

Winter, 2026

Issue 61



Long Island Physics Teachers Association Newsletter

President's Message

If you've been teaching physics for a while, you've probably felt the shift. The classroom many of us grew up in--rows of desks, careful note-taking, and problem sets for homework--looks pretty different from a lot of physics rooms today. And honestly? That change has been building for decades.

One of the biggest evolutions has been in pedagogy. Traditional lecture hasn't disappeared, but it's no longer the unquestioned center of instruction. Instead, we're seeing more student-centered learning: whiteboard discussions, small-group problem solving, modeling cycles, and students explaining their thinking instead of just copying ours. Approaches like inquiry labs, peer instruction, and phenomenon-driven lessons are now common. The focus has shifted from "covering content" to helping students construct understanding.

That said, hands-on learning isn't new to physics. It's worth remembering that even 40 years ago, the PSSC curriculum was already pushing labs, exploration, and learning through direct experience. The spirit of "figure it out from the evidence" has long been part of reform efforts in physics. What's different now is how widespread that philosophy has become, and how strongly it's supported by research on how students actually learn.

We've also seen changes in what we teach, not just how we teach it. The traditional sequence--kinematics, Newton's laws, energy, momentum, and circuits--is still our backbone. But there's growing room for modern physics topics and contemporary contexts. Whether it's introducing wave-particle duality at a conceptual level, discussing medical imaging, or using climate data when talking about energy transfer, we're connecting physics to the world students live in now.

Just as important is the push to link abstract ideas to everyday phenomena. Instead of teaching forces in a vacuum (sometimes literally!), we start with why passengers lurch forward in a sudden stop, why your phone screen rotates, or how noise-canceling headphones work. These anchoring phenomena help students see physics not as a set of formulas, but as a way to make sense of their experiences.

Of course, no discussion of recent change is complete without mentioning COVID. The sudden pivot to remote and hybrid learning was exhausting, but it also accelerated our comfort with technology-centered instruction. Simulations, video analysis tools, shared digital whiteboards, and online formative assessment platforms went from "nice extras" to survival tools. Many of us have carried those tools back into the in-person classroom, blending hands-on labs with virtual experiments and digital collaboration in ways we might not have tried otherwise.

NYSSLS is the next major influence shaping our classrooms. Its emphasis on three-dimensional learning--weaving together disciplinary core ideas, science and engineering practices, and crosscutting concepts--aligns naturally with the student-centered, phenomenon-driven direction physics teaching has been moving. It chal-

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Important Dates

Physics Olympics	Thurs Mar 19
Spring Conference	Sat Apr 18
AP 1	Wed May 6
AP 2	Thurs May 7
Physics C Mechanics	Wed May 13
Physics C E & M	Thurs May 14
AP/IB Physics Analysis	Sat May 30
Regents Physics Exam	Thurs Jun 25
End of year Picnic	Mon Jun 29

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lenges us to design learning experiences where students aren't just solving for x , but developing models, arguing from evidence, and seeing connections across topics.

The learning environment that emerges is messier, more talkative, and often less predictable, but also richer. Physics class today is less about delivering answers and more about helping students learn how to think like physicists. And that's a pretty exciting place to be.



The Olympics Are Coming!

It may be too late for the Winter Olympics, but the Physics Olympics are on March 19th! Registration is open and rules can be found online at lipta.org. So get your team together and register for this highly competitive and fun event! There's a limit of 18 teams so don't delay if you want your school to participate.



"Sit down, Roger! You're creating drag!"



Check the LIPTA website www.lipta.org for any updated information.



2025 Fall Conference Highlights

About 60 educators gathered at Commack High School for the fall physics conference on October 25th. It was a morning packed with hands-on learning, curriculum updates, and plenty of problem-solving in true science fashion. As always, the morning started with a plethora of delicious breakfast choices provided by LIPTA Treasurer Tania Entwistle.



Dr. Winters welcoming a packed crowd.

President Gillian Winters opened the event by welcoming participants and introducing a colored-dot system that helped attendees rotate smoothly through a series of lab workshops. Teachers also had the opportunity to purchase equipment aligned with the three labs required under the new Physics Regents, making it easier to bring standards-based investigations back to their classrooms. In addition, an updated optics equipment list was distributed. Optics has returned to the curriculum after more than 29 years, and many newer teachers have little experience teaching the unit, so having clear guidance on materials was especially helpful.

