
slope



Radiant heat dries
vegetation upslope
from the fire making
the fuel easier to
burn.



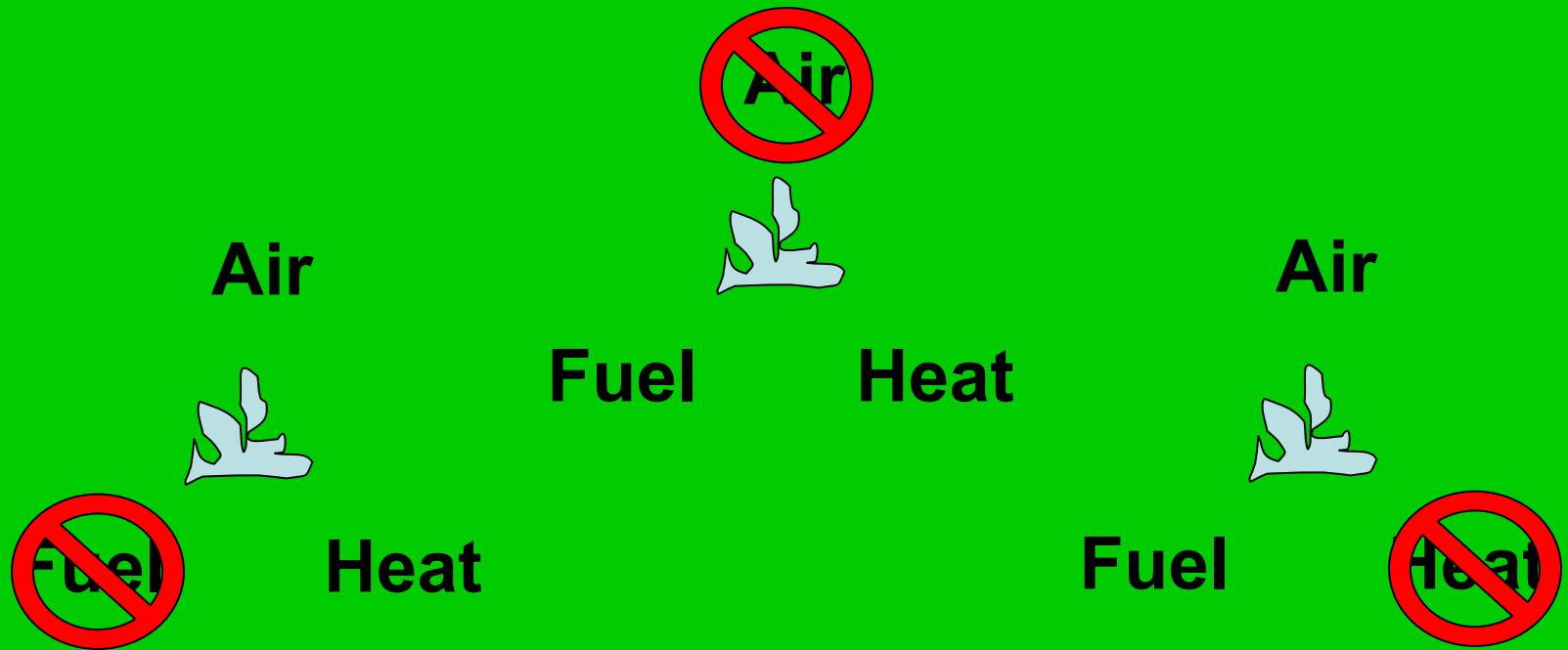
Fire intensity is hottest upslope.



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Basic Fire Fighting

Fire needs air, fuel and heat to live. Remove any one of these and the fire dies.



Common Fire Fighting Hand Tools



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Removing Air

Fire needs air to live. If you remove air from the fire, you can stop the fire.

Fuel **Heat**

Covering the fire with dirt will cut off the air fire's air supply.

- You need hand tools to scrap away vegetation to get to bare mineral soil.
- You need hand tools to scoop up the bare mineral soil to throw at the base of the fire to cover it.



Air



Heat

Removing Fuel

Fire needs fuel to live.
There are a number of
ways to remove fuel
from a fire.

- Cut and clear vegetation (making a fire break).
- Burning vegetation ahead of the fire (back fire; using fire to fight fire).
- Selectively planting vegetation that is less likely to dry out.



Air



Fuel



Removing Heat

Fire needs heat to live.
Removing or reducing
heat helps stop a fire.

