

TRENDING NEWS:

1 New Studies Unveil the Mysterious Bumps and Haze of Winter's Iconic

Sunny mornings with freezing temperatures are an odd pair in winter. The effects of this pair are even weirder. Icicles are pointy ice shards that form on branches and wires or any edge when the sun melts ice or snow. Water drips down from an edge, and when it is cold enough these droplets refreeze, forming icicles.



Icicles aren't crystal clear, and neither are the physics that form them.

If you have ever held an icicle, you will find it to be quite slippery. This is because every icicle is covered in a thin film of liquid water. Why does that film of water not also freeze? To understand this, you must know that heat is transferred from a region of higher temperature to lower temperature. When you hold a piece of ice in your palm, the ice melts, while your palm, which is hotter than ice, gets colder. Similarly, the dripping water freezes (becomes colder) and in the process releases heat to the surrounding air, which gets warmer. Warm air is light, rises upwards, and gives the icicle its characteristic shape.

Pretty straightforward, right? Well, not with the bumps in icicles. If you made icicles with distilled water, they would be smooth and pointy.

However, the icicles that form in tree branches or on the edge of roofs contain impurities, like dust. These icicles have bumps on them, which are always a centimeter apart (that's right, you can use an icicle as a meter ruler!). Icicles appear hazy, and it was thought that trapped air bubbles were responsible. New studies at the University of Toronto not only disprove this notion, but also show that there are hardly any air bubbles in an icicle.

Then why are icicles hazy? The scientists mixed a dye with the water that they used to form icicles. They found that these dyes were densely present in pockets made of ice inside the icicles, which contain dollops of water inside. The scientists deduced that these water pockets make icicles hazy. And, like rings of a tree trunk, these water pockets can trace the formation of the icicles.

2 Chemical Engineers Develop Revolutionary Device to Harvest Hydrogen from Thin Air

The question of "What will be the next big source of energy?" rattles scientists even now. Our stash of fossil fuels is dwindling, and multiple options have been proposed. Yet, doubts over how accessible they would be is a major setback. One cannot place windmills in areas that are not windy. Nuclear power plants are costly and need a lot of space.



Sun paves way for more hydrogen fuel

A new technology developed by chemical engineers at Ecole Polytechnique Fédérale de Lausanne might be a contender for the next-gen fuel. For years, scientists have wanted to develop a device that can harvest water from the air and convert it into hydrogen, which is a green fuel. Now, chemical engineer Kevin Sivula and his team of scientists have tried to develop a device that can do just that.

They took their inspiration from leaves. Leaves absorb carbon dioxide and water and use it to form sugar in the presence of sunlight. In a way, they absorb solar energy and store it in form of sugars. The device this team has created does something similar, and stores solar energy in form of hydrogen. To achieve this, the scientists made a fusion of solar panels with transparent electrodes. Electrodes are materials that help in conducting electricity through liquid or gas. What makes these electrodes special? First, these electrodes are porous and are made of a mesh of quartz fibers. This amps up the contact between water in the atmosphere and the electrode. The next tweak is the transparency of the electrodes. Other electrodes are opaque and so light cannot pass through them. In this case, sunlight passes through the electrode. When the device is kept in sunlight, it absorbs water from the air to produce hydrogen.

Although an impressive feat, there is a long way to go. Only 12% of solar energy is converted to hydrogen. Science is magical, and pulling fuel from thin air is one of science's newest tricks

Science Everyday

Why do people like chocolate?

A delicacy that can lift spirits, chocolates are quite a treat. Almost a billion people consume chocolate every day. Why do most people love chocolate, and is it good for us in some way? A simple reason why chocolate is cherished lies not only in its taste but also in the chemicals it contains. These chemicals can make a person happy. Chocolate contains tryptophan, which the brain uses to make a chemical called serotonin. Serotonin is a 'feel-good' chemical that makes us happy. Other chemicals like theobromine, phenylethylamine, and caffeine are also present. These chemicals make us feel more alert, and full of energy. However, this also makes chocolate a toxic food for our beloved fluffy friends, dogs.



