WILDLAND FIRE Facts

Nearly 85% of wildland fires in the United States are caused by humans. Human-caused fires result from:

- **Campfires.**
- **Burning of trash and debris.**
- **Negligence, such as tossing cigarettes on the ground.**
- **Intentional arson.**

LIGHTNING is the most common cause of naturally occurring wildfires.

STRIKES IGNITE

Lightning strikes the Earth over 100,000 times a day. 10%-20% of these lightning strikes can cause fire.

FIRE BEHAVIOR

Fire is unpredictable. The three elements that comprise fire — **heat**, **fuel**, and **oxygen** — can interact with one another in an infinite number of combinations. (This complex relationship is more commonly referred to as the "fire triangle.")

Heat is the increase of ambient temperature, which can not only ignite a fire but also prolong it.

Fuel is the combustible material available to burn. Common fuels are trees, brush, grasses, and leaves.

Oxygen is the gas needed to support the chemical process of combustion. Fire needs oxygen to burn.

Further complicating the predictability of wildfire, other external factors can influence how quickly it spreads or how hot it burns.

Weather: Wind supplies oxygen to fire, causing it to spread. Warm temperatures and lower humidity make fuels burn faster.

Topography: The slope of the land can affect the speed of wildfire progression. The steeper the slope, the faster wildfire can move.

THAT'S A LOT OF HEAT!

An average of 1.2 million acres of U.S. woodland burn every year.

RISK OF FIRE

Wildfire can be extremely dangerous, especially when it threatens human lives, homes, or livestock. It can quickly destroy thousands of acres of forest or brush, leaving the earth charred and bare. The earth becomes susceptible to mud slides, ash flow, and erosion in the aftermath of wildfire.

It can also affect the quality of our water. Lakes and rivers can become polluted with sediment and ash. Underground flows of groundwater can become contaminated with carbon and other harmful chemicals. Flow of stormwater runoff can be disrupted.

BENEFITS OF FIRE

Although destructive, wildfire can also help ecosystems. Fire can clear out dead, dry, organic material (e.g., fallen trees, leaves, needles) that clutter the forest floor, creating new space for plants to grow. Additionally, the burned material can release nutrients into the soil faster, increasing its fertility. Fires can also help get rid of invasive species in an area, which allows native plants and animals to thrive.

FIRE AWAKENS

Some plant species require fire for their seeds to sprout. Plants, such as the lodgepole pine, eucalyptus, and banksia, can only open to release their seeds after the heat of a fire. Other species, including several shrubs and annual plants, will remain buried in the soil, seed bank for decades, and only sprout when a fire occurs. Chemical signals contained in the smoke and ash awaken them.

DIY Carbon Filter

FILTER YOUR OWN COLORED SPORTS DRINK OR SODA.

MATERIALS

Colored sports drink or soda
Five two-ounce plastic cups
Tablespoon
Activated carbon
Timer
Coffee filters (at least four)
Permanent marker
Paper towels
White sheet of paper

You can buy activated carbon from a pet store. If you would like to taste your results, use food-grade activated carbon.

PREPARATION

1. Label five two-ounce plastic cups with: A, B, C, D, and E.
2. Pour half a tablespoon of activated carbon into cup B. Do the same for D.
3. Prepare two double-layered coffee filters. Insert one filter into another filter to form the two layers.
4. Get your timer and colored drink ready.

Age Level: 6-11 (elementary).
Key Definitions: Wildland Fire, Fire Triangle, Heat, Fuel, Oxygen, Combustion, Carbon.
Objective: To learn about the risks and benefits of wildland fires, and how the properties of carbon act as a filter.

PROCEDURE

1. Take the empty two-ounce plastic cup, labeled A, and add about one tablespoon of colored drink (liquid).

   How does the liquid look inside the cup?
   Is the color very intense?
   Smell the liquid in the cup. Does it have a specific smell?

SOLUTION
solute (activated carbon) + solvent (liquid) = solution

2. Set your timer for five minutes.

3. Add about a half tablespoon of liquid to the cups B and D. Carefully swirl each cup to make sure that the liquid mixes well with the activated carbon to produce a solution. Start timer for five minutes.

   What happens when you add the liquid to the activated carbon?
   What does the solution look like?

4. Take the double-layered coffee filter and hold it above cup C. Once the timer rings after five minutes, pour the contents of cup B (liquid and activated carbon) into the double-layered coffee filter. Collect the liquid that runs through the filter into cup C and, using your timer again, let sit for 25 minutes.

   Did the appearance of the solution change? Smell the liquid again.
   Do you notice a difference compared with the original unfiltered liquid?

