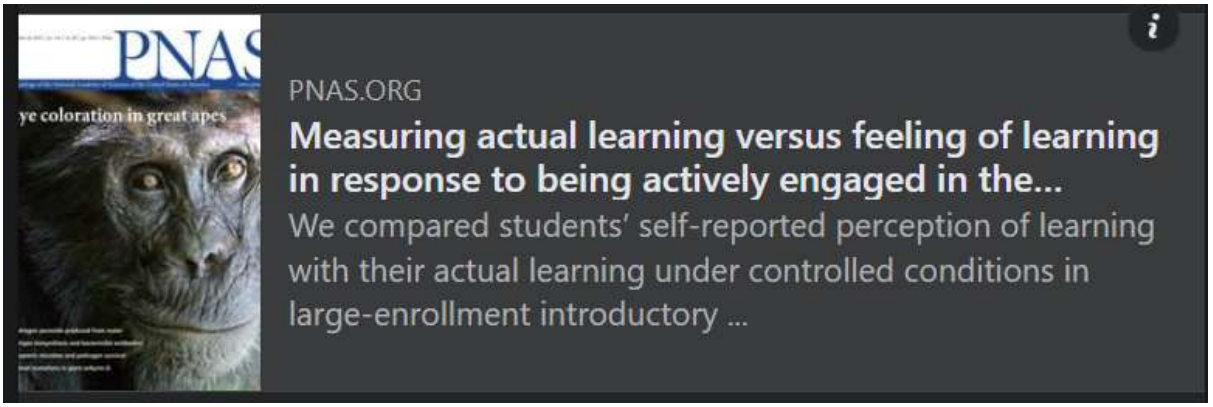
Exploring and Applying Physics

Facebook group

Member's posts from 2023

Carolyn Sealfon
January 4
.

First-day-of-class idea
I wanted to run this idea I just had by this group. I'm thinking of discussing the Deslauriers et al. 2019 study on measuring actual learning vs. feeling of learning in active learning vs. passive lecture, to help shift students' expectations. After facilitating OALG 1.1.3 (balloon-pop ISLE-cycle activity, but in an in-person large-class meeting, which I hope can be done in 15 minutes), I was thinking of using this study as another illustration of the ISLE cycle: sometimes physicists investigate how people learn physics, too! I'd probably present the phenomenon to be investigated (how active learning vs. lecture affects student learning and perceptions of learning), explain the observational experiment to investigate this phenomon, share the results (graphs) and ask students to find a pattern. Then I could ask students to generate possible explanations of the pattern(s), and I could connect their ideas with the possible explanations that the study authors proposed. As time allows (I'd have about 10 minutes for this whole discussion), we could discuss what evidence could support or refute various ideas. Thoughts? Comments? Proposed modifications? Link to study:



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Nejc Davidović shared a post.
January 10 at 10:14 AM
.

I just noticed this post in another group. Interesting explanation, I have a diffrent hypothesis though 🙂. Now I just need a testing experiment, haha.

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EbX26NxlRcUJBwh0gqLQcEHOSawpwmSxp9Dxb4aYkA_JJh8a6wUiVoJYq6XUJyoJTu-l8dXUQ0S&__tn__=%2CO%2CP-R

Rebecca Kung
January 10 at 7:47 PM
.

Quick question - why chalk crushing ability and not clay pyramid crushing ability? It seems that if I make a small, pointy pyramid out of never-dry clay/plasticine, I could have a better sense of how much crushing ability a block had by how much the pyramid flattened. Whereas chalk is either crushed or not, and also makes a mess and is not reusable. Am I missing something, or would this substitution work?

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Rob Mason
January 10 at 10:29 PM
.

Has anyone come across platform scales that are calibrated in Newtons? I am specifically thinking about the activity in the Ch. 3 ALG that involves a mass that is partially supported by a hanging scale and a platform scale to show the summative nature of forces. I currently do this activity with a scale calibrated in grams and a hanging scale in Newtons. I have to explain how to interpret the electronic scale to Newtons. It would be so much easier with a scale calibrated in Newtons! I searched a few science supply sites with no luck so far. Thanks!

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Christine Russell
January 10 at 10:44 PM
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First day of classes in the new year and we did the chalk crushing experiments. Since the chalk made a mess on the table, we moved outside. The students really enjoyed this experiment. The new quantity they came up with is “chalkafication”. That will do for now.

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Allison Daubert shared a link.
January 11 at 1:31 PM
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Looking for a 3-credit online graduate course about teaching with ISLE? Or, are you looking for a complete MA in Physical Science for Teachers that is an ISLE based program? Bridgewater State University in Massachusetts is offering a completely revamped graduate program for Physical Science teachers. It can be completed 100% online or has optional in-person components for local students. I have seats available in our spring semester course which is all about teaching with ISLE! Feel free to comment here or PM me with questions.

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Jose Garcia shared a link.
4d
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I have a few questions for the group. First of all, why is glass "transparent"?
Some of the explanations I have recently heard of are the following:
-Explanation 1: Scientific American: In pure silicon, there is a very strong absorptive process at work: the incident visible light is absorbed by electrons that then move from one electron energy state to another (an occurrence technically known as a band-to-band transition). Glass, being silicon dioxide--not pure silicon--does not have this band structure, so it cannot absorb light as pure silicon does. Sand, on the other hand, is also silicon dioxide, but it is so filled with impurities that light simply scatters outward incoherently and does not pass through to a noticeable extent.
"A material that appears homogeneous to the human eye is really made up of minute crystals--regions in which the atoms or molecules follow a regular order. The boundaries between these regions are called grain boundaries. If the distance between boundaries is smaller than the shortest wavelength of visible light (in other words, if the refractive index of the material is uniform with respect to the light passing through it), then the material will appear transparent. Each boundary tends to diffuse the light that passes through; if the regions are small enough, however, the light waves essentially 'jump' right over them.
"Glass (which consists of silicon dioxide along with a few impurities) is not really a solid; it can be more accurately thought of as a supercooled liquid. It has no internal grain boundaries, and hence it looks transparent. Solid silicon dioxide (sand), in contrast, has obvious grain boundaries, so it is not transparent.
https://www.scientificamerican.com/.../what-determines.../
Explanation 2: TED talk https://www.youtube.com/watch?v=VwRLIt6jgdM This is very similar to Explanation 1
Explanation 3: Online forum University of Illinois: Not all glass is transparent, since some of it is colored, meaning that it absorbs some frequencies of light. Nevertheless, as you say,

glass that doesn't absorb light does transmit it. In that way its similar to transparent crystals, such as diamonds.
The reason is basically that the index of refraction of the glass is very nearly uniform on distances as large as the wavelength of light. That means that the light waves transmit smoothly, not bouncing off different directions. Although the individual atoms in the glass would scatter the light in different directions, just as a stick in water will scatter a water wave. However if you put a lot of regularly placed sticks in water, much closer than the wavelength of the water wave, the scattered waves from the different sticks will not be in phase except in the forward and backward directions. That means that when you add the waves in other directions the crests and troughs will cancel.
Something very similar happens for light hitting glass. Some of the light bounces back from the surfaces and some transmits through. It doesn't scatter off to the sides, except for a small amount due to small unevenness in the density of the glass.
https://van.physics.illinois.edu/ask/listing/19452
Explanation 4: (Comment from someone from physics.stackexchange.com) Glass does absorb photons - they are absorbed by the inter atomic bonds (phonons) and re-emitted, this is essentialy why the speed of light in glass is slower. It appears transparent because the direction of the light is preserved by the ordered bonds and because little of the energy is lost
Explanation 4 is the one I learned when I went to college. All other explanations seem to ignore the fact that it takes longer for light to travel through glass than it does through air or a vacuum. My understanding of this time difference is that indeed visible light is absorbed by glass and also re-emitted in the same direction.
Here are my questions:
-How do we test these different explanations? This question assumes we have all the resources needed to test them.
-How can we guide our students test these explanations in the classroom? This question has to do more with what equipment we already have in the classroom, pedagogy, etc.

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Daneil H. Lee shared a link.
3d
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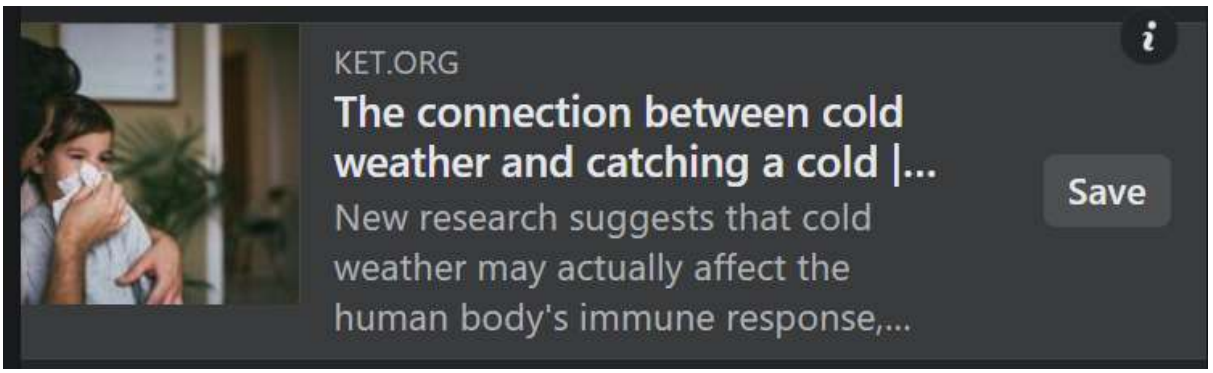
ISLE cycle that leads to quantitative hypothesis!!
https://www.ket.org/.../the-connection-between-cold.../....
#BiologyIsJustPhysicsWithLessAssumptions
#DoesThatMeanBiologyIsActuallyEngineering??🤔🤔



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Gary Bass shared a post.
January 19
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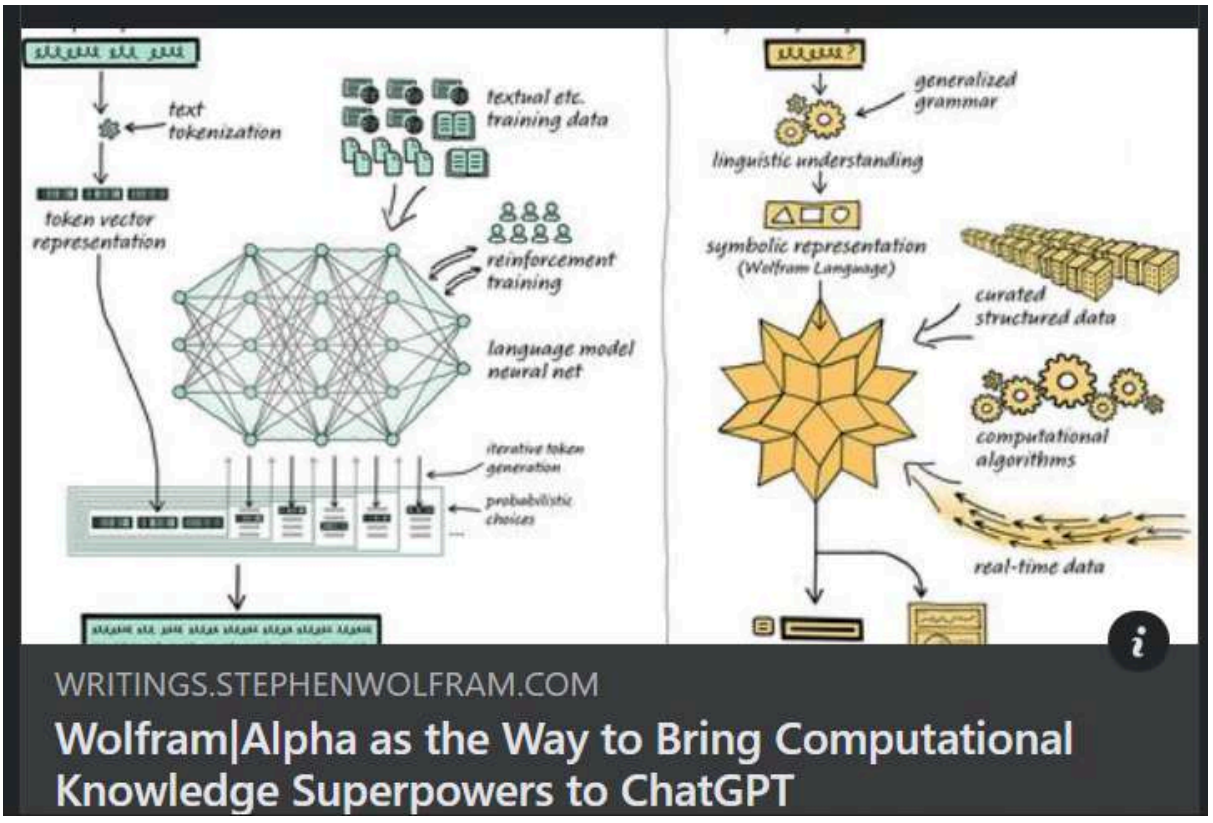
This will expose any physics question which only requires remember and repeat..
https://writings.stephenwolfram.com/.../wolframalpha.../…



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Rob Mason
January 24 at 4:03 PM
.

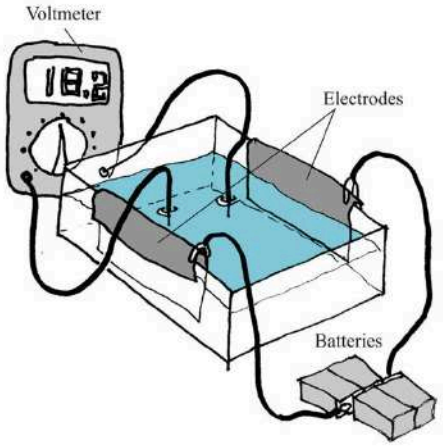
Has anyone else tried this activity from the Ch. 18 ALG? I have tried it with batteries and a power supply. In both cases, I am not getting a consistent potential difference between predicted equipotential lines (which *should* be equally spaced, right??). The difference actually increases as you approach the higher potential terminal.
Any thoughts or suggestions?

18.4.3 Test your ideas

Lab: *Equipment per group:* a plastic container filled with tap water, two metal strips (you can make them from aluminum foil), connecting wires, alligator clips, a voltmeter, and a set of four 9V-batteries connected in series (total of 36 V).

In this experiment, you will use a device called a *voltmeter* that allows you to measure the potential difference between two points. You will also use a battery that creates a constant potential difference between two metal strips connected to it.

You fill the container with tap water and place metal strips (electrodes) as shown in the figure on the right. You can measure potential difference between two points by touching them with the voltmeter leads. These can be the electrodes or two arbitrary points in the water. The potential difference provided by the batteries across two electrodes is 36 V.



Assemble your equipment and predict the distribution of $\vec{E}$ field lines and equipotential surfaces inside the container (on the surface of the water) assuming that the electrodes (the metal strips) create an electric field inside the container in a similar way to charged parallel plates creating an electric field in air. Make your predictions as detailed as possible, draw the shapes of the equipotential surfaces, and label (approximately) their values. Then conduct the experiment and compare the measurements to the predictions. Do you need to revise your ideas?

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Tom Prewitt
January 24 at 5:44 PM
.

I am going to need to be out for about a month. I want my students to continue exploring and applying physics but they will need to do it on their own. There will be substitutes but no one capable of teaching physics and certainly not in the ISLE framework. What do I do? Is there a way to stay with PUM or OALG? The Physics Classroom has good videos. Should I try posting those to Google Classroom? What do you all recommend?
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Blake Laing
January 25 at 2:02 AM
.

Hello all. I am trying the ISLE approach for the first time at a level I've never taught before: the general education college class often called "Conceptual Physics". Yes, I'm aware of Eugenia's College Physics textbook, but my class is at a level lower than algebra-based physics or AP physics. More like high school freshman physics.
1. Is there a textbook that I should check out as an alternative to Hewitt's Conceptual Physics for this approach?
2. I know that ISLE is a philosophy rather than activities. But are there resources I should know about that aren't algebra-based? The PUM approach (and materials) worked great for kinematics, but we're done with kinematics now. My plan is to draw from the ALG as much as I can unless there's something written at a lower level.
Thanks
Blake Laing
Physics, Southern Adventist University

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Ting-Hui Lee
January 25 at 5:51 AM
.

This semester I started asking the students to share "What did they learn today?" 5 minutes before the class ends. The rules like Allison Daubert said, they can't repeat what was said before them. The first day I did it, the students were somewhat timid and needed some encouragement to raise their hands. The second day, their hands went up so fast that I had

a hard time deciding who to call first. Any good suggestions as to how to choose which student goes next? Would it be better to determine the order of them speaking before we start?

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Ting-Hui Lee
January 27 at 6:50 AM
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I am teaching a physics teaching seminar course. I have 7 students, 2 of them already know they want to be high school physics teachers, the others are there because they thought it sounds fun, it can be useful later and so on. They are all physics majors who have at least gone through University Physics I and II (not ISLE). Yesterday I gave them a marble, two meter sticks (to make a track), a bunch of salt or pepper packs, and asked them to investigate motion with constant velocity. They worked in groups and quickly drew position-versus-time diagram and found the slope. Some of them spent time to figure out the best way to make the marble move with constant velocity, which is fine with me. But I found most of them would just focus on finding the answers. I had to pulled some of them back to think about the basics, draw dot diagram and motion diagram. I can talk about some common difficulties students have from the instructor guide, but I don't think that will be very effective. What can I do to make my students think like novice physics students, and then think like teachers teaching novice physics students?

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Amanda Thompson
January 29 at 7:54 PM
.

Hi everyone, I would love to hear from someone who is using the PUM modules in their high school classes. What does that look like for you? Do you work through each lesson with homework and assessment, do you use any supplemental materials? I really like the way they are set up, but I am interested to hear how they are implemented in a classroom setting.

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Carolyn Sealfon shared a post.
January 29 at 11:21 PM
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Fyi. Calling all North Americans here--join one of these conversations!

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Ting-Hui Lee
February 1 at 7:23 AM
.

I would love to use rollerblades in my physics teaching class, but I can't skate. We have a hovercraft I can use, but the experience is not quite the same, and it's more likely the schools they are going to won't have it. Two of the students have skateboards. Will they work?

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Jose Garcia
February 3 at 9:32 PM
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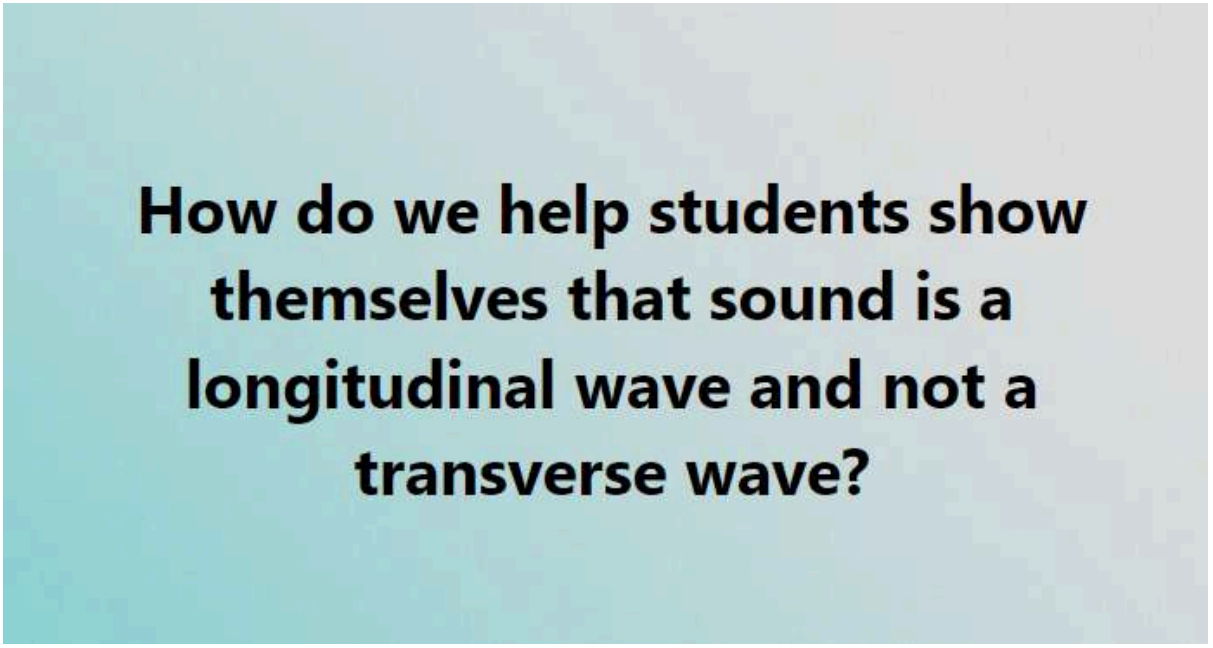

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Karen Dodson Ladd
February 3 at 10:05 PM
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How can I get a copy of the Explore and Apply textbook? I am a consultant and work with science teachers. I previously taught with the 1st edition Etkina text.

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Katerina Visnjic shared a link.

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February 5 at 8:54 PM
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Princeton University is hiring physics lecturers!
https://puwebp.princeton.edu/AcadHire/apply/application.xhtml?listingId=29166

Full time, with the possibility of long-term and (eventually) promotion. We do ISLE labs for many of our introductory courses, so I thought some of you in this group may be interested. Feel free to forward to others.

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Jose Garcia shared a link.
February 6 at 4:07 PM
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Why Are Plants Green Instead of Black?

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Anne L. Caraley
February 9 at 12:20 AM
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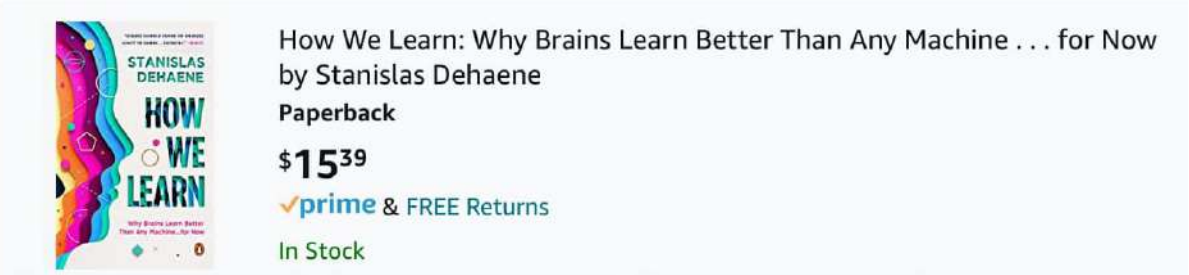
Hi. Based on some of Eugenia's posts and/or discussions during the workshop a few weeks ago, I had this book sitting with one other similarly themed (and suggested) book in my Amazon shopping cart (save for later).

