When I think of wildfires, I think of…

- **Santa Ana Winds**

The Santa Ana winds are strong, extremely dry offshore winds that affect coastal Southern California and northern Baja California in autumn and winter. They can range from hot to cold, depending on the prevailing temperatures in the source regions, the Great Basin and upper Mojave Desert. The winds are known for the hot dry weather (often the hottest of the year) that they bring in the fall, and are infamous for fanning regional wildfires.

Meteorology
The National Weather Service defines Santa Ana winds as "Strong down slope winds that blow through the mountain passes in southern California. These winds, which can easily exceed 40 mph, are warm and dry and can severely exacerbate brush or forest fires, especially under drought conditions."

It is often said that the air is heated and dried as it passes through the Mojave and Sonoran deserts, but according to meteorologists this is a popular misconception. The Santa Ana winds usually form during autumn and early spring when the surface air in the elevated regions of the Great Basin and Mojave Desert (the "high desert") becomes cool or even cold, although they may form at virtually any time of year. The air heats up from adiabatic heating during its descent. While the air has already been dried by orographic lift before reaching the Great Basin as well as by subsidence from the upper atmosphere, the relative humidity of the air is further decreased as it descends from the high desert toward the coast, often falling below 10 percent.

The air from the high desert is initially relatively dense owing to its coolness and aridity, and thus tends to channel down the valleys and canyons in gusts which can attain hurricane force at times. As it descends, the air not only becomes drier, but also warms adiabatically by compression. The southern California coastal region gets some of its hottest weather of the year during autumn while Santa Ana winds are blowing. During Santa Ana conditions it is typically hotter along the coast than in the deserts.

Note that while the Santa Ana Winds are a katabatic wind, they are not a Föhn wind. A Föhn wind results from precipitation on the windward side of a mountain range which releases latent heat into the atmosphere which is then warmer on the leeward side (e.g., the Chinook or the original Föhn). The Santa Ana winds do not originate in precipitation, but in the bone-dry high deserts.

The combination of wind, heat, and dryness accompanying the Santa Ana winds turns the chaparral into explosive fuel feeding the infamous wildfires for which the region is known. Wildfires fanned by Santa Ana winds burned 721,791 acres (2,920.98 km2) in two weeks during October 2003.These same winds have contributed to the fires that have burned some 426,000 acres (1,720 km2) as of late October 2007.

Although the winds often have a destructive nature, they have some benefits as well. They cause cold water to rise from below the surface layer of the ocean, bringing with it many nutrients that ultimately benefit local fisheries. As the winds blow over the ocean, sea surface temperatures drop about 4°C (7°F), indicating the upwelling. Chlorophyll concentrations in the surface water go from negligible, in the absence of winds, to very active at more than 1.5 milligrams per cubic meter in the presence of the winds.

Historical Impact
The winds are also associated with some of the area's largest and deadliest wildfires, including the state's largest fire on record, the Cedar Fire, as well as the Laguna Fire, Old Fire, Esperanza Fire, Santiago Canyon Fire of 1889 and the Witch Fire.

In October 2007 the winds fueled major wild fires and house burnings in Escondido, Malibu, Rainbow, San Marcos, Carlsbad, Rancho Bernardo, Poway, Ramona, and in the major cities of San Bernardino, San Diego and Los Angeles. The Santa Ana winds were also a factor in the November 2008 California wildfires.

In December 2011 the winds led to "state of emergency" declarations in several municipalities after 80+ mph gusts toppled hundreds of trees, power lines, and traffic signals throughout the San Gabriel Valley. Approximately 230,000 people were left without power for an extended period after the incident.

- **Dry Thunderstorms**

A dry thunderstorm is a thunderstorm that produces thunder and lightning, but most or all of its precipitation evaporates before reaching the ground.

Where dry thunderstorms occur
Dry thunderstorms generally occur in deserts or places where atmospheric water vapor is low. Because dry air tends to absorb liquid water, causing it to change phase into vapor, it is absorbed before reaching the ground. They are common during the summer months across much of western North America.

