Winter, 2023

Issue 52

Long Island Physics Teachers Association Newsletter

President's Message

What does Professional Development (PD) mean to you? Our newest teachers, those with fewer than 20 years of experience, are required to engage in PD on a regular basis, and most of us would do that anyway.

So almost all of us do some PD, and I hope some of what you do is coming to LIPTA workshops. Our next one is April 29, providing you with 3 CTLE hours, in case you need it. Sometimes PD takes the form of learning or practicing new or different general pedagogy, applicable to any subject. Sometimes it takes the form of learning new physics. If that's of interest to you, consider joining the QuarkNet workshop the last week of June for particle physics and quantum computing, and providing you with 28 CTLE credit hours and the opportunity for graduate credit. At other times, PD takes the form of learning new ways to present and get students to think about core curriculum material.

Often, good PD pushes us to reflect on our own teaching practices. I know what I think I do, but have you ever actually seen yourself teach? During COVID most of us taught online for a while, and many of us pre-recorded lessons for our students even if teaching a flipped class wasn't our normal mode of instruction. But have you seen yourself in a classroom, interacting with students?

I recently needed to create a video of myself teaching for 30 minutes. Two wonderful colleagues filmed me for 30 minutes each, so I had two sessions to choose from. Then I needed to self-critique and reflect on my lesson, recognizing and pointing out the good and the not-so-good aspects. Watching and rewatching myself in action was quite an eye opener for me.

On a light note, I don't look nearly as young as I thought I did, and I don't smile at my students as much as I thought. Both of the videos were with great classes, and I genuinely like all the students, so I thought I smiled more often than I actually do. On a more serious note, I don't communicate to the students as much as I thought I did. When I have groups of students working collaboratively to solve problems, I go from group to group assessing and asking questions. When I leave each group I expect them to keep moving forwards, which they do, but it turns out that I don't actually say anything to that effect. Instead of saying something like "you're on the right track, now see where you can go from there," I tend to just walk away. I had no idea that I often leave my students guessing about what I expect!

In general I believe that I have good structures in place and that I have and use good pedagogical techniques. Now I have two small general thoughts for myself: 1) smile more out loud, not just to myself, and 2) my students aren't mind readers, so I need to tell my students what I want them to do next, even if it's just to continue along the path they were already taking.

Note to self: the little things matter too.

Important Dates

Physics Olympics	**Thurs Mar 16**
Spring Conference	**Sat Apr 29**
AP C Exam	**Tues May 9**
AP 1 Exam	**Thurs May 11**
AP 2 Exam	**Fri May 12**
AP/IB Physics Analysis	**SAT May 20**
Regents Physics Exam	**Thurs Jun 22**
End of year BBQ	**Wed Jun 28**

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

A Case for Keeping Regents Physics

by Terese Keogh

Zoom has opened up a whole new way to tutor physics. Tutoring could take place at any time without having to leave your house. It gave me the opportunity to help my friend's daughter, Mary, who was struggling with a first year physics course that she was taking in her NJ high school. I know there's been a lot of discussion about possibly getting rid of Regents exams in NY state and many teachers are concerned that the physics course we teach could be "watered" down, but as I have experienced with poor Mary, it can be taught at a much more challenging level than necessary when there is no required curriculum.

I have been friends with Mary's mom since we were teens attending high school in Brooklyn. We were even in the same Regents physics class and have fond memories of the class and our teacher, Mr. Lewis. It's largely due to that class that I continued with physics in college and became a physics teacher. Though the Regents course has gone through some changes since we took it back in the day, it still covers a smattering of basic physics topics: Mechanics, Electricity & Magnetism, Waves, and Modern. And it's now from tutoring Mary that I really appreciate the course I took and the course most of us teach.

For Mary, there is no state exam to prepare for or even a state course curriculum that has to be followed. And though it sounds great that a teacher can have total control over what is taught and how it is assessed, I can see the downside. Mary's teacher is teaching physics at an extremely challenging level, even at a higher level than the AP course. He uses a Pearson online program to assign plenty of homework problems. Some of the questions that the teacher assigns are very good, but some are so difficult that it takes me awhile to figure them out. For example, Mary recently had a conservation of momentum problem with an inelastic collision involving three balls colliding with each other at three different angles! And then there's the box on an inclined plane (WITH friction) attached to a hanging block with a frictionless pulley and you first need to figure out whether the blocks will move and then, if they do, you need to determine the magnitude and direction of the acceleration!

