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American Nobel winners: A legacy of teaching and learning

By Susan Salcido, Santa Barbara County Superintendent of Schools

Eight American scientists won the Nobel Prize this year. We appreciate them for their inspiration and discoveries, and also thank the teachers they had throughout the years who encouraged their curiosity, tenacity, and brilliance.

America's dominance in Nobel Prizes is an ongoing success story, as our scientists continue to extend the reach of human knowledge. The awards are also a tribute to their teachers at every level, who supported those budding intellects and helped instill a sense of determination and wonder.

In physiology/medicine, the Nobel Prize this year went to three Americans for their discoveries of the mechanisms that control the body's natural rhythms. Jeffrey Hall and Michael Rosbash of Brandeis University and Michael Young of Rockefeller University used fruit flies to isolate a gene that influences the biological clock ticking in rhythm inside all living organisms.

Organisms all operate on a 24-hour circuit that influences biological functions like blood pressure, heart rate, and sleep, with shifts between night and day. Hall, Rosbash, and Young identified a gene that controls this circadian rhythm, directing a protein that accumulates at night and depletes during the day. The scientists discovered that insects lacking this gene lost the ability to self-regulate these functions. Replacing the gene's function renewed that ability. Imagine the benefits that can accrue from this finding.

In physics, the Nobel Prize went to three Americans as well. Rainer Weiss of MIT and Barry C. Barish and Kip S. Thorne of Cal Tech shared the prize for observing gravitational waves — a momentous achievement after decades of trial and error.

By detecting for the first time gravitational waves that rippled out from the collision of two immense black holes, the researchers confirmed once again the predictions of Einstein's 100-year-old general theory of relativity. The Nobel winners built LIGO — the Laser Interferometer Gravitational-Wave Observatory — with two large detectors in Louisiana and Washington. The LIGO collaboration

now includes more than 100 institutions and 18 countries, as scientists measure changes thousands of times smaller than an atomic nucleus, demonstrating disruptions in the space/time continuum.

In chemistry, an American shared the Nobel Prize with two other scientists for inventing imaging technology that provides new ways to see molecules. Biophysicists Joachim Frank of Columbia University, Jacques Dubochet, and Richard Henderson collaborated to invent microscopy that enables scientists to see proteins and other biological molecules at the atomic level.

This new technology has already been put to life-saving use. Cryo-electron imaging enabled scientists to determine the shape of the Zika virus, and helped speed research into vaccines. Through cryo-electron microscopy, researchers can now freeze biomolecules mid-movement and visualize processes never before seen, helping in the development of pharmaceuticals and expanding our basic understanding of life's chemistry.

The Nobel Prize in economics went to Richard Thaler of the University of Chicago, whose work on behavioral economics shed light on how humans make decisions, especially poor economic choices. He developed the concept of “nudge” economics that can subtly guide humans toward beneficial behaviors. He is considered a pioneer in integrating economics and psychology, having a deep impact on economic research and policy.

We thank these American leaders for their lifelong work toward the betterment of humanity, and we hope they become role models for young students everywhere who want to make a difference in their world. The discoveries of these Nobel laureates demonstrate new ways of perceiving the world, and inspire those just starting out to dream big and work hard to help improve humanity. The cycle of teaching and learning continues, and that is an equally fitting legacy.

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