- Pour water on the fire to put it out or reduce the heat so new fuel will not burn.
- Increase fire fighting efforts when air temperature is lowest and relative humidity is highest
- Rain and fog help to lower temperatures.



“Where there is smoke, there is fire” is a common English saying.



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Smoke may be the first sign of a fire.



Smoke is small, unburned solid particles carried into the sky by the hot air rising from the fire.

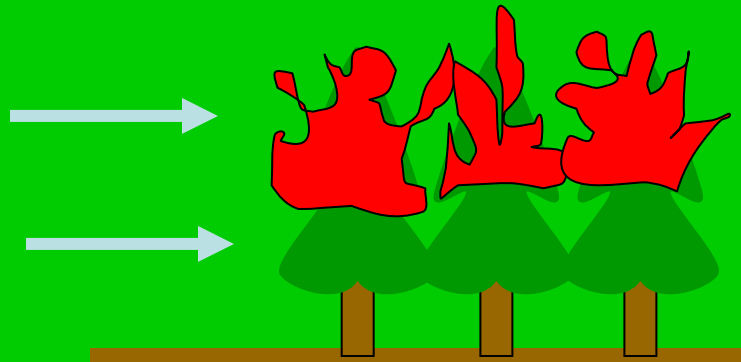


Three Basic Types of Wildfire

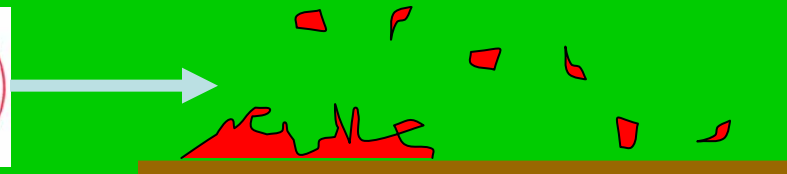
Creeping: Low temperature, slow speed.



Crown Fires: High temperatures, high speed, depending on wind conditions.

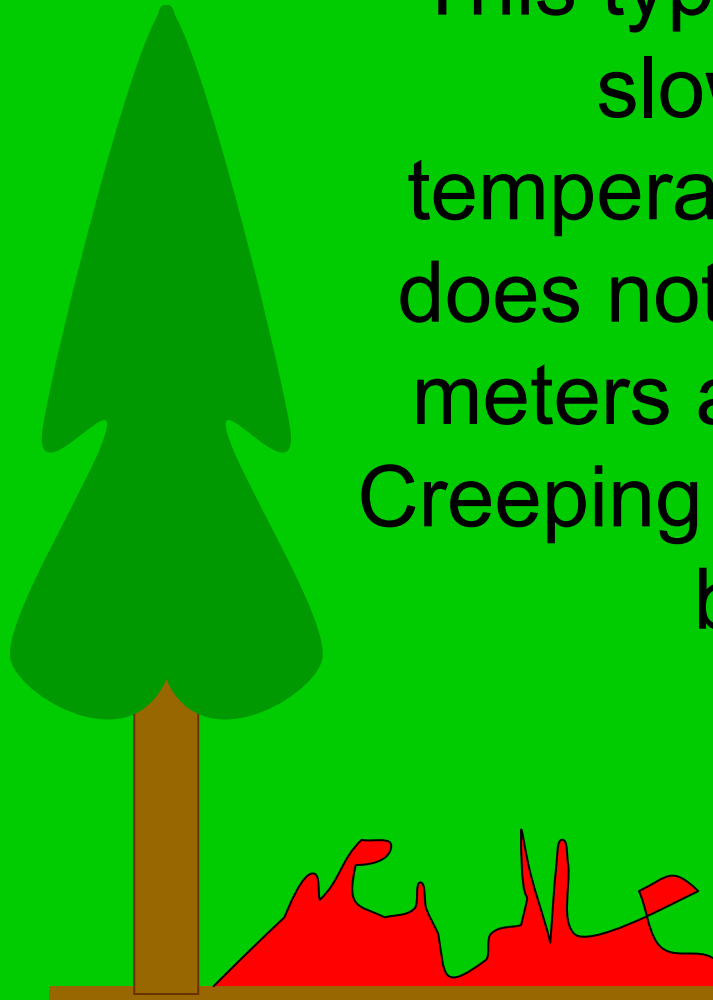


Jumping: Moderate to high temperature, moderate to fast speed depending on the wind conditions.