Mary started out the year very enthusiastic about the course, but that has subsided. She's a hardworking and bright young woman and her mom is upset that Mary is so beaten down by the course that she wished Mary never took physics! What a horrible thought! I still meet up with Mary on Zoom nearly every week, but where we used to spend about 2 to 3 hours together, now we usually spend less than an hour. And that's not because Mary is understanding physics any better. She's just giving up on it. And that's what is so sad! And she's not alone. Seems like most of her classmates are feeling the same way.

What's even worse about this physics course is that the teacher doesn't seem to be teaching anything beyond mechanics. It's March and he hasn't even started energy yet. There's so many other physics topics and phenomena that Mary will never have an opportunity to learn and it's extremely doubtful that she will take another physics course in her life. So with all the issues that we may find with the Regents course, I think it's still a better choice to have a curriculum that gives you a good foundation for basic physics and an exam that at least the majority of students can succeed on.

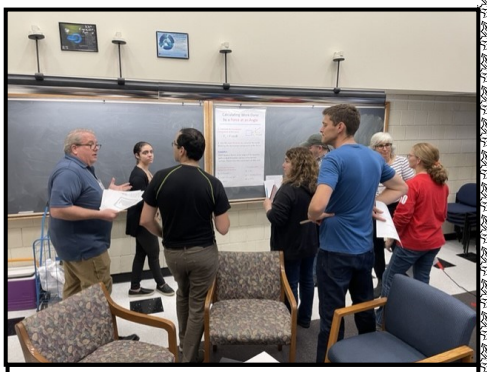
Fall Conference

About 35 teachers gathered on Saturday, November 5th at Stony Brook University for the annual LIPTA Fall conference. LIPTA Treasurer and "chef" Tania Entwistle had tons of delicious food set out to greet participants and presenters. LIPTA President Gillian Winters welcomed everyone and highlighted all the events that LIPTA sponsors, most notably the fall and spring conferences and the annual Physics Olympics competition.

Justin King and Rich Gearns discussing the jigsaw cooperative learning exercise.

The first session was jointly run by Justin King of Commack HS and Richard Gearns of Sachem East HS. Their presentation piggy backed off of a jigsaw learning workshop that was done last spring. This time, Justin and Rich developed and demonstrated how a specific lesson might be done using the jigsaw cooperative learning method. They first separated everyone into random "families" by using numbered popsicle sticks. And they encouraged everyone to be in "student" mode so we could see things from the student's point of view. When students joined their families, they introduced themselves to the group and greeted each person by name to practice social skills as well. Social skills such as calling each other by name, taking turns listening to each other and even repeating what another student said were highlighted and is an integral part of the cooperative learning experience.

The lesson they developed was an introduction to work, power and energy. Four expert areas were set up around the room in which posters were placed that highlighted a specific topic with a sample problem set up and a solution given. Each family sent one person to each expert area. At the expert areas, students were encouraged to practice their social skills and learn about the material from the poster. Students would copy down the notes and the sample problem from the posters and then would return to their families to discuss and share what was on the poster.



"Family" members gathering information at the expert areas.

Students were then given a 'quiz" worksheet that incorporated the four expert areas and this worksheet was to be completed by the family by the end of the class period. It was suggested to do this type of cooperative learning activity in a double period especially the first time it is done. Justin said it's probably not an activity to do every day, but maybe for each unit. Assessment for the lesson involved each student individually completing a "check for your understanding" worksheet as well as how well the family did on the questions on the "quiz" for which the student had been the expert.

Dr. Chang Kee Jung's presentation based on his college physics course, *The Physics of Sports*

After a break for some talking and more eating, Stony Brook Physics Chairperson, Dr. Chang Kee Jung, presented a session on the physics of sports that is based off of a course he teaches at the university. Dr. Jung said that physics is difficult because it has to incorporate natural phenomena with math. He uses popular sports to help students understand basic physics and also has them study the physics to understand the sports better.

