二零二六 THE KTI VIBE
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Winter

https://images.pexels.com/photos/19727167/pexels-photo-19727167/free-photo-of-a-snowy-mountain-with-trees-and-snow-covered-ground.jpeg

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News And Events

Society

The Brown University shooting happened on December 13, 2025, in Providence, Rhode Island. A gunman shot inside the Barus & Holley building during exam week. Two students died, and nine were hurt. Police searched for the shooter and questioned a person of interest. The campus was locked down, and students stayed inside for safety. Later, authorities said Claudio Manuel Neves Valente was linked to this shooting and another killing. He died by suicide during the investigation.

Technology

A report on December 18, 2025, said global AI caused as many carbon emissions as New York City and used more water than all bottled water worldwide. This alarming data has sparked strong Debate in the tech industry has emerged about the urgent need for sustainable and eco-friendly AI practices, including reducing energy use, improving efficiency, and developing greener technologies.

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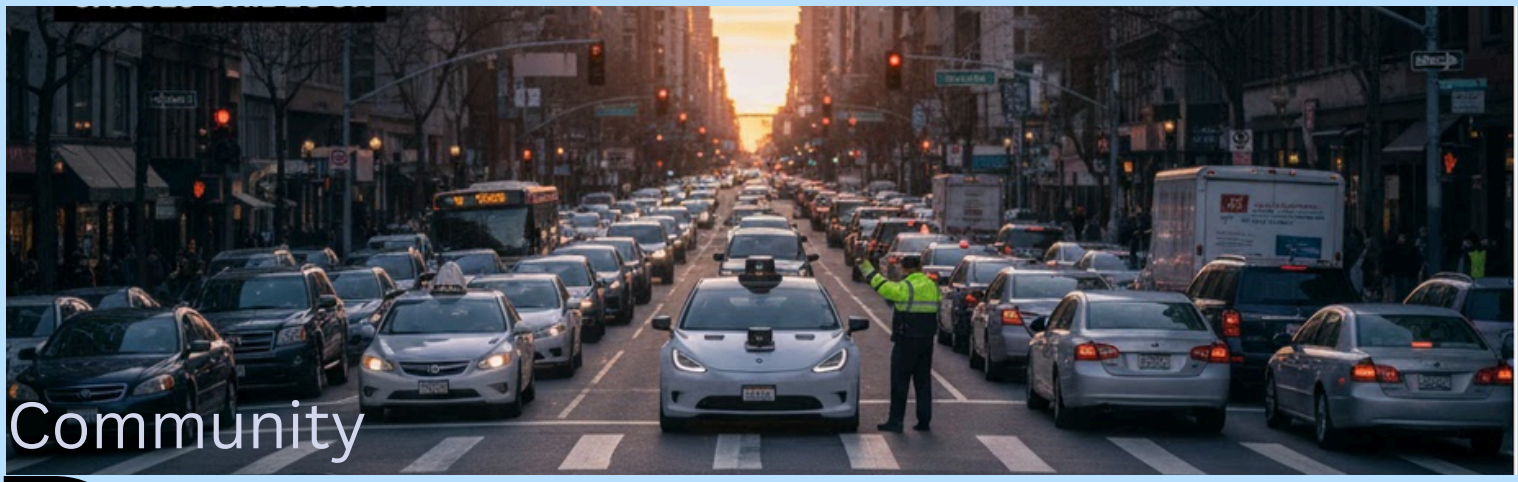

Community

During a power outage in San Francisco on Dec 20, Waymo's self-driving cars stopped in the middle of the road because traffic lights were not working. Without functioning signals, the vehicles could not safely determine right of way at intersections. As a

As a safety measure, Waymo paused operations, and some cars remained stationary until conditions improved. The incident caused traffic disruptions and highlighted the fact that autonomous vehicles still rely on city infrastructure, raising concerns about how they should respond when essential systems, such as traffic lights, fail.