I've just made a slip up and accidentally deleted the suggested companion book from my cart.
Any ideas which it might have been?
Thanks.



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Chance Theriot
4d
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Does anyone have any ideas for what to use as a substitution for a ripple tank with overhead projector to show "live" wave interference? Yes, I know there are simulations, but I was hoping to do it in person.

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Redentor Rojas
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After several years I am again teaching Physics 101 at the college level, and this afternoon I discussed the different fundamental quantities, as the following: length, mass, time, electric charge, luminous intensity, amount of matter, temperature. One of my students reacted and disagreed, he said he saw from the internet that electric charge is a derived quantity, and electric current instead is the fundamental quantity...when i skimmed the internet awhile ago, indeed, there are many sites saying so. However, as I try to read closely, it is the SI system that adopted the definition that electric current is the base(?) quantity not electric charge, because it is easier to measure current than electric charge. Is there really a new definition

of fundamental and derived quantities? What I know is, fundamental quantities cannot be described in terms of other quantities. Electric current is defined as charge passing through a cross sectional area per unit time, and so it must be a derived quantity. Any thought?

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Hrvoje Mihaljević
3d
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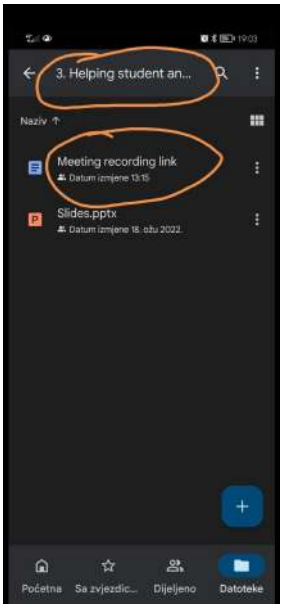
This is the link to Google Drive folder with old posts:
https://drive.google.com/.../10qn...
Here you can find sorted facebook posts from this group, links to ZOOM meetings, slides, recordings, other ISLE resources... Every post has original link so you can read the latest comments. Documents are regularly updated.
Latest update:
Thanks to Eugenio Tufino and Bor Gregorčič we have almost complete recording history of our meetings. Its uploaded to YouTube as non-public videos. Links can be found in the above folder + see the screenshot. Please let me know if you find some errors.
Thanks to Eugenia Etkina for amazing meetings 🙂



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zaGI7Q9iK0VYw6tS_W7pP7oYNEk81tyw020HGmysOwP26fyJyC-OzNymxQ&__tn__=%2CO%2CP-R

Eugenia Etkina
Admin
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Hi all, this is my next post related to the epistemology of physics. We discussed the elements of physics, now we move into how physicist construct knowledge, or how they reason. In other words, we are moving into physicists' habits of mind. This is a short post - an intro to the next series. Please do not forget to comment or like it to make it more visible, thank you.
How are the elements that we discussed in the previous posts connected to the physicist habits of mind? When a physicist encounters a new phenomenon or reads a research paper, they habitually ask themselves the questions mentioned in my previous posts about the elements of physics. Maybe not all of them at once, but all of them eventually. That is why physics teachers should not only ask themselves these questions habitually, but engage the students in answering those questions when they encounter new ideas in the course. This questioning prevents students from seeing physics as collection of facts and instead allows them to see the elements as the building blocks of physics, similar to the bricks, windows, banisters, toilets, sinks, etc. as building blocks of a house. One way to do it is to make posters in the classrooms with the questions to be answered about each element and when the students encounter a specific element, focus on the questions and the similarity of all representatives of such element (this is what I did when I was a high school physics teacher). For example, when the students learn a new physical quantity, they should habitually ask themselves its operational definition, units, the instrument to measure it, cause affect relationships, and so forth.
We can think of the elements discussed before as the building blocks of physics. How do physicists put them together or use them to develop the huge body of knowledge that we our student need to learn? In their paper introducing the habits framework, Etkina, Gregorcic and Vokos (2017) give the following examples of reasoning used by physicists: “inductive (experiment-based) and “spherical cow” reasoning, analogical reasoning, establishing causality, questioning claims, quickly assessing coherence of suggested ideas with the rest of the physics body of knowledge, and being able to spontaneously think of an experiment to test an idea when it is proposed (hypothetico-deductive reasoning) (page 010107-7). In the next posts I will elaborate on some of those examples and connect them to physics teacher preparation and professional development.

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Eugenia Etkina
Admin
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Hello @everyone! two things today. First @everyone, I am reminding you of our Vibrational motion workshop on Saturday. A small number of people signed up so far, please do it! Second, I am continuing with the epistemology of physics - what types of reasoning physicists employ to develop knowledge. Here is the first type. PLEASE do not forget to like or comment on the post to make it more visible, thank you.
Inductive reasoning.
Inductive reasoning in physics means finding patterns in the experimental data, constructing models and/or explanations of collected data, making generalizations and extrapolations based on data (Copi et al., 2006). This type of reasoning is crucial for the implementation of the ISLE approach as observational experiments, their analysis and inference of the patterns is the first step in student construction of any concept.
An example of qualitative inductive reasoning could moving a magnet with respect to a coil connected to a galvanometer and deducing the pattern for when the current is induced in the coil inductively.
Activity for the students:
Observational experiment (see textbook College Physics: Explore and Apply, Chapter 21 and corresponding ALG and OALG chapters)
Your group has the following equipment: whiteboard, markers, a coil with several turns, a bar magnet, and an analogue galvanometer.
a. Examine the equipment that you have on your desk. The galvanometer registers current through the coil. It needs to be connected directly to the coil (note, there is no battery). Now that you have connected the galvanometer to the coil, work with your group members to find out what you can do to make the galvanometer register current through the coil. Once you found one way, look for others so that at the end you can formulate a pattern for the cases in which the current is induced. Describe your experiments and findings with words and sketches.
b. Develop a rule: Devise a preliminary rule that summarizes the condition(s) needed to induce a current in a coil.
The students conduct a series of experiments and find that for certain motions the current is induced through the coil but for certain motions and when the magnet is at rest with respect to the coil, there is no current through the coil.
This finding is a pattern, but it can be generalized to a hypothesis. The generalization (hypothesis) would be that one needs to have relative motion on a coil and a magnet to induce current in the coil. We can think of this hypothesis as a causal explanation. It connects the cause (motion of a magnet in a specific way) to the effect (the appearance of the induced current).
This was a qualitative example. To see how we can help students develop quantitative inductive reasoning we use an example from electrostatics. Imagine, that your students are investigating interactions of electrically charged objects. You do not have equipment for them to collect quantitative data, so you offer them the activity which helps then construct Coulomb’s law.
Activity for the students:

Figure at right (not shown in this post, the figure shows a torsion balance) shows a schematic of the experimental setup that Charles Coulomb used to determine the force that one charged ball exerts on another charged ball. He wished to find how the force that two electrically charged objects exert on each other depends on the magnitudes of the charges and on their separation. Coulomb did not have tools to measure the absolute magnitude of the electric charge on the metal balls. He used an ingenious method that helped him estimate the relative charges. He divided charges on the balls in half by touching a charged metal ball to an identical uncharged ball. The table that follows (see the screen shot attached, the table is adopted from the textbook Chapter 17 and from the ALG Chapter 17) provides data that resemble what Coulomb might have collected. Represent the data graphically collaborating with your group members on a whiteboard. Discuss with your group: which are the independent variables and what is the dependent variable in Coulomb's experiment? Then analyze the changes in the dependent variable as you change only one independent variable at a time. Use this analysis technique (controlling variables) to find patterns in the data and devise a mathematical relationship based on these observations. Put your final equation on a whiteboard and share it with another group.

Notice that the students need to graph the data separately for each variable to infer the pattern of the force being directly proportional to the product of the electric charges and inversely proportional to the square of the distance between their centers. If the students do this activity, they would know exactly WHERE Coulomb's law comes from.

As you can see from the above examples, inductive reasoning is used for the analysis of the observational experiments. The elements of physics engaged in the inductive reasoning are the phenomena (observational experiments), physical quantities, and models/explanations/hypotheses. Sometimes two other elements are engaged too - measuring instruments and physics devices but those are not necessary.

We have developed specific language for the prompts that would elicit students' qualitative and quantitative descriptions of phenomena. Although we listed some of them discussing phenomena/observational experiments, some prompts are new:

· Describe what you observe using simple language that a 5-year-old will understand.
· Describe what you observed without trying to explain.
· Describe the experimental set-up with words and with a sketch.
· Decide what is the independent variable and what is a dependent variable. Represent data graphically.
· Find a pattern in the graph.
· Represent the pattern mathematically.
· Devise and explanation for the pattern (or devise a hypothesis explaining the pattern).

When students collect data, there is an issue of experimental uncertainty. We will return to it later.

Charges (q_1, q_2)	Distance	Force
1, 1 (unit)	1 (unit)	1 (unit)
1/2, 1	1	1/2
1/4, 1	1	1/4
1, 1/2	1	1/2
1, 1/4	1	1/4
1/2, 1/2	1	1/4
1/4, 1/4	1	1/16
1, 1	2	1/4
1, 1	3	1/9
1, 1	4	1/16

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Eugenio Tufino
14h ·
I came across this excerpt from the autobiography of Freeman Dyson, one of the great theoretical physicists of the 20th century, describing a time when he was "relaxing" in the laboratory performing historical famous experiments and the wonder of finding the experimental results described in books. He provides other good reasons to not make cookbook lab activities! 😀

As a relaxation from quantum electrodynamics, I was encouraged to spend a few hours a week in the student laboratory doing experiments. These were not real research experiments. We were just going through the motions, repeating famous old experiments, knowing beforehand what the answers ought to be. The other students grumbled at having to waste their time doing Mickey Mouse experiments. But I found the experiments fascinating. In all my time in England I had never been let loose in a laboratory. All these strange objects that I had read about, crystals and magnets and prisms and spectroscopes, were actually there and could be touched and handled. It seemed like a miracle when I measured the electric voltage produced by light of various colors falling on a metal surface and found that Einstein's law of the photoelectric effect is really true. Unfortunately I came to grief on the Millikan oil drop experiment. Millikan was a great physicist at the University of Chicago who first measured the electric charge of individual electrons. He made a mist of tiny drops of oil and watched them float around under his microscope while he pulled and pushed them with strong electric fields. The drops were so small that some of them carried a net electric charge of only one or two electrons. I had my oil drops floating nicely, and then I grabbed hold of the wrong knob to adjust the electric field. They found me stretched out on the floor, and that finished my career as an experimenter.

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Seth Martin

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I'm wondering if people have experienced pushback from students regarding the labs. I like the type of labs that ISLE uses, but students throw a fit when they aren't given a procedure to follow. I'm trying to figure out how to improve student buy-in and resilience when they are trying to design an experiment to answer a question. Any suggestions?

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Ting-Hui Lee
3d
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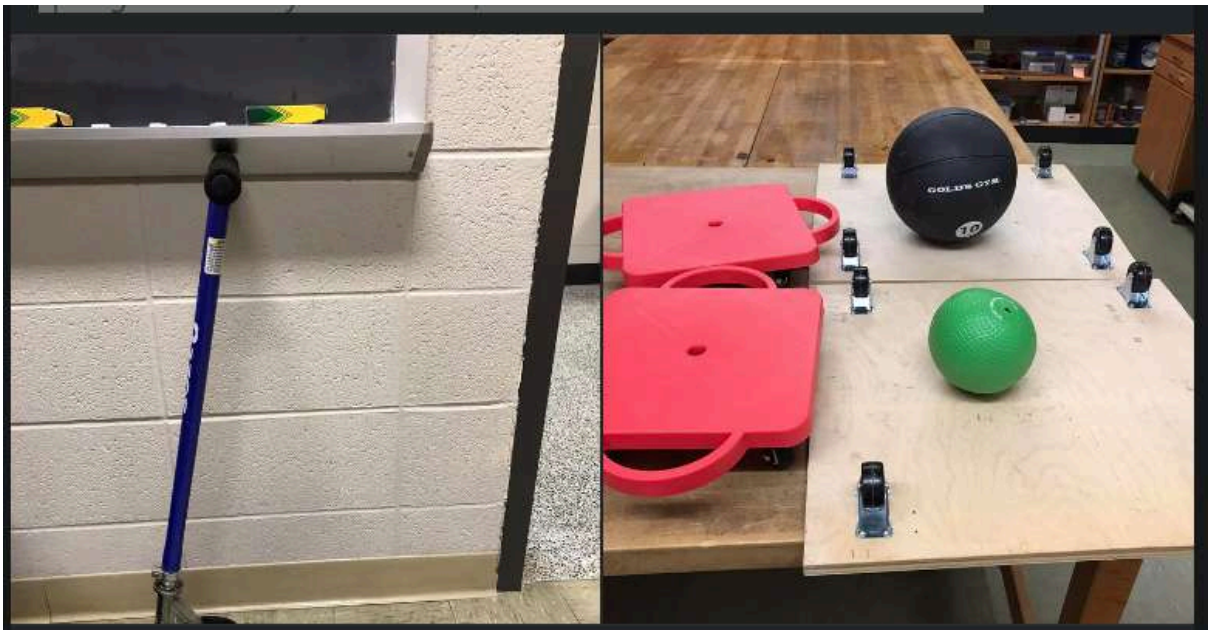
In my physics teaching seminar course, we tested different tools for doing rollerblade physics without rollerblades because no one in the class owns rollerblades. We tried with a hovercraft, a kid's scooter, a kid's sliding board, and a human dynamic cart made by our wonderful lab manager by attaching low friction chair caster wheels to a plywood board. The students like the scooter the best because they can stand, and I can put a bathroom scale on their back to push. The others they have to sit, and get pulled while holding a spring scale. They still worked, but not as effective as the scooter.



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Gorazd Planinsic shared a link.
1d
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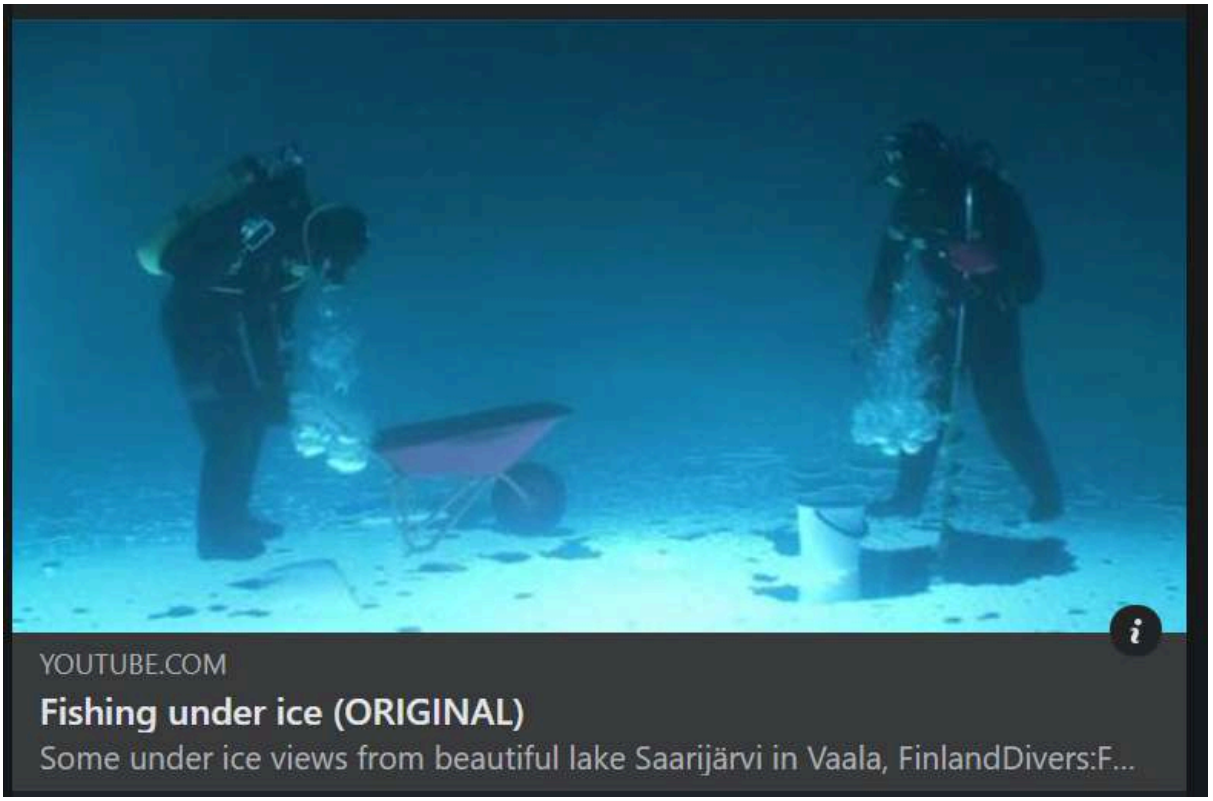
See this upside down world under frozen lake in Finland (it is an old video). You can ask your students to draw a force diagram for the objects in the video.
https://www.youtube.com/watch?v=VIs00QjiJZQ



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Gorazd Planinsic shared a link.
February 26 at 9:38 PM
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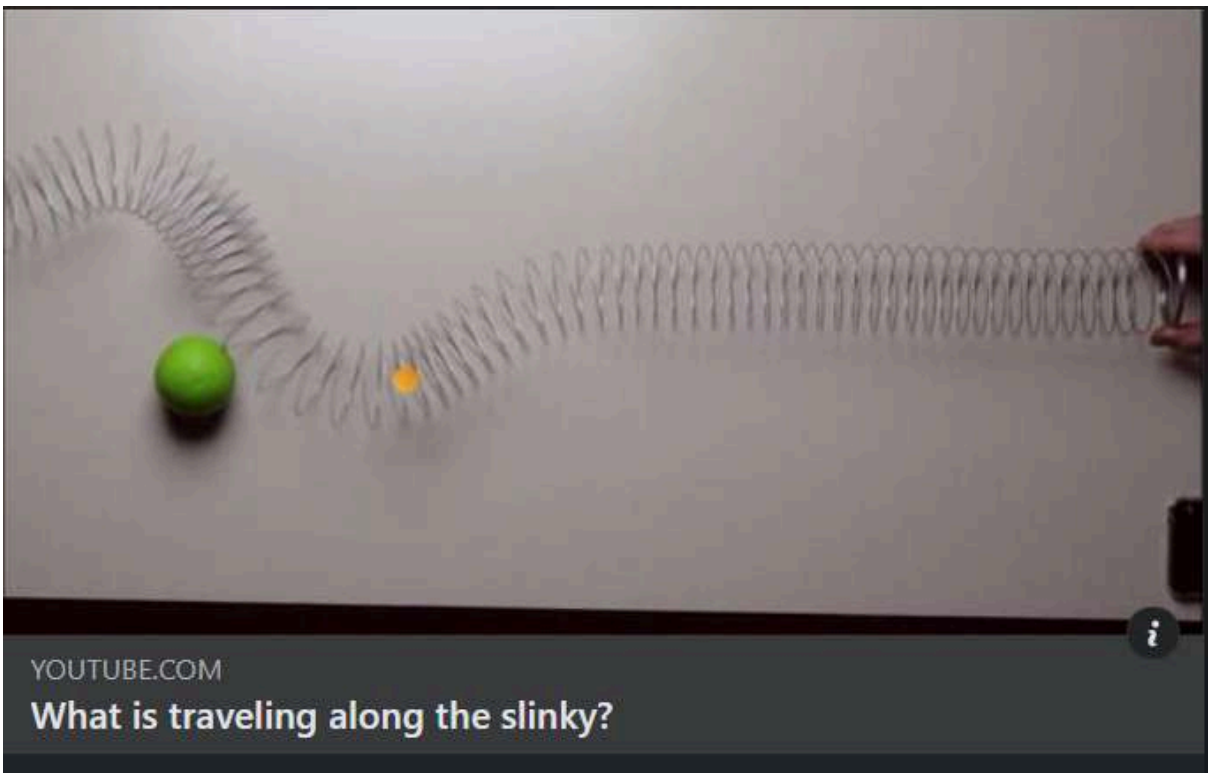
Today's post by Eugenia Etkina inspired me to take this video https://youtu.be/gvKIF1o48c0 What do you think is the best role of this experiment: observational, testing or application experiment? What additional questions would you pose to students?



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Dinah MacArthur shared a link.
February 28 at 9:00 PM
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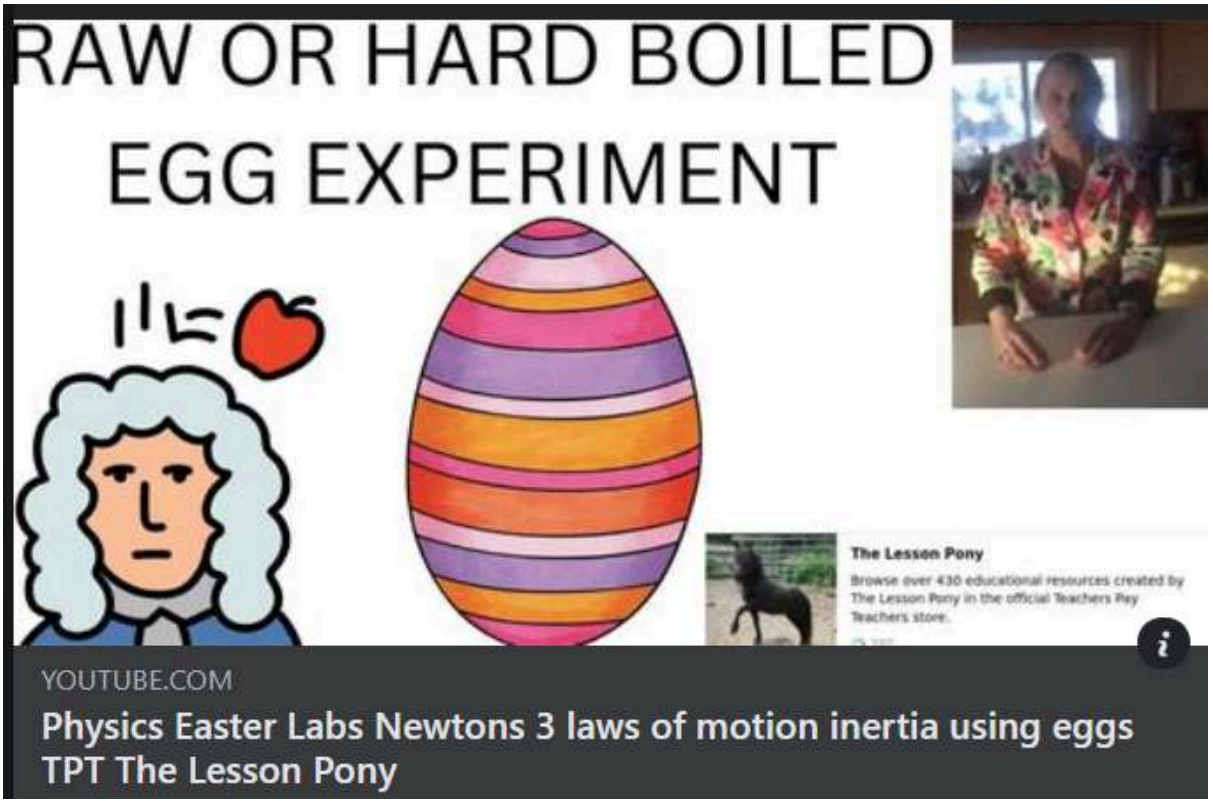
https://youtu.be/OA31_ISf0Yg



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Group member
March 3 at 3:54 PM
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How do you plan out your units?
Specifically, how do you go about deciding what to keep/use and what to let go and at what time during the unit to incorporate certain things? I am not new to teaching, but I still have trouble developing pacing guides / lesson plans that truly work and are meaningful / useful. BTW, my question is not referring to the PG or LP posted for students. Those are practically useless, and none of my students actually look at them.