Bill Leacock shared important insights about the upcoming Physics Regents exam. He emphasized that all Performance Development Skills (PDS) — including engineering practices — will be assessed. Reading comprehension will play a larger role than in the past, with students expected to interpret reading passages, graphs, and charts, and make data-driven decisions. Unit conversions will remain a key skill.

The new test will feature clusters of questions centered around a main idea, requiring students to pull together multiple pieces of information. About a dozen teachers at the conference said they are implementing these changes in their classrooms this year, making professional collaboration even more important.

There will be three required labs included in the new curriculum: *Wheels to Watts*, *Thermal Tales* and *Induction Junction*. For many participants, this was their first introduction to these labs. Participants had the opportunity to become students and do each experiment with a group of fellow teachers.

Wheels to Watts

In his session *Wheels to Watts*, Bill Leacock shared a two-period engineering lab where students design and test the efficiency of a water wheel made from a Styrofoam cylinder. Participants were advised to place a wood dowel through the center of the Styrofoam cylinder so it turns smoothly without wobbling. Materials, such as plastic spoons, bottle caps, pieces of aluminum, etc., were provided to stick into the edge of the Styrofoam cylinder to become the vanes on the water wheel.

The setup uses a large bucket to catch the falling water, and the spinning water wheel drives a small motor to measure voltage output. After testing the initial build, the water wheel is redesigned by changing the vane materials and/or the number of vanes. This is not necessarily to improve performance, but to evaluate design decisions.

Once Bill demonstrated the system, teachers jumped into building and testing their own designs. There was plenty of troubleshooting — and plenty of spilled water — reinforcing the authentic engineering experience. Cleanup was no small task, and Bill joked that teachers might consider waders and boots on that lab day!



Bill Leacock explaining *Wheels to Watts*.

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Diana Nigro describing the specific heat lab.

Thermal Tales

In *Thermal Tales*, Diana Nigro presented a four-period lab where students determine the specific heat of an unknown substance. This activity follows lessons on energy conservation and the heat equation.

This lab requires two containers connected by an aluminum bar to model heat transfer. Students work with room-temperature and warm liquids, using beakers, cups, and an insulated food container fitted with two thermometer holes and an empty can. Thermometers must float freely in the liquid, and students use scales to measure mass.

Temperatures are recorded every 30 seconds until readings stabilize, typically after about two minutes. Reaching identical equilibrium temperatures is not required. Students graph their data and analyze trends, learning that even the thermometer itself can influence temperature, an important real-world consideration in experimental design.

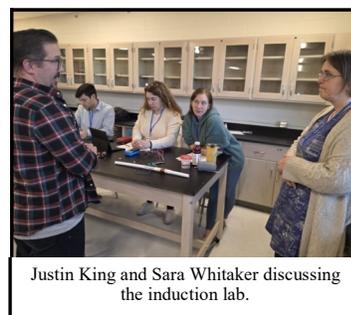
Induction Junction

In Sara Whitaker's session, *Induction Junction*, participants explored electromagnetic induction by dropping a magnet through a coil, generating current strong enough to briefly light an LED. They also used electromagnets with 300–400 turns of wire, experimenting with adding nails to strengthen magnetic fields. Sara recommended investing in a manual coil-winding machine to make coil production easier in the classroom. Safety was also discussed: neodymium magnets must be handled carefully because they can interfere with pacemakers, insulin pumps, and other electronic medical devices. This lab is also expected to take about 4 periods.

Across all sessions, teachers experienced exactly what their students will: trial and error, design challenges, unexpected results, and yes — a bit of a mess. From splashing water wheels to delicate temperature measurements and glowing LEDs powered by falling magnets, the conference emphasized that meaningful science learning is active, collaborative, and sometimes gloriously chaotic

There are upcoming NYSSLS-aligned workshops given by Rich Slesinski for teachers interested in deeper professional development. If interested, check out the link below:

<https://scienceteaching3d.my.canva.site/transform-your-science-teaching-with-ngss-nyssls-aligned-workshops-by-richard-slesinski>.