International

In late 2025, tensions between the United States and Venezuela rose sharply and turned into a direct military clash under the Trump administration. After building up naval forces, the U.S. launched Operation Southern Spear and carried out more than 28 airstrikes on ships suspected of drug trafficking. On December 10 and 20, U.S. forces seized two oil tankers near Venezuela, acting like a blockade. President Trump also closed Venezuelan airspace and labeled some groups as terrorists. In response, President Maduro mobilized millions of militia members and accused the U.S. of piracy and violating Venezuela's sovereignty.

Author: Zhiyu Wen

Holiday Tree Collection Guidelines

As the holiday season comes to an end, many families have a common question: What should be done with the Christmas tree? Properly getting rid of a Christmas tree is more than just keeping the neighborhood clean. It also helps protect the environment and supports recycling. By looking at how the city of Fremont, California, handles this issue, we can see how holiday waste can be turned into something useful.

In Fremont, the city collaborates with a waste management company called Republic Services to ensure that Christmas trees are recycled instead of being thrown away. For people living in single-family homes, the city offers free curbside pickup during the first two weeks of January. However, residents must prepare their trees correctly. All decorations, lights, and stands must be removed before placing the tree in the green organics bin.

For people living in apartments or condominiums, the process is slightly different. Instead of individual pickup, property managers or Homeowners Associations organize special collection areas for everyone in the building. This helps make recycling easier in areas where many people live in close proximity.

It is also important to know the difference between natural and treated trees. Natural trees can be turned into mulch and used to help plants grow. However, trees that are sprayed with fake snow or paint cannot be recycled and must be disposed of in the regular trash. By following these simple guidelines, residents can help reduce waste and ensure their Christmas trees are reused in an environmentally friendly manner.

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Skiing in California

Spending Christmas in California is a fantastic way to enjoy winter fun without having to travel too far. If you love skiing or just want to experience a snowy holiday, the Sierra Nevada mountains are perfect. Fresh snow, clear blue skies, and cozy mountain towns make it a magical getaway for families, friends, and beginners alike.

Lake Tahoe is a top choice for many visitors. The area boasts numerous ski resorts catering to all skill levels, from gentle green runs for beginners to thrilling black diamonds for experts. Beyond skiing, you can enjoy ice skating, holiday markets, and scenic walks along the snow-covered lake. South Lake Tahoe has charming restaurants and cafes, perfect for warming up with hot chocolate after a day on the slopes. The festive lights around town make it feel truly special during the Christmas season.

https://equityresidences.com/residence/vail-colorado-mountain-home-equity-platinum-fund/

https://commons.wikimedia.org/wiki/File:Mammoth_Mtn_ski_area_-_Scott_%26_Robin_Foubister_-_a_skiing_paradise_%2816151982375%29.jpg

Mammoth Mountain is renowned for its dependable snowfall and extended ski season. The resort offers a mix of slopes and terrain parks, allowing both skiers and snowboarders to have fun. Beginners can join ski school lessons, while advanced skiers can explore steeper trails and off-piste areas. In the town of Mammoth Lakes, you can relax in natural hot springs, check out holiday events, and enjoy cozy dinners after a day outdoors. The mountain views at sunrise and sunset are absolutely breathtaking.

Author: Zhiyu Wen

Big Bear is a smaller, family-friendly option, especially convenient for Southern California travelers. Its ski resorts have beginner-friendly slopes and easy lifts, making it perfect for a short trip. Beyond skiing, you can try sledding, tubing, or snowshoeing around Big Bear Lake. The town gets decorated with Christmas lights, creating a festive and cheerful atmosphere. Local cafes serve warm meals and treats to keep you energized throughout the day.

For different types of visitors, Big Bear is ideal for beginners, thanks to its gentle slopes, easy-to-use lifts, and supportive ski schools that make learning simple and stress-free. Families with kids will enjoy Lake Tahoe, which offers a variety of fun activities beyond skiing, including ice skating, snow tubing, and holiday markets, creating a magical experience for children. Experienced skiers or snowboarders will find Mammoth Mountain perfect, with its long runs, challenging terrain, and reliable snow. The town also offers hot springs and cozy dining options for relaxation after an active day. No matter which mountain you choose, planning ahead, dressing warmly, and following safety tips will ensure a fun, safe, and unforgettable Christmas ski trip in California.

