

TRENDING NEWS:

Climate

1 Scientists Discover How to Break Down PFAs

PFAs, short for polyfluoroalkyl and perfluoroalkyl substances, have become a big concern for scientists. These substances resist water, oil, and stains, making them useful in objects ranging from frying pans to makeup. However, these same properties make them difficult to destroy.



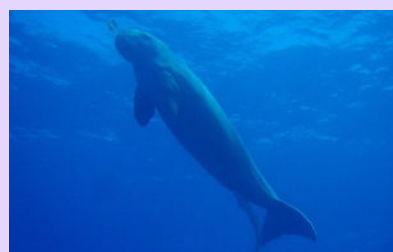
*Answer to PFA removal lies in a common chemical
Credit: Jacinta Quesada*

Therefore, PFAs are also known as the 'forever chemicals.' PFAs may remain in the environment and enter water or soil, becoming a severe concern at high levels. Exposure to these chemicals may cause cancer or birth defects. Recently, scientists from Northwestern University have found a way to destroy PFAs. The carbon and fluorine bonds found in PFAs can possibly be broken by a common chemical known as sodium hydroxide. Scientists claim that this discovery is "exciting because of how simple—yet unrecognized—our solution is."

Biology

2 Dugong Declared Extinct in China

The dugong, thought to have inspired many folk stories about mermaids and sirens, is a mammal related to the manatee.



*No more Dugongs in China as they
are declared extinct Credit: Gejuni*

It is known as the ocean's most gentle giant because of its slow and relaxed behavior. However, this same behavior makes the dugong vulnerable to fishing and shipping

accidents. Recently, scientists declared the dugong to be extinct in China, as there have been no verified sightings by scientists since 2000. Only three people surveyed from coastal regions in China have seen a dugong in the past five years. Scientists declare that the disappearance of the dugong in China is a devastating loss. Although the dugong is still present outside of China, it may be facing similar threats around the globe.



STEM Challenge: Chill a drink challenge

Challenge description: A refrigerator is a convenient way to cool beverages. There are also multiple ways to cool a drink using ice. Some of them will be faster than others. Your challenge is to chill a drink in forty seconds, using ice only. There is no need to use a thermometer to check the temperature.

Materials needed:

- Any drink (should not be pre-cooled)
- Ice
- Glass

Challenge objective:

Pour the drink into a glass. If condensation appears on the glass, then the challenge has been cleared.

Challenge Reflection: Does the drink cool faster when kept at rest, or in motion? How does the container which holds the drink affect the rate of cooling? Try adding salt to the ice before chilling the drink. How does this change affect the rate of cooling?

STEM Around Us

Header: Trapping Lightning in Glass



Credits: Bert Hickman
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“Catching lightning in a bottle” is an idiom for a nearly impossible goal. While trapping lightning in a bottle is still out of reach, we can trap lightning in plexiglass or acrylic with some clever science.

To start with, lightning is a giant electric spark that occurs in a cloud, between two clouds, or between a cloud and the ground. All forms of electric spark occur due to the movement of electrons. Electrons are particles with a negative charge. When a large number of electrons accumulate in the clouds, they discharge to form lightning.

In the same way, when plexiglass is passed through an electron accelerator (a device that produces a beam of electrons), it becomes loaded with electrons. This charges the glass with a million volts. The trapped electrons are released manually by making a sharp tap on the glass which produces miniature lightning. The energetic sparks create microscopic cracks and tubes along the glass, and the patterns they form are called fractal patterns. These are beautiful, branched structures, and this type of fractal pattern is called Lichtenberg figures. This is the path that the sparks took while passing through the glass slab, so these figures are, in a way, ‘fossils’ of the spark. This method is used in making branch-like patterns in glass paperweights.



Science Video: The Alkali Metals!

Lithium (Li), sodium (Na), potassium (K), rubidium (Rb), caesium (Cs), and francium (Fr) together make up the alkali metals. They are also known as the lithium family of elements.

Along with hydrogen gas (H), the alkali metals form the first group of the periodic table of elements. All the alkali metals have one outer electron at the atomic level. They quickly lose this electron to gain a +1 positive charge. Having the same arrangement of electrons gives them similar properties. All the alkali metals are shiny, soft, and highly reactive. Because of their softness, a knife can easily cut all alkali metals.