Hazards

Dust storms: Strong winds often develop around dry thunderstorms as the evaporating precipitation causes excessive cooling of the air beneath the storm. This cool air then descends rapidly and fans out upon impacting the ground, an event often described as a dry microburst. As the gusty winds expand outward from the storm, dry soil and sand are often picked up by the strong winds, creating dust and sand storms known as haboobs.

Fires: In areas where trees or other vegetation are present, the lightning will cause the trees to catch fire and there is little or no rain to stop the fire. Storm winds fan the fire, causing it to spread more quickly.

- **Firefighters**

How do I get a job as a wildland firefighter?

USAJobs is a good source for information about wildland fire jobs in the federal government. Most federal wildland firefighters are technically "forestry technicians", so at the USAJobs site you should search for that term or "fire". To work for state or local agencies you will need to inquire with each individual organization.

What training does a wildland firefighter receive?

Most entry level wildland firefighter jobs require that you complete at a minimum, Firefighter Training (S-130) and Introduction to Fire Behavior (S-190) either before or just after you are hired. If you want to get these courses before you apply for a job, check with your local federal or state land management agency, or inquire at a community college. Or search on the Internet for a wildland fire academy. To reach the highest level of rank or qualifications, such as the position of Type 1 Incident Commander running the largest fires, it takes longer than it does to become a General in the Army.

What are the physical requirements to be a wildland firefighter?

The job of a wildland firefighter is VERY physically challenging. VERY. So if you have never worked out of doors or used your muscles for anything more arduous than operating a video game controller, you will have a hard time.

Taking the Work Capacity Test

The federal agencies require that firefighters pass a Work Capacity Test, or "pack test", that requires you to walk three miles on level ground in less than 45 minutes while carrying a 45-pound pack. Some states and local agencies use this test, but many use other types of physical-agility tests. Fire-related jobs that are less arduous than a firefighter have different and less arduous versions of the work capacity test. And did I mention that the job of a wildland firefighter is VERY physically challenging?

How can I get a job as a wildland firefighter in another country?

It is very, very difficult for a U.S. citizen to get a job as a firefighter in Australia. Forget about it. For a citizen from outside the U.S. to get a job as a firefighter in the U.S. you would first need to be sponsored by an employer. Then you need a work permit from the U.S. embassy and a "green card" or resident alien card.

What is a "Red Card."
It is a wallet-sized card that certifies that a person is trained and qualified to perform specific jobs on a wildland fire or other types of incidents. After a person is hired and trained and they pass the required level of the Work Capacity Test, they are eligible to be given a red card by their employer.

When thousands of firefighters assemble to fight one of the larger wildfires, how are they organized?
Following some disastrous fires in southern California in 1970, firefighters began designing an organization system that was based on the military.

It eventually evolved into the Incident Command System (ICS) which defines jobs or positions that can be activated and used on fires and other types of planned or unplanned incidents. Each position has clearly defined duties as well as training and experience requirements. Each person filling a position that has been activated knows where they fit into the organizational structure and to whom they should report. Standard terminology is used to facilitate communication so that personnel from different agencies can easily work side by side. The system is flexible and scalable so that it can be used on very small or very large incidents. The ICS became used, not just by firefighters, but by many emergency management agencies as it evolved further into what is now known as the National Incident Management System, or NIMS. In 2003, it formally went national with the passage of Homeland Security Directive number 5, mandating that all federal, state, and local agencies use NIMS to manage emergencies in order to receive federal funding.

- **Helicopters**

Aerial firefighting is the use of aircraft and other aerial resources to combat wildfires. The types of aircraft used include fixed-wing aircraft and helicopters. Smokejumpers and rappellers are also classified as aerial firefighters, delivered to the fire by parachute from a variety of fixed-wing aircraft, or rappelling from helicopters. Chemicals used to fight fires may include water, water enhancers such as foams and gels, and specially formulated fire retardants.

Termonology
A wide variety of terminology has been used in the popular media for the aircraft (and

methods) used in aerial firefighting. The terms **Airtanker** or **air tanker** generally refer to fixed-wing aircraft based in the United States; "airtanker" is used in official documentation. The term "**waterbomber**" is used in Canadian government documents for the same class of vehicles.