If you’re new to skiing, start on easy slopes and gradually move to more challenging runs as you gain confidence. Taking lessons is highly recommended, even for a short visit, to learn proper techniques for turning, stopping, and controlling speed. Always wear proper gear, including a helmet, gloves, goggles, and layered clothing, to stay warm and dry. Take regular breaks to rest and avoid fatigue, and remember to stay hydrated throughout the day.

Driving to the mountains in winter requires extra caution. Roads may be icy or snowy, and snow chains or winter tires could be required, so always check conditions before heading out. On the slopes, follow all resort rules, stay on marked trails, and respect other skiers. Bring sunscreen, snacks, and water, as the sun can be strong at high elevations. Monitor fatigue and altitude changes, and be aware of the location of nearby medical facilities or ski patrol stations in case of an emergency.

Author: Zhiyu Wen

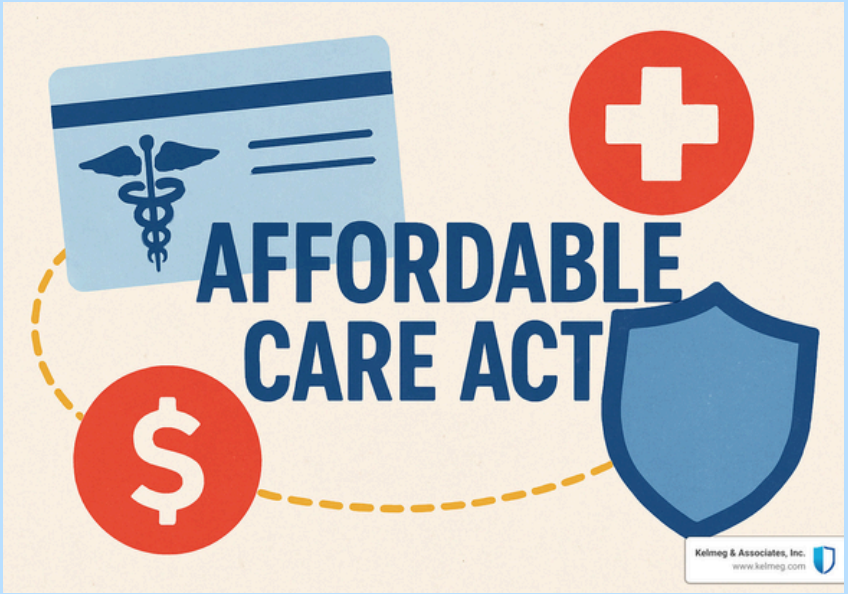
High Healthcare and Drug Costs in the United States

Healthcare and prescription drug prices in the United States remain far higher than in other developed countries. This problem has persisted across multiple administrations, including the current Trump 2.0 era, indicating that high costs result from long-term structural features of the U.S. healthcare system rather than the policies of any single president.

Before 2003, the United States already spent more on healthcare than other developed countries, but the gap, especially in prescription drug prices, was relatively moderate. During the 1980s and 1990s, U.S. healthcare spending exceeded that of European nations largely due to higher administrative costs and provider fees, rather than extreme drug pricing. Prescription drug prices were higher, but not dramatically so.

The sharp divergence emerged after 2003, when Medicare expanded drug coverage without granting the federal government the authority to negotiate prices for these medications. At that time, President George W. Bush signed the Medicare Prescription Drug, Improvement, and Modernization Act. This law explicitly prohibited Medicare from negotiating directly with pharmaceutical companies for drug prices. By limiting the government's bargaining power, it granted drug manufacturers significant control over pricing. This influence continues today.

The Obama administration attempted to address healthcare access through the Affordable Care Act (ACA). The ACA expanded insurance coverage to millions of Americans and strengthened consumer protections, including a ban on discrimination based on pre-existing conditions. However, in order to avoid strong opposition from the pharmaceutical and



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insurance industries, the law did not impose direct controls on drug prices. As a result, access to healthcare improved, but overall costs, especially for prescription drugs, remained high.