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Ting-Hui Lee

March 4 at 5:27 AM
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Hello! I started making some notes to sort Eugenia's old posts by topics and dates just so I can find what I need faster. It looks like this:
Chapter 15, thermodynamics: 2022-01-04 to 2022-01-13
Chapter 16, Second Law of Thermodynamics: 2022-01-14 to 2022-01-16
Chapter 17, Electric charge and electric force: 2022-01-18 to 2022-01-23
Chapter 18, Electric Field: 2022-01-24 to 2022-02-05
But then I thought someone else probably has already done it. So I thought I'd ask here if anyone has done it and is willing to share. If not, I'd be happy to share once I finish it.

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Eugenio Tufino
March 7 at 4:40 PM
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Hi! I cannot locate (it does not work the search function) from Gorazd's channel https://www.youtube.com/@gorazdplaninsicfmful3516/featured, the video of the glass with cold water, can anyone help me?

https://www.facebook.com/groups/320431092109343/posts/1374891619996613/?__cft__[0]=AZVmqN0kC5vx0zuhmzwUOAS0vL3VdHDmnUaP15y7lUZcL4EpCOesWc_d_eBOYvS5b-b89TurRktX1Z4Sy1OoxLAX095JHLfOHhourAa1IsZSlTApqAYjodA_XX4UFIbpO-PR3olgaKm

XDBwJtQnNsWYxqWnQ0kED7E52Ye2n0_y5aMMj_lqeBs2f8AlMd31weqA&__tn__=%2CO%2CP-R

Eugenia Etkina
Admin
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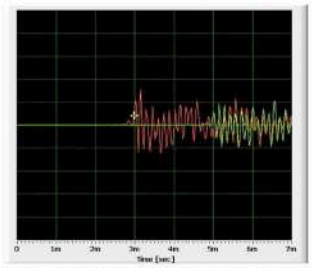
#waves
Hi all Exploring and Applying Physics, I continue with waves today. The example is from sound and it is a great activity. It is an example of the type of problems that are ubiquitous in our materials (both the textbook and the ALG/OALG) - the problems where the students are given the problem situation or a phenomenon and they need to saw all they can about it. They are called "Tell all" problems and they are excellent for allowing students of different level of achievement to succeed. Take a look, solve, and comment! And please do not forget to respond to the post to make it more visible. Thank you!


OALG 11.7.4 Observe and analyze

We placed two microphones 70 cm apart and fixed them to a wooden plank with an adhesive tape. A computer soundcard captures sound detected by each microphone and displays it on an oscilloscope-like screen. The signal from the right microphone is represented with a red curve and the signal from the left one is represented with a green curve. The program for capturing the signal was set in a way that it started recording signals from both microphones when the signal detected by the right (red) microphone rose above a certain value.

The experimental setup is shown in the figure below (each microphone is circled with a color that correspond to the color of the signal trace on the screen):

Experiment We held a mug somewhere close to the right end of the wooden plank (without touching the plank) and hit the mug with a spoon. The recorded signals are shown in the figure below. On the vertical axis you see the pressure and on the horizontal axis you see the time in milliseconds (m stands for milli).



What can you determine from the data collected in this experiment? Make a list of physical quantities and determine each of them.

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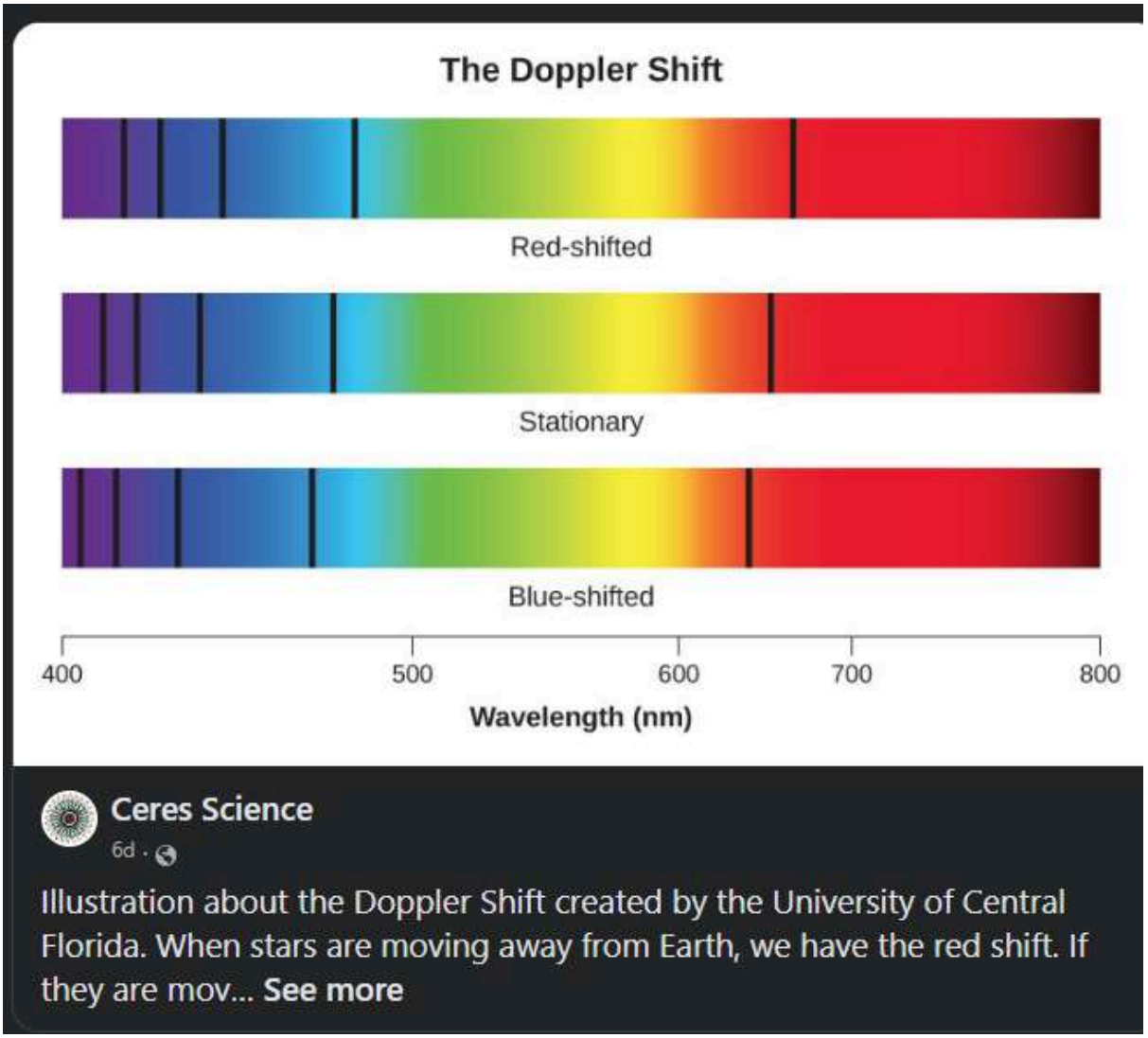
Dinah MacArthur shared a post.



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Danielle Buggé shared a link.
6d
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Hi Everyone! The Rutgers-Newark PER team published a paper on the development of student hypothetico-deductive reasoning skills in ISLE-based labs.
https://iopscience.iop.org/article/10.1088/1361-6552/acb9ca
Diane Crenshaw Jammula, Sheehan H Ahmed, @Josh Rutberg, Rob Charles
For more information on hypothetico-deductive reasoning, see Eugenia Etkina's post from February 20.

https://www.facebook.com/groups/320431092109343/posts/1375677183251390/?__cft__[0]=AZVoVrQOhr1w5VYHZgdhmCbyH94AKnWEZ9PGYKYCjNDfFmVUIRnIXbW26mdRDj9hhQktpw9drgImSWUw3_jkD-dVkgtkS39ecJrvfbyTzVGgYCtstFNFBArcSk3qxfzKTz8HfF1ddKgEAnniBD_pqNZiiB2K7QBtuHs9mpIcztKMAT1jHZwfClBJdHkuZLpMjKE&__tn__=%2CO%2CP-R

Gorazd Planinsic
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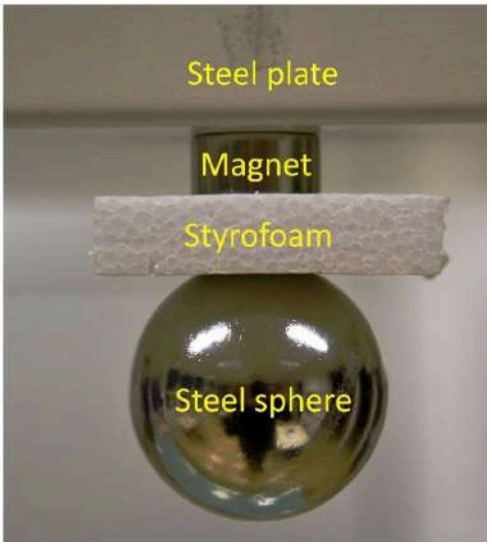
Today I am posting a problem for practicing 3rd Newton's law (successfully tested yesterday with my students, future teachers). The problem involves two noncontact forces (magnetic and gravitational) and the situation in which two objects interact in two different ways. This is an example of a problem where additional bookkeeping of the character of the force (contact/noncontact) is very helpful (see Brant Hinrich's article posted by Jane Jackson two days ago). If someone needs word file, let me know. I encourage you to post the solutions!

A magnet, a piece of Styrofoam and a steel sphere are hanging from the lower side of a steel plate as shown in the figure.

a) Draw a separate force diagram for the steel sphere, the Styrofoam, and the magnet. Assume that the magnet attracts steel and that the Styrofoam is not attracted or repelled by the magnet.

b) Identify forces that are pairs according to 3rd Newton's law.

c) For each force determine its character: weather it is contact force or noncontact force. (Note, forces that require the interacting objects to be touching are called contact forces, while forces that do not require touching are called noncontact forces.)



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Matthew Mac
5d
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Dear physics teachers and researchers. I am a New Zealand teacher who is completing some small PER research this year.
My interest is that when I explain the benefits of PER (Physics Education Research) to other teachers, I feel like I am "selling the solution" without the teachers understanding the problem...
My small research project will be into seeing if I can increase teachers understandings of the need to upskill, and any holes in their knowledge. I was wondering if anyone out there has any experience with this, and any papers you could point me towards?
Thanks!

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Dinah MacArthur shared a link.
March 16 at 11:14 PM
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Christine Russell
March 22 at 5:58 AM
.

I use ISLE in a small classroom setting and I can see it works very well for that. How does it work in a large classroom setting? What adjustments need to be made? Do you need to rely on TAs? How do you make sure groups don't get missed in a large classroom/lecture hall?

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Bor Gregorčič shared a link.
6d
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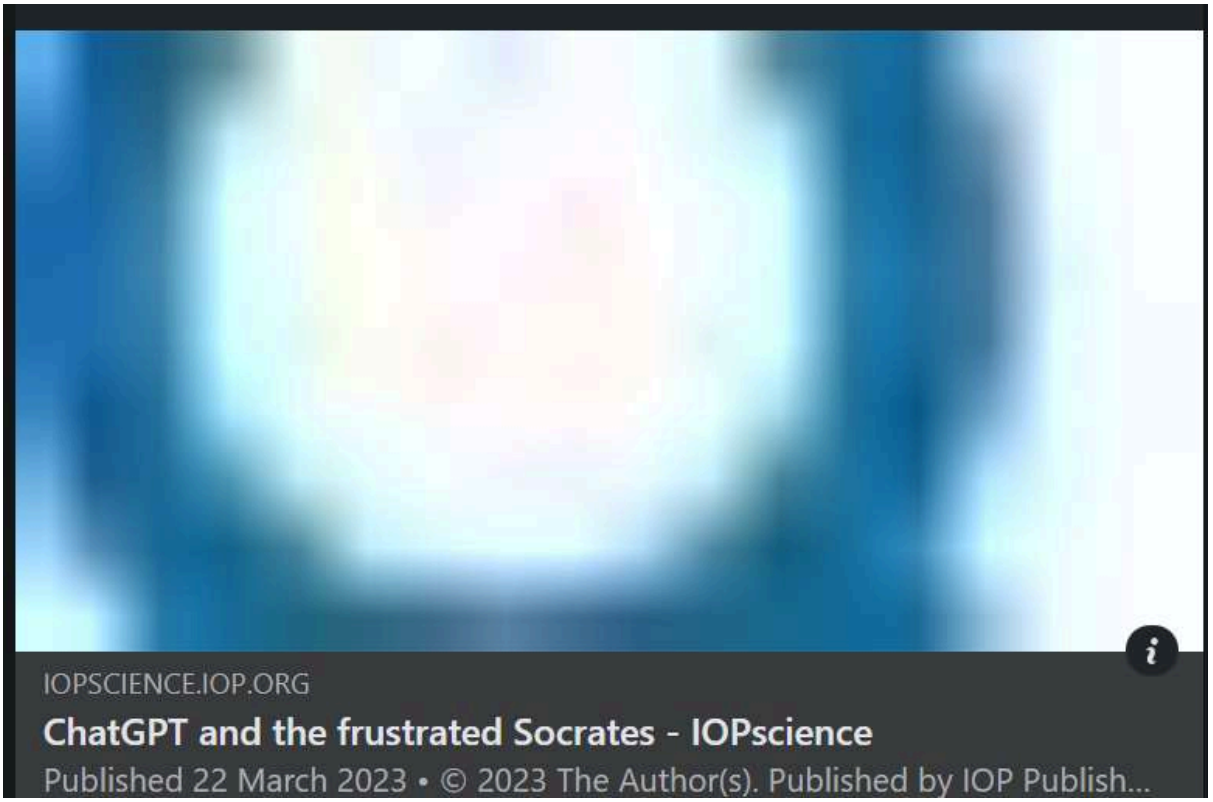
Three months ago, Ann-Marie Pendrill and I wrote this paper. Today it got published and it is already outdated. The pace of AI development really is that fast. I hope the paper will at least serve as a reference point, a throwback to times when AI still couldn't produce a coherent physics argument. Perhaps some of the findings still hold true, but who knows for how long.
https://doi.org/10.1088/1361-6552/acc299



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GS Menaria shared a link.
April 3 at 9:08 AM
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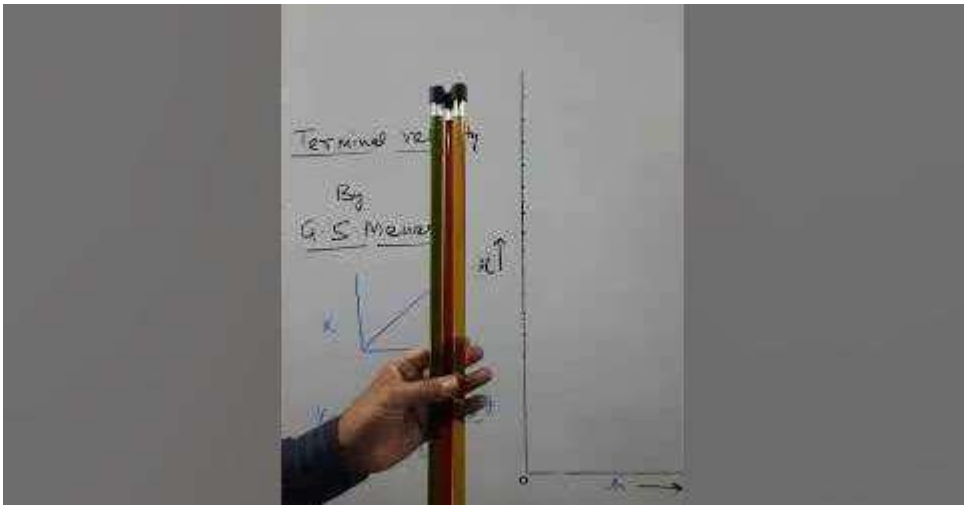
https://youtube.com/shorts/VGf4DuRrU1k?feature=share



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Rebecca Kung
April 4 at 8:09 PM
.

I'm using a mix of PUM I and II to teach a small class of 9th and 10th graders. They have always struggled to rearrange 3-variable equations (like v=delta x/delta t or a =f/m) but lately I have finally realized that they cannot do it at all and were either figuring out the equation based on units or what made sense or purely guessing. I gave them an anonymous survey and students were unable to solve/rearrange most of the equations. Many wanted to subtract a multiplied variable from both sides.
What I'm wondering is, is this worth a battle at this point in the year? I could spend two weeks on this or I could go even more conceptual and just not require this skill. Yes, they passed pre-algebra. No, they clearly didn't learn anything that stayed with them. I do think they will need this skill and should get it, but should I derail to attempt it again, when they didn't get it the first time?

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Dinah MacArthur shared a link.
April 6 at 2:44 PM
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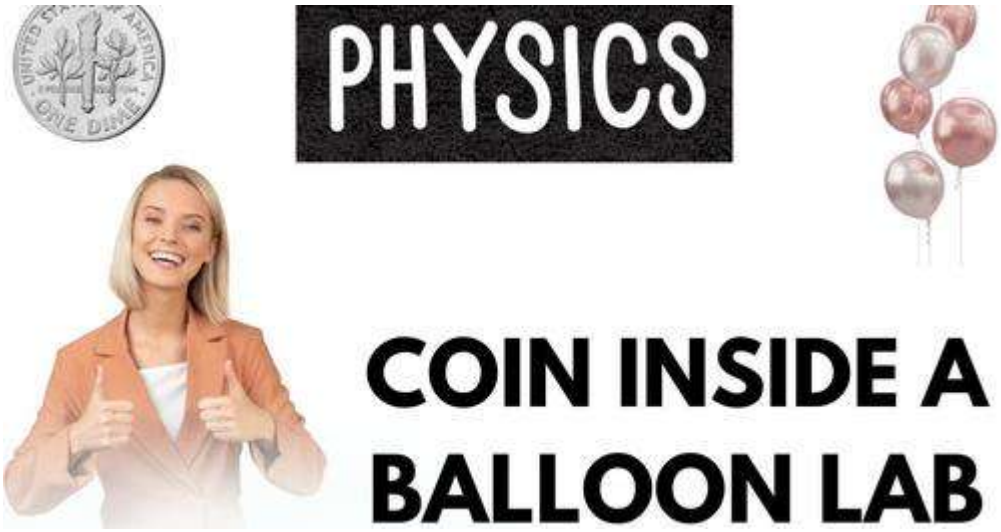
https://youtu.be/o99I_gOhHko



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Jane Jackson
April 8 at 7:57 AM
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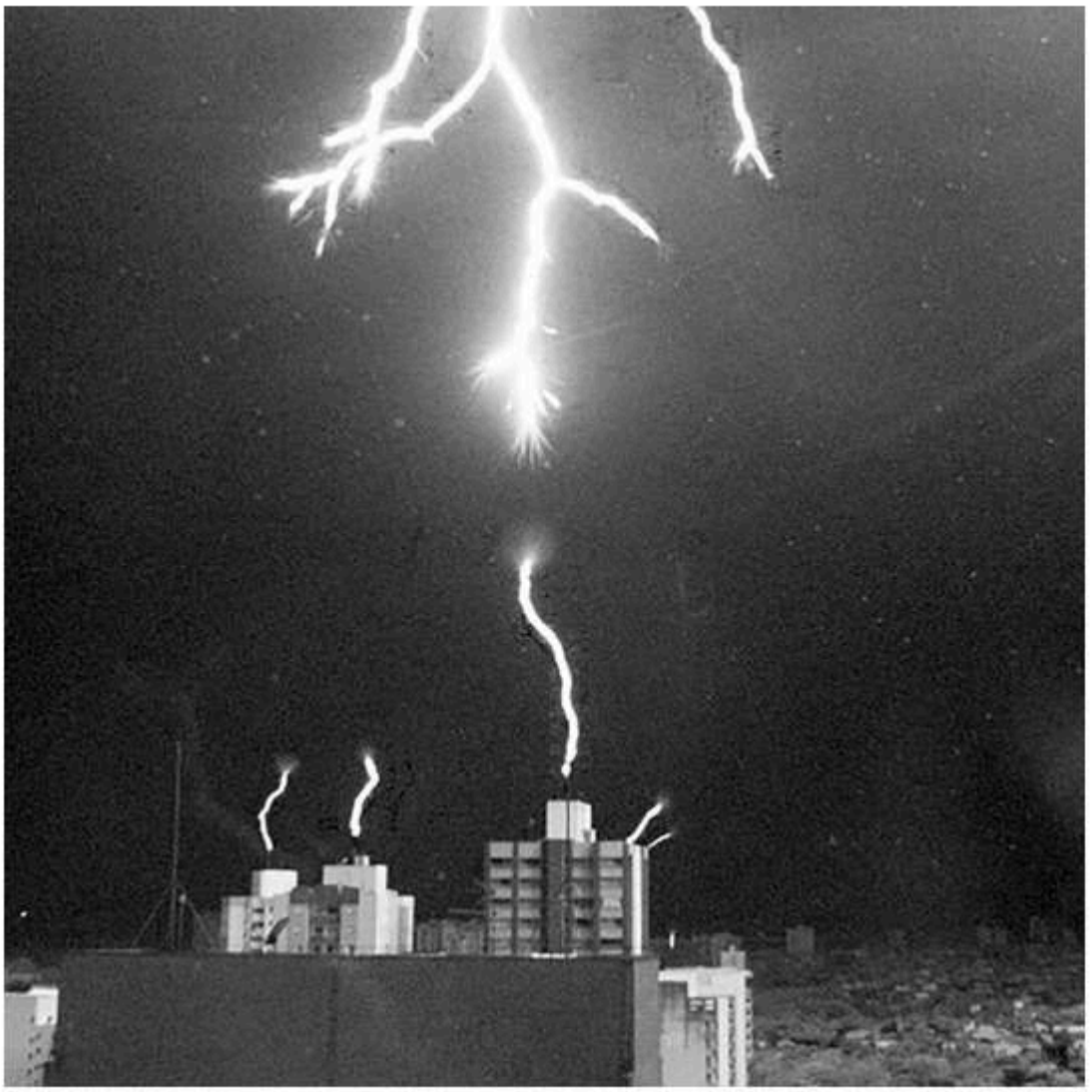
A physics teacher sent me this amazing photo of a lightning flash.



