

Science in the News

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Once in a Blue Moon

Written by Angela Freeman

Clever photo editing makes this moon appear to be a beautiful shade of blue.



What Is a Blue Moon?

You may have heard that a blue moon is coming on May 31, but that may not mean what you think. A “blue moon” usually has the same mottled gray color that the Moon always has. So what sets a blue moon apart from the Moon on any other night?

The Original Blue Moon

The definition of a blue moon can be a little confusing, and not just because of the name. The phrase refers to more than one lunar event. A blue moon is the third full moon in a season with four full moons. This event is called a *seasonal blue moon*, though it doesn't occur every season, or even every year. This is the original definition of a blue moon.

A Modern Take

A more modern definition of a blue moon is the second full moon in a month with two full moons. This event is known as a *monthly blue moon*, but you may have already guessed that these blue moons *don't* occur every month. In fact, each type of blue moon occurs about once every two and a half years. The upcoming blue moon on May 31, 2026, will be a monthly blue moon, but will it *look* blue? Probably not! ❖



Is the Moon Ever Blue?

You've probably noticed that the Moon can look white, yellow, or reddish-orange. These differences are due to the position of the Moon in the sky and conditions in the atmosphere. Most photos where the Moon looks blue are edited. Very rarely, though, the Moon actually looks blue! It happens when debris in the sky is just the right size (around 900 nanometers) to block red light. This debris can form during a volcanic eruption or large forest fire.

Triple Whammy!

1. huge size = supermoon
2. color = blood moon
3. date = monthly blue moon



This monthly blue moon rose over a castle in England on January 31, 2018. It looked reddish-orange due to a total lunar eclipse on the same night. It looked huge because the Moon was near the closest point to Earth in its orbit. All three events together made this a very rare “super blue blood moon.”



Environment



For the first time in 180 years, juvenile giant tortoises roam free on Floreana Island, their native habitat.



Getting Back the Galápagos

February 20 was a special day on the Galápagos island of Floreana. More than 150 giant tortoises were released into the wild. The move was part of a decades-long project to restore the Galápagos Islands. Human activities have left their mark on the region. Some *native* species—wildlife that lived there for millions of years—are now gone.

Bad Change, Good Change

When humans first arrived, giant tortoises were hunted for their meat. Those humans also brought *invasive* species that didn't belong there and spread across the islands. Rats, *feral* (wild) cats, and even pigs eat giant tortoise eggs and prey on young tortoises. Goats, cattle, and other livestock destroy native habitat. But as workers restore that habitat, tortoises can return home. And tortoises are just the beginning. The team plans to bring several native species back to Floreana Island over the next seven years.

Birds, Bugs, and Blackberries

One of these species is the brujo flycatcher. This charming black-and-red bird

faces an invasive insect threat: the avian vampire fly. The fly feeds on young brujo flycatchers, reducing their chances of survival. Invasive blackberry plants also compete with native scalesia trees. These trees are important for brujo flycatchers and other birds that live in the Galápagos Islands.

The Hard Work

Returning native animals isn't enough to restore Floreana. Workers must also *eradicate*—or get rid of—the plants, animals, and insects that have taken their places. The team is considering natural ways to remove blackberry plants. One option they have is to introduce fungi that infect the plants with disease.

Pesticides and other poisons help to eradicate rats, cats, and parasitic flies. Removing invasive species is necessary for the survival of native ones. Later, the team will release finches and other birds back onto Floreana. They even plan to return the Floreana racer, a type of snake. ♦



The brujo flycatcher will depend on humans to bring back suitable habitat.



Math

The STEM of World Cup Soccer Balls

The World Cup is right around the corner. It starts on June 11 and lasts until July 19. While most people are focused on the players, there's another star of this show: the ball.

You might think that soccer balls are all basically the same, but each World Cup gets its own new soccer ball. These balls undergo years of testing and design—and they're not simply round.