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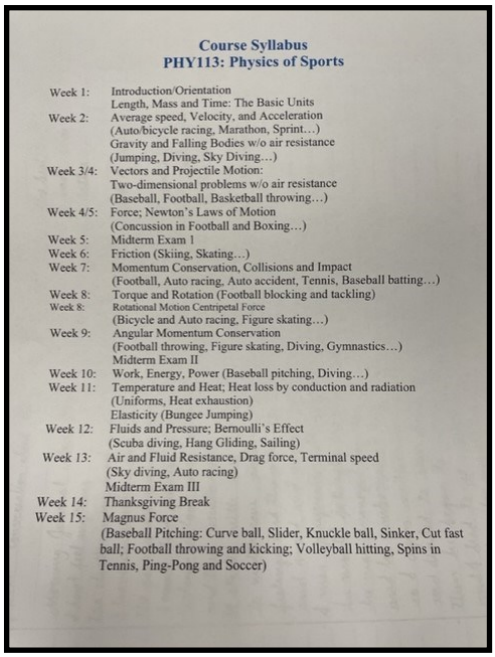
For a topic on kinematics, he had us watch several world class runners competing in 100 meter races. Before we watched the videos, he asked us to predict how the sprinter would accelerate during the race and when the top speed would be reached. By going frame by frame using a sprinter's race video, he then showed how a world class runner, such as Usain Bolt, would accelerate early on, then reach constant speed and then decelerate at the very end. Then he would ask some questions about how these sprinters would fare in football as a running back or as a wide receiver to get us to think about how their skill set may or may not transfer well into other sports.

Dr. Jung discussed hang-time by using former basketball player Michael Jordan and Olympic gymnast Simone Biles as examples. And then he discussed the evolution of a high jumper's technique as it changed from going over frontwards to backwards. This alteration places the jumper's center of mass outside his body by making their body form into a semi-circular shape as they go over the bar. This places the center of mass below the bar. Angular momentum was also briefly introduced using ice skating and swimming as examples. Dr. Jung showed how the athletes can change their rotational inertia by putting their arms above their heads thus changing their spinning speeds and the resulting number of twists or rotations that could fit into their performance.

The conference was a huge success not only for the content provided, but by the way it got all of the participants to think about physics and how it is taught.



Course Syllabus
PHY113: Physics of Sports

Week 1:	Introduction/Orientation Length, Mass and Time: The Basic Units
Week 2:	Average speed, Velocity, and Acceleration (Auto/bicycle racing, Marathon, Sprint…) Gravity and Falling Bodies w/o air resistance (Jumping, Diving, Sky Diving…)
Week 3/4:	Vectors and Projectile Motion: Two-dimensional problems w/o air resistance (Baseball, Football, Basketball throwing…)
Week 4/5:	Force; Newton's Laws of Motion (Concussion in Football and Boxing…)
Week 5:	Midterm Exam 1
Week 6:	Friction (Skiing, Skating…)
Week 7:	Momentum Conservation, Collisions and Impact (Football, Auto racing, Auto accident, Tennis, Baseball batting…)
Week 8:	Torque and Rotation (Football blocking and tackling)
Week 8:	Rotational Motion Centripetal Force (Bicycle and Auto racing, Figure skating…)
Week 9:	Angular Momentum Conservation (Football throwing, Figure skating, Diving, Gymnastics…) Midterm Exam II
Week 10:	Work, Energy, Power (Baseball pitching, Diving…)
Week 11:	Temperature and Heat; Heat loss by conduction and radiation (Uniforms, Heat exhaustion) Elasticity (Bungee Jumping)
Week 12:	Fluids and Pressure; Bernoulli's Effect (Scuba diving, Hang Gliding, Sailing)
Week 13:	Air and Fluid Resistance, Drag force, Terminal speed (Sky diving, Auto racing) Midterm Exam III
Week 14:	Thanksgiving Break
Week 15:	Magnus Force (Baseball Pitching: Curve ball, Slider, Knuckle ball, Sinker, Cut fast ball; Football throwing and kicking; Volleyball hitting, Spins in Tennis, Ping-Pong and Soccer)