Justin King and Sara Whitaker discussing the induction lab.

Lab Setup Sale

Spring Conference, Stony Brook University, April 18th

There are several leftover physics lab setups from the STANYS conference available for just **\$20 each**. These can be purchased at the Spring Conference. These are perfect for teachers looking to bring engaging, standards-aligned investigations into their classrooms without stretching their budgets.

Limit one per person. First come, first served.

Once they're gone, they're gone!

2026 AAPT Winter Meeting: Highlights

by Carissa Guiliano

The 2026 American Association of Physics Teachers (AAPT) Winter Meeting was held January 17-19 in Las Vegas, NV. I have attended and enjoyed AAPT conferences in the past, however, this was my first year with the honor of attending as LIPTA's AAPT Section Representative. I arrived looking forward to the usual benefits of an AAPT conference – an abundance of new lesson ideas, instructional resources, and opportunities to collaborate with fellow educators – while also seeking AAPT-wide offerings to share with LIPTA members.

Phenomena-based instruction – which many of us already incorporate – was at the center of many workshops as well as a plenary talk given by Dr. Jason H. Steffen, an Assistant Professor of Physics at the University of Nevada, Las Vegas. Discussions highlighted various implementation methods for this type of instruction. One of my favorite suggestions was to open with an absurd question (e.g. “How do you know the sun isn't powered by hamsters?”) as a fun way to entice students into debating scientifically. We also considered when to “give in” and tell students an answer/next step (short answer: right before they get frustrated – you know your students best). [The Wonder of Science](#) remains a favored resource among many of the teachers in attendance.

Other talks and workshops I attended offered practical, actionable strategies to support the new NGSS-aligned Regents. One idea that piqued my interest is allowing students to self-grade small assignments to promote self-efficacy. In this model, students productively struggle for a set amount of time. If they become stuck, they follow a flowchart (look at notes, look at the solution, talk to the teacher, etc.) to get un-stuck while deducting points for selected actions. Regardless of whether a point system is applied, I appreciate the underlying principle: giving students guidelines to help them independently navigate challenges.

Another emerging trend is the integration of quantum mechanics to keep our students on the cutting edge of physics. [Perimeter Institute](#) was frequently lauded for its robust quantum education materials. I tried several experiments myself and they were straightforward and engaging, perfect for sprinkling into my curriculum. Perimeter Institute also offers resources for other STEM disciplines.

If you are interested in attending an AAPT meeting, be sure to visit AAPT's K-12 [Funding Toolkit](#) and [Awards & Grants](#) pages for resources. Be advised that after January 2027, the winter AAPT meeting will be retired. AAPT's next conference will be held July 18-22 in Pasadena, CA.



**Need
CTLE
credits?**

- ◆ Fall and Spring Conferences
(3 credit hours for each conference)
- ◆ AP/IB Physics Exam Analysis
(3 credit hours)

CTLE Certificates are available.

Did You Know ...

by Harry Stuckey

Did you know that the Vera C. Rubin Observatory in Chile began operations in 2025? It was designed to map dark matter, track asteroids, and see to the edges of the cosmos. It is also the first major U.S. observatory named for a woman. So, what did Vera Rubin do to earn that honor?

Vera was born in 1928. Her parents, Phillip and Rose Cooper, encouraged an early love of science. Her father helped her make a cardboard telescope that she used to photograph stars, and her mother arranged for her to check out adult science books from the local library. Inspired by the first U.S. female astronomer, Maria Mitchell, who taught at Vassar College, Vera enrolled at the all-girls school in 1944. Her high school physics teacher suggested she avoid science and study art, but she majored in astronomy. She worked summers at the Naval Research Laboratory and US Naval Observatory, where she met her future husband, Bob Rubin. Her application for graduate study at Princeton was rejected because of her gender (remember, this was 1948). She was accepted to the master's program at Cornell, where husband Bob was doing Ph.D. work, and while the astronomy department had yet to acquire its reputation for excellence, the physics faculty was top-notch.

