



Science

SHORT WINTER DAYS ARE A GREAT TIME FOR SCIENCE

BY HELEN I. HWANG · ILLUSTRATION BY ANUJ SHRESTHA



IT'S GETTING CLOSER. Yes, something dark and gloomy is on the way — the shortest day of the year! It's called the winter solstice. When it arrives on Dec. 21, people in the Northern Hemisphere will have only about seven hours of daylight. That means almost 17 hours of darkness. Ugh. Lots of people dread it and dream of long summer days. But believe it or not, there are other people who are really excited about the darkest time of year: scientists who do some of their most important work between autumn and spring.

SEEING STARS

Scanning space through a telescope on Earth requires near-total darkness. The darker, the better. The longest night of the year gives astronomers the chance to observe faint, far-off galaxies. During winter nights, Caitlin M. Casey at the University of Texas McDonald Observatory can study distant galaxies that she can't see during other parts of the year because they are blocked from view.

WATCHING REPTILES REST

While bears and other warm-blooded animals hibernate, reptiles brumate, waking up occasionally to drink. The word comes from "bruma," Latin for "winter solstice." Triggered by shorter days and colder temperatures in late fall, reptiles burrow into holes. That's when James Danoff-Burg and other conservationists at California's Living Desert Zoo and Gardens start watching their endangered desert tortoise population carefully — especially a female named Mojave Maxine. Locals try to guess the date in January or February when Maxine will emerge from her slumber. As global temperatures have risen, she has been waking earlier and earlier in the new year.

STOPPING THE CLOCK (CHANGES)

One thing that makes the short days feel even shorter is setting the clocks back an hour to standard time. Suddenly the daylight you expect at 5 p.m. is fading at 4. Sleep researchers study how "springing forward" and "falling back" affects people. "The sun acts like our

little timekeeper," the sleep scientist Erin Flynn-Evans says. It can take up to two weeks to get used to the time change. Studies show that during the spring transition to daylight saving time, students' test scores go down and there are more car accidents. Sleep experts want the standard time we're in now to stay permanent, so we don't change clocks ... ever.

COUNTING NEUTRINOS

At this time of year, it's always nighttime in the Arctic. But the South Pole is basking in 24-hour sunshine, so it's the perfect time for physicists and astronomers to make their way to the IceCube Neutrino Observatory in Antarctica. Neutrinos are tiny particles that shoot out from black holes. They are nearly impossible to see with telescopes. But when they float to Earth and crash into the Antarctic ice, they flash blue light, the scientist Francis Halzen says. Thousands of sensors have been tracking these flashes since 2010, helping researchers learn what's happening in space and how it is changing. ♦

DARK DAYS CAN LEAVE YOU FEELING SAD

BY CLAIRE KARWOWSKI

WINTER IS FULL OF holidays, cookies and cheer. But for some people, the season's short days and long nights can be a major bummer. There's a certain type of depression that sometimes comes with changing seasons. Scientists call it seasonal affective disorder, or SAD. (Perfect nickname, right?) Here's what you should know.

WHAT CAUSES SAD?

The brain makes a chemical that "keeps us content and calm," the child psychologist Cara Goodwin says. Scientists think sunlight increases this chemical, so shorter winter days mean less happy juice. At the same time, darkness makes the brain produce more of a sleepiness chemical.

COULD I HAVE SAD?

It's normal to want to hunker down more during winter. But if you also feel hopeless or more easily annoyed, it could be SAD. "Other signs are having mood swings, little interest in favorite activities, changes in eating and sleeping or not wanting to hang out with friends," Goodwin says. SAD is not common in

kids, but if the feelings last two weeks or are getting in the way of school or relationships, talk to a doctor.

WHAT CAN YOU DO TO FEEL HAPPIER?

Spend more time in the sunshine! Brave the cold, and schedule fun activities (even if you aren't in the mood). A

doctor or therapist might also suggest buying a special lamp, called a phototherapy lamp, that shines ultraviolet light. The sun also gives off this kind of light. Sitting in front of a phototherapy lamp for a while every day seems to create more of the happy-making chemical in the brain, helping shake off those winter blues. ♦

HOW I BECAME A

POLAR GUIDE



BY EMIL
GRÍMSSON

I GREW UP IN a small town in Iceland, where my father ran an electric workshop. I started working with him when I was 5, so I learned how to fix things early. When I was 9, I was sent to help out on a farm during the summers, and I learned how to drive cars, tractors and big trucks.

When I got older, I earned a degree in business and economics from the University of Iceland. Then I got a master's degree in business administration at San Diego State University. I thought I might end up marketing Icelandic fish to the United States. But instead, I ended up working for Toyota in Iceland, where I started a project called Arctic Trucks. We re-engineered vehicles for extreme conditions, doing things like rebuilding the trucks to fit much bigger tires that could handle snow and ice.

Eventually, I made Arctic Trucks its own company. One day I got a call from a British show called "Top Gear." They wanted to put on a race between a dog-sled team and a truck to the north magnetic pole. My team had never engineered a truck to drive on sea ice before. I had a lot of problems to solve: If a truck sank, how would we get out? How much fuel would we need? Where would we go No. 2? That expedition really ignited something in me. I loved the singular focus, keeping the team together and everyone hydrated and healthy. I wanted to do it again.

Later, I got a call asking me to help set up a ski race to the South Pole — a freezing place with one sunrise and sunset per year. I had to figure out if the trucks could handle the altitude, how they would get fuel, how much food we would need and safe routes to the pole itself. Once you get there, you're at the center of all time zones, where there is no day and night. You lose your sense of time. And there was so little there, we almost felt like aliens.

Now I have planned dozens of expeditions to the poles, for film crews, scientists and even Prince Harry. I myself have been to Antarctica six times and the Arctic four times. The most exciting thing is when you're doing something no one has ever done before. I don't even think of it as a job — I think of it as an adventure. *Interview by Elise Craig*



TINY STORY

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That's how many different faces cats can make, according to a new study based on 50 cats. The expressions included blinking, whisker twitches, nose-licking and ear positions. Almost half the faces were friendly. Nearly as many were aggressive. The rest were too hard to read. (If you've ever tried to figure out what a cat is thinking, this won't surprise you.)