Creeping or Crawling Wildfire

This type of wildfire has a slow speed, low temperatures, and usually does not burn more than 2 meters above the ground. Creeping fires usually do not burn trees.





Leaf litter is the fuel for creeping fires.



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The speed of
the fire
depends on
the terrain,
amount of
fuel, and the
wind
velocity.



Forest fire fighting truck with a creeping fire.



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Fighting a Creeping Wildfire



Fuel

Heat

Remove Air: Smother the fire with mineral soil.



Use a shovel to scoop bare mineral soil.
Throw it at the base of the fire.

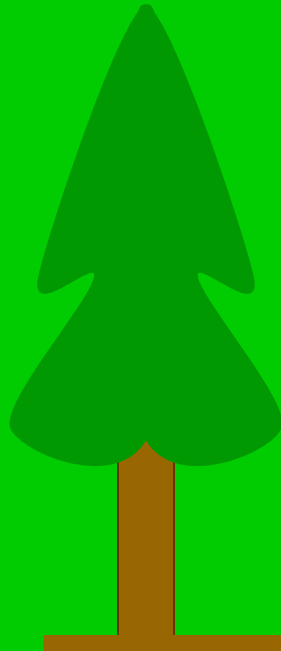


Fighting a Creeping Wildfire

Air



Heat



Remove Fuel: There are a number of ways to remove fuel (both before and during the fire).



Before fire season, clear brush and dead vegetation that can burn from around trees and structures. These clear areas are called fire breaks.



Clearing away fuel before a fire.



Fighting a Creeping Wildfire

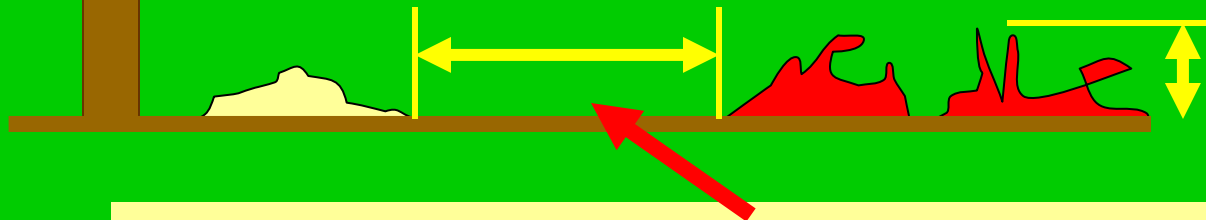
Air



Heat



Remove Fuel: Use hand tools to scrape down to bare mineral soil to make a fire break.



The width of the fire break should be about 2 ½ the height of the fire.





**Remove
Fire Fuel**



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Fire crews clearing fuel by scraping down to bare mineral soil to create a fire break.

A dirt road used as a fire break.