Chocolate makes us happy and lifts our spirits

Theobromine, which is present in chocolate, can poison a dog. Chocolate also contains anandamide, another feel-good ('ananda' means joy in Sanskrit) chemical. Anandamide is found naturally in our brains but breaks down fast. Chemists have speculated that the anandamide in chocolate can last longer. Chocolate makes our happy hours even longer! Chocolate also increases the amount of a chemical called enkephalin in our brains, which makes us desire more chocolate.

The question arises: with so much goodness in chocolate, is it beneficial for our health? Since chocolate makes us happy, it is already giving us a leg up when we are sad or feeling low. Mental health is as important as physical well-being. Chocolate also contains a type of substance called antioxidants. Antioxidants can delay cell damage. Dark chocolate can boost heart health. Chocolate lowers blood pressure. Sometimes blood can form a clot, which is a clump of blood cells, inside the body. This can block blood vessels that carry oxygen to the brain and cause strokes. Chocolates reduce the chances of blood clotting and hence prevent strokes.

Chocolate is a great food, but too much of anything is bad. Most experts agree that 1-2 ounces of chocolate is the daily limit.

STEM Challenge/ Science Experiment

Make your own chalk

Materials needed: 10 eggshells, 2 tsp of plain flour, 4 tsp hot water, food dye, paper towel

Procedure:

- Clean the eggshells and leave them to dry.

- Grind the eggshells in a pestle and mortar or electrical grinder. As long as you have a fine powder, you are good with either method.
- Place the eggshell in a bowl. Mix two tsp of plain flour and hot water to make a stiff paste.
- Add the food dye of your choice and then transfer the paste to a paper towel.
- Roll the paste into a tube, and leave it to dry for a few days.
- Your chalk is ready, and so is the artist in you!



Science Video: How does optical fiber work?

Light is the fastest thing in the universe. Why not get light to piggyback data, and make the internet faster? This is where optical fibers out“shine” other methods. Imagine you are in a room, and it has open doors and windows. Now you stand at the center of one of the walls and throw a ball in a way that it hits the adjacent wall and bounces to the next wall, and this goes on forever. You manage to achieve this with such efficiency that the ball never goes out of the open windows or doors, staying inside the room throughout. Impressive, right? Now, imagine the same with light. Light is passed through a glass fiber cable in such a way that it bounces off the walls of the cable but doesn't leave through the transparent glass. This process is called total internal reflection, and it is the same phenomenon that causes diamonds to sparkle. In optical fibers, this ray of light carries data and moves forward by bouncing from one wall to another. An additional layer of glass, called 'cladding,' is also present around the 'core' or the cable through which the light beam passes. The cladding improves total internal reflection and prevents loss of data by dispersion of light.



Scan QR code to see the video



Did You Know?

A rare green comet, named Comet C/2022 E3 (ZTF), will be visible in February of this year. This is a once-in-a-lifetime opportunity since the comet was last visible fifty thousand years ago! It will be closest to the sun on 12th January, and will be visible on the first two days of February.



Brain Teaser:

Two ships leave the port of San Diego, both sailing for the distant shores of Japan. Each ship plans to travel the same route, spending a two-week stopover in Tokyo before returning to California. The first ship churns through the sea at 35 miles per hour throughout the entire journey. The second ship moves slower, at just 30 mph. After two weeks in Tokyo, the captain of the second ship decides to run at a faster pace, moving at 40 mph for the entire return trip. Which ship arrives in San Diego first?