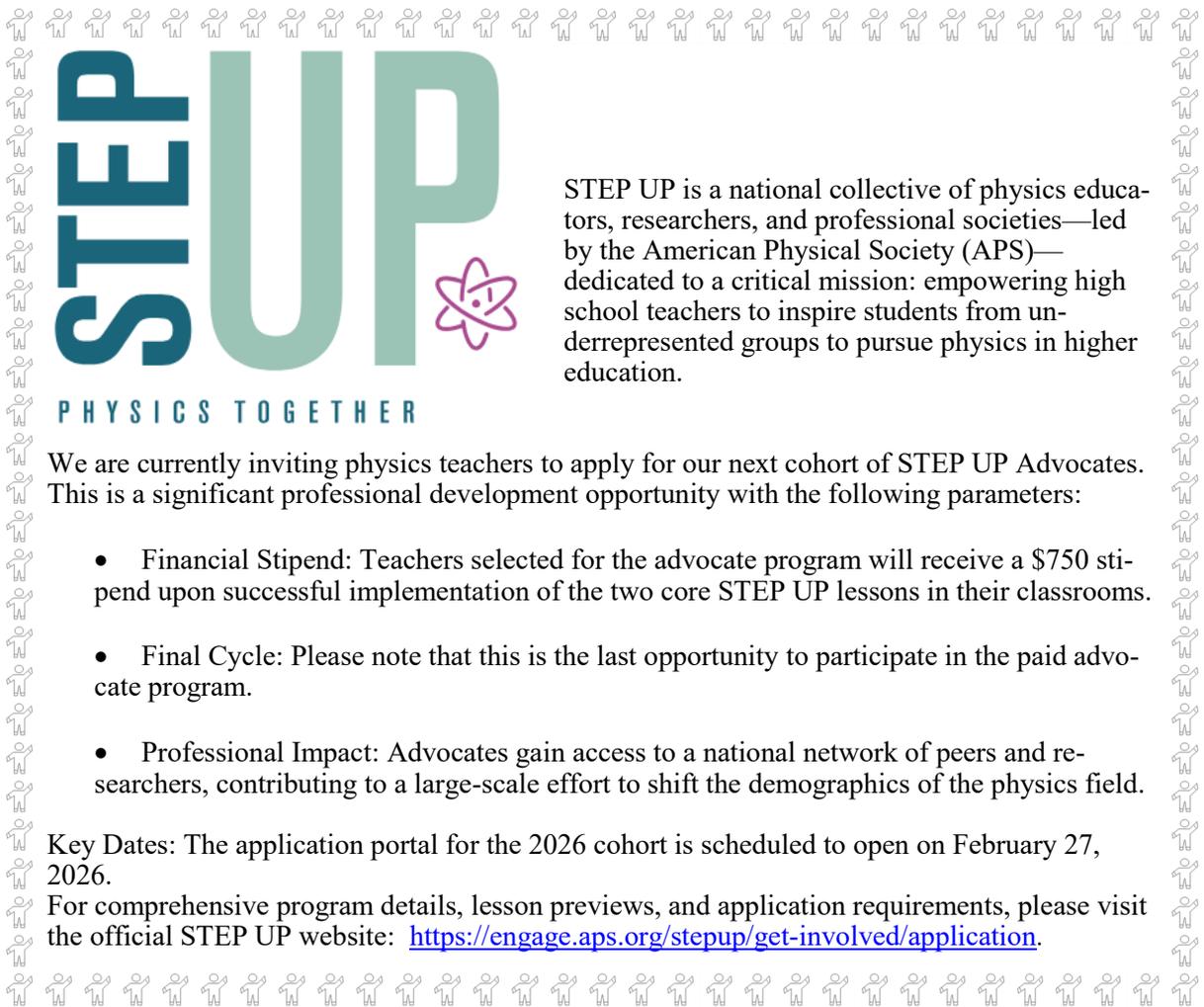
Vera studied with Philip Morrison, Hans Bethe, and Richard Feynman. She also worked on the motions of galaxies with astronomer Martha Carpenter. Vera earned her Ph.D. from Georgetown University in 1954; her thesis advisor was George Gamov. Her dissertation, which was published in the *Astrophysical Journal*, included the controversial idea that galaxies clumped together, rather than being randomly distributed; it was largely ignored.