Fighting a Creeping Wildfire

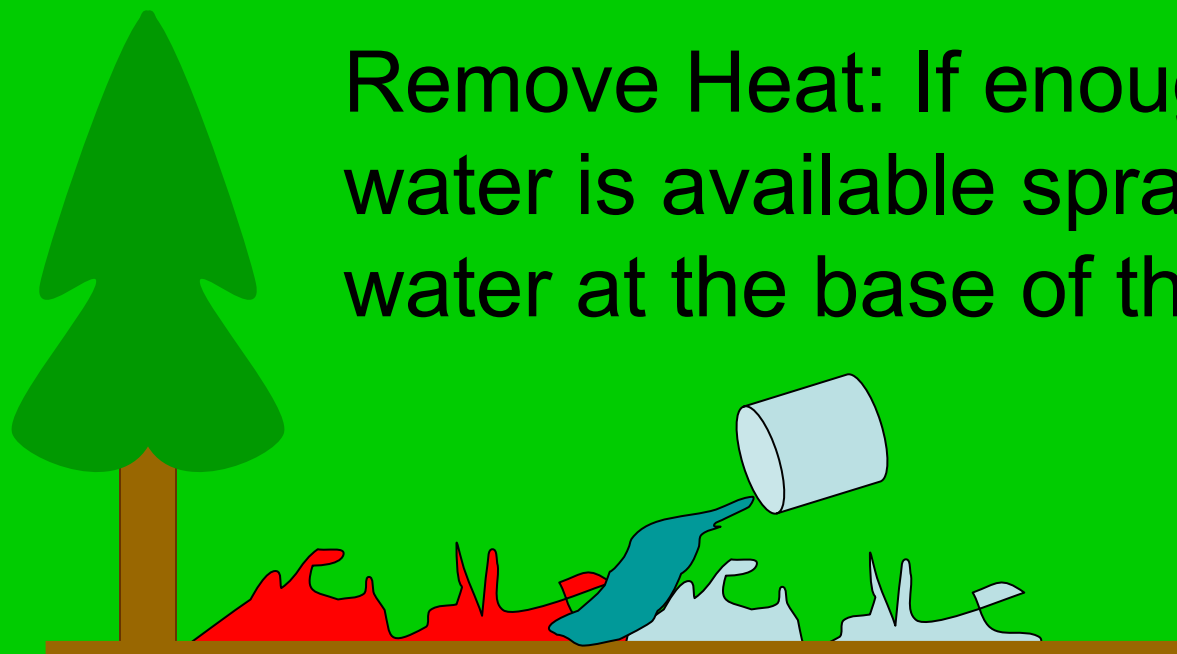
Air



Fuel



Remove Heat: If enough water is available spray water at the base of the fire.



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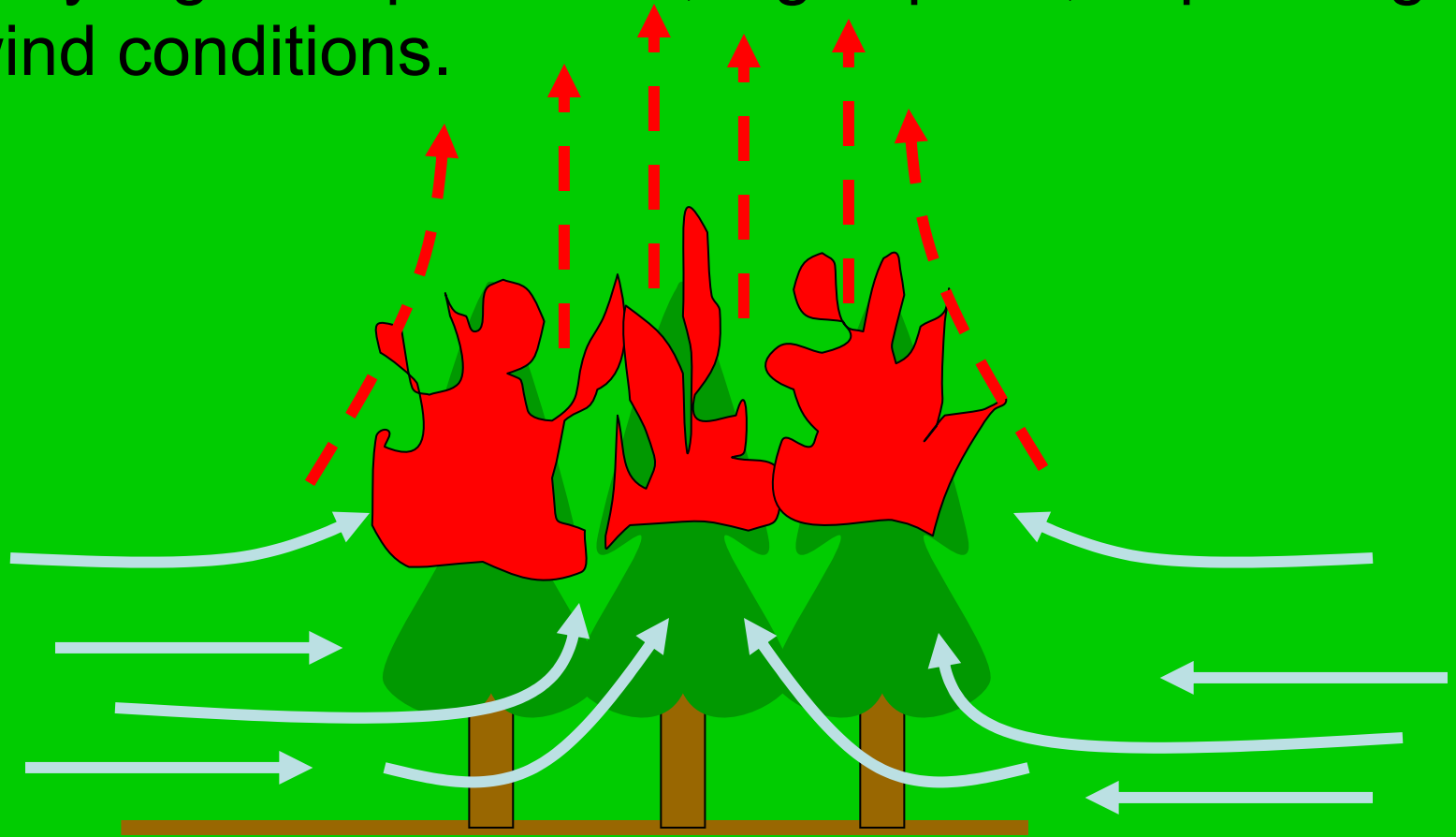
In many cases, water may not be readily available to fight wildfires in Thailand.