Free Course

Quarknet Workshop

June 26-29, 9AM-4PM
Stony Brook University
Topics: Particle Physics and Quantum Computing

Registration and more details coming soon.
Questions? Contact winters@lipta.org

Are You Dangerous?

by Ed McDaniels

Recently, a politician, I won't honor him by using his name, labeled Randi Weingarten as the most dangerous person in the world. Of all the leaders who threaten our country and the world with nuclear missiles and social order instability, he chose Randi Weingarten, the president of the American Federation of Teachers, the AFT. Why? He quotes famous thinkers who feel that America's greatest threats come from within our own borders and not from foreign threats. Even Abraham Lincoln agreed with him on that when he said, "America will never be destroyed from the outside. If we falter and lose our freedoms, it will be because we destroyed ourselves." I think it is important to analyze this threat and see what role each of us, as teachers, play in it.

First, what aspect of Randi Weingarten is it that he finds so dangerous? Is it because she is a woman? Is it because she is Jewish? Or could it be because she is a married lesbian? To some of our fellow Americans, each of those reasons individually would mark her as a threat, but collectively, she is an abomination in the sight of some God-fearing individuals. This politician tries to score "points" with his intended audience by using an individual who is well known to them and has been at the center of some of the "Culture War" issues that have wracked our country. He throws out, to his almost all white audience, the baiting terms, ***Critical Race Theory*** and ***The 1619 Project*** as examples of how America's educational system is steering our young people away from learning about math and reading. Our history is our history, be it good or bad. If it makes some people uncomfortable, that's okay. How we move forward as a society, striving to improve, is to learn from it, so we don't keep doing the same actions that we are ashamed of in the future. In analyzing his remarks, Randi Weingarten is simply the avatar he uses to condemn all of education and teachers in general. He considers you, and what you do, to be part of this plot to destroy America from within.

I put his remarks in a different context, one that reflects the reality of today's divided America. We have some politicians and some of our fellow Americans who seem to reject reality. Their "facts" are contradicted by the vast majority of news organizations and our own eyes. They want their followers to disbelieve or disregard the inconvenient truths that the rest of us accept as fact. They do not want their followers to question their asserted reality or to ask questions that are embarrassing to answer.

Our Foundering Fathers believed that an educated public was the greatest defense from an internal tyranny. Samuel Adams said, "If Virtue & Knowledge are diffused among the People, they will never be enslav'd. This will be their great Security." We teachers, are the guardians of that security. How do we use our position to safeguard our nation? The greatest threat to disinformation is the ability of the public to analyze statements and situations to see the reality of the world and to reject the dystopian view of this vocal and malevolent minority. "Elections can not be honest, if we don't win." "Italian satellites changed votes from one candidate to another." "Jewish space lasers started wildfires in California." How can people believe these absurd claims and statements? It is because they live in a reinforcing bubble of news and reality. Every analysis of events they hear or see is through the same lens which reinforces the same absurdities. It can be uncomfortable to leave one's reality bubble. When I watch that other purveyor of "news," I am only able to stand about 10 or 15 minutes of disinformation or a slant on events, which is so different than the other multiple sources of news events, that I tune out in distaste and disgust.

Okay, back to you. In physics, we often focus on facts and equations which are both necessary for academic success. The truly vital aspect of what we should be guiding students towards is their ability to think, to reason, to evaluate, and to determine the relative importance of given information. In a phrase, critical thinking. I have addressed this topic before, and time after time, real world events reinforce its importance so that the educated public will not be swayed by lies and tropes. If reason and reality is the enemy of disinformation and an ignorant public, then you are dangerous to the those who do not want a populace who questions or evaluates the reality presented to them. If your side's success depends on the mindless adherence to hate of the "other" and not to reason, then a thinking, rational public is your greatest threat. Would you be viewed as a collaborator to mindlessness or as a provocateur, an agitator for reason? So, my question to you, literally to **you,** is how dangerous are you and how dangerous are you willing to be? Will you safeguard the future of America?