In 1955, Georgetown University hired Vera to teach and do research. In 1965, she became the first female scientist on the staff of the Carnegie Institution's Department of Terrestrial Magnetism. That same year she became the first woman astronomer permitted to observe at the Palomar Observatory. She also began collaborating with astronomer Kent Ford, publishing nine papers together. One involved the rotations of distant spiral galaxies. Building upon a proposal by Fritz Zwicky in the 1930s, they tracked the rotation of stars around galactic centers. It was expected that stars farther from the center would rotate at lower speeds. Instead, their observations showed that the outermost stars were rotating as rapidly as those close to the center. At those speeds there was not enough gravity from the constituent stars to prevent the galaxies from flying apart. Vera calculated that galaxies must contain 5 to 10 times more mass than can be directly observed. This was evidence that galaxies were surrounded by dark matter haloes, the first results supporting Zwicky's theory of dark matter, and explains the naming of the observatory.

In 1981 Vera was elected to the National Academy of Sciences, only the second woman astronomer so honored. Throughout her life, Vera encountered resistance to her choice of study but persevered. As a result, she encouraged more women to study astronomy and became a force for greater recognition of women in the sciences.



Do you have any comments, information, or tips to share for future newsletters? Send it via email to: keogh@lipta.org



STEP UP



PHYSICS TOGETHER

STEP UP is a national collective of physics educators, researchers, and professional societies—led by the American Physical Society (APS)—dedicated to a critical mission: empowering high school teachers to inspire students from underrepresented groups to pursue physics in higher education.

We are currently inviting physics teachers to apply for our next cohort of STEP UP Advocates. This is a significant professional development opportunity with the following parameters:

- **Financial Stipend:** Teachers selected for the advocate program will receive a \$750 stipend upon successful implementation of the two core STEP UP lessons in their classrooms.
- **Final Cycle:** Please note that this is the last opportunity to participate in the paid advocate program.
- **Professional Impact:** Advocates gain access to a national network of peers and researchers, contributing to a large-scale effort to shift the demographics of the physics field.

Key Dates: The application portal for the 2026 cohort is scheduled to open on February 27, 2026.

For comprehensive program details, lesson previews, and application requirements, please visit the official STEP UP website: <https://engage.aps.org/stepup/get-involved/application>.

St. Patrick's Day Science Humor

*What do leprechaun scientists call a fake rock?
A sham-rock.*

*What happens when a leprechaun falls into a black hole?
He becomes a "leprequark".*



Interestingly, the term *quark* was coined by Caltech physicist Murray Gell-Mann, who had read Irish author James Joyce's book *Finnegans Wake* and came across the word there. Gell-Mann intended it to be pronounced "kwork," and some people do use this pronunciation. However, most pronounce it as it appears in Joyce's text, rhyming with "mark."

"Three quarks for Muster Mark!
Sure he hasn't got much of a bark,
And sure any he has it's all beside the mark."

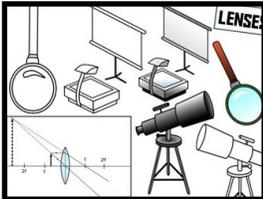
LIPTA Spring Conference

Saturday, April 18

Stony Brook University

Physics/Math Tower, S-240

8:30-Noon

8:30	Registration and Breakfast
9:00	Welcome
9:15	Teaching Optics with Rich Slesinski 
10:00	Break/Networking
10:15	<p style="text-align: center;">NYSSLS Lightning Rounds (10 min each)</p> <p>Bill Leacock -- What to Expect on the New Physics Regents</p> <p>Sara Whitaker -- How to Write a Cluster</p> <p>Peter Tsun -- Origami</p> <p>Diana Nigro--Pacing a Unit in the New Curriculum</p> <p>Joe Monroy-- Strategies for Solving Cluster Questions</p>
12:00-12:30**	<p>Optional Post Conference NYSSLS (2 Extra CTLE credits will be available) ** Bring a Brown Bag Lunch</p>
12:30-2:00	<p>Collaborative Work Sessions Writing NYSSLS Cluster Questions</p>

3 CTLE credits available

- Current Members: \$15 – Early Bird registration through April 12th
- Non-members: \$30 – Early Bird registration through April 12th (includes 1 year membership)
 - \$5 extra added on to the above rates if registering after April 12th

Register at lipta.org