Creeping fires can develop into crown fires.



Crown or Canopy Fires

Very high temperatures, high speed, depending on wind conditions.



Strong updrafts create winds coming to the fire and draws oxygen away from the ground level.



Crown fires are very intense fires that are hard to control.



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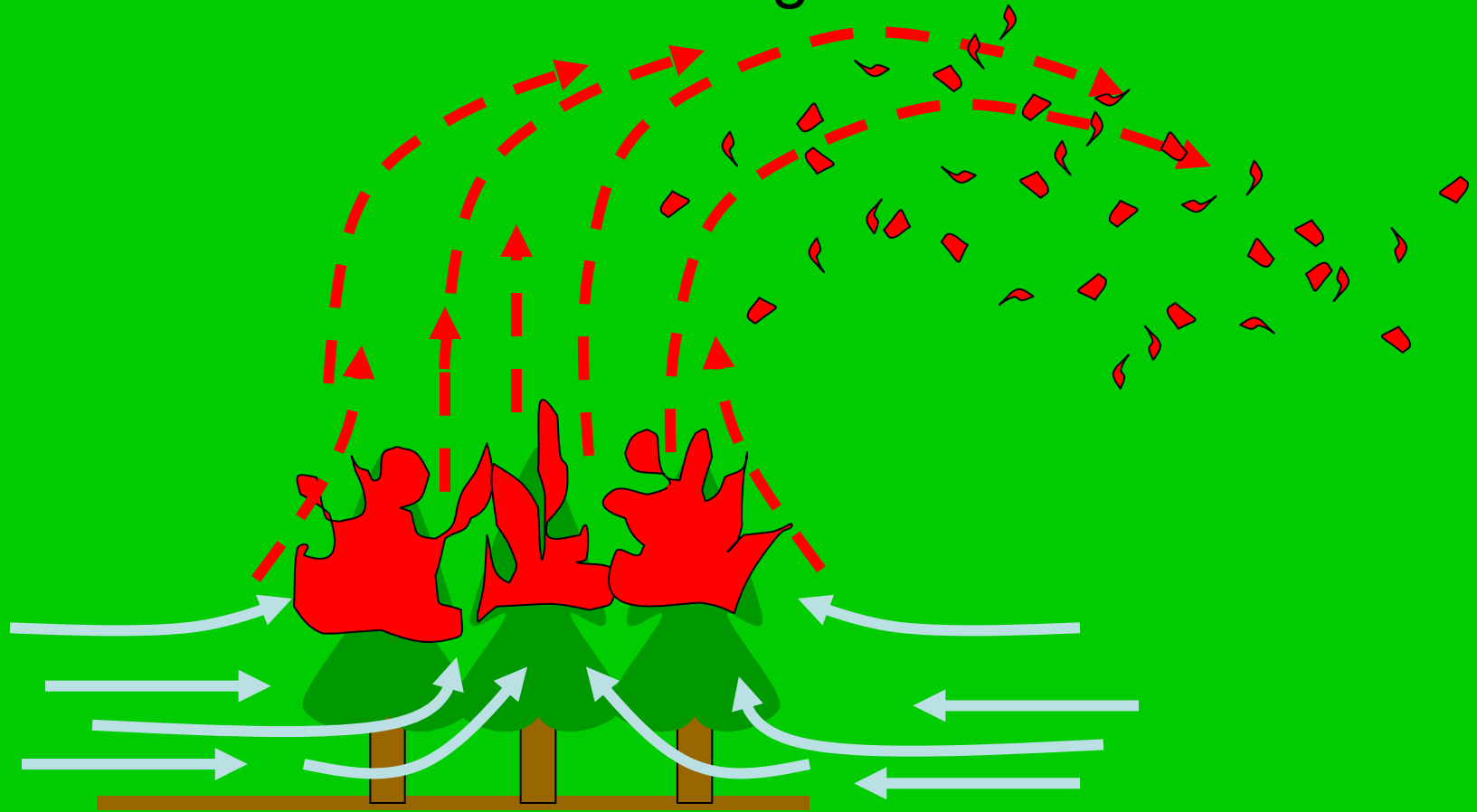
Crown fires and lift burning embers high into the air.