To capture the lightning, the scientists used a camera that records 40,000 images a second.

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Dinah MacArthur shared a link.
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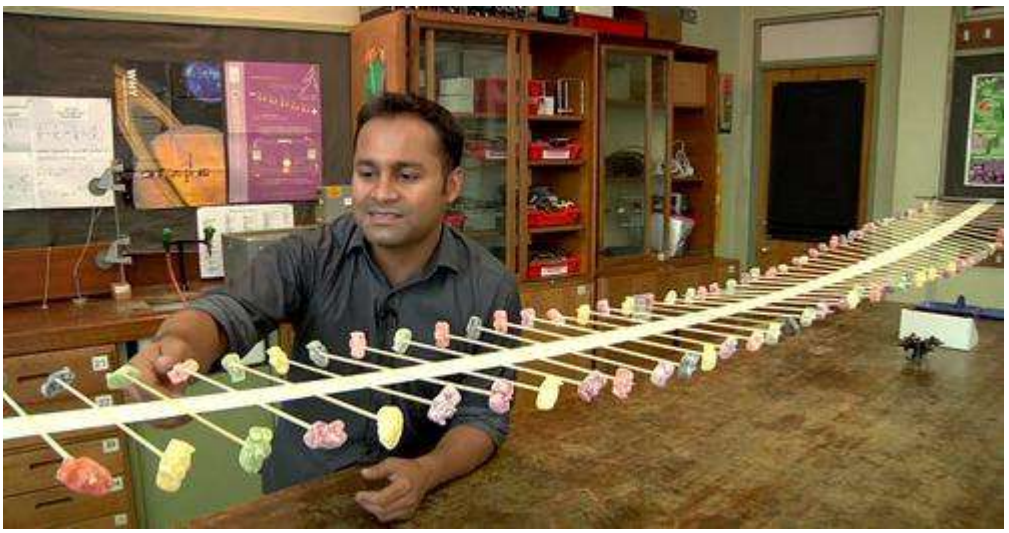
https://youtu.be/VE520z_ugcU



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Dinah MacArthur shared a link.
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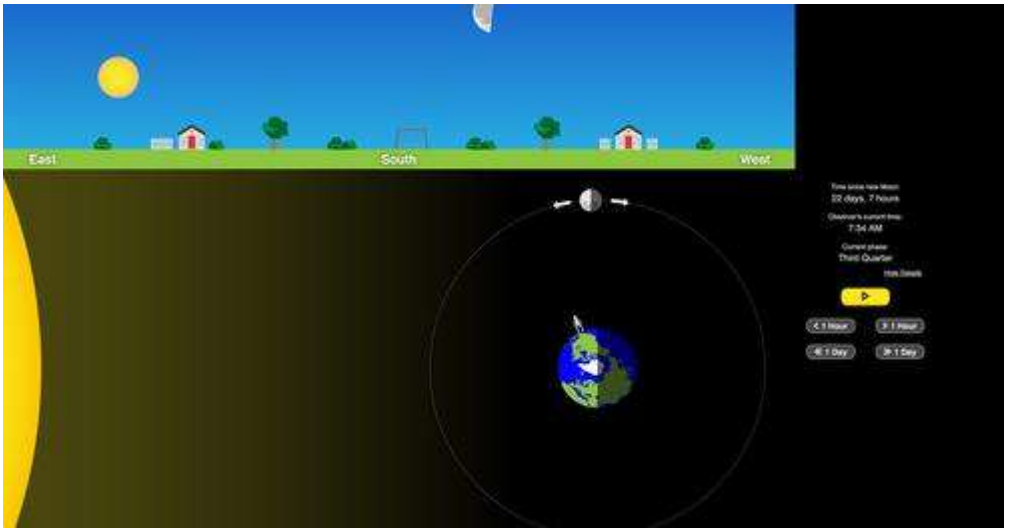
https://mass.pbslearningmedia.org/.../moon-phases.../...



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Kristen Acton-Benton
April 24 at 5:42 PM
.

Cause and Effect: I have been struggling all year to get freshmen to understand this concept. AHA Moment: maybe the problem is the way I write equations. If I started using the "effect = causes" pattern (like they learn in algebra, where x is always the input, and y is always the output), would students pick up on it more easily, or would it just be a memorized crutch?
Is it better to teach: F=ma because it's easier to remember or a=F/m which follows the effect = causes pattern?
And if this effect = causes way is better, how can I apply it to the waves unit I'm currently teaching (waves is a weak spot for me)? Example: v=fw implies that the frequency and wavelength are the inputs, but speed is determined by the medium (so v is a cause), and frequency and wavelength are linked, but which is a cause and which is an effect?

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Tom Prewitt
April 26 at 5:41 PM
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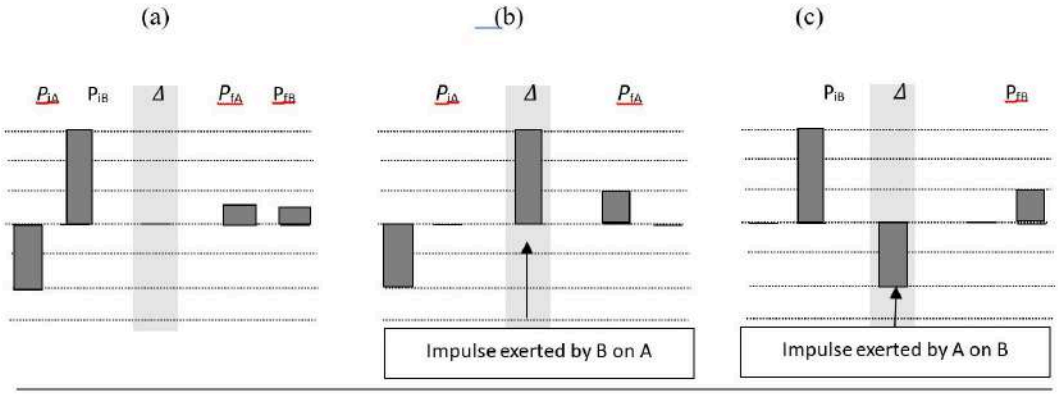
I am beginning to think that viewing everything I do in my high school physics classes through the lens of assessments might be key to inverting my students' (and my) old ways of thinking about how learning happens in high school (and better align it to how learning happens in life after high school). I am offering this up in hopes those of you further down the road to mastering ISLE will comment and coach me.
First, while it isn't explicitly stated in the ISLE documentation (or maybe it is, and I just missed it?), I am thinking the way forward is to focus on exams (assessments) that use the ISLE non-traditional questions.
I am currently on Impulse and Momentum. I found some of these questions in the PUM Physics II Assessment area. Are there other places I should be looking?

A friend constructed the bar charts to answer the questions a-c. Evaluate his answers explaining what is correct and what is incorrect about them, and if you find mistakes, provide your corrected answers.



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Amanda Thompson
April 30 at 2:21 AM

Hi all,
I am thinking through the review question from Chapter 3:
Three friends argue about the type of information a bathroom scale reports: Eugenia says that it reads the force that Earth exerts on a person, Alan says that it reads the sum of the forces exerted on the person by Earth and the scale, and Mike says that the scale reads the force that the person exerts on the scale. Who do you think is correct? Why?
My initial thought was Mike because if the person is experiencing an acceleration the scale will read more or less than the person's weight based on the direction of the acceleration. I saw in the clicker questions that it said two people were correct and this should prompt discussion about which two. Who would the other correct person be? And could you help explain this to me?
https://www.facebook.com/groups/320431092109343/posts/1403519043800537/?__cft__[0]=AZUaMV_y-7CoNlYE9wmqNK1Ilv5hjZ3OYnLciVntkvLveEvJb9mLdh1W2_0Wf2HBCR3j6mqjQpj4ZI6u-r0UKjGMaokGytr6inWpYTdfGDUArsxlABs5qZeBvuLTFSdUslaB0n-C4uaRzQzlrqDhYhys6n6Y1RTPTrO9ItHPQOXl8wdcrkSf53nTOfkzKZiB6Bc&__tn__=%2CO%2CP-R

Chrisso Mallouris Konomou
May 1 at 5:06 PM

Hello Eugenia Etkina. I'm trying to recreate the electrostatics experiments using styrofoam rods instead of the balloons. I'm having issues with finding appropriate plastic materials to rub with. I've tried cellophane wrap paper, zip block bags, and Saran Wrap. Is there a specific material that usually works. Also, it has been rainy and humid here this week, but the felt cloth works really well!

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Dinah MacArthur shared a link.
May 2 at 9:38 PM
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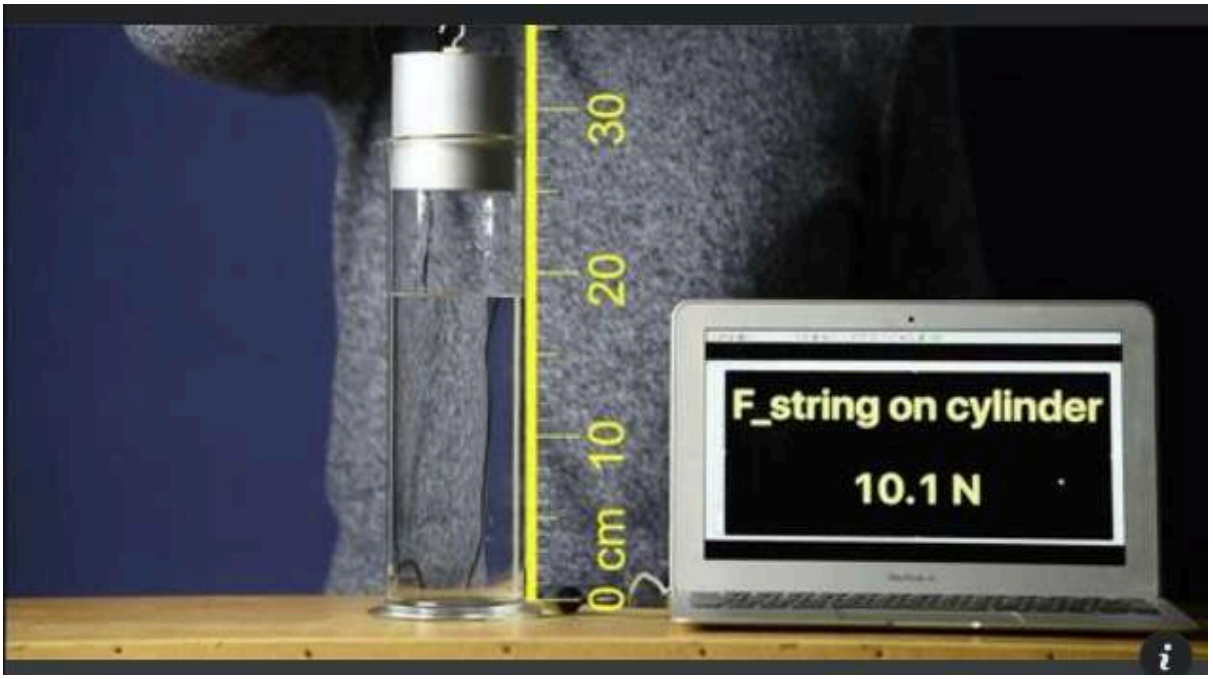
https://youtu.be/SBvMD0oMTJg

https://www.facebook.com/groups/320431092109343/posts/1405174006968374/?__cft__[0]=AZVaJfqEpFyTAoOkGTgQuRtnbQ8mxZYX6bW81SkPm94Z1dQUfzMHz1Fu2FLj9J_QMR9KziRrzdB5chLiVYVKDuy9X4hGeAz3xy_tdiQA40hTgtqIK76EoFBU0xA9Xn73JSmrayG3jtB0mbTcBTAEPHrWNEOR868zqjZRLebIPe-rNFCrLAmKXDyFLFY-_fKI7Ak&__tn__=%2CO%2CP-R

Gorazd Planinsic shared a link.
May 4 at 1:54 PM
.
This is the post related to buoyant force and work and energy. These two topics are rarely explored together but we have examples in the textbook. For example, when we lift a rock underwater by 1 meter, we do less work than if we do the same on land. In both cases, the change in the gravitational potential energy of the rock-Earth system was the same. Where does the extra energy come from when lifting underwater? There is a qualitative analysis of a similar problem in the College Physics – Explore and Apply (page 399, chapter 13; as far as I know, our textbook is the only one that deals with energy changes in hydrostatics).
I made an assignment for my students based on the following video https://youtu.be/bmRbaA9sOwE . Students had to test quantitatively whether the generalized work-energy principle successfully describes the experiment. The initial state is the moment when the lower side of the cylinder touches the water surface, and finally state is at the end of the video. The choice of a system is left to the students. Students are also asked to indicate any assumptions that they made. (The task is an instructive example of how we can make calculations easier by choosing the system wisely).



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Bridget Schober
May 11 at 4:50 PM
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ALG 3.2.1 asks students to use a spring scale and a platform scale calibrated in Newtons to understand forces. I have spring scales calibrated in Newtons but the only platform scale calibrated in Newtons that I have is a Vernier force sensor held vertically with a homemade wooden platform screwed onto the post. Where can I buy a platform scale measured in Newtons? The only ones I see online are ArborSci but they are for people standing on them like a bathroom scale. I need a smaller range.

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Shahram Mostarshed
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Hi, in section 10 of chapter 11 the discussion is about the Doppler Effect, and on page 344 example 11.9 describes a buzzer that is being swung over the head. I'm curious about the solution to this problem as explained in the book. Given that the observer is stationary, why did the solution involve both the source moving towards and away from the observer?
As a follow up I solved the problem using the stationary observer Doppler equation to see what I get for the speed of the buzzer, and what I got was ~9.9 m/s when buzzer is moving towards the observer, and ~9.6 m/s when the buzzer is moving away. Both of these values differ from the solution in the textbook which is 9.8 m/s. My question is why are there discrepancies in the solutions?
I used the following equations:
V_src = V_snd (1 - f_s/f_o) moving towards the observer (9.9 m/s)
V_src = V_snd (1 + f_s/f_o) moving away from observer (9.6 m/s)

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Erin Kathleen
June 3 at 12:05 AM
.

Trained with Matt Blackman at Rutgers many years ago and he showed us how to turn our classroom into a dark room for geometric optics. Finally got around to teaching this unit!

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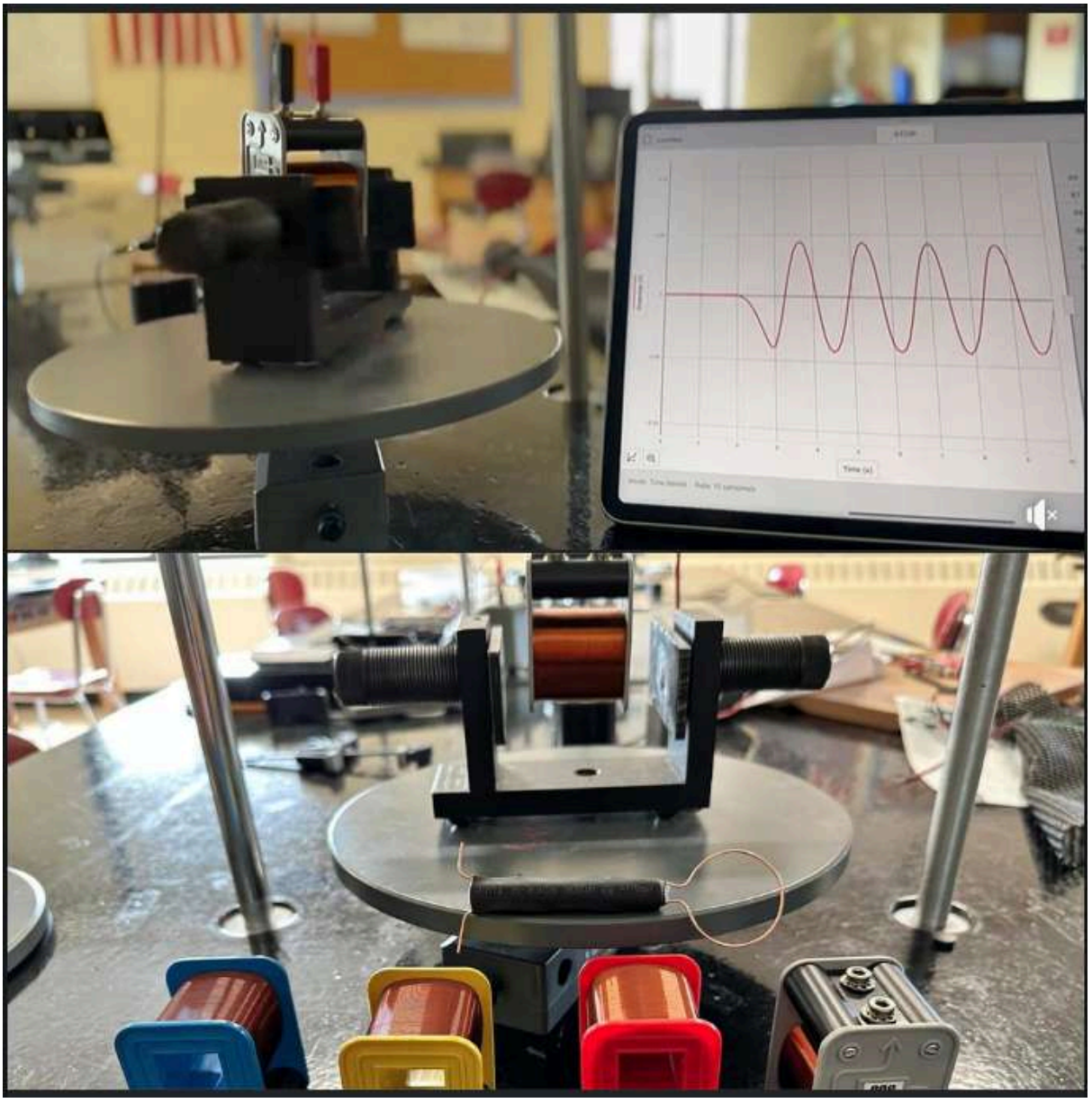
Chris James
2d
.

Inspired by last weeks posts:

Really happy with the way this lab turned out. After doing an inquiry lab where kids used a single coil of wire and played around with moving it through a magnetic field to produce an EMF, they came up with different ideas on how they could get “prettier” results. They had some great ideas which resulted in us grabbing some lab equipment from our UCM/rotation unit and an old PASCO transformer kit that we only ever used for a demonstration. They kids figured out how to suspend the coil between a fairly powerful magnet, and the rotational motion sensor that a platform was fixed to allowed the magnet to spin freely around the coil without any issues. We used a vernier voltage sensor hooked up to either end of the coil to determine the difference in potential as the magnet rotated. The PASCO kit has different coils with turns ranging from 200-3200. They were able to test the EMF produced against number of turns on the coil, and also tested different rotational speeds of the magnet. Data was very clean. They also had to trouble shoot for some crazy stray magentic fields that were causing a lot of background noise in the data. After systematically removing sources of potential interference, they eventually figured out the giant classroom power supply we have was the culprit. After cutting the main the the panel, data was spot on. Chef’s kiss. 👨‍🍳💋



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Joe Milliano
June 14 at 10:54 PM
.

Hi all! I'm on the hunt for some videos of noninertial reference frames. In particular, I have feint memories of (1) a coffee cup spilling over on the dashboard of an acceleration car and (2) random items in a shoebox that is being accelerated in some way.
I think the videos came from this group, but I could be mistaken. Does anyone know of the videos I'm referring to, and do you have the links? Thanks in advance for the help.
P.S. I'll take any other cool videos you have. I played the Humes and Ivey Frames of Reference today, and tomorrow I want to show videos and play a game: "inertial or noninertial frame?"

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Carolyn Sealfon
June 16 at 3:39 AM
.

On the topic of misconceptions: So we know students new to physics don't have "misconceptions" in physics, but rather vague ideas about how the world works that they have yet to carefully test (as per Eugenia's previous posts; we want to help shift the physics education community away from a deficit model towards a resources-based model).
But is there such a thing as misconceptions about teaching and learning? At ISLS, I had a conversation with Jonan Donaldson in which he proposed that yes, misconceptions about teaching and learning exist, but in society and in institutions, not in individuals. Individual instructors don't have "misconceptions" but can internalize and participate in the misconceptions currently perpetuated in our society. I found this idea intriguing. I'm not sure how well I am articulating it as I am in post-conference exhaustion (on the train home), but I wanted to share. I'm interested in your thoughts (or questions if I'm not making much sense at this point).

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JrLw5lg2Z8AVMGromTTTJFyHOpFhqa2chubhiFWWSfYTIFXZ0xxxweoE&__tn__=%2CO%2CP-R

Eugenia Etkina shared a link.
Admin
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June 16 at 4:12 PM
.
Hi @everyone! Yesterday Carolyn Sealfon posted a very interesting question - do teachers hold misconceptions about teaching? As we have talked before, thinking of students' ideas as misconceptions is not a productive way to think of students' ideas for many reasons. That is why we do not use this framework to analyze and explain student reasoning, but adhere to Knowledge in Pieces framework (KIP) or resource framework (I posted about those and you can find those posts in our google folder).
But what about teachers? Is it productive to think about teachers' ideas about student learning that we disagree with (an example of such idea is that only some students are capable of learning physics, not all, or that if you explain something really clearly, the students will learn, and so forth) as misconceptions that we need to hammer out or resources that we can build on? I am inviting you to talk about this. But to help organize the discussion, I would remind that teacher's ideas about teaching can be grouped into three categories: dispositions, knowledge, and skills.
A disposition is a strong (often subconscious) belief or attitude related to some aspect of teaching, that in concert with other factors, shapes a teacher's thought and behavior (for example, that the speed with which a student solves a problem is not important, but perseverance is).
Knowledge - what the teachers need to know to carry out the complex tasks of teaching (for example using motion and force diagrams to help students analyze situations involving forces).
Skills - a skill is a precompiled procedure that one deploys automatically without consciously thinking about it (for example trouble shooting an electric circuit or making the class listen to you when they are distracted).
So, what do you think? In which category do teachers' ideas about teaching belong and how do these ideas help them or prevent them from implementing the ISLE approach? If you are new to the group, please read about the ISLE approach at https://www.islephysics.net/. I recommend everyone to go there not only to learn what ISLE is but to bookmark all of the resources that we offer.