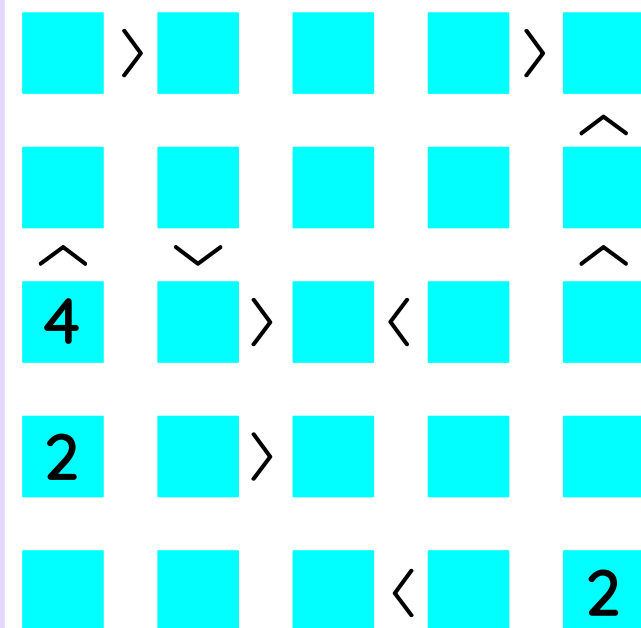
Answer to be published in the next edition

Previous edition answer:

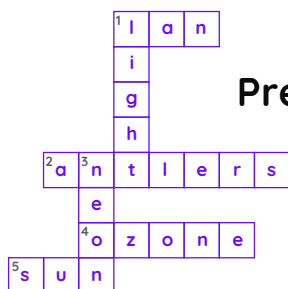
If you flip a coin twice, the probability that you will get heads and then tails is the same as the probability that you will get tails and then heads.

So, you either call HT or TH, and when you flip the coin twice you have four possibilities: HT, TH, HH, and TT. If you get heads twice or tails twice, simply flip the coin two more times until you get one before the other. Which will occur first, HT or TH, is a 50/50 split, regardless of how unfair the coin is.

Can you do a Futoshiki?



Answer to be published in the next edition



Previous edition answer

Xu previously said that this species of roundworm lacks the sense of hearing. They do not have ear-like organs to help them hear.



Scan QR code to know more

Quiz:

What is the only U.S. state that has never had an earthquake?

- A. Utah C. Alaska
B. Nevada D. North Dakota



Scan for more science trivia quiz



Science in Depth

Can worms hear?



What worms are these?

These are roundworms that are used for biological research. Their scientific name is ***Caenorhabditis elegans*** (***C. elegans***). These worms are about a millimeter long and are used for studying different

sensations like smell, touch, and taste. However, very recently these animals have displayed a new sensation: audition or hearing capability.

Do worms have the five senses like humans?

Previously, worms were believed to have only three primary senses. These included the senses of taste, touch, and smell. Interestingly, these worms do not have eyes. However, they are still capable of sensing light. In addition to this, *C. elegans* can also sense their position, and are aware of their body's position while moving. This ability is called proprioception. The team of Dr. Shawn Xu at the University of Michigan is conducting experiments to study the senses of *C. elegans*.



STEM Career:

Watch Biologist Mia Cerfonteyn at Work

Mia Cerfonteyn is a South African biologist who researched seabirds in the sub-Antarctic and Antarctica. She loves the interconnected nature of science and has studied botany, zoology and even forensic science. These interests and her love for the ocean led to her current field: marine microbiology. She now lives in Reykjavík, Iceland where she researches phytoplankton diversity and abundance in the ocean for her PhD based at the University of Iceland and Matís.

As a child I loved reading and hanging out with my pet cat, Suzie. I read the book *Born Free* by Joy Adamson, which told the story of a woman raising a lion cub and their beautiful friendship. The hope of one day befriending my own lion led me to study zoology. Since then, science has taken me on many unexpected and exciting adventures. I lived on the volcanic and sub-Antarctic Marion Island for a year researching albatrosses and catching the soft, massive birds with their 3-meter wingspans. I sailed to Antarctica to observe cute penguins drifting past on icebergs and watched the startling white Snow-Petrels gliding through the sky. The great thing about science is that it makes you part of an international community, and you end up with new friends all over the world.

"So far I have yet to befriend a lion cub, but my adventure has just begun"



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