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Crown Fires

Embers can be carried a long distance from the fire.



Temperatures get so hot the liquids in the trees vaporize. Volatile gases explode tossing embers higher and higher.

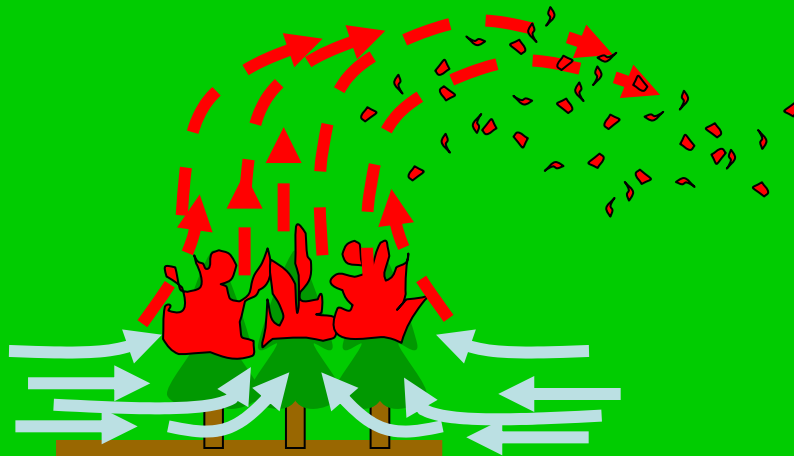
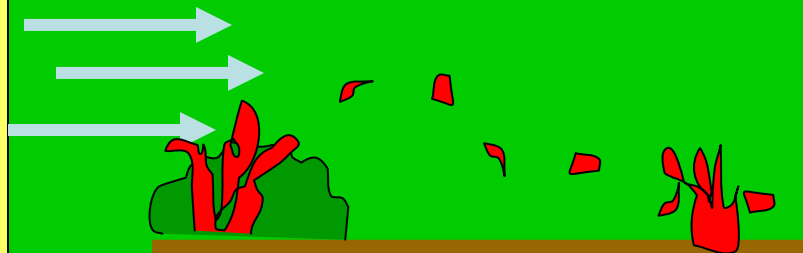
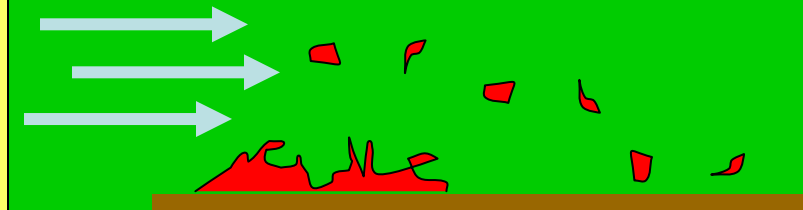


Wind carries burning embers to start smaller spot fires.



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Jumping or Spotting Fires



Moderate to high temperatures, moderate to fast speed depending on the wind conditions.

Wind blows hot ash and glowing embers into areas of unburned fuel starting new spot fires.



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Grasses and shrubs are common fuels for jumping fires from creeping fires. Branches, leaves, embers are associated with crown fires.

Ember factors
affect lofting
height

Ember size
affects burnout
time

Tree factors
affect lofting
'intensity'

20 ft
wind

Factors Affecting Spotting



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Numerous Spot Fires



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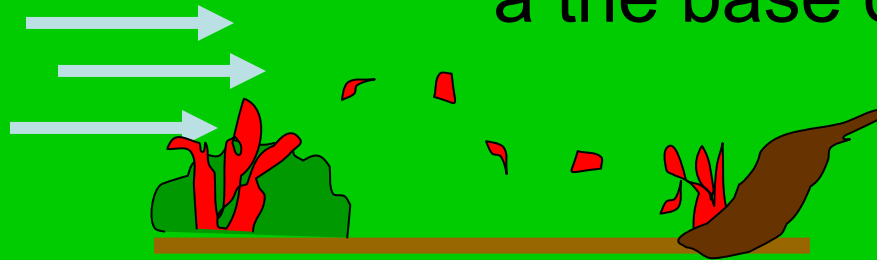
Fighting Jumping or Spot Fires



Fuel

Heat

Reduce Air: Use a shovel to scoop bare mineral soil. Throw it at the base of the fire.