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Dinah MacArthur shared a link.

June 16 at 11:14 PM

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https://youtu.be/jFiC6lHIYtY

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Dan Ledoux Nightingale
July 3

.

Hello everyone,

I have been a teacher for fifteen years, but I am a relatively new physics teacher (3 years). I am also a new member in the Exploring and Applying Physics group. When I first became a member, Eugenia Etkina, reached out to me and suggested I look into attending the ISLE Workshop hosted at Rutgers University. The workshop was held this past week from June 26-30th, and was run by Rob Zisk and Danielle Buggé. It was a fantastic workshop that introduced me to many of the practices the ISLE approach implements to help students explore physics as physicists do. If you have not had the opportunity to attend an ISLE workshop, I strongly recommend you do so.

Not only did we, as a group of in-service and pre-service teachers, discover ways to adopt this approach, but we were able to observe the method in action through Rob and Danielle's instruction and our work in groups. In addition, we were fortunate to have high school students, who had experienced the ISLE approach, come in every day and work

through the ideas with us. They provided insight into how they perceived ISLE and the benefits this environment had on their ability to comprehend physics.

Moving into the next academic year, I am excited for my students to experience the ISLE approach. In particular, the ISLE cycle including various types of experimentation (observational, testing, and application) is how I hope to structure my units in Physics. The textbook, College Physics: Explore and Apply, as well as the Active Learning Guide (ALG) and Physics Union Mathematics (PUM) resources are invaluable for having students guide their own learning. Look for upcoming workshops if you are able to attend.

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Bor Gregorcic

Hi folks,

anyone know of any ISLE activities in astronomy, especially ones involving night sky observation activities ? I apologise if I am missing something very obvious. Eugenia Etkina, Gorazd Planinsic, Urban Eriksson

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Kateryna Kushnir
July 18
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Hi All, We are trying to integrate ISLE approach in our classrooms and we are a little bit confused with the labs. Can someone please help me figure to this out. Thank you!

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David Brookes
July 19
.

Kateryna Kushnir, in response to your question about labs in ISLE; the question is: How do you want to integrate experimentation into the course? Do you have 3 "lecture" hours a week and a 3-hour lab? Do you have control of both what happens in "lecture" and lab or are they separate courses. Once your circumstances are established, take a look at the ALG activities. There are specific activities that are clearly designated for lab. They come with a bunch of guiding questions. And I or someone else can help you integrate scientific abilities rubrics into those labs by identifying the most relevant rubric items that students should use for self-evaluation and which you can use to grade their work. If it is at all possible, it is best if you can align the "lecture" content with what happens in lab so that it follows one continuous arc of reasoning from observational to testing to application. And if you can do that, it doesn't really matter which part gets assigned to the official "lab" time. When I was in that circumstance, some weeks the students did the observational experiment in lab and we discussed the results during the classroom meeting time (not a lecture obviously). Other weeks we started the sequence with a video of an observational experiment in the classroom meeting time and did a testing and an application experiment in the lab.

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Deepa Jain
July 20

.

Thinking of waves - if you double the frequency, would the speed be doubled? or stay the same?

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Jeffrey Lai
July 21
.

Hey Rob, so depending on which aspect you're on and what is your school budget, there's a few ways:
(1) Buy 12-13 dollar "Thrifty White Panel Board" from home depot and they will cut it into equal size pieces for you. Prices may have increased since I last did this since wood prices are currently up.
(2) For the vertical set-up, you have a few choices: (a) borrow painting easel stands from your art department (b) use your budget to buy whiteboard easel stands if you wish the school to purchase for you (c) if you're hardware savvy with power tools, then buy a 2x3 from home depot (about $3 for a LONG piece and cut down to act as a vertical spine, then buy a pack of Heavy-Duty Bookshelf brackets (in otherwords, and L bracket) from Amazon because Home Depot L brackets cost way too much. When you mount the L bracket onto the spine, you can then use C-clamps to secure the L bracket to the table and C-clamps to mount the whiteboard to the spine.
Liljedahl recommends far cheaper alternatives such writing on windows, or writing on clear vinyl (which is 3 dollars per yard and then you can just nail it onto a wall).

Made a separate post because Facebook wouldn't allow the pictures to go into a reply easily.

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Deepa Jain
July 22
.

Thank you so much Eugenia for letting me a part of the ISLE workshop. Your dedication and time was much appreciated! Every bit over the two days was very helpful, sequential and clarified the pedagogy underpinning the ISLE. This certainly should be the approach followed by the teachers to provoke the inquisitive nature of the students. This will definitely help our students to engage and make that conceptual understanding required to create scientists in long run.I was really benefitted with the techniques, resources, and rubrics. Can’t wait to attend an upcoming one on Kinematics. Also cannot thank enough to Debbie Stephanie, Danielle Buggé, Carolyn Sealfon, Andrew Yolleck for their amazing contribution to the workshop. Much appreciated!

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Andrea Miller Barallardos
July 23

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All I can say is wow! If you are a teacher wondering how to increase student learning, increase AP test scores or looking for a smarter not harder approach to teaching look no further. I just finished the ISLE workshop and I am so excited to start getting my students to think like physicists. In a society where things are commonly accepted on face value, this method teaches students to question "How is this true?" The best part is this is for ALL students not just students good in math. I know it will be hard work to change from traditional teaching but it will be worth it. Thank you to all that lead the workshop over the past two days!

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Kelli Araujo
July 24 at 10:28 PM

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Thank you so much for the ISLE workshop this weekend. I am new to physics and new to this great way to explore and learn physics. Thank you for sharing your tried and true teaching experiences and creative ways to have students decide that they too can be physicists. I am excited for the new school year.

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Andrea Miller Barallardos
July 25 at 5:51 PM

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Does anyone teaching AP Physics 1 and AP Physics 2 have a pacing guide you use for this text? I need a starting point. Thank you!

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Michele Albertine
July 25 at 8:43 PM
.

I just found out to due to low enrollment numbers and the inability to find a replacement for the engineering teacher, they will be combining my physics classes and I will have to teach 2 engineering classes; Intro to Engineering Design and Principles of Engineering.
I'm a geophysicist not an engineer. Can anyone point me in a right direction to get started?

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Tom Prewitt
July 27 at 10:54 PM
.

I am possibly teaching high school on-level chemistry - either as a co-teacher based on my New Jersey "TOSD" certification or possibly a stand-in full time single teacher while my district seeks to recruit someone. Either way, I am looking for something that parallels the Active Learning Guide for E&AP. I see a modest amount of material on the ISLE website. Can anyone point me to any other materials?

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Todd Bayat
July 28 at 9:28 PM
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This year will be my first year teaching physics. I have taught chemistry and biology for years. I will be teaching honors/AP and cp physics. I am looking for labs that people recommend. Thanks for the help.

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Bridgette Boudreaux
July 29 at 8:09 PM
.
How do you assign reading to your students? Do you have guided notes they fill out or do you have them turn something in proving that they did the reading?

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Marianna Anthea Bannon
August 2 at 6:46 PM
.
Hi all, I'm wondering if anyone on the Rutgers team is involved/still using/has more details around using Physics Invention Tasks. I ran across some work and I'm really interested! Thanks!

https://www.facebook.com/groups/320431092109343/posts/1459376454881462/?__cft__[0]=AZX0GmWLcnV_o9l4tElVSZ3Oe01uOD_oy8_4UylWEg_M8LS7apZ-STzjJWtLdUXgcy5-i-cYSuxu7YE-CtggdMjTjK1gH-dncPFJ7TJ1EZpLKKXaDZslVnTtl8lF1tYgQbwcHPtWk2ZGHOHYNWhL7IqmsrtVHeKdwYyAdXerUQnVYFB43pvUZIavW4INLJNGkPM&__tn__=%2CO%2CP-R

Bridget Schober
August 8 at 6:18 PM
.
I would like to check my understanding on problem 2.5. It asks to list all the vectors with a scalar component equal to -2 units. I think that means that scalar doesn't mean scalar quantity but means according to the x scale(axis) or y scale(axis). Scalar quantity means no direction associated with the quantity. It seems confusing to say x scalar component because that seems like we are saying scalar quantity. Is there a reason to use x scalar and not just say x component? In other words, how can a scalar component be negative? Does the scalar in scalar component just mean axis?
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yNyjjzVWsZaYNIUnVde48Yj5LlcAPxakrpJJhRQ3kvo3t3hDMF7HIyJkY&__tn__=%2CO%2CP-R

Paul Wolf
August 8 at 9:05 PM
.
General question about curriculum--and sorry if this is off topic.
My upcoming regular HS physics class doesn't currently have a textbook and we probably won't have time/money to order the whole class a copy of this one. Do you still recommend the PUM materials? I figured I would use the Physics II curriculum here.
If PUM is recommended, are there any guidelines for pacing? It is an 18-week class that meets 90 minutes a day.

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Deepa Jain
August 9 at 2:06 PM
.
Has anyone got any interesting physics demonstrations that we can use during science week to spark interest in students?

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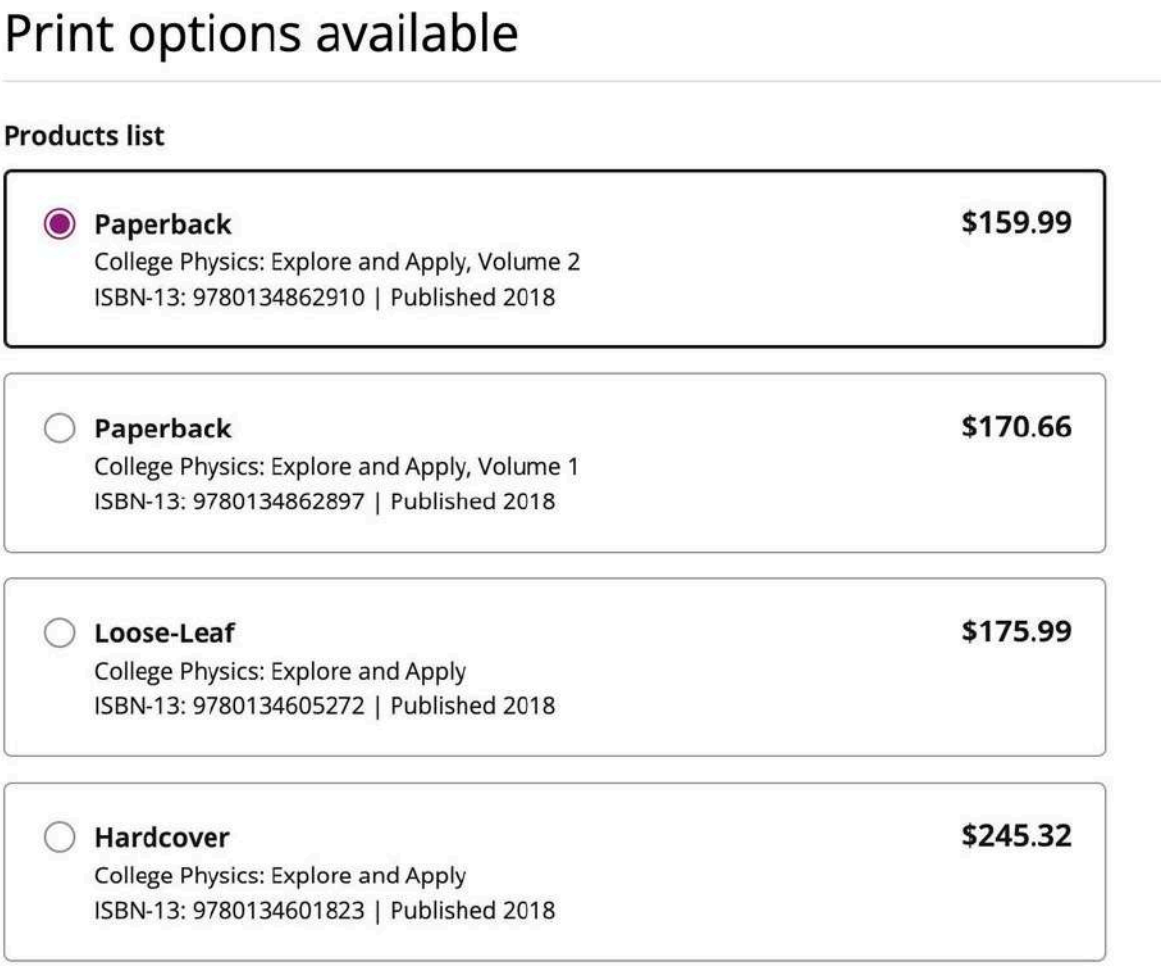
Roby Rod
August 11 at 11:41 PM
.
Hello, I am new here. I am an IB Physics teacher and I am wondering whether ISLE can work with such a fixed and content-packed curriculum as the IB one, where most of the assessment is a standardised test. I have done a lot of work with my students around self-regulated learning, with lots of independent learning, and even so we struggle with time. Thank you.
https://www.facebook.com/groups/320431092109343/posts/1464278227724618/?__cft__[0]=AZWYYVT6d8vtCvsu01c47fTLztL5sTl83cXsLQOr1feyjK_uqCzFZGkKOyTaGor5uVCTt2qn338BWVc_xubsEVoBYC9r0q8UScr071xiipKzyzujAsoPmeamL9EYNALhBANPgQ213OPqWU0u4eYXt3nrUA3DOmQkf580Qs0Kems8UJR7DNsVERhr4GNCkZKULRc&__tn__=%2CO%2CP-R

Roby Rod
August 13 at 12:27 AM

Hi everyone, I am having trouble finding the right textbook. I teach the last two years of high school in the IB curriculum so I think I need the AP version of the book. The link on the ISLE site takes me to the ebook version, and Pearson has the following options (attached in the picture). When I search for the AP version, nothing comes up. Is the AP version one of these? Thank you for your help! (I am based in Europe, I don't know if this has anything to do with the different search results).



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Matthew Mac
August 16 at 2:00 AM

This question is not just for Eugenia, I would love everyone's opinion on this...

I just finished watching the recording of the kinematics workshop. There was one activity where groups compared two dot diagrams, and following along with the slides, it looks as if one group had some confusions. My question is, how do you deal with this in class? I assume with students, they would do these questions on mini whiteboards. Do you point out the mistakes to the whole class? The 'pro' of this, is its a great learning opportunity for everyone, but the 'con' is students don't want to look "dumb" in front of their peers. Thoughts on this? How would you all approach this?
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Amin Rainy
August 18 at 3:19 AM
.

Dear all,
I should order new dry erase boards for my ISLE class (Group working)
I found the following in Amazon. Do you think it is a good selection?
I appreciate any suggestion.

216

https://www.facebook.com/groups/320431092109343/posts/1467442370741537/?__cft__[0]=AZV4L-4AEllQdqXy9wdDs2JBUm7Db6Aa7W2EsCEdYhMAxCX2c21zOjNKYOLRQg8TDCEFrOjMpjgUzYpv45I3gdUIZwOgrcdBQ36B34Biv74pgS0ZXpRd8nPH3k6PfVicSZ1SMFVA0-oo3ESIsMkfr_n14M01ORJSa6iUPSjKNXXz0OOFK5hD07l-ysYesFjXcRg&__tn__=%2CO%2CP-R

Christine Russell
6 days ago
.

Does anyone require their students to maintain an electronic journal of the activities? If so, how do you have them do it and how often do they submit it for grading?

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Sohail Khattak
4 days ago
.

Hello All,
I am a new AP Physics 2 teacher.I was wondering if someone from the group can help me with resources, Scheme of Work, planning etc.
I would really appreciate if someone can be my mentor to assist me and guide me on a proper track to teach AP PHYSICS 2.
Thank you 🙏 in advance.

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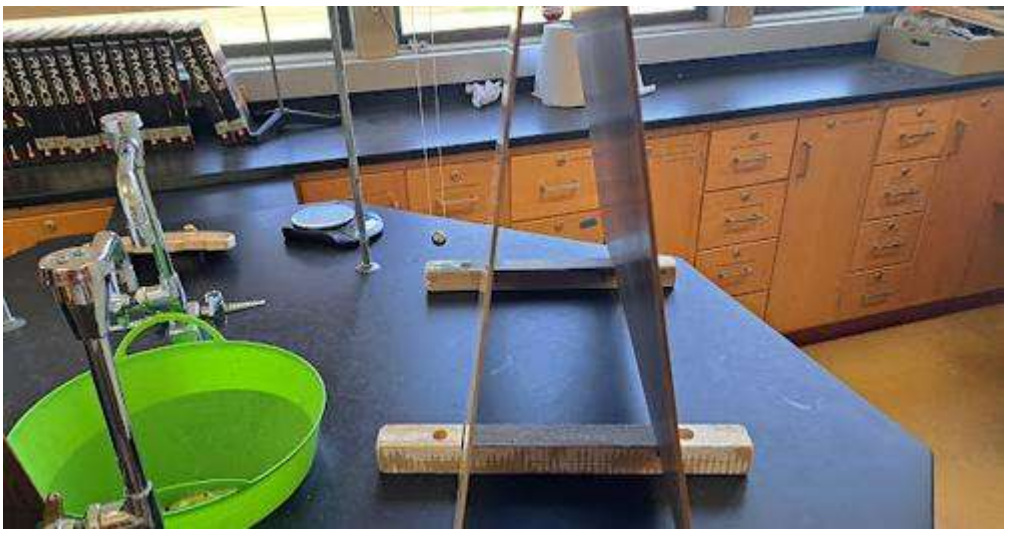
Rob Mason
4 days ago
.

Just revisiting a discussion I had started previously about ways to transition to vertical whiteboarding from seated... this idea was shared last spring in the PrettyGoodPhysics group. It's a pretty clever idea, and I think it will work pretty well with my room setup. I am working with our shop teacher to make a class set to try:
"I'm not using this in the classroom yet, but I made some simple wooden stands by cutting some slots in some scrap 2x2s I had lying about. I figured out recently that I could cut two grooves instead of one and velcro the handles together tightly and it made an entirely passable tripod structure that can be used to go vertical. I don't have enough finished to go classwide with it yet - it's the busy time of year and I can't seem to find time to finish. I think it's going to work well. Photos in the folder here: Feel free to comment.
https://photos.app.goo.gl/ZeYHwBHkb443Hspw6
Super cheap. I used about 10 inches of 2x2 or 2x4 or whatever you have lying about for each support. I think the pen holes were 5/8th's, but Expos don't fit. The Auspens fit nicely in the holes I drilled, and I'll incorporate that into the design as well as a slot for refill ink.
Velcro - I'm going to use Velco One-Wrap wrap for the final product https://www.homedepot.com/s/velco%20one%20wrap?NCNI-5 I've used that for other projects and it will be the right thing. I'm thinking wider is better. I'm guessing 3/4 would work fine, but I might spring for the inch and a half. The prototype is cheaper 5/16 wide about 6 inches long. Might have got it in sets from the dollar store. I think it will work, but could also wiggle its way loose."
Cameron Nickerson



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Tom Prewitt
2 days ago
.

Edutopia, this week, has an article, "How to Motivate Students to Work in Collaborative Teams." The article recommends the book, "The Power of Teams" by Toth and Souza. Some Amazon reviewers rate it "average" though. Small team learning is so important to ISLE (and all practices). What is your recommendation? I need some practical things I can teach my students.
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Rob Mason
2 days ago
.

I'm doing Activity 2.2.1 in the ALG (battery cars and sugar packets). Every year, in every class, I have this issue: When I ask them to describe the motion, they default to measuring the distance and time and telling us the speed.
Any clever ways to nudge them where were are really trying to go? I usually emphasize that the goal is to *use the diagram* to describe the motion. I also try to bring them back to our definition of motion from the earlier activities: change of position. Any other ideas?

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WA-peZSIVdCN_zIedAcaJKzidFcLkQNPM5gj4LBF9wNg06z5DG355g&__tn__=%2CO%2CP-R

Bor Gregorčič
a day ago
.

When I saw the GPS tracking of Sophie Etheridge's English channel crossing, I did not understand why she swam in this pattern. Then I found out that the water in the channel moves with the tides. Her swim was 29 hours long. So much that could be talked about. Difference between position, displacement, distance, path length. Relative motion, tidal amplitudes and periods, what else?

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Andrea Miller Barallardos
19 hours ago
.

I am struggling to determine how fast to go with the curriculum. I have been doing all of the ALG's and assigning review questions and interrogation after each section. I assigned problems and have done a quiz. But it's been three weeks and I'm only on 2.7. Am I going

too slow? Should I be skipping? Anyone have a detailed day to day on what they do and assign?
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Amin Rainy

.

Dear all,
For measuring students learning in ISLE (College level Mechanics) which assessment tests do you recommend?
Thanks in advance.
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Joseph Wachs
August 29

.