Who is out there?

by Robert Krakehl

As Long Island teachers we tend to forget that many of us have a robust network of in-person physics teacher connections. For example - you are currently reading an article within a newsletter designed for Long Island physics teachers! However, for the majority of the country and for many parts of New York state, this is not true. Whether you are an isolated physics teacher, a novice physics teacher, or someone who wants to grow their physics teacher network outside of the walls of the school - there are many others who have the same mentality! Below are several online physics education-based organizations that allow for conversations, professional development opportunities, and support for both inside and outside the classroom. Many of them have either open slack channels (similar to an online discussion board), virtual meetings (over Zoom or Google meets), in-person meetings for local branches or direct messaging (like texting or Twitter).

PoLS-T Network

The PoLS-T network is a teacher driven network dedicated to tackling the problems that high school physics teachers are facing. One of the main goals of this network is to bring together isolated and new physics teachers so they can begin to build a support network. PoLS-T normally runs monthly meetings on either a topic of choice from the PoLS-T community, or have a "coffee break" session, where members can just set aside time to meet with other physics teachers virtually and discuss whatever they need. You can find more information and join the slack page here:

https://projects.iq.harvard.edu/pols-t-network/home

Twitter

Twitter can sometimes be seen as a toxic environment (and I do not disagree!), but if used correctly, it is also free daily professional development! There are tons of people that you can follow on Twitter who love to share their materials as well as answer tweets such as: Helen Reynolds, @helenrey; Joe Cossette, @cossettej; Joe Milliano, @MrJoeMilliano; or Frank Noschese, @fnoschese. There are many, many more! You can also search the tag: #iteachphysics - which any user can add to their post indicating that it's related to physics teaching. When searched, these tags will pull up all the posts that include them which often brings you to a full page of amazing different experiments and ideas to use in your classroom. #modPhysics and #teach180 are also great tags to search.

There are also several other organizations that have a presence on Twitter as well as their own slack channels - such as STEP-UP NYC (part of the greater STEP-UP network as well as APS). There is also the New York PhysTEC regional network that meets every other month virtually for professional development and conversations. STANYS also has local and statewide sections of physics that often have questions asked and answered over email.

If you have any questions regarding these networks or finding one that may be able to help you, please feel free to reach out to me at: Robert.Krakehl@stonybrook.edu.

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

LIPTA Spring Conference

Saturday, April 29

8:30 — Noon

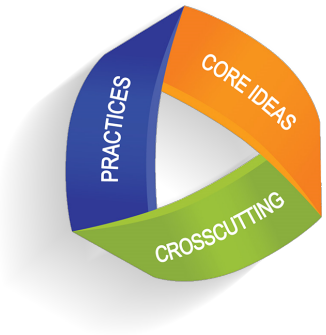
Northport HS

NGSS / NYSSLYS Phenomena & Anchoring Activities

Presenter: Karyn Libretto

Despite their centrality in science and engineering, phenomena has traditionally been a missing piece in science education, which too often has focused on teaching general knowledge. This can cause students to have difficulty applying their knowledge to real life situations.

Anchoring learning in explaining phenomena supports student agency for wanting to build science and engineering knowledge. Students are able to identify an answer to "why do I need to learn this?" before they even know what the "this" is. By centering science education on phenomena that students are motivated to explain, the focus of learning shifts from learning about a topic to figuring out why or how something happens. Explaining phenomena and designing solutions to problems allow students to build general science ideas in the context of their application to understanding phenomena in the real world, leading to deeper and more transferable knowledge.



A Brief History of Neutrinos

Presenter: Harry Stuckey

Ever wonder how scientists found the neutrino? How did anyone know to look for it, and what good is it? The story takes many turns including the Nobel laureates who wanted to scrap a conservation law, the theorist going through a painful divorce, a major journal's blunder, a mysterious (and still unsolved) disappearance, the political defection of a major player, and the Nobel prize given to a self-described plumber. All that and more will be revealed in this presentation on the "ghost particle".

3 CTLE credits available

$15 online registration by Wed, April 26

$20 to be paid at the door after April 26

Full details and registration at www.lipta.org