It is a race to put out the new “spot fires” before they become bigger fires.



Fighting Jumping or Spot Fires

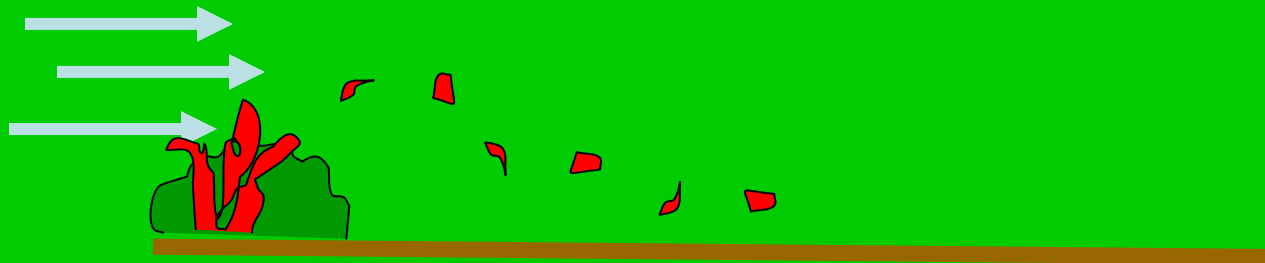
Air



Heat



Remove Fuel: Prepare and maintain fire breaks before fire season.



The width of the fire break should be about 2 ½ the height of the fire.





Fuel

Heat

Air



Heat



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Fire crews shoveling soil and clearing fuel to fight spot fires.

Fighting Jumping or Spot Fires

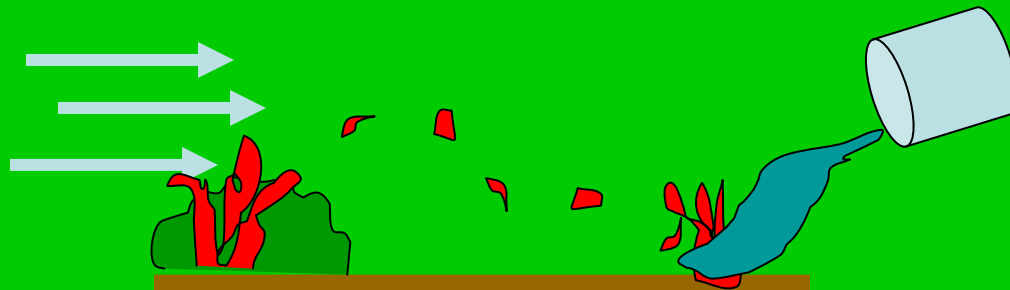
Air



Fuel



Remove Heat: If enough water is available spray water at the base of the spot fire.



Combine this with established fire breaks for optimum fighting of jumping fires.



Managing Crown Fires

Crown (canopy) fires are too large and intense to put out. The typical strategy is to let them burn out.

Creating fire breaks to limit the spread of the fire is the key way to reduce fuel. However, in rural areas, equipment for this work may not be readily available or the terrain too mountainous for the equipment.

Air



Fuel

Heat



Global Warming

In the near future, Nan Province, Thailand may have dry seasons that are hotter, longer, and drier than before. The rainy season will be shorter, but the rains may be more intense than before. These conditions can increase the number of wildfires in Nan Province.

Learn about wildfire now so you know how to reduce the risk of wildfires.



RTC-TH

Rural Training Center-Thailand



is dedicated to providing
community-based
environmental education
for the self-sufficiency
and sustainability of
small rural family farms





The RTC-TH was created to honor the memory of Mr. Tang Suttisan, a father, a farmer, and a man who valued education and used it in starting his family farm



REEEPP

Rural Environmental Education Enhancement Pilot Program



An innovative, non-traditional community-based environmental education program integrating math, science, geography, English language, and technology lessons for environmental stewardship using interactive experiential learning in outdoor settings at Ban Na Fa Elementary School, Nan Province, Thailand..



The End



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