Ciao, Trying to locate the relative motion video. Specifically the one with the train and station where its the station that's moving. Thanks

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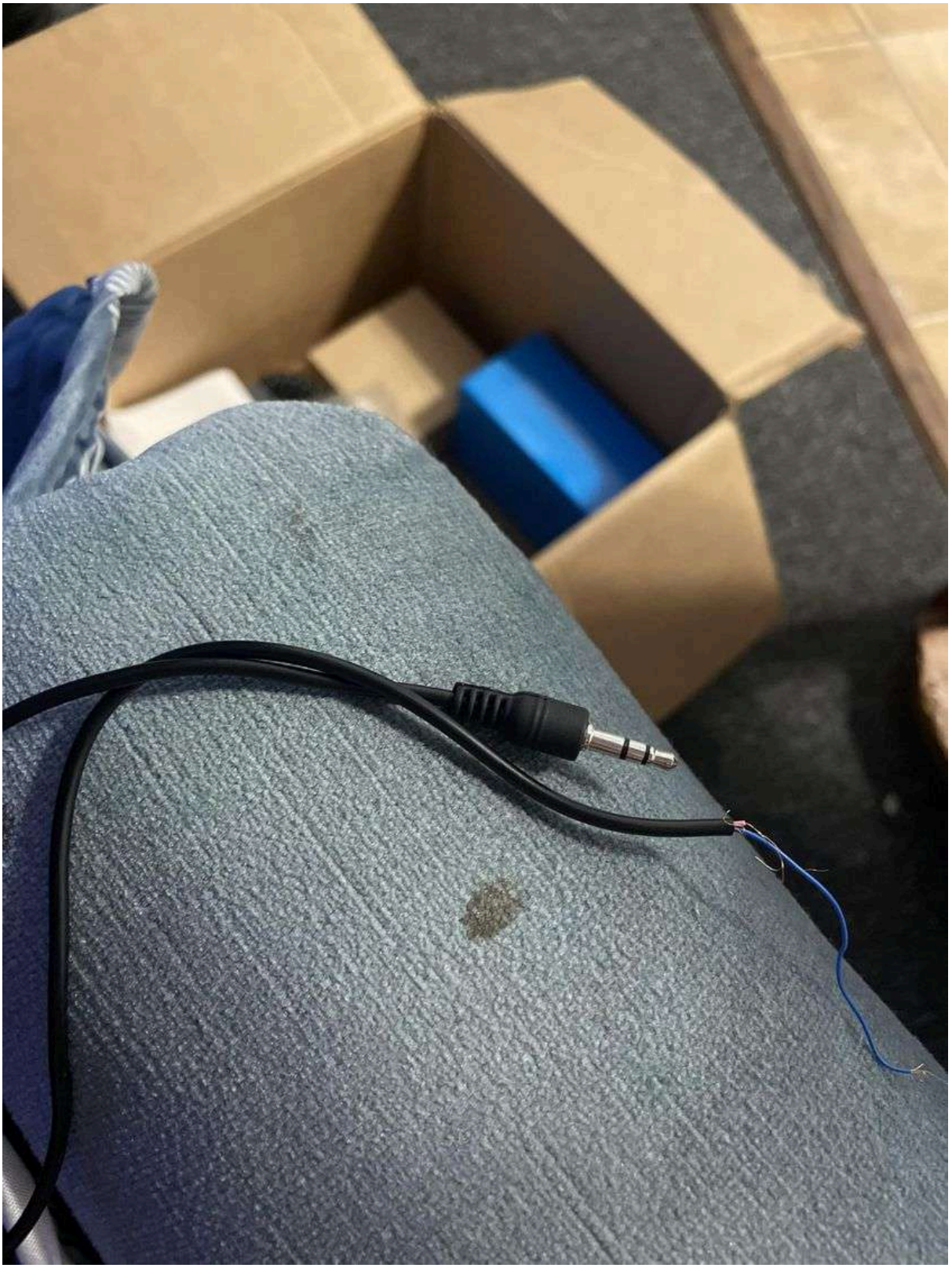
Jeremy Drysdale
August 30

.

Hello everyone. I had my school’s Meade 2080 Telescope taken to an astronomy Society to make sure it was functioning properly and to learn how to properly use it. I had two student carry the telescope into the school and sadly this cord was destroyed. Its called a declination cord in the manual but I cannot find it when I Google it. Does anyone know what type of cord this is? It was double male. (If it’s aux cord I will not be surprised, I am just assuming its not that simple)
Thanks in advance!



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Gorazd Planinsic
August 30 at 4:24 PM
.

Hi everyone, Today I'm posting a new activity on Kinematics, suitable for calculus level. The acivity is based on simple experiment using a pullback car https://youtu.be/lPPH8VgJ6L0 . I look forward to see your solutions and feedback!

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Joseph Wachs
September 1 at 1:39 AM
.

For 2.1.1 With the bystander, red car yellow car. We watched the video, then I had them walk it out as well. With promptings they can get the bystanders frame of reference no problem. How to get them to put themselves into the yellow cars frame of reference. They default to that they know the yellow car is moving so still want to describe motion based on the moving yellow car

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Jane Jackson
September 3 at 6:45 AM
.

If you teach high school and want a sample copy of Eugenia's textbook, visit https://www.savvas.com/index.cfm?locator=PS33Xc . Click on "Request Info". You want to 'sample this product', I think. Use your SCHOOL email when you fill out the form. (I hope it works. ESSER funds can be used to buy the book, if you have trouble getting a copy for free.) You really NEED her textbook, to implement the great ideas of ISLE/PUM.

https://www.facebook.com/groups/320431092109343/posts/1475773076575133/?__cft__[0]=AZXVUtjrFOEC-bKq6SborxmGMhPL8JDUCl4UtHsCZ2EXBiKCdG7vA5jwgaBCbEf_9eFVK7f-zMP8Qgcg92hQOJ74bmkwZ27OEFLOwyvmhSGemYBWSJbC-aoZH2Sw5vSD1OKO8DcDmqA8b7EylxKXVs5VtxWpdOOPFRDvcAjlvpEegtFeIaH3YgzqqOjlH5ensnE&__tn__=%2CO%2CP-R

Roby Rod
September 4 at 10:26 AM
.

Hello everyone, for ALG 2.2.1 would boule balls work to show constant motion? I can't get enough bowling balls - I have 20 students in the class. If not, any other suggestions (other than roller blades? does it work with a very inflated football? Basketball? skateboard?) Thank you!

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Jared Betz
September 6 at 9:21 PM
.

Hello! I have a question about motion mapping activities. How do you all feel about the use of spark timers and ticker tape instead of the sugar-packet and metronome activity from the motion workshop? Would spark timers with constant velocity be a good replacement for that other activity, or would it be better to do both? I know the more practice the better, but I also don't want to waste precious time with too much redundancy. This would be for a HS AP Physics 1 class.

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Paul Wolf
September 7 at 3:20 PM
.

I have another PUM question. I notice that the links for the videos in some of the Physics II materials are no longer working as intended. I was specifically curious about the "kinematics10-1" video, and whether there is a corresponding video available elsewhere.

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Cao Tuan
September 9 at 8:52 AM
.

https://youtu.be/32gp_VKpLtg?feature=shared

https://www.facebook.com/groups/320431092109343/posts/1478829912936116/?__cft__[0]=AZWXAv8k3CSOD6QhxTGnzWKXeA0kO4piONeCrUtz-VGRT4fCcneIVlNaV2-4tmfHn1Gm3vBUMRW71QdFzilhhsHF5IG86uFsxs06Rxq85lH5TsBe4YEDs5da4Dk7QEfVI1iGfyvki72bCxF8A-MZTOR-BgISNGUk2m9RJL717osnmoKYz9MuC66iKGdTH-gsXOQ&__tn__=%2CO%2CP-R

Jose Garcia
6 days ago
.

Is it better to take AP Physics C in High School or to take the equivalent classes in college? What is more convenient for the student?

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Mattie Baker
4 days ago
.

Hello- it’s my first year teaching physics, and I’m looking at buying things for demonstrations and activities. I don’t have a huge budget, but I was wondering if there were a few high-leverage things I could pick up. In other words I can’t buy a full lab set-up like I had in

college, but if there's one thing I could use as a teacher in the front of the room or something small to buy for groups, that'd be helpful. Thanks!

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Dane Peagler
4 days ago
.
Eugenia Etkina and everyone else, where do you all fall on the Momentum vs Energy first debate? I have tried it both ways and personally haven't noticed too much of a difference, but there could be something that I am missing. Teaching energy first allows you to introduce elastic collisions when you get to collision types, but momentum tends to be a simpler topic with which to introduce conservation laws due to there being only one kind of momentum--although, it is a vector which makes things a bit more difficult.

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Jaya Ramchandani
a day ago
.
Is it possible to do the ISLE approach with the IB curriculum within the time frame?

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Jose Garcia
a day ago
.
Change my mind. AP Physics C should be taught but not AP Physics 1. Here is my reasoning: Both classes are about intro to mechanics, virtually the same physics. In order to better understand mechanics one should take calculus not only because of some exposition

to the calculus content but also because the students who have taken calculus have already trained their trigonometric and algebraic skills further.
I , like many others, find that the hardest part about intro to mechanics or calculus is often the algebra not the calculus. So, AP Physics 1 is intro to mechanics without an initial calculus context but with all the difficult algebra and trig. In other words, AP Physics 1 has similar cognitive demands to that of AP Physics C but accepts students who have not had the chance to develop such fluency in algebra and trigonometry. It seems to me that the college board is acting like a business under the flag that they provide some sort of intermediate level physics. If you think that both classes should be taught please tell me why. I have taught AP Physics 1 for 8 years. I will be teaching AP Physics C next year.

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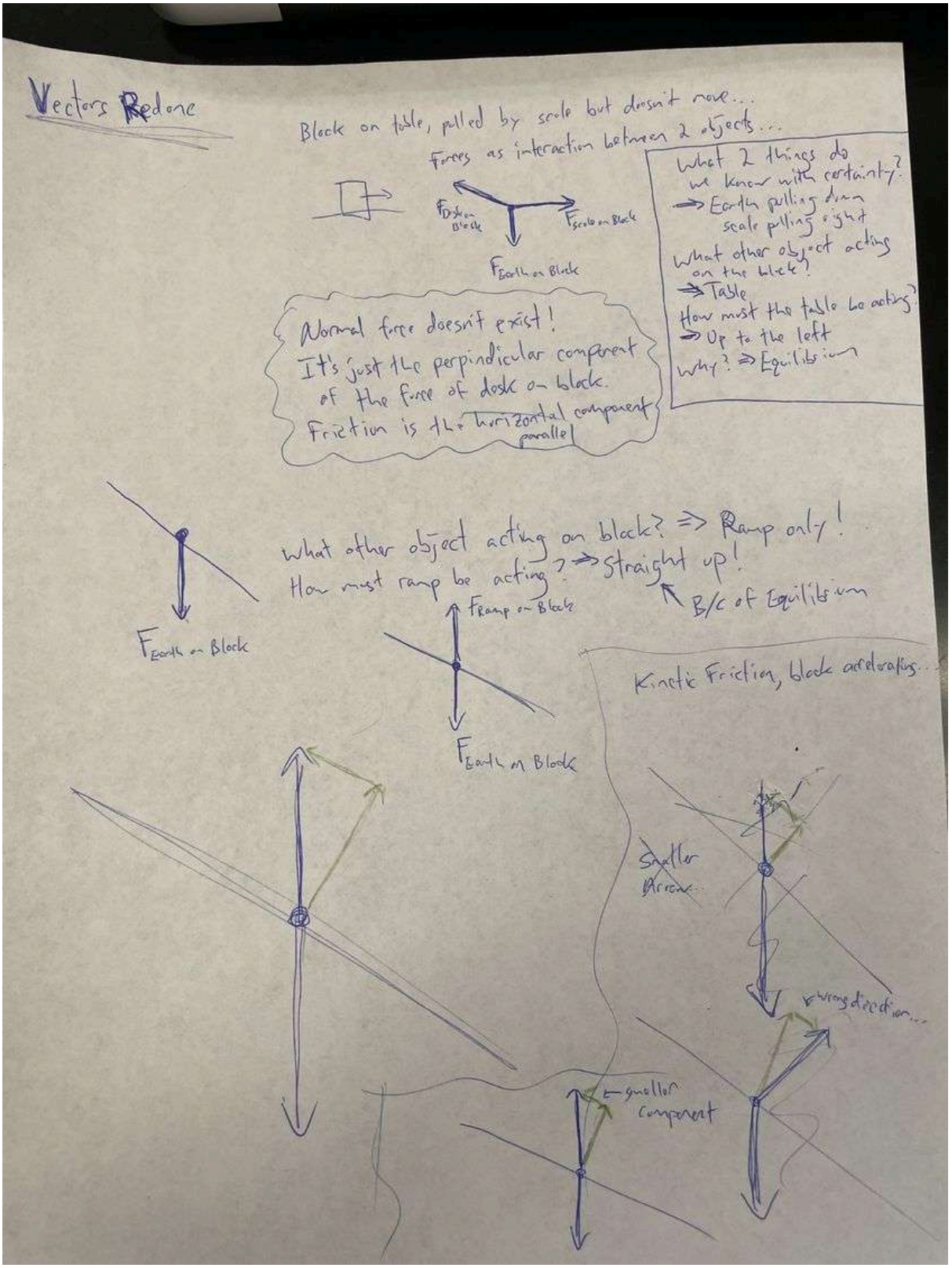
Jared Betz
2 days ago
.

Hi Eugenia. Thanks so much for hosting the 2D Forces workshop last weekend. Since I'm on this exact topic with my HS AP students right now, I'm trying to put together some discussion notes to talk with my students about some of the things we covered. While I totally understand the conceptual benefit to this approach, I'm having some trouble wrapping my head around the usefulness when it comes to quantitative application. When analyzing objects on a ramp, I always teach breaking the force of Earth on object into components parallel and perpendicular to the ramp, so they align with Normal and Friction forces. Thinking of those two forces as an interaction between the ramp and object is neat, and I see how it's "correct," but is there a benefit to glossing over that idea once you have to derive equations? Otherwise you have two sets of forces that have to be broken up into components, and I feel like it could get messy (as my own discussion notes demonstrate). Thanks so much!



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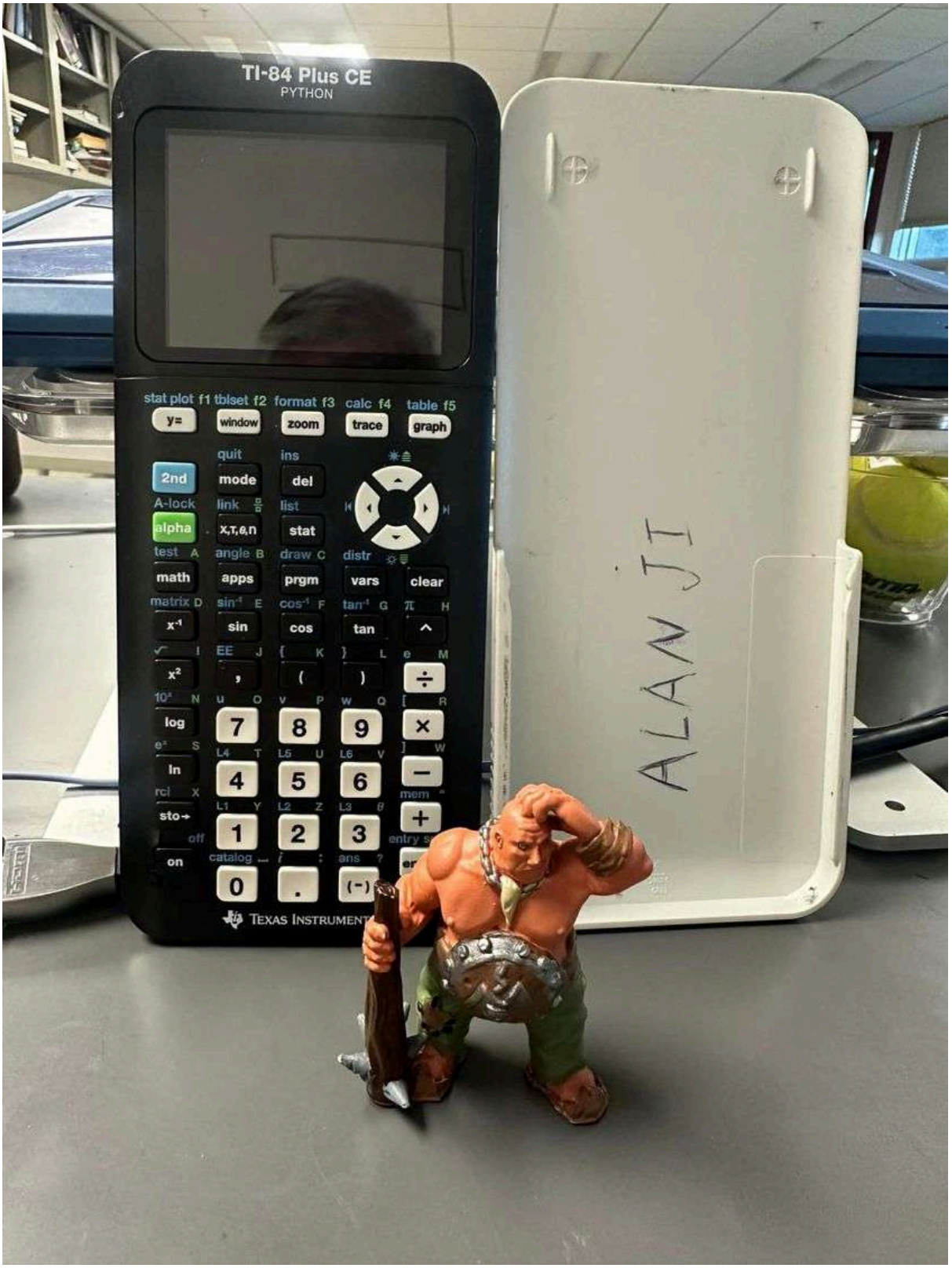
Drew Tanzosh
21 hours ago
.

I have way too much fun when my students leave things. They get an email asking what the calculator did to be abandoned and a pic with the Course Ogre.



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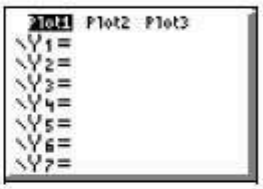
Lee Trampleasure
20 hours ago
.

Analyzing data on a TI 83/84
I don't think I've shared my TI calculator tips page with this group. The download PDF is a two-sided document that walks students through all portions of using their TI 83/84 calculator for analyzing lab data. If your students use TI 83/84, you'll probably find this useful.
https://bit.ly/TI-graphing

TI-83 or TI-84 calculator

C: Graphing two lists

1. To graph two lists, **they must contain the same number of data points.** Scroll to the bottom of your lists and if one has more data points than the other, check your data to see if you have missing data.
2. **Clear the graphs:**
   a. Press [Y=] to display the *Equation* window.
   b. If there are any functions (equations) listed, clear them by using the [CLEAR] key.



Equation window

3. Set the parameters for your graph: [2nd] [Y=] for [STAT PLOT] .
4. If `Plot2` or `Plot3` are `On`, in most cases you will need to turn them off before you graph.

Window showing all three plots

5. Click `1` to open the [STAT PLOT] options window for `Plot1`.
6. In `Plot1`, the first two rows should be set to `On` , and scatter-plot: . The last row (the marker) should be the open square: □ .

[STAT PLOT] options window

7. In Xlist, press [2nd] [L1] (or other list number to plot on X).
8. In Y list, press [2nd] [L2] (or another list number).
9. Press [ZOOM] 9 to select `9:ZoomStat`. Your calculator should now show a graph zoomed in on the area that contains your data.

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Paul Wolf
20 hours ago
.

Had an idea about something I notice in my classes, including physics. Students often revert to their own strategies for finding slopes of lines of best-fit that have a pretty high level of discrepancy from the calculator's answer, even after we have done it "the right way" a bunch of times.

I wonder about the effectiveness of making an HDR-type activity that allows them to use some strategies I see often (taking the slope of each interval and averaging those, using two data points as points on the line) and compares the results to the conditions of a best-fit line. They would have a hypothesis (the method of finding the line) and prediction (something like "it will visually fit the conditions of a best fit line") then make judgments about which appear to work the best...

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Jane Jackson
4 hours ago
.

Great news! Eugenia Etkina has an excellent NEW article in PHYSICS TODAY magazine. It's FREE to download in pdf in October (after that it costs money), so don't wait: download it now. And share her insights with colleagues; they're important.

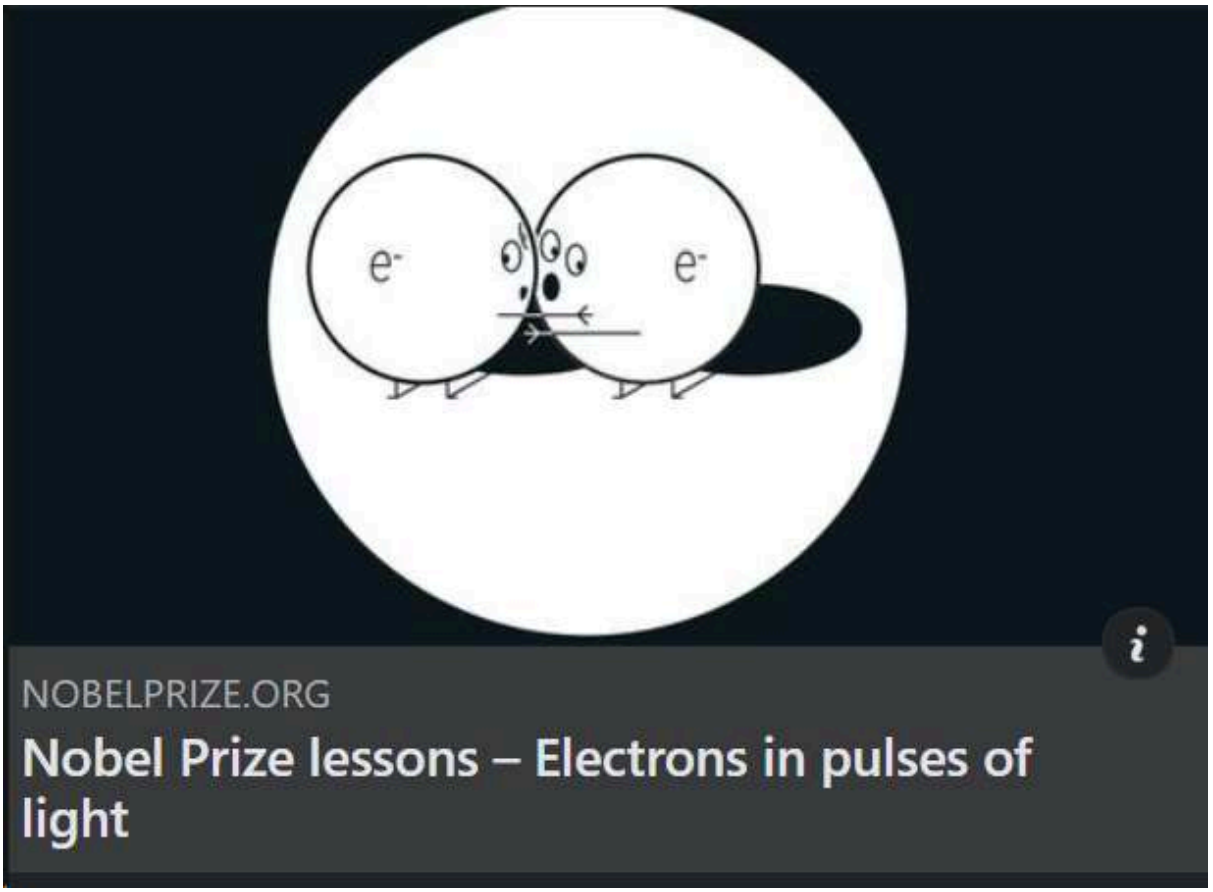
She gives an overview of ISLE, and she puts it in larger context, for citizenry. Thus, I quote her: "... Thousands of students take introductory physics courses in the US and across the world. Some will become physicists, and for them the experiential part of learning physics through the ISLE approach will be a window into their future profession."

"But many will become doctors, ecologists, chemists, politicians, journalists, pharmacists, biologists, and so on. What do those students need to learn in introductory physics courses to be prepared for success in their field in the 21st century? What will they need to remember from their physics course 3, 5, or 10 years down the road? Although some knowledge of physics content might be useful for a pediatrician trying to help a feverish child, they will certainly need to collect data, identify patterns, come up with an explanation for the symptoms, and predict what kind of treatment is appropriate." ...