The shiny surface of alkali metals dulls in the air, caused through oxidation by atmospheric moisture, oxygen, or nitrogen. Due to their high reactivity, the alkali metals are stored under oil.

In addition to air, all alkali metals react with water. The heavier alkali metals react more intensely with water than the lighter alkali metals, and may cause fire or an explosion.

Although not commonly seen, the alkali metals have many uses. Lithium is used in medicines and batteries. The sodium-vapor lamp makes use of sodium. Along with sodium and lithium, potassium is biologically relevant. Atomic clocks use rubidium and caesium.

Watch the video to revise the properties of alkali metals and see them chemically react!

[Scan QR code to see the video](#)



Did You Know?

Water can boil and freeze at the same time. By tweaking the pressure and temperature to a certain value, all three states (solid, liquid and gas) can exist together. This value of temperature and pressure is called the triple point.



Brain Teaser:

A man is looking at a photograph of someone. His friend asks who it is. The man replies, “Brothers and sisters, I have none. But that man’s father is my father’s son.” Who was in the photograph?

Previous edition answer:

Turn on the first two switches. Leave them on for five minutes. Once five minutes have passed, turn off the second switch, leaving one switch on. Now go through the door. The light that is still on is connected to the first switch. Whichever of the other two is warm to the touch is connected to the second switch. The bulb that is cold is connected to the switch that was never turned on.

Can you solve a futoshiki?

1. Fill in the 5 x 5 grid with numbers between 1 to 5, such that no number is repeated twice in a row or column
2. Place numbers according to the greater than and lesser than signs wherever applicable.

	<			
			< 3	
		>		>
			>	<

Answer to be published in next edition

3	5	1	<	2	4	
2	3	<	4	5	1	
5	4	>	2	1	<	3
4	1	<	5	3	2	
1	2	<	3	4	5	

Previous edition
Futoshiki answer



Science in Depth

How can we help local organisms to survive?

What is the Karner blue butterfly?

In 1861, the Karner blue butterfly was discovered in Karner, New York. At just one inch in wingspan, this little friend can fit inside a water bottle cap. The male Karner butterfly is brilliant blue in color, while the female is a subtle blue-gray.

Although the Karner blue was discovered in New York, its home has historically been throughout the Northeast United States. Over 150 years after its discovery, the Karner blue butterfly is an endangered species. Many groups, like nature conservancies and preserves, work hard to help the Karner blue survive. One example is the Albany Pine Bush, near Karner, New York. Scientists have great knowledge about how to support this unique species.



"Male Karner Blue Butterfly",
Credit: U.S. Fish and Wildlife Service - Midwest Region

Scan QR code to know more



STEM Career:

Watch Ecologist Ronnie Steinitz at Work

What does an Ecologist do?

Ronnie Steinitz is an ecologist currently in the first year of her doctoral research for her PhD. She studies primate-community interactions in several monkey species in Kibale National Park, Uganda. She also collaborates with the US Geological Survey (USGS) to study bobcat prey preferences with changing climate.



One of the handful of times that Katie, a 200lb jaguar, was not attempting to tackle me to the ground. I spent several months caring for her at a wildlife refuge in the Bolivian Amazon.

I had just finished my military service in the Israel Defense Forces, when I took off to explore the world far away from home. With nothing more than a backpack and a dream, I traveled South America by foot, finally settling at a wildlife refuge nestled in the Bolivian Amazon. I spent several months as the caretaker of a 3-year-old female jaguar named Katie. Katie chose to test my confidence the first time I walked into her compound.

Her stunning, perfectly tailored camouflage, a product of half-a-million years of evolution, made her blend perfectly with the lush vegetation around me; I had no idea how closely she was stalking me until I felt the full impact of 200 pounds of pure muscle against my body.



Scan QR code to know more



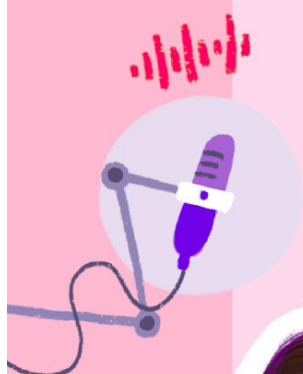
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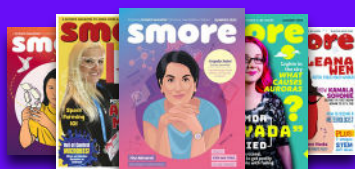
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