During Trump's first term, healthcare policy emphasized market-based solutions rather than government intervention. The administration promoted hospital price transparency, expanded access to short-term insurance plans, encouraged the use of generic drugs, and proposed allowing the importation of drugs from Canada. While these measures aimed to increase competition, they did not significantly weaken the pricing power of pharmaceutical companies or insurers.

A notable shift occurred during the Biden administration. The Inflation Reduction Act of 2022 marked a historic turning point by allowing Medicare to negotiate prices for a limited number of high-cost prescription drugs. The law also capped insulin prices for Medicare patients and placed limits on annual out-of-pocket spending for seniors. These policies represented the most direct federal effort to control drug prices in U.S. history, though their scope was limited and their impact gradual.

In the current Trump 2.0 era, healthcare policy has again moved toward deregulation and market competition. The administration has expressed skepticism toward government-led drug price negotiations, arguing that such policies may discourage pharmaceutical innovation. Consequently, while past reforms remain in place, federal efforts to directly reduce drug prices face uncertainty.

In conclusion, high healthcare and drug prices in the United States are the result of decades of policy choices across both Democratic and Republican administrations. Despite shifts in political leadership, the underlying cost structure remains largely unchanged, making healthcare affordability one of the most persistent challenges in American society.

Polarity of Molecules

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Written by: Lyndon Tsai

December 23, 2025

Overview

What is polarity?

Atoms of different elements have varying numbers of protons, electrons, and neutrons. This affects their polarity. In chemistry, polarity refers to the distribution of electrons within a molecule; there are two main types of polarity: polar and nonpolar.

How is polarity determined?

When different atoms are close together, they form bonds as electrons are attracted to protons and vice versa. Furthermore, different atoms have different electronegativity, the ability for atoms to attract electrons. When two atoms have similar electronegativity strengths, they form two types of covalent bonds: nonpolar and polar. Nonpolar covalent bonds have very small electronegativity differences. Polar covalent bonds have a medium difference in electronegativity and form dipoles, areas where a partial charge exists. Ionic bonds have large differences in electronegativity and are often described as bonds formed after one atom has “stolen” electrons from its bonding atom. Ionic bonding is different than covalent because it creates greater differences in charges which form ions. The more electronegative atom becomes negative because of its extra electron while the atom that has its electron stolen becomes positive. These types of bond polarities only apply to bonds, not entire molecules.

Author: Lydon Tsai

Bonding

Image Credit: Wikimedia Commons

Molecular Geometry

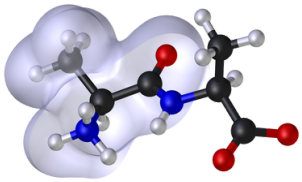

Image Credit: Wikimedia Commons

Molecules are composed of multiple atoms bonded to each other resulting in various molecules having different shapes and sizes. These structures result in different molecular polarities. When an atom is bonded to two of the same element, their bond polarities cancel out because the outer-atoms are pulling with the same force. This is known as symmetry where the bond polarities cancel each other out and result in a nonpolar molecule. However if two atoms have different electronegativities, it results in an asymmetrical polar molecule. Some molecules are complicated with multiple bonds with various different bond polarities. The repulsions between electrons form shapes labeled by the VSEPR model. To determine polarity of molecules, observe the shape and check for symmetry. A VSEPR table is located above the EXAMPLES section.

Importance of polarity?

Physical Properties

Ionic bonds are much stronger than covalents bonds because of the stronger attractions between the nucleus and electrons. Ionic compounds form with positive ions and negative ions are alternately placed to form a crystal lattice. As solids, they are brittle because after impact, ions of the same charge are pushed together and repulsion occurs. Additionally, they are not good conductors of electricity beccause of their rigid structures and have high melting/boiling points. But when they are dissolved in water, they are great conductors of electricity because they are free to move and carry an electrical charge. Polar covalent compounds are weaker than ionic compounds but are also brittle, have high conductivity as a liquid, and have high melting/boiling points. On the other hand, nonpolar covalent compounds are also brittle but are not good conductors of lectricity and do not have high melting/boiling points.