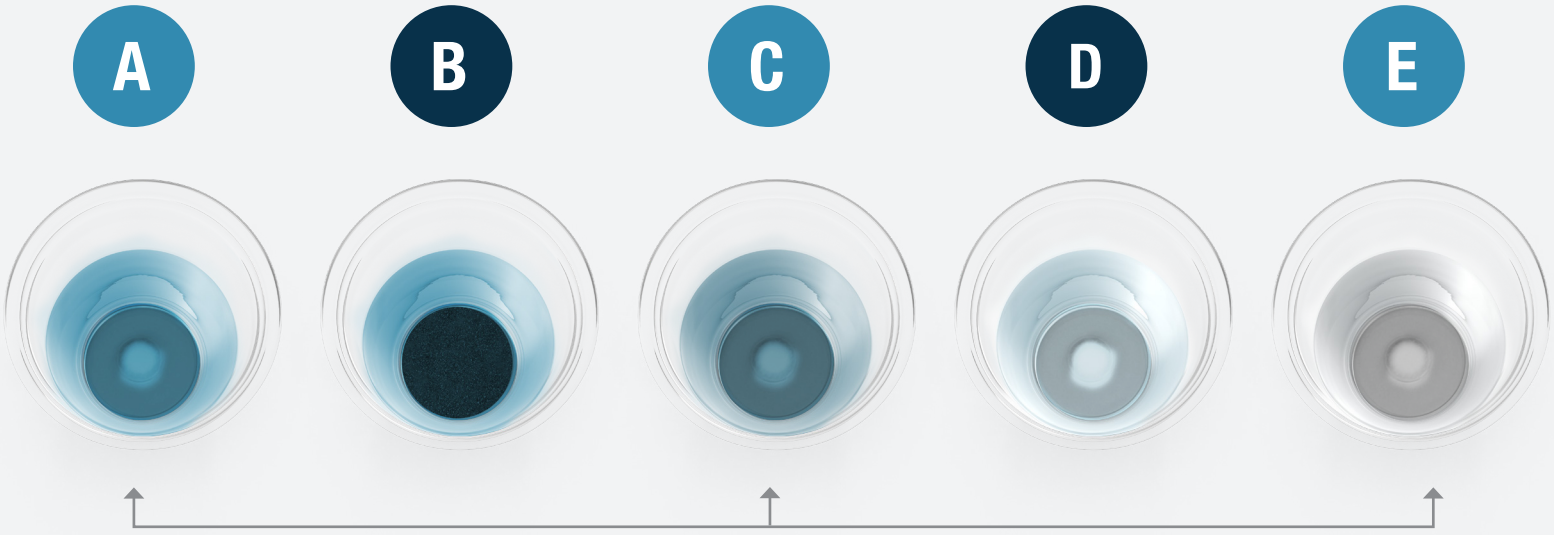
5. While waiting, swirl cup D occasionally.

6. Now prepare your second double-layered coffee filter, and once your timer rings after 25 minutes, hold it over cup E. Pour the contents of cup D (liquid and activated carbon) into the double-layered coffee filter. Collect the liquid that runs through the filter into cup E.

   How does this solution look compared with the original unfiltered liquid and the solution in cup C?
   Do you notice any change in smell?

7. Place cups A, C, and E on the white sheet of paper so that the solutions can be easily observed. Look at and compare the three cups.

   How did the liquid change over time, after mixing with the activated carbon?



Compare the liquid in cups A, C, and E to demonstrate the carbon-filtration process.

OBSERVATIONS AND RESULTS

When you poured the liquid into the cups with activated carbon (B and D), did you see it fizzing and bubbling? Once the activated carbon becomes wet, all the air that is inside its many pores is replaced by liquid, which releases the air and causes fizzing and bubbling.

After you filtered the solution from cup B into cup C for five minutes, you probably noticed that the original color of the solution become less intense. You might have also noticed that the original fruity smell was either faint or unrecognizable. The activated carbon absorbs and traps various compounds, removing them from the liquid.

Did your liquid look clear in cup E once you filtered out the activated carbon after 25 minutes? The longer the beverage is in contact with the activated carbon, the more its color and fragrance will be absorbed into the carbon's surface. If you spend enough time filtering, you can remove all color and fragrance from the liquid, resulting in a clean cup of water.

Taste the colorless liquid. If you used food-grade activated carbon, it will likely not taste like the original drink.

Think of the water filter you use at home; it works exactly the same way. Many compounds (even some that you cannot see or taste) will be trapped in the activated carbon filter, and the only thing left is water for you to drink.