

Science in the News

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The Science of Popcorn

Sure, popcorn tastes great. But it's also the subject of some serious scientific study.

Written by Rhonda Lucas Donald

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What Happens When Popcorn Pops?



Physical Science

Studying popcorn might make everyone in the lab hungry. But two French scientists are more interested in how popcorn moves than how it tastes. The scientists study *mechanics*—the science of force and motion. What temperature is needed for a kernel to pop? Why does it make a popping sound? Is there a pattern to the way a kernel jumps when it pops? These are some of the questions they wanted to answer.

To start, they put kernels of popcorn on a pan in an oven. They used high-speed cameras to film what happens when the kernels pop. All the kernels popped at the same temperature: 180°C (356°F).

As a kernel heats up, liquid water on the inside turns into *water vapor*, a gas. At the same time, the starchy insides of the seed turn to mush. At 180°C, the *hull*, or outside of the kernel, can't hold the steam inside any longer and—*pop!* The mushy insides of the kernel explode.

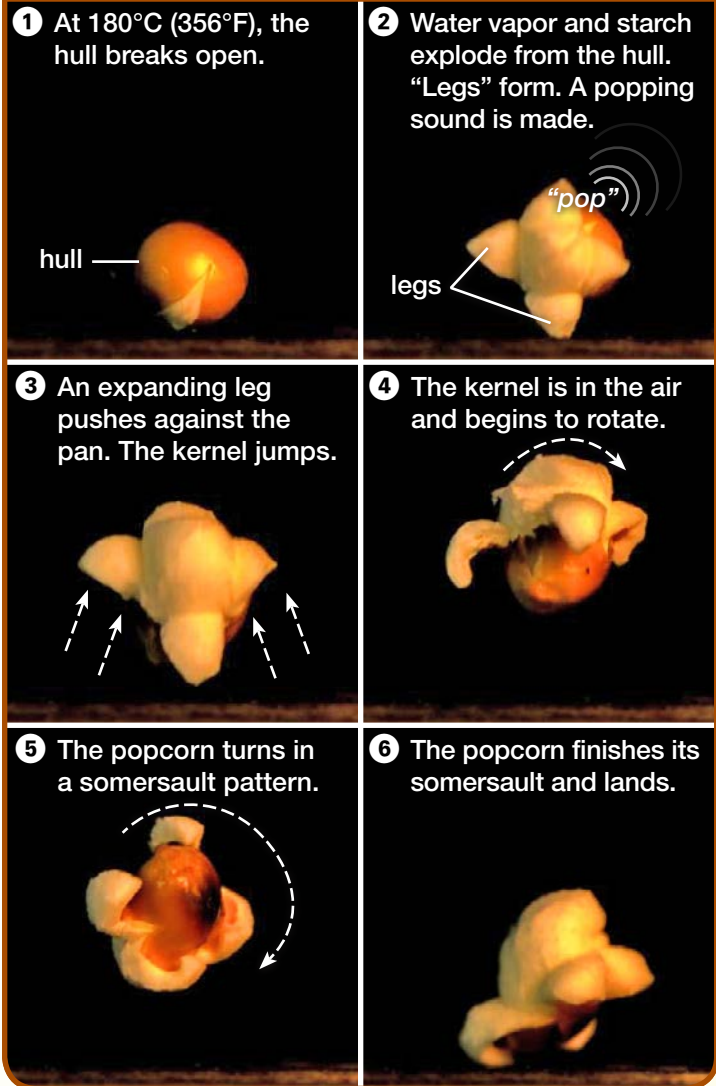
The mushy starches shoot out once they are free of the hull. They start to cool off instantly and form what the scientists call “legs.” These are the soft parts you eat. When one leg pushes off against the pan, it sends the popcorn spiraling into the air. It jumps in a way that looks like a *somersault*. All of this happens in just a fraction of a second.



The movement of a popping kernel of corn is a bit like a person doing a somersault.

HOW A KERNEL POPS

High-speed cameras help us understand how a kernel of popcorn pops.



The scientists filmed and studied about four hundred pieces of popping corn. They found that each kernel repeats this same pattern when it pops. In fact, there may be more action happening inside your popcorn than on the big screen! ♦

Home Sweet Magnetic Home



Earth Science

Just after hatching, loggerhead sea turtles plunge into the ocean. Then they roam the ocean, swimming thousands of miles. Years later, they return to the same beach to mate. How can they find their home after roaming the ocean for so long?

Some animals, including loggerheads, can sense Earth's *magnetic field*. Earth is like a giant magnet. It has invisible lines of force that start at the South Pole and go to the North Pole. Two scientists thought that the young turtles could memorize the magnetic field of the beach where they are born. Later the turtles could use the information to get home. But over time, Earth's magnetic field moves slightly. Would the turtles move their nesting spots, too?

Luckily, people had recorded turtle nesting sites on Florida's coast for years. The scientists studied the nest locations. Sure enough, the nests moved slightly each year. The new nest sites matched the change in Earth's magnetic field. Now that's an *attractive* beach! ❖



Some animals can use Earth's magnetic field as a compass.



A loggerhead turtle digs a nest on its home beach.



F-shaped holes on a violin aren't just for looks. They give the instrument its rich sound.

F-Shaped Holes Make a Better Violin



Physical Science

Violins have two thin, curved holes that look like the letter "f." The holes allow air to flow out from inside the instrument. The flow of air makes the rich sound you hear when the strings are played. Older string instruments have round or c-shaped holes. These instruments do not produce tones as loud as violins with f-shaped holes.

Scientists from Massachusetts who study sound and airflow wanted to know why the hole shape matters. They studied the best violins in the world. These instruments were made four to five hundred years ago and have f-shaped holes. The scientists also studied even older string instruments with round holes. They found that f-shaped holes speed up the air leaving the violin. The faster-moving air makes for louder sounds. This was especially true for lower-pitched tones. So when grading violins, an "f" is a good thing! ❖

Say "Ow!" and Feel Better



Life Science

When you fall and skin your knee, what do you say?

"Ow!" of course. It's natural to screech in pain when you hurt yourself. Now it seems that there's a scientific reason.

Scientists predicted that saying "Ow!" helped people deal with pain better. To test this idea, they asked people to put their hands in painfully cold water. They had to keep their hands submerged as long as possible. The scientists asked some to say "Ow!" or to press a button when they started to feel pain. They asked others to remain silent and do nothing. Some listened to a recording of someone saying "Ow!"

Those who said "Ow!" or pressed a button kept their hands in the icy water longer than any of the others. Doing something during a painful experience may distract the brain and make pain easier to handle. ♦



Saying "Ow!" helps you put up with pain.

STEAM Activity

Popcorn Flipbook

Make a mini movie of a popcorn kernel popping in a flipbook. All you need is a pencil and a pad of sticky notes or a stack of index cards. Use these photos as your guide. You can also visit Science A-Z to view a slow-motion video of popping corn. Draw a picture of a piece of popcorn on each sticky note. Start with a kernel and then change it bit by bit until the kernel pops, does a somersault, and lands. The more pictures you draw, the better the "movie." After completing all your drawings, quickly flip the pages to see the popping action.