Air attack is an industry term used for the actual application of aerial resources, both fixed-wing and rotorcraft, on a fire. Within the industry, though, "air attack" may also refer to the supervisor in the air (usually in a fixed-wing aircraft) who supervises the process of attacking the wildfire from the air, including fixed-wing airtankers, helicopters, and any other aviation resources assigned to the fire. The Air Tactical Group Supervisor (ATGS), often called "air attack," is usually flying at an altitude above other resources assigned to the fire, often in a fixed-wing plane but occasionally (depending on assigned resources or the availability of qualified personnel) in a helicopter.

Depending on the size, location, and assessed potential of the wildfire, the "air attack" or ATGS person may be charged with initial attack (the first response of firefighting assets on fire suppression), or with extended attack, the ongoing response to and management of a major wildfire requiring additional resources including engines, ground crews, and other aviation personnel and aircraft needed to control the fire and establish control lines or firelines ahead of the wildfire.[4]

Equipment
A wide variety of helicopters and fixed-wing aircraft are used for aerial firefighting. In 2003, it was reported that "The U.S. Forest Service and Bureau of Land Management own, lease, or contract for nearly 1,000 aircraft each fire season, with annual expenditures in excess of US$250 million in recent years".

Helicopters
Helicopters may be fitted with tanks (helitankers) or they may carry buckets. Some helitankers, such as the Erickson AirCrane, are also outfitted with a front-mounted foam cannon. Buckets are usually filled by submerging or dipping them in lakes, rivers, reservoirs, or portable tanks. The most popular of the buckets is the flexible Bambi Bucket. Tanks can be filled on the ground (by water tenders or truck-mounted systems) or water can be siphoned from lakes, rivers, reservoirs, or a portable tank through a hanging snorkel. Popular firefighting helicopters include variants of the Bell 204 and the Erickson S-64 Aircrane helitanker, which features a sea snorkel for filling from a natural water source while in flight. Currently the world’s biggest helicopter Mil Mi-26 uses a bambi-bucket.

- **Hot Summers**

In just seconds, a spark or even the sun’s heat alone sets off an inferno. The wildfire quickly spreads, consuming the thick, dried-out vegetation and almost everything else in its path. What was once a forest becomes a virtual powder keg of untapped fuel. In a seemingly instantaneous burst, the wildfire overtakes thousands of acres of surrounding land, threatening the homes and lives of many in the vicinity.

wAn average of 5 million acres burns every year in the United States, causing millions of dollars in damage. Once a fire begins, it can spread at a rate of up to 14.29 miles per

hour (23 kph), consuming everything in its path. As a fire spreads over brush and trees, it may take on a life of its own -- finding ways to keep itself alive, even spawning smaller fires by throwing embers miles away. In this article, we will look at wildfires, exploring how they are born, live and die.

On a hot summer day, when drought conditions peak, something as small as a spark from a train car's wheel striking the track can ignite a raging wildfire. Sometimes, fires occur naturally, ignited by heat from the sun or a lightning strike. However, the majority of wildfires are the result of human carelessness.

Common causes for wildfires include:

- Arson
- Campfires
- Discarding lit cigarettes
- Improperly burning debris
- Playing with matches or fireworks
- Prescribed fires

Everything has a temperature at which it will burst into flames. This temperature is called a material's **flash point**. Wood's flash point is 572 degrees Fahrenheit (300 C). When wood is heated to this temperature, it releases hydrocarbon gases that mix with oxygen in the air, combust and create fire.

There are three components needed for ignition and combustion to occur. A fire requires **fuel** to burn, air to supply **oxygen**, and a **heat** source to bring the fuel up to ignition temperature. Heat, oxygen and fuel form the **fire triangle**. Firefighters often talk about the fire triangle when they are trying to put out a blaze. The idea is that if they can take away any one of the pillars of the triangle, they can control and ultimately extinguish the fire.

After combustion occurs and a fire begins to burn, there are several factors that determine how the fire spreads. These three factors include **fuel**, **weather** and **topography**. Depending on these factors, a fire can quickly fizzle or turn into a raging blaze that scorches thousands of acres.