

Spring, 2024

Issue 56



Long Island Physics Teachers Association Newsletter

President's Message

As we approach the end of the school year, this might be a good time to examine what order we teach the units in our classes, particularly in light of the upcoming changes to both the Regents and AP Physics curricula. If you are the only physics teacher in your school, then you have the flexibility to determine the order of units as you see fit. If you are one of several physics teachers, you will want to discuss a plan with your colleagues and reach a consensus on a general sequence. You wouldn't want to have students whose schedules change midyear to find themselves in a class that was taught in a completely different order!

The new NYSSLS and NGSS standards barely mention kinematics, even though that is the topic that many of us begin the year with, possibly after a dose of remedial math. Instead of starting with kinematics and then transitioning to dynamics, consider embracing NYSSLS by starting with forces. By beginning with forces, you highlight the fundamental role they play in causing motion, thereby aligning with the NYSSLS Crosscutting Concept of Cause and Effect. This approach could provide a seamless transition to acceleration and all aspects of kinematics. It's worth reinforcing to our students that forces are the *cause*, and the resulting motion (kinematics) is the *effect*.

In AP Physics 1, the College Board consolidates all of rotation together into a single unit, and the new fluids unit will be a completely separate unit. Is that how you want to teach those topics, or do you want to integrate these topics into the broader curriculum? Consider breaking those topics apart, so that you address kinematics (linear and rotational) all together, and then dynamics (all forces, including buoyancy and torque) together as one unit, and energy all at once (including rotational kinetic energy and Bernoulli's equation). To make sure you haven't left anything out you could revisit the College Board units separately as a review: all of rotation together as one unit, and all of fluids together as one unit. Revisiting the College Board units separately as a review could offer students multiple perspectives and deepen their understanding of the material.

Regardless of how you will be sequencing your courses, you might want to give that some thought this spring and into the summer so that you have a plan in place for the fall. And remember to prioritize your own well-being by incorporating a little rest, relaxation and rejuvenation into your summer break, just for you.

Thank you for your dedication and commitment to excellence in physics education.

Important Dates

AP Physics C Exams	Tues, May 14
AP Physics 1 & 2 Exams	Fri, May 17
AP/IB Analysis	Sat, June 1
Regents Physics Exam	Tues Jun 25
End of year BBQ	Thurs Jun 27

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

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STEP UP

Supporting Teachers to Encourage the Pursuit of Undergraduate Physics

<https://engage.aps.org/stepup/curriculum/everyday>

Several Physics organizations are working together to try to increase the number of physics undergraduates, and their approach is to try to increase the number of females and minorities. Their suggestions are good for everybody, and these suggestions could increase the number of students in all of science and technology, not just in physics.

STEP UP's suggestion for choosing group members

- Ensure girls (and minorities) are taking active roles
- Avoid isolating girls/minorities in a group of mostly boys

Their research shows that

- Creating small groups with high proportions of women in otherwise male-dominated fields is one way to keep women engaged and aspiring toward related careers.
- Groups comprised of two males and one female tended to be dominated by the male students... even when the female member was articulate and the highest ability student in the group.

STEP UP suggests that you might say: "Make sure that no one is dominating the activity in your group and that everyone in the group is getting a chance to use the equipment, conduct the analysis, and contribute to the group discussions."

STEP UP material is based upon work supported by the National Science Foundation.

Need CTLE credits?

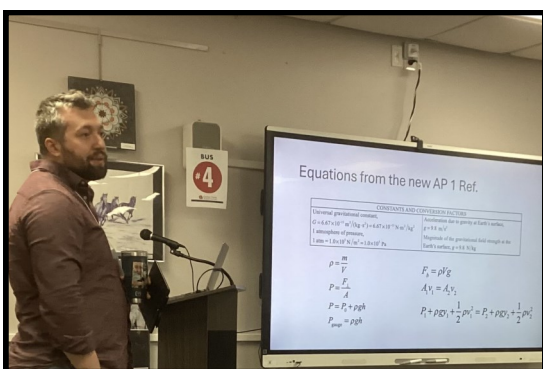
- ◆ Fall and Spring Conferences (3 credit hours for each conference)
- ◆ AP/IB Physics Exam Analysis (3 credit hours)

CTLE Certificates are available.

LIPTA Spring Conference Highlights

Sachem East HS Physics teacher, Richard Gearn, welcomed us to his school for the Spring Conference and the opportunity to view students' science board displays as we mingled and munched on a continental breakfast. LIPTA VP, Bill Leacock, emceed the conference and introduced the executive board and upcoming LIPTA events which includes the AP/IB Analysis and the end-of-year LIPTA picnic.

The first presenter was Rob Krakehl from Manhasset HS who discussed upcoming changes in the AP Physics 1 curriculum including the addition of a fluids unit which will be about 10 to 15 percent of the new 2025 exam. The new exam will only include 40 multiple choice questions to be completed in 80 minutes and 4 free response questions to be done in 100 minutes, but the two parts will each be weighted 50% of the exam.



Rob Krakehl's presentation on teaching fluids in AP 1.

