**6th Grade**

**Literacy Fusion Article: “The Unexplained Mystery Of Why Hot Water Freezes Faster Than Cold”**

One of the most popular ways to demonstrate this year's severe US winter appeared to be tossing out a glass of boiling water and watching it freeze instantly, in mid-air. Of course, the reason the fun experiment impressed viewers is because nobody expects boiling water to turn to ice that quickly. Turns out that contrary to intuitive thinking, it actually solidifies faster than cold water! Why? That's a mystery still waiting to be solved.

While this counterintuitive phenomenon has been observed for thousands of years, it was brought to the world's attention in 1963, by Tanzanian high school student, Erasto Mpemba. It all began when the young boy was learning to make ice cream in cooking class. After dissolving the sugar in boiling milk, the students were instructed to allow the mixture to cool down, before putting it in the ice cream churner. Too impatient to wait, Mpemba put his ice cream mix in while it was still hot. To his and everyone's surprise, his treat was the first to freeze! His explanation appeared so unbelievable that even his teacher thought Mpemba must be mistaken.

The theory that most believe, is fairly straightforward. It is a known fact that hot water evaporates faster than cold. Hence, when boiling water is tossed into cold air, some of it turns into steam and dissipates, leaving behind less to turn to ice! Sounds plausible right? Turns out, Mpemba thought of this possibility and even tested it. Unfortunately, he found no loss of volume in the ice formed between waters frozen at different temperatures. Another theory suggests that dissolved gases change the boiling water's freezing point causing it to solidify faster. However, that too was tested and refuted by Mpemba and the professor.

In 2012, Nikola Bregovic, a chemistry research assistant at the University of Zagreb in Croatia, who said that extensive testing had led him to conclude that the Mpemba effect was caused by convection currents in the hot water.

A more recent yet to be published scientific study conducted by Xi Zhang at the Nanyang Technological University in Singapore, attributes the phenomenon to the chemistry between the hydrogen and oxygen molecules that make up water. The researcher believes that as the temperature rises, it provides the molecules with a lot of pent up energy. When this water is tossed into a cold environment, the energy 'jumps' out similar to how a highly compressed spring would, when released. This results in the hot water cooling down much more rapidly than cold or lukewarm water, which do not contain as much energy.

While all these theories are plausible and explain the phenomenon under certain conditions, none seem to provide a satisfactory universal solution to this strange physical property that has confounded scientists since Aristotle observed it in 380 BCE.

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