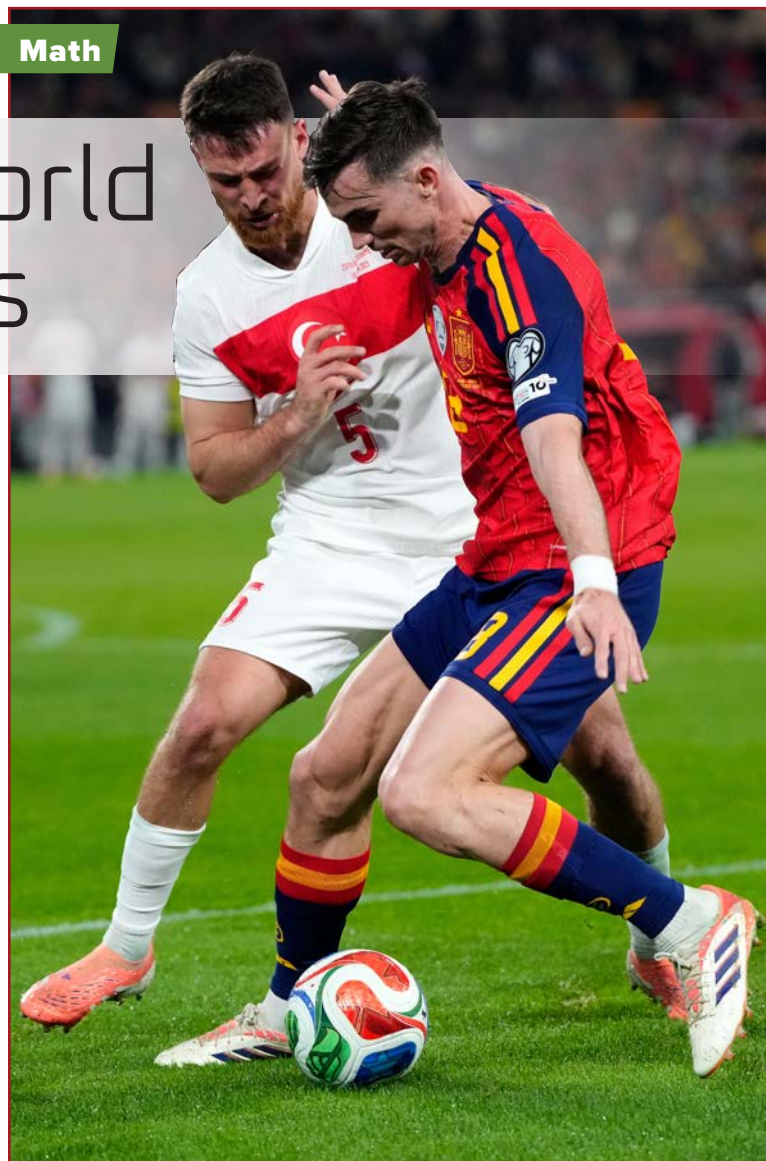
The Trionda

This year's World Cup ball is called the Trionda. Its basic shape is a *tetrahedron*, a 3D form made up of four triangle-shaped sides. The edges of each triangle are curved. These modified triangles give the ball's panels three extensions each. It's a shape that represents the United States, Canada, and Mexico, which will co-host the World Cup this year.

Cubes and More

The basic soccer ball that most people recognize is the Telstar ball. Its base shape is an *icosahedron*—a shape with twenty triangle-shaped sides. Another base shape is the cube, a six-sided *hexahedron*. The 2014 Brazuca ball was made by curving the edges of each side of a cube to make it round.

Changes in shape, however small, can mean big changes in how a ball behaves! ❖

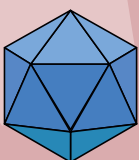


Athletes compete for their place in the World Cup while kicking the new Trionda ball.

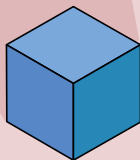
The Geometry of Soccer Balls



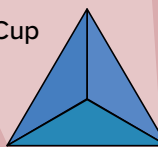
Telstar ball
1970 World Cup
base shape:
icosahedron



Brazuca ball
2014 World Cup
base shape:
hexahedron
(cube)



Trionda ball
2026 World Cup
base shape:
tetrahedron



Soccer balls have changed a lot from the original Telstar ball.

The Physics of Soccer Balls

The design of a soccer ball can affect its *drag*—how much the air pushes against the ball as it moves. At a certain speed, the drag on a ball decreases. This point is called the *critical speed*. Getting past the critical speed makes a ball more stable as it flies through the air. A ball that's too smooth will have a high critical speed that is harder to reach, and a ball traveling below that speed might behave strangely. For goalies who try to predict where the ball will go, it can be a nightmare!