Rob has taught AP Physics 2, which has up until now included fluids in its course, and he figured the fluids topics will take about 3 to 4 weeks of class time in the AP 1 course. After a general overview of the fluids topics and the equations given on the reference tables, Rob gave out a small canister of Play-doh and a ruler. He asked us to figure out the density of the play-doh with the materials and an electronic scale that was set up at the front of the room. Working in small groups, we set out to do the task. We all had the basic idea of measuring the volume and mass of different quantities of the Play-doh and graphing the results to find the density using the

slope of the graph. Some groups made squares of the clay and others made cylinders to make measurements to find the volume, but Rob pointed out that there would be more uncertainty for these shapes since they required two measurements. He suggested that a sphere was the best shape to use since it reduced the uncertainty by only including one measurement for the diameter.

For the type of lab questions given on the AP exams, Rob explained that it is important to reduce uncertainty in the measurements, but not the actual number of measurements. He suggested 7 trials seems to be the magic number to shoot for. It's important for students to master doing graphs, some calculations and form an argument when developing a lab experiment. He suggested several other labs that should be done including the densities of an unknown fluid and irregularly shaped objects, buoyancy force, relationship between pressure and depth of a fluid and a task oriented lab to figure out where water will land from a hole in a bucket. He also gave an outline of how he covers the course in 3 weeks with the topics covered, labs done and assessments offered.

Rob gave out some practice multiple choice and free response questions for us to try and discuss. He emphasized that it is important to pay attention to the scaling of vectors in the diagrams also. He ended his talk with issues that students encounter with certain concepts and some hints about how to help students better understand some of the misconceptions.

After a brief break, Rich Gearn led us in a brainstorming session on how to increase enrollment in physics since enrollment seems to be falling, possibly because of the lowering of graduation requirements. Suggestions included doing whiz bang demos to show future students,

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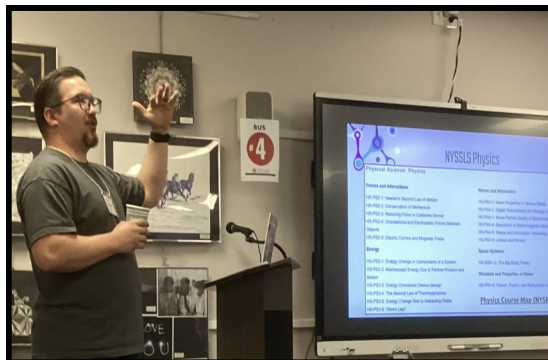
offering different types of physics courses to reach different levels of students, talking to math teachers to show how math can be applied to physics and making physics more visible to future students by doing labs or demos in the hallways or outside.

The final presenter at the conference was LIPTA exec board member Justin King, who gave us some possible insight into what the new assessments will look like under the NYSSLS guidelines. He used NY state sample questions from the 5th and 8th grade exams which are coming out now. Though the first physics exam will be administered in June 2026, it will not be required until 2028. So many schools are opting for the wait and see approach before offering it to their students.

Though NYSSLS is basing most of its course outline on the NGSS, NY has added Ohm's law and optics to its standards even though there is no specific mention of them in the NGSS. Justin mentioned that the website, thewonderofscience.com, has helped organize performance expectations with color codes. In blue is the science practice which will be what students should be doing to learn the concept. The core idea is in yellow and that is what concepts are being learned. And the crosscutting concepts are in green and point out how students should be thinking about the concepts.

Justin gave out copies of the [3-D Performance Screening Assessment tool](#) that we used to assess how well some of the sample questions from a 5th grade exam aligned with the tool. The big difference that was noted with the new exam questions is that multiple choice and free response questions are mixed together with a single phenomenon being described and questioned about. Based on our assessment tools, it seems like NY state has a bit of work to do with its performance screening. But Justin said it's a good tool to get teachers to start thinking about their own exam questions and how to improve them to align better to the standards.

Thanks to all the presenters who made this conference another great success!



Justin King giving some insight on how assessments may look with the new NYSSLS guidelines.



**The final
Stretch
is here.
Hang in there!**

Physics Olympics 2024

Seventeen schools, the largest contingent of teams since COVID, competed at the 38th annual Long Island Physics Olympics at Farmingdale State University on Wednesday, March 13th. As usual, teams of five students from each school competed in five events. Teams were awarded trophies for the top 3 positions for each event and four teams were given trophies for their overall performance. MacArthur took the big trophy home with the top overall score. Second place went to Wheatley and third to Great Neck North. Fourth place went to MacArthur's companion school, Division Avenue.

The five events included the two standards: Physics Bowl and the Fermi Questions. The Physics Bowl final was an exciting one with the wild card Syosset edging out its competitors. The Fermi Questions was a tight competition with all the teams just being separated by a few points, so time became a big factor. Commack took top honors for it.