"I believe physics educators face three challenges. The first is shifting the focus of learning from the pure outcomes of physics as an intellectual endeavor to the process through which those outcomes are obtained. In other words, instructors need to help students learn by experiencing how physicists construct knowledge. The second is changing the focus of physics pedagogy from simply transmitting physics knowledge to students to creating an environment in which they can self-construct that knowledge. The third is helping students believe that they can do physics and that they belong in physics—namely, helping them see themselves as physicists even though they may take different career paths." ... Download it here:

https://www.facebook.com/groups/320431092109343/posts/1493176641501443/?__cft__[0]=AZXNT1k_wuyxQhCtzforSTfkUYYwvpsVbEvHMVr6GHMd6nifoQfE-OOYNFtEk9AaSkhl72KGDtsi8SODuoZptZlPv5_GfYaZDnPqes3V7hrBuTLFtmwDcQtaCIuKByeMMelwtDVJrQq0RM0nYz9latpla5KMWo33B9MbPlmOV58by3tErxx0LY_Zokp8LiQn2OM&__tn__=%2CO%2CP-R

Ann-Marie Pendrill
October 7
.
Did you know that each year, Nobelprize.org publishes lessons relating to the prizes. (Both in Swedish and English)
This is the physics lesson suggestion for 2023.
https://www.nobelprize.org/nobel-prize-lessons-physics-2023/



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Ting-Hui Lee
Top contributor
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October 9
.
Hey Eugenia, a while ago you mentioned that you were helping someone to develop astronomy materials for ISLE approach. I am wondering how it went. I am also teaching astronomy and I would love to be able to use ISLE approach for my students!

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Ting-Hui Lee
Top contributor
.
October 10
.
Hi Eugenia, we did OALG 7.3.2 the other day, dropping two balls on a florist foam block. The metal ball is 17.7 g and the glass one is 5.9 g, both about 1.5 cm in diameter. We dropped the metal ball from 60 cm high and calculated how high we need to drop the glass ball to make the same indentation. While we verified our calculation successfully, the indentations the balls made were not as impressive as the video you made. I got the foam block for dry flowers apparently. Should I have gotten the foam for wet flowers? I didn't even realize there were two kinds of foam blocks.

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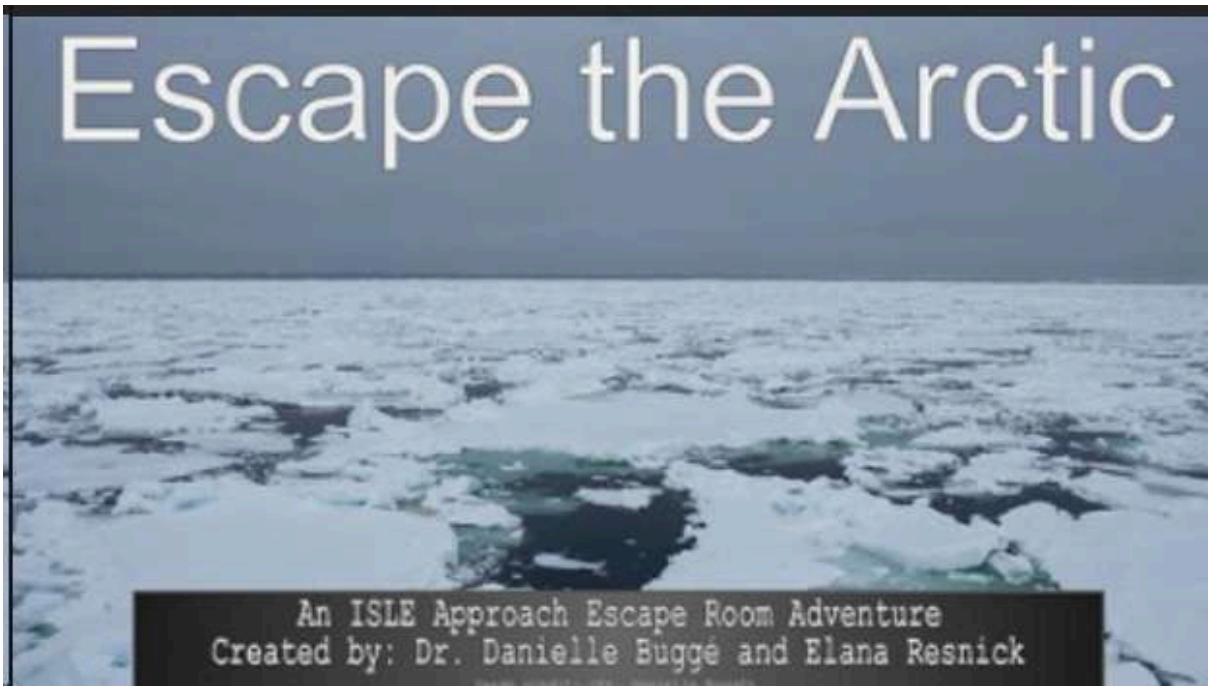
Jane Jackson
Top contributor
.
October 11
.
Danielle Buggé and Elana Resnick created " an escape room-style game based on the Investigative Science Learning Environment (ISLE) approach.
Students are at the center of the action in the ISLE approach, where they collaboratively develop physics concepts while mirroring scientific practice. In an escape room, teams are locked into a room and need to work together to discover clues and solve a series of puzzles to find a way out. Not only does this approach present scientific learning in a fun and engaging way, but it also encourages teamwork and helps learners establish growth mindsets.
In the researchers' escape room, students find themselves trapped in an Arctic research base while investigating the effects of thermokarst — the process by which lakes and sinkholes are created due to thawing permafrost. Developing and testing a hypothesis for the origin of this phenomenon summons a helicopter to escape before the facility collapses."



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Katie Rogers
October 12
.

I feel like this is a silly question but I can't find the answer anywhere. I finally got my textbook from Pearson and created a my Pearson physics account. Where are the ALGs? I can't find them anywhere, is it possible I'm missing access to something?
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Ting-Hui Lee
Top contributor
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October 16
.
Hi Eugenia, is there an OALG file for Chapter 16? I couldn't find one under "Files" (I only found ALG). THanks.

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Rob Spencer
October 18 at 2:56 PM
.
Does anyone have a video of someone catching a medicine ball while kneeling on a low-friction cart and rolling backward...then catching and throwing back the medicine ball while kneeling on a low-friction cart and rolling back faster/further demonstrating bouncing increases impulse delivered? This seems like something Dr. Etkina might have done or created.
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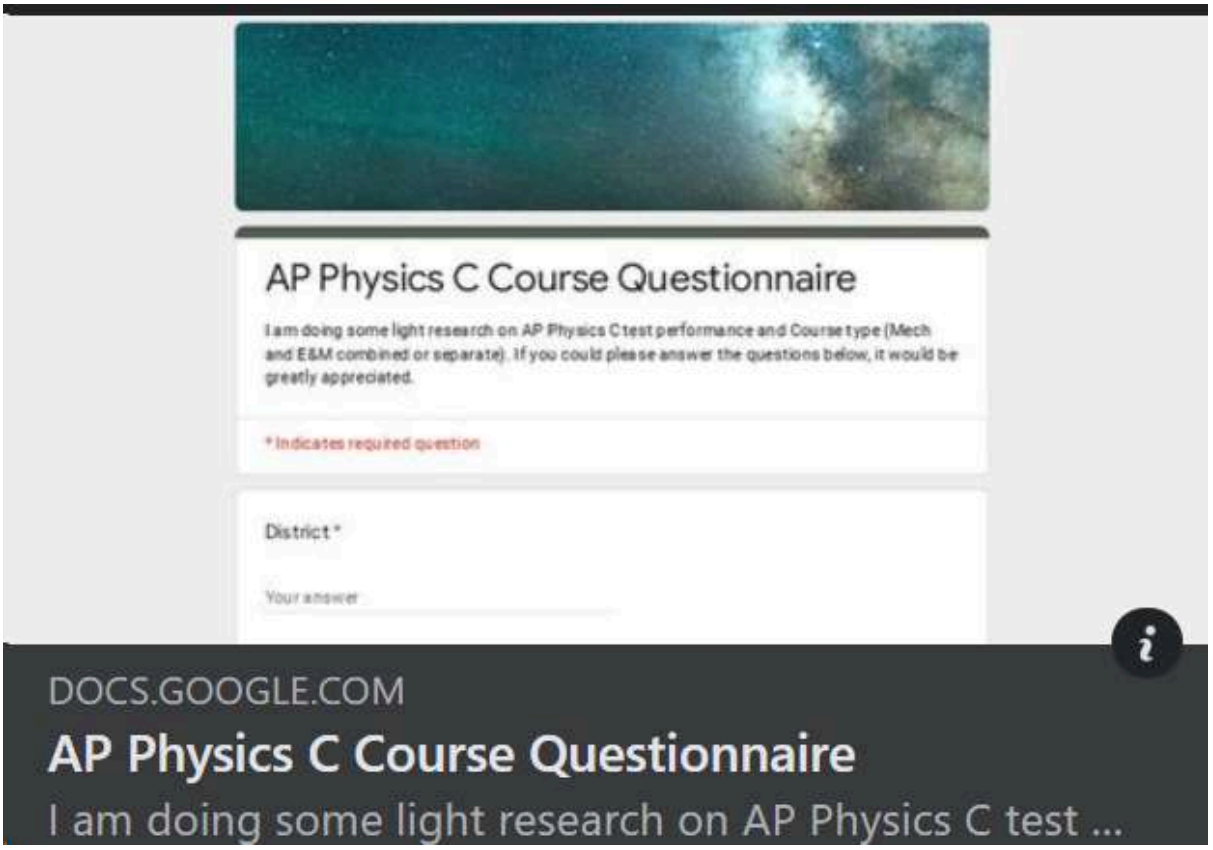
Oren Levi
October 19 at 4:27 PM
.
Hello folks! I'm doing a little light research about AP Physics C and the difference between teaching it as a single yearlong course (Both mech and E&M) as opposed to teaching it as 2 separate courses. If you have the time, and don't mind sharing, could you please fill out the form below? Thanks for the help!



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Amin Rainy
Top contributor
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October 23 at 3:57 PM
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Dear all,
The university asked me for TechhFee-Funding Proposal. This fund is mainly used for buying equipment that connects to a PC or software. I am new in ISLE and this semester I am teaching mechanics. Would you please tell me some ideas?
I saw Eugenia Etkina post about equipment. However, I am thinking about fancy equipment that can connect to apps or software.
Best,
Amin
https://www.facebook.com/groups/320431092109343/posts/1503598877125886/?__cft__[0]=AZV7hAAyhziZK6uu3UY5lFmrq0-6A-XDcmb8byHRQfSY6KQPMzpdFMupwd3mTDC0LH_NsKuQ1UlXsqXFl4X48frQv0jRDe3K2M64ouuRFAD0Rl5SktGEzfM3lwddlrMyOCvhLqOj12XWKT5Vy07qWfue7BmwWYBVX5oIza1TuW5wI7r_ZgHjaanhCtrznBPB5NA&__tn__=%2CO%2CP-R

Next Generation Modeling Courses for Teachers
October 25 at 11:31 PM
.

UW Oshkosh physical science students entering class today... 😀
Next Generation Modeling Courses for Teachers
(*student permissions secured)
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Bor Gregorčič
October 27 at 7:07 AM
.

"In physics, we don’t have any problem considering all possible explanations for an observed puzzle. If we’re doing our jobs correctly, then we’ll be able to consider every fathomable explanation, hold the data up against each one of them, and all of them will be ruled out except for one. The challenge is to find the correct explanation that fits all facets of our observations, and is still powerfully predictive for what signals should appear versus the ones that actually showed up."

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VGPFaUIo5SDVvYQY4-KiKmtt-mrBEgK3GV6RrLrj07tD0puXQaALvmlOkLQ-PqVa8z0R44omQJChqoHTLGDRrgqSZtuNGZCX0Tugan6k_weL2sBytJ4hwmXmVhfs_LXY&__tn__=%2CO%2CP-R

Robin Lewis
November 1 at 5:51 PM
.

Hello All,
What is the depth and breadth of content that needs to be covered on the topic of graphical linearization in AP Physics 1?

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Eugenio Tufino
Top contributor
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November 3 at 9:40 AM
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Hi everyone!

I wanted to share an inspiring initiative called "Design For Physics," promoted by design students at IED Rome, under the guidance of physics professor Giovanni Organtini of La Sapienza University. The special feature of the project is that it involves students of a design institute (IED) in the creation of teaching tools for physics.
The focus is on developing affordable and accessible teaching tools, compatible with smartphones and applications such as phyphox, designed to enhance the learning experience in high school physics classrooms.
These tools have been made openly available, in the future will be released construction details for 3D printing and laser cutting under a Creative Commons license.
For those interested, more information is available on the project website at the following links (content in Italian):
https://www.ied.it/news/design-for-physics
https://www.frizzifrizzi.it/.../design-for-physics-una.../

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Robin Lewis
November 3 at 5:03 PM
.

Hello!
When measuring the length of a vector, do you include the arrow head in the measurement?
https://www.facebook.com/groups/320431092109343/posts/1509792106506563/?__cft__[0]=AZUo_8GXhPWrFCBRpRQqhYzcniSHP7WsZ-Wbn6HxifsQBesnMwlLhPesXUybeHP_SLDxCsSokXMm2wGyEr0c96OAjhN7AeTgK10GZjc_73YfFqXrwgdS4BRPZE0TLevTvIdQR6g__nJkTDM9IzpeNgkDmr6F58pVOsaDzf7n8qDJDAUsfeXHN2Tn0kjKWV7g2pc&__tn__=%2CO%2CP-R

Amy Paris Bancroft
November 4 at 6:05 PM
.

I have been given some money to help supply/build our lab. What are your most used/loved items in the lab?
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7Dunfi0MSVknw1x_Dpil50EN4L3oPMXtpAQ9g_9Rpj1-lA8d4XJcmWicxCOypN_p5FJtfXlaFYJDCw_Agm2-BqBVRDCJTcS8PeYSriw22Kxwr2nL3ezqdLVcyjbs6fZs&__tn__=%2CO%2CP-R

Amin Rainy
Top contributor
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November 5 at 4:30 AM
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I found it in Phsical Review PER. I hope it will be useful for you.

https://www.facebook.com/groups/320431092109343/posts/1510505713101869/?__cft__[0]=AZUhQaUQxbSjbU718Q_NmrDYZJD7u25oADvicOf8RsXxD69T6dXMpZ4pm9oRD6qIax1-xAh3Q4ADGfrABBC-d3qCVBlaFyaIY-anFwB85zLZY1p_5fIOhpG5CY2D_4xTFgtrjoTHPremvtk2xSCTJFzxNNVW8OpldS88SMql2YO4gRA1lVhM1c4_a5fdlMugfFg&__tn__=%2CO%2CP-R

Marianna Anthea Bannon
Top contributor
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November 6 at 2:24 AM
.
I'm working my way through Sweller's Cognintive Load Theory and in the same chapter he cites McDermott and also lays a heavy hand on all inquiry/constructivist approaches in that they are inefficient and unideal methods of teaching.
There's arguments between direct and constructivist approaches all over the place, but we also know that active learning environment, such as ISLE are, in fact, highly effective for students.
I'm wondering where, if anywhere, is some formal literature that makes the distinction between the inquiry/constructivist approaches that are highly criticized by direct instruction advocates and active learning environments, such as ISLE which LOOK like students constructing all of their knowledge, but its done in a highly scaffolded way, designed by the instructor, in order for students to base their learning on evidence from their experiences rather than just being told (directly).

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Kristina Pahor
Top contributor
.
5 days ago

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Hello fellow Physics teachers 😊
As suggested by Eugenia Etkina, I am starting this post as a follow up to the post about how to motivate our students.
We can motivate them only if we are the source of motivation and enthusiasm.
As it may happen that we also loose our energy and motivation sometimes throughout the school year, or sometimes we are just overworked and don't manage to prepare the lessons in the way we would want to,
or sometimes we just come tired to class… what do you do in these situations? How to motivate yourself and stay motivated and enthusiast?😊
Thanks for your thoughts😁
Picture of motivated students for facebook algorithm… 1 experiment, 5 countries 😊
#isle #teaching #activelearning #internationalstudents
(Picture shared with students permission).

https://www.facebook.com/groups/320431092109343/posts/1513759836109790/?__cft__[0]=AZWwDiGjX77zgJIaH4vK-Z_A2GIrdRjUkQ80Bp9YJ-8bBhoA2Z3dEHPIdc6-3yD5UagAk39ID7YMGneQ0sMy_zTRmsO9iqBRkxAACLsBAnH_R-mD9DBXo7BtXtiPgPFxJVAaeWJS6wWneRDfehAiVyZRxlXwYitoNZln60MzkLIMvdprWHHvOlzzKHtc59eU1cg&__tn__=%2CO%2CP-R

Hadjisavvas Giannis

.

5 days ago

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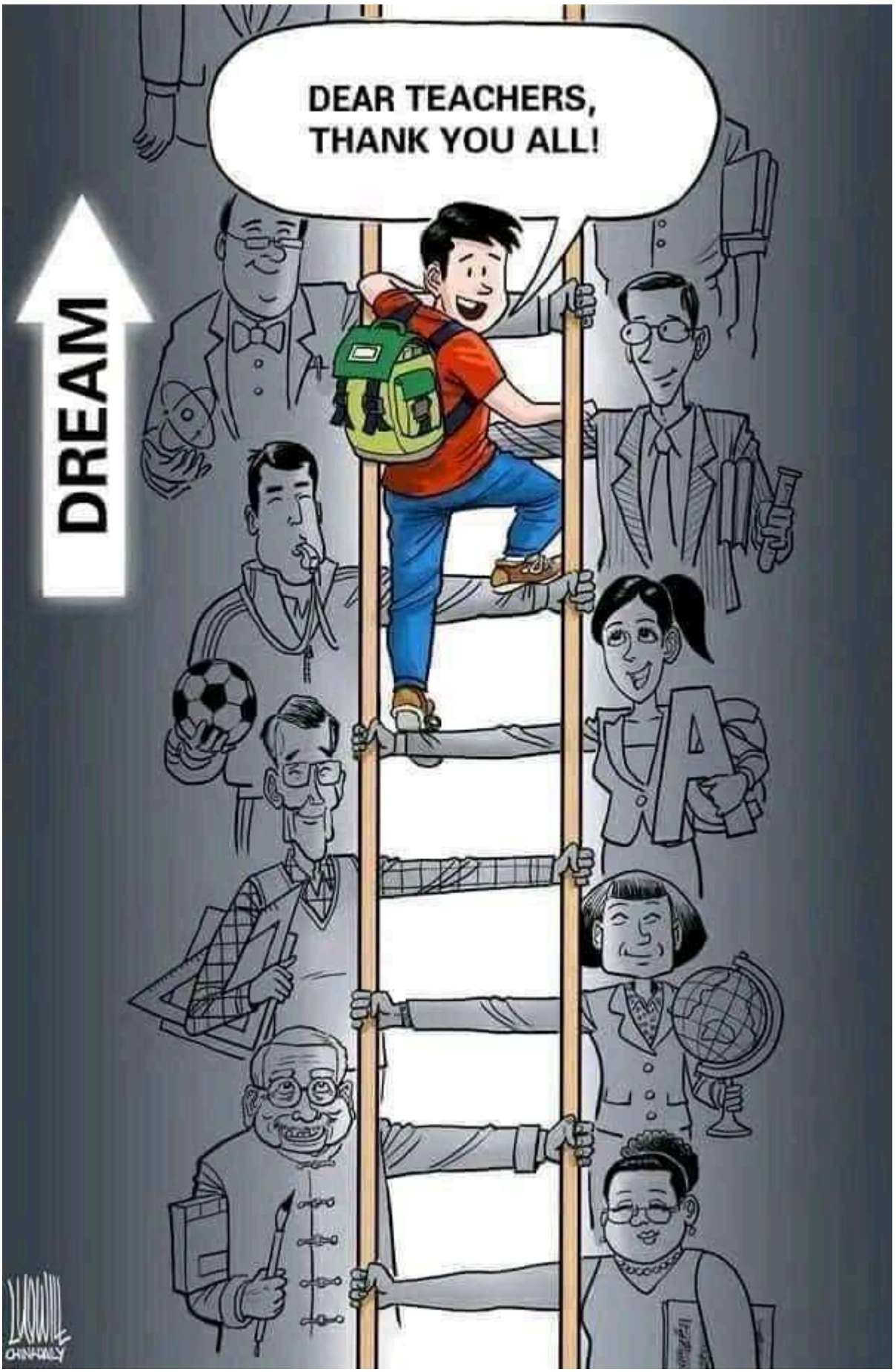
Hi all! I just wanted to introduce myself and share a photo that I like!


DEAR TEACHERS,
THANK YOU ALL!
DREAM

https://www.facebook.com/groups/320431092109343/posts/1513877449431362/?__cft__[0]=AZWh1ZSDu1njX60NyifwMIycV5rKLZfh0dgTQDQjV5voDApWXdr-FC8A60tDcmkA7M4oblirgrUD6fzuN__O7vKNfzFLSSbS6myrqfZ8PfGHaxaI1e1ghgC22OS4aKFJJt1WLIp_0aDx0sZ_olVzA4N9z0bjpm-ydAo68wPV1ZRGP89utZ_72YCvhDLIMV4FVog&__tn__=%2CO%2CP-R

Bor Gregorčič
5 days ago
.