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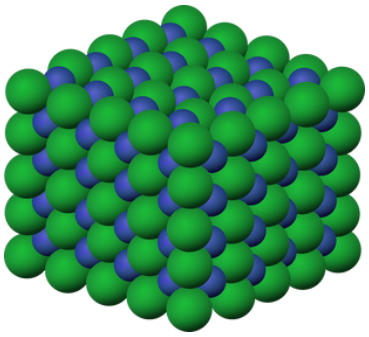

Image Credit: NeedPix.com

The green atoms represent negative ions (anions) and the blue atoms are positive ions (cations).

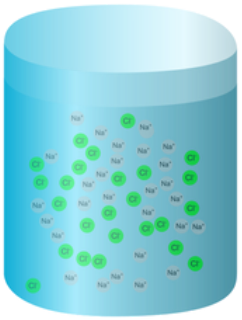

Image Credit: FreeSVG

NaCl can be dissolved in water because water and NaCl are both polar.

Solubility

You may have heard the phrase “like dissolves like,” but what does this mean? Well, it means polar soultes dissolve well in polar solvents and the same goes for nonpolar molecules. This is because the forces between molecules must match. Polar molecules have dipole-dipole intermolecular forces and nonpolar molecules have London Dispersion Forces (LDFs). Dipole-dipiole forces are stronger than dipole-dipole forces. When a nonpolar solute is added to a polar solvent, the polar solvent molecules have stronger attractions to each other than the solute and prevents dissolution. When a polar solute is added to a nonpolar solvent, the solute molecules are strongly attracted to each other and the solvent can not pull them apart.

VSEPR Theory (Molecular Shapes)

A = the central atom, X = an atom bonded to A, E = a lone pair on A

Note: There are lone pairs on X or other atoms, but we don't care. We are interested in only the electron densities or domains around atom A.

Total Domains	Generic Formula	Picture	Bonded Atoms	Lone Pairs	Molecular Shape	Electron Geometry	Example	Hybridi -zation	Bond Angles
1	AX	A—X	1	0	Linear	Linear	H_2	s	180
2	AX_2	X—A—X	2	0	Linear	Linear	CO_2	sp	180
	AXE	A—X	1	1	Linear	Linear	CN^-		
3	AX_3		3	0	Trigonal planar	Trigonal planar	$AlBr_3$	sp^2	120
	AX_2E		2	1	Bent	Trigonal planar	$SnCl_2$		
	AXE_2		1	2	Linear	Trigonal planar	O_2		
4	AX_4		4	0	Tetrahedral	Tetrahedral	$SiCl_4$	sp^3	109.5
	AX_3E		3	1	Trigonal pyramid	Tetrahedral	PH_3		
	AX_2E_2		2	2	Bent	Tetrahedral	$SeBr_2$		
	AXE_3		1	3	Linear	Tetrahedral	Cl_2		

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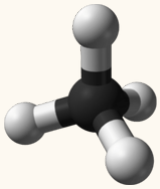
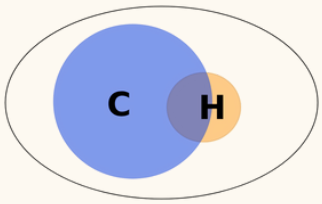
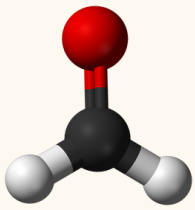
Examples

Methane (CH4)  *Image Credit: Free SVG*	Methane has a tetrehedral molecular geometry and because the carbon-hydrogen bonds are equally spread out, they cancel each other out. Therefore, methane is nonpolar
Hydrochloric Acid (HCl)  *Image Credit: Wikimedia Commons*	Hydrochloric acid is a linear molecule with one bond. It is polar because chlorine has a much larger electronegativity than hydrogen. The difference causes chlorine to have a partial negative charge and hydrogen to have a partial positive charge.
Formaldehyde (CH2O)  *Image Credit: Wikipedia*	Formaldehyde has a trigonal planar molecule. It is polar because there is one polar bond causing an imbalance of polarities in the molecule.