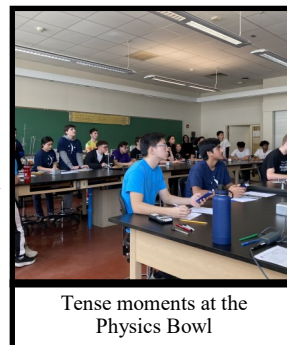


Eyeing out the course for Let Us Reflect

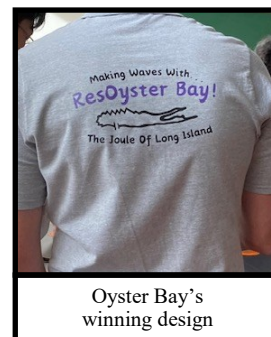
The Accelerate! event returned where a student from each team had to accelerate at a rate of 0.5 m/s^2 through a hallway. Oyster Bay took first place and was only 1.3 seconds off the expected time. The Let Us Reflect event had students use several mirrors to guide a laser beam around obstacles to hit a target point. Again several teams were right on the money so time became the tie breaker with Great Neck North edging out its competitors.

Precisely Predicting Projectiles was a two tiered event. Teams could have simply predicted where a ball would land on the floor when it rolled down a ramp and off a table. But if they wanted to be put into tier 1, they had to have the marble hit a target placed on the top of a moving car. About half the teams were successful in having the ball hit the target sheet on the moving car, but Valley Stream North came closest to the target line.

Oyster Bay took the award for Best T-shirt. It's "Making Waves with ResOyster Bay: The Joule of Long Island" had so much physics involved in its very unique design. If your school didn't make it to this year's Olympics, consider trying for it next year. Up to 18 teams are allowed to compete. Anyone interested in becoming involved with planning next year's event should contact Justin King at king@lipta.org.



Tense moments at the Physics Bowl



Oyster Bay's winning design

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

Did You Know ...

by Harry Stuckey



Last issue we learned that Ben Franklin was acknowledged as America's first scientist. So, who was considered America's next eminent physical scientist? Here's a hint – an SI electromagnetic unit was named for him. No, not Tesla; he's Serbian-American, but lived later. Not Weber either; he's German. Did you think of Joseph Henry? He's the one!

Born into a poor family in Albany in 1797, Joseph had a tough childhood. His father died when he was young, and he was sent to live with his grandmother. He worked in a general store after school and at 13 was apprenticed to a watchmaker and a silversmith. He briefly considered becoming a professional actor, but at 16 he read a book on scientific topics, *Popular Lectures on Experimental Philosophy*, and he was hooked. In 1819, he was admitted to The Albany Academy, a private college prep school, which waived the tuition for him. Joseph excelled in school while tutoring other students for a fee and often helping his teachers teach science. In 1824, he became assistant engineer for the survey of a major NYS road project resulting in a shift of focus from medicine to engineering. In 1826 at the age of 29, he became Professor of Mathematics and Natural Philosophy (think physics) at The Albany Academy, where his early research was conducted.

Joseph was the first to coil insulated wire around an iron core to make a stronger electromagnet. His experiments with electromagnets led to his invention of the electric relay, which made a practical telegraph possible. It is believed that Joseph helped Samuel Morse several times in the development of the telegraph, although Morse denied that. In 1831, Joseph built a machine using electromagnetism for motion, the ancestor of the DC motor. Using this device, he identified self-inductance at about the same time as Michael Faraday, but because Faraday published first, he was credited with the discovery. Joseph also discovered mutual inductance independently of Faraday, who again published first, but Joseph's use of an electromagnet to induce current in a separate coil was the basis of the transformer. Joseph was able to ring a bell at a distance using electric current in a wire, the precursor of the electric doorbell.

From 1832 to 1846, Joseph served as the first Chair of Natural History at what became Princeton University. While there, he continued his work in electricity and magnetism while publishing papers on capillarity, phosphorescence, the heat of sunspots, and the aurora. He was appointed the first Secretary of the Smithsonian Institution in 1846 and served in that capacity until 1878. He encouraged the work of balloonist Thaddeus Lowe in aeronautics and recommended Lowe to the US government, leading to the formation of the US Army Balloon Corps during the Civil War. He was also the founding father of the National Weather Service.

In 1875, Joseph met with Alexander Graham Bell and advised him on ideas that would emerge as the telephone. Joseph was elected president of the National Academy of Sciences in 1868 and remained in that capacity until his death in 1878. Joseph was honored with the naming of the SI unit of inductance, the henry; the Joseph Henry Elementary School in Galway, NY; the Henry Mountains in Utah; the Joseph Henry Laboratories at Princeton; and Mt. Henry in California. Not bad for a guy who didn't go to college!

AP/IB Exam Review

Solutions to the AP Physics exams and the IB Physics exam will be handed out and discussed .

Saturday, June 1

9am -12pm

NYIT Old Westbury

Harry J. Schure Hall Auditorium

Parking on the side and rear of the building.

Come celebrate the end of another successful school year!

LIPTA PICNIC

Thursday, June 27

3PM-6PM

East Setauket, NY



Free for all current LIPTA members.

Please RSVP at lipta.org so enough food can be provided.

Location information will be emailed prior to the event to all registered persons.