Author: Zhiyu Wen

Wildfires Are Becoming Smarter And Harder to Fight

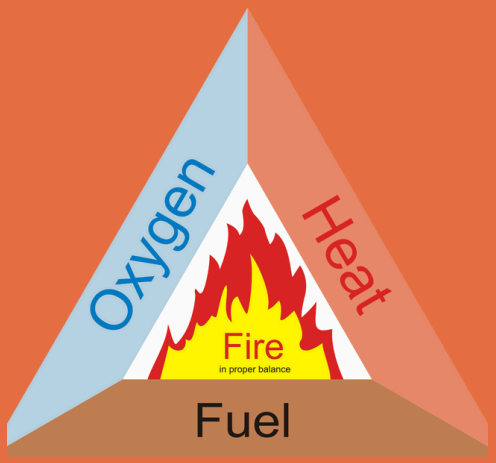
https://upload.wikimedia.org/wikipedia/commons/5/5e/5-fire_whirl_tornado_devil_2.jpg

The scariest thing about wildfires isn't just the heat; it is the way they move. Back then, a fire would crawl along the ground in a line. If you dug a dirt trench in front of it, the fire stopped. But today's fires have learned to jump. Imagine a campfire tossing a spark onto your shoe. Now, imagine a massive forest fire launching millions of burning branches like missiles into the sky. These firebrands can fly up to a mile ahead of the central fire, landing on rooftops or in dry bushes behind the firefighters' lines.

It used to be that when the sun went down, the air would cool off, the humidity would rise, and the fire would lie down and rest. This gave crew members a crucial window to dig trenches and get ahead of the blaze. But that rule is broken. The air is now so dry, even at 2:00 AM, that it sucks moisture out of plants like a sponge. Fires now burn with the same rage at midnight as they do at noon. This creates a fire that never stops moving.

To understand why these fires are so effective, it is necessary to examine their chemistry. A fire is actually a simple engine. It needs three things to survive, known as the fire triangle: 1. Heat (from the sun or lightning), 2. Fuel (trees and grass) 3. Oxygen (air). If you take it away, the fire dies. But today, the fuel part has changed becuase of climate change, the trees in the forest are now drier than the lumber you buy at the store.

In the scariest cases, the fire becomes so large that it stops behaving like a fire and starts acting like a storm. Intense heat punches a hole in the atmosphere, creating giant smoke clouds called fire clouds (Pyrocumulonimbus). These aren't rain clouds; they are thunderstorms made of smoke. They shoot lightning bolts miles away, starting new fires. Sometimes the rising heat starts to spin. This creates a fire tornado, a vortex of flame that can spin at speeds of up to 140 miles per hour. It rips trees right out of the ground and twists the steel power tower.



https://upload.wikimedia.org/wikipedia/commons/6/63/Fire_triangle_2.svg

Author: Zhiyu Wen

The Electronic Watchtower

We can no longer rely on people with binoculars. Today, networks like ALERT California and Pano AI have transformed mountaintops into smart towers. They use thousands of 360-degree cameras connected to AI. The system spots smoke, calculates the exact GPS location, and alerts fire commanders minutes before a 911 call is even made. It catches the fire while it is still small.

The Brain Prediction

Labs like UC San Diego's WIFIRE are building a digital Twin of the forest, a virtual copy of the real world inside a computer. The AI utilizes real-time and terrain data, running thousands of simulations in seconds. This lets firefighters set up defenses before the flames arrive.

The Robot Firefighters

A startup called Rain is testing autonomous helicopters. These autonomous aircraft can launch the moment a camera detects a fire, fly to the designated coordinates, and drop water on the fire within minutes. We are also seeing heavy-lift drones from Parallel Fight, which can carry supplies into smoky canyons where it is too dangerous for a human pilot to fly.

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