Hi all, I just wanted to respond to Eugenia's post, but thought this may as well be a separate thread. I just finished listening to this podcast about a reformed approach to math teaching. It touches on many topics that are being discussed in this group, like systemic change, the inertia of the "old ways" and the need for making students think, not just reproduce. It was cool to recognize in this approach many of the productive things I have learned from ISLE, but in a context that does not use or even refer to ISLE directly. I believe it shows that ISLE has a solid pedagogical foundation that transcends the ISLE curriculum. So learning to use ISLE and the pedagogical approaches that come with it will help you be a better teacher even in subjects where there still aren't any ISLEized curriculum materials.
If you are like me, and you cannot stand still and listen to someone speak, then I recommend listening to the podcast through your favorite podcast app (or downloading it to your phone) while you are jogging or taking a walk. I promise, it will be a very short hour 🙂

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Paul Wolf
Top contributor
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I have a question about a PUM lesson. I don't know if it would be ok to post a screen shot of it? It is Physics II, Energy, Lesson 8. We are asked to launch a spring vertically from a pole to test our energy formulas. We did the lab today, and I made the mistake of not testing it myself first.
I had assumed that if we were to launch it, we'd use the top of the pole as the zero reference for the height, but when we actually did it, it seemed like prediction would be much closer to the outcome if made our zero the bottom of the spring after it was stretched. I don't know if that was just coincidence or if that is the assumption we should work with.
I generally struggle with the proper place for the gravitational reference point when we launch things vertically.
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Allison Daubert
Top Contributor
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November 18 at 1:19 AM
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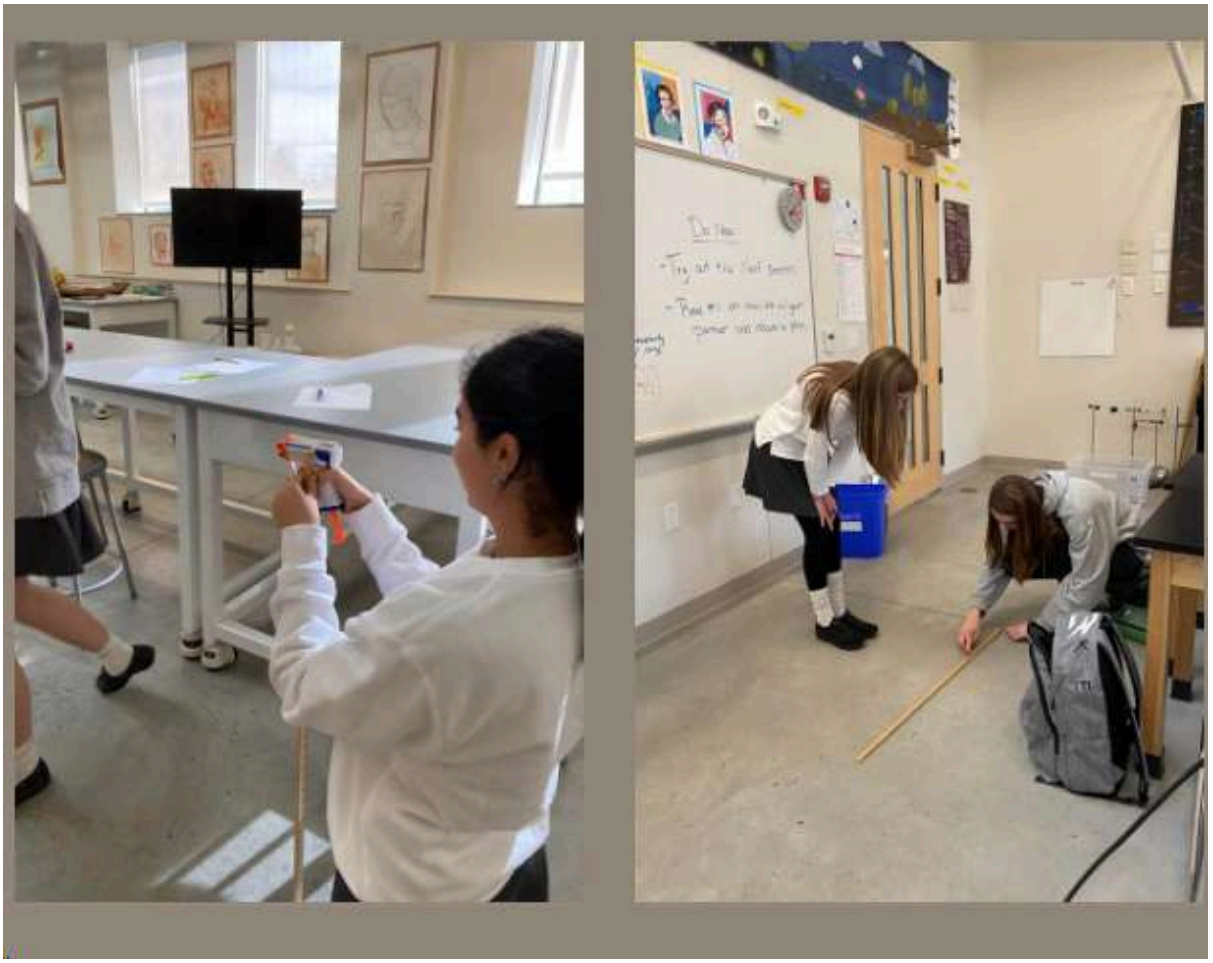
Pre-Thanksgiving Physics Fun in an Application Experiment Lab! My CP girls had fun creating experiments today to determine the initial velocity of Nerf darts. They had some of the most consistent results that I've seen with these little nerf guns yet with only about 15-20% random uncertainty. Great way to finish out before break



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Marianna Anthea Bannon
Top Contributor
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November 18 at 4:52 AM

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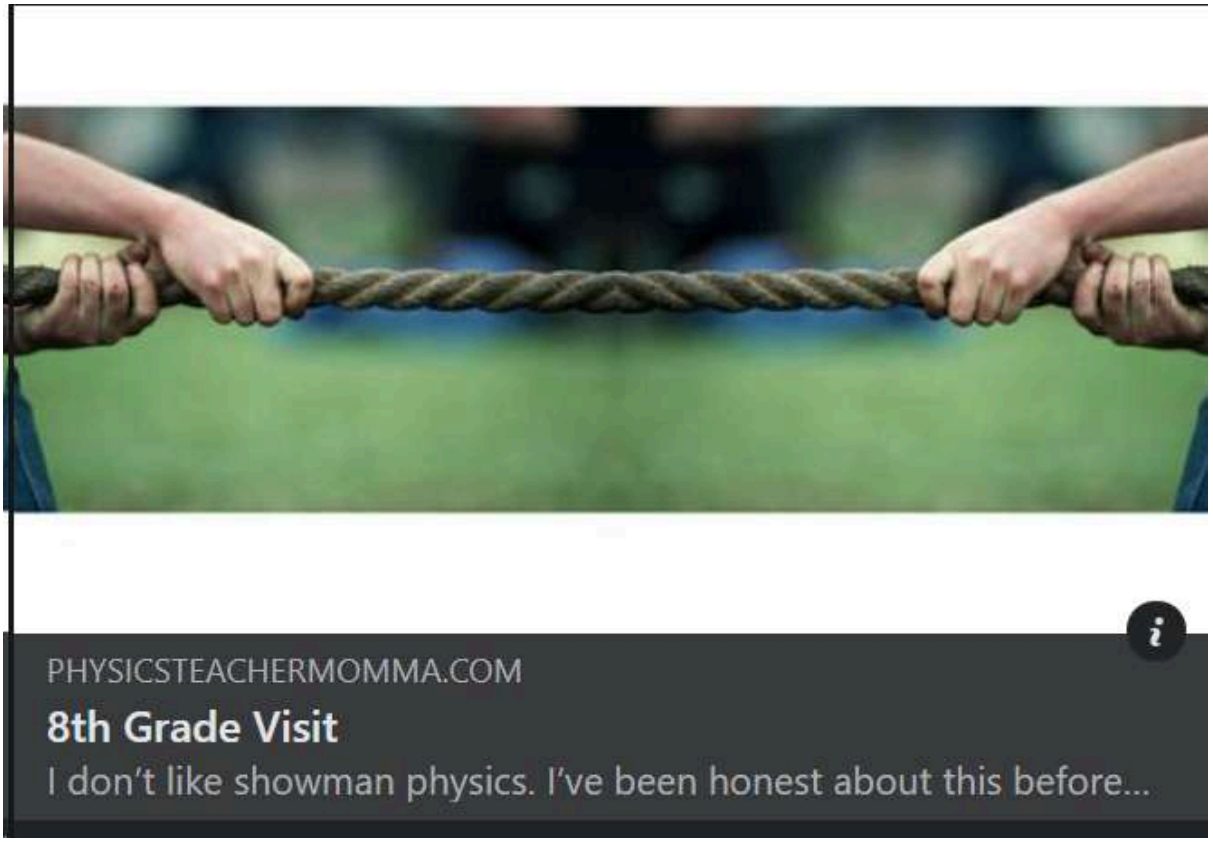
We had 8th grade tours today and since my entire class was giving tours I through really hard about how I wanted to showcase physics without doing a “show”. ISLE really helped me ground my thinking around what I would do. It wasn’t perfect because I had 10 minutes but I’m pretty satisfied.



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Gopa Mukherjee
November 18 at 3:52 PM

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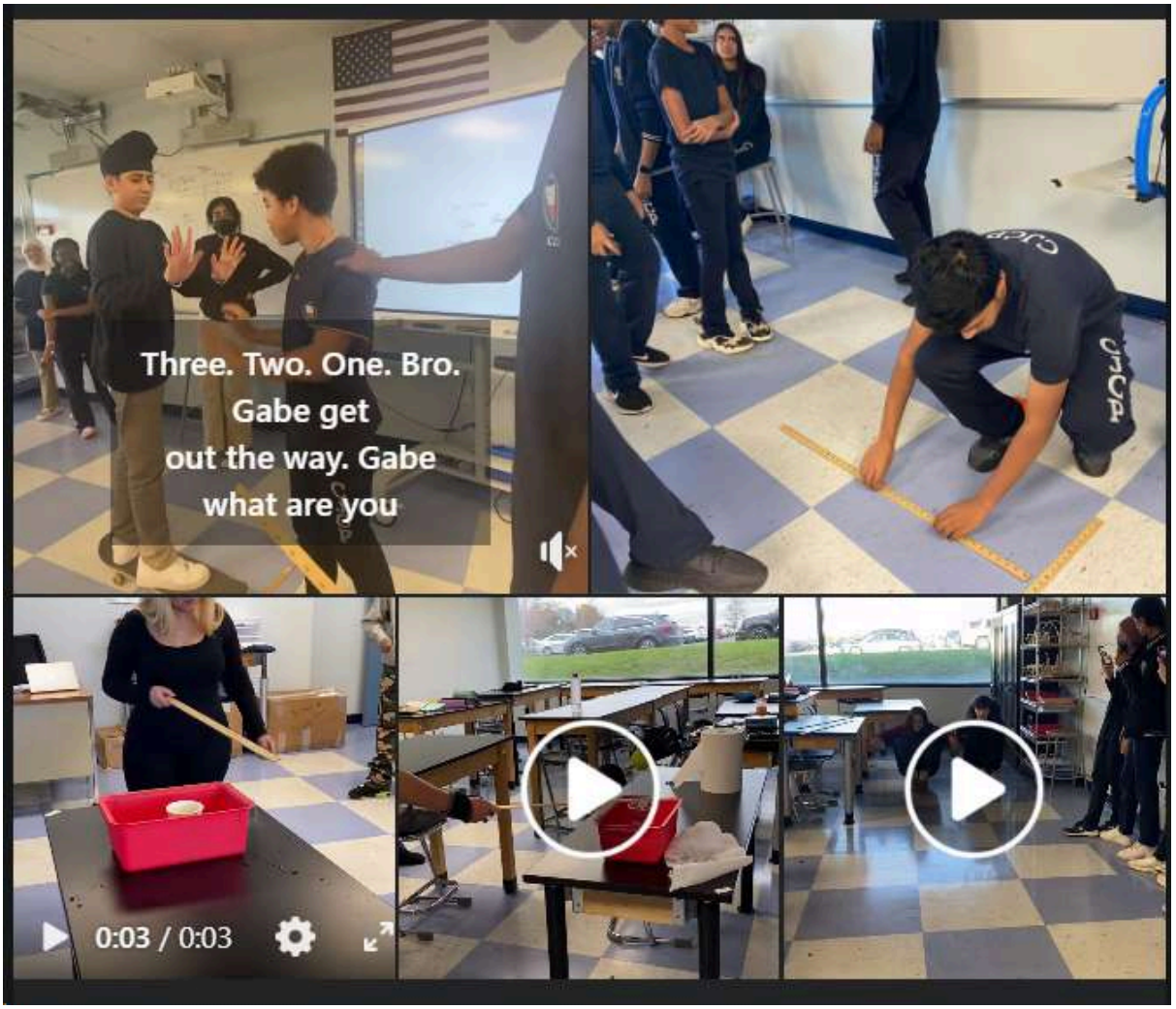
Students demonstrating Newton’s Laws of Motion in class 😊



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Ann-Marie Pendrill
November 20 at 7:49 PM
.

Some time ago, I created an advent calendar based on an amusement park map for the Christmas season, filled with physics examples relating to different rides.
The calendar has clickable digits. Next week I will close all the "doors" to ensure they cannot be opened until the right date.
But for now, you can have a look and check if you would like to suggest that your students use it.
https://tivoli.fysik.org/english/calendar/

https://www.facebook.com/groups/320431092109343/posts/1518593098959797/?__cft__[0]=AZVWWSy0WDMHP6xYpGOarmWIULhM32UMbB5wiwt83Mwa3fhaC_gyWLTn9NcqSLK_L3RdTunBWfvmP2lF3k8OFFajxikzpvjBnJkcnwX53qRbiYT2ow9803SbayhNK5Zqp2TzxOzokYjc3nT-E4vMWIEcWHZ3cMa43N7Tr1uZb4zTPpebxrSEjtd6NBzyVCJbyvc&__tn__=%2CO%2CP-R

Parul Goswami
November 21 at 4:18 AM
.

Hello everyone,
I have a doubt. What will be the tension in a rope if it is pulled through different forces at both the ends? And how can we explain this using an activity?
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Mohamed Gamal
Top Contributor
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November 21 at 10:17 AM

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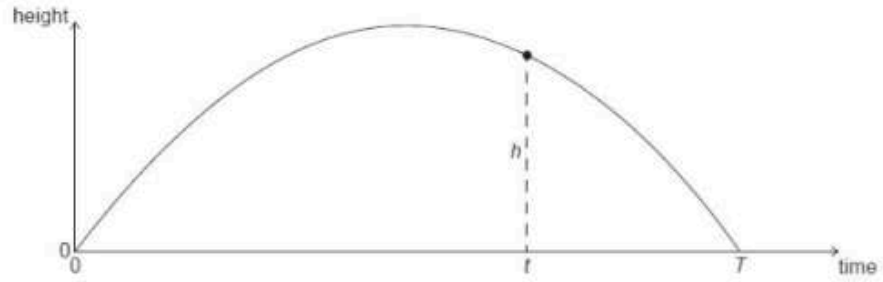
A ball is thrown upwards at time $t = 0$. The graph shows the variation with time of the height of the ball. The ball returns to the initial height at time T.



What is the height h at time t?

A. $\frac{1}{2}gt^2$

B. $\frac{1}{2}gT^2$

C. $\frac{1}{2}gT(T-t)$

D. $\frac{1}{2}gt(T-t)$ [1]

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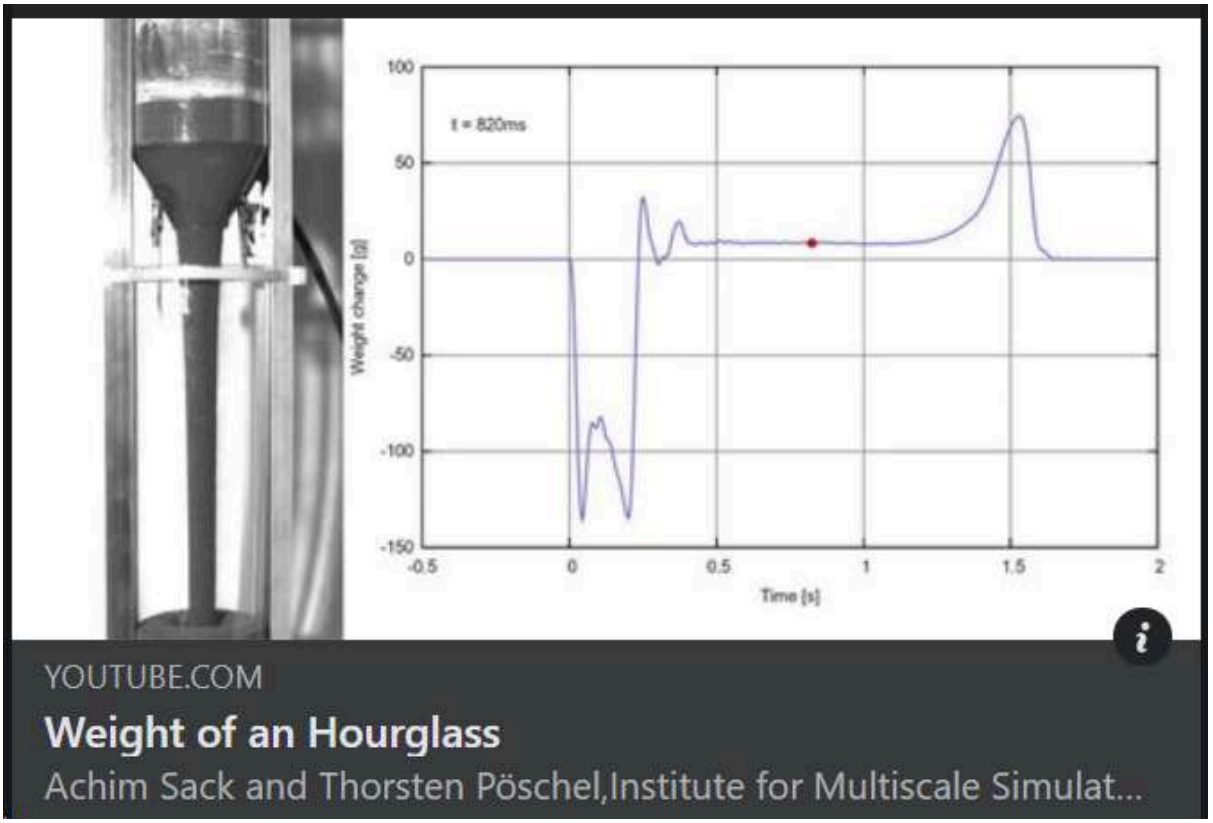
https://www.facebook.com/groups/320431092109343/posts/1518873765598397/?__cft__[0]=AZUdidHbWXFwINfeXwBf8G3xRpYsUEJIVvUBSNE-OAMpX0Q5V_svE5GGz6em_3-dhvUt_ZjzhpxPV98HN9HY5q25UVq38Wad0l_IHIlrMts4xBiAGBL54cMC6GfYLl6d8efE1yTgY3ExHNzMVLaF21YbII0LhyIExG0H7Zi77GdQPFxVZ3IVTZmsGLxpzjqa8YA&__tn__=%2CO%2CP-R

Bor Gregorčič
Top Contributor
.
November 21 at 8:33 PM
.
Hello, folks! There was a workshop recently on the topic of momentum, right? Can we use the ideas of momentum and impulse to explain what happens in this experiment? (Nevermind the title, I don't like the word weight). But I think it is really cool! Brought up by a student in a course for physics teachers I am currently teaching together with my PhD student Ebba.



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Mohamed Gamal
Top Contributor
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November 23 at 12:02 PM
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Hello all,
I'm kinda behind regarding the practical work and investigations in the HL , any ideas or lab reports, our lab has basic material, no sensors or advanced equipment. my email is mmm.mohamedgamal@gmail.comm
your help is highly appreciated

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Dorota Sawicka
Top Contributor
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November 26 at 4:18 AM
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Could more than one of these answers be correct depending on how the system is defined?

NT6A-CCT2: BICYCLIST ON A STRAIGHT ROAD—WORK

A bicyclist initially travels at a steady 8 m/s for 100 seconds on a straight level road, and then takes 40 seconds to slow to 5 m/s. Three students discussing this situation make the following contentions about the bicycle's kinetic energy:

Axel: *"The bicycle is just going to slow down naturally. It doesn't take any work for something to slow down."*

Bram: *"I disagree. The speed of the bike decreased, so there is a change in kinetic energy. That means work was done on the bike."*

Cassie: *"I think Axel is right that no work was done, but I don't agree with his reason. There is no work being done here because there are no external forces being exerted."*

Which, if any, of these students do you agree with?

Axel_____ Bram _____ Cassie _____ None of them_____

Explain

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Amin Rainy
Top Contributor
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November 27 at 9:08 PM
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Dear all,
I always give anonymous surveys to my students in the last classes of the semester. I am trying to design a new survey.
I mainly give them the following question+CLASS survey.
1) Which classroom activities do you learn from the most and why? (Please rank them)
2) What is one thing you'd change about the class if you could? And how do you want to change it?
3) What are things that I should not change in my class (Something that you love in my class)?
4) What are you proud of accomplishing in my class?
5) What advice would you give to students in next year's class?

Would you please give me a feedback about them? Which questions should I add to this survey to receive better feedback?
Thanks for your time in advance.

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Caroline Coburn Cooney
December 1 at 8:53 PM
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We are looking at our course offerings at our High School, and are trying to figure out what makes sense. Currently physics is offered to grades 11/12 at Honores level and Collegr Prep level as a Full year.
Grade 12 students can take APC mechanics as a full year.
Grade 10/11 has a basic introductory physics (1 dimension only) as a full year. (this used to be a physical science class)
We're thinking about replacing Honors with AP1 & AP2. Are these meant to be one semester courses each or a full year for AP1, and full year for AP2. I have seen conflicting information.
To clarify, we have a 6 classes per day, and students take 7 classes. So we drop every 7th day. Classes meet 155 days for about 55 minutes. Then of course there are the assemblies and 1/2 days that eat into that time as well… so it is more like 145 class meeting times… out of the 180 days…,

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Tom Prewitt
Top Contributor
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December 2 at 7:53 PM
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I just finished Kinematics (I know, I took too long!). As part of my closure for the unit, I attempted to return to the "need to know" (The Three Second Rule), but was not sure how to do it in a way that was engaging to students. I had students create motion diagrams for the situation of "Car B" following "Car A" with only 1 second between them. I found a reference online that says the average driver can react (observe and then get foot off accelerator and onto the brake) in 3/4 of a second. Using that in our motion diagrams made it pretty obvious (to me - I fear maybe not to them) that the driver of Car B didn't have enough distance to stop. I also had them create a position/time graph and "free hand" Car B slowing to a stop. I

found a number of references on the question of what a typical driver and car can achieve in deceleration (0.6 g's). Finally, I created a very nice but I fear wasted on the students graft in which a user can vary the spacing between cars and the deceleration value. My question is - how do others show students that what they've learned in Kinematics can be used to help them make sense of the rule?

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Carolyn Sealfon
Top Contributor
.
December 2 at 8:43 PM
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I just clicked on my AAPT e-nnouncer and wanted to congratulate Debbie Andres, AAPT's new Vice President and President-Elect! Wooohooo!!!
https://www.facebook.com/groups/320431092109343/posts/1524999438319163/?__cft__[0]=AZWBuOjyWzvYAfR4SlTb3rO8IBNOL5lDlbZvuCEZmG8MbjucPYZvjBJ3lPyWcfpOCQlBRMpZWIDKuhUUeiUSmlTV7qIpEN3ev9kk3mZilTH0FicuWJFxpmknJHK4Io4dn64OLJ0lSGiSnZvGC0GFgaEKCgEdZ1CeafNTDcUWeOSVB7BOfd4JXrXPnDOKQQPDfos&__tn__=%2CO%2CP-R

Deepa Jain
Top Contributor
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December 5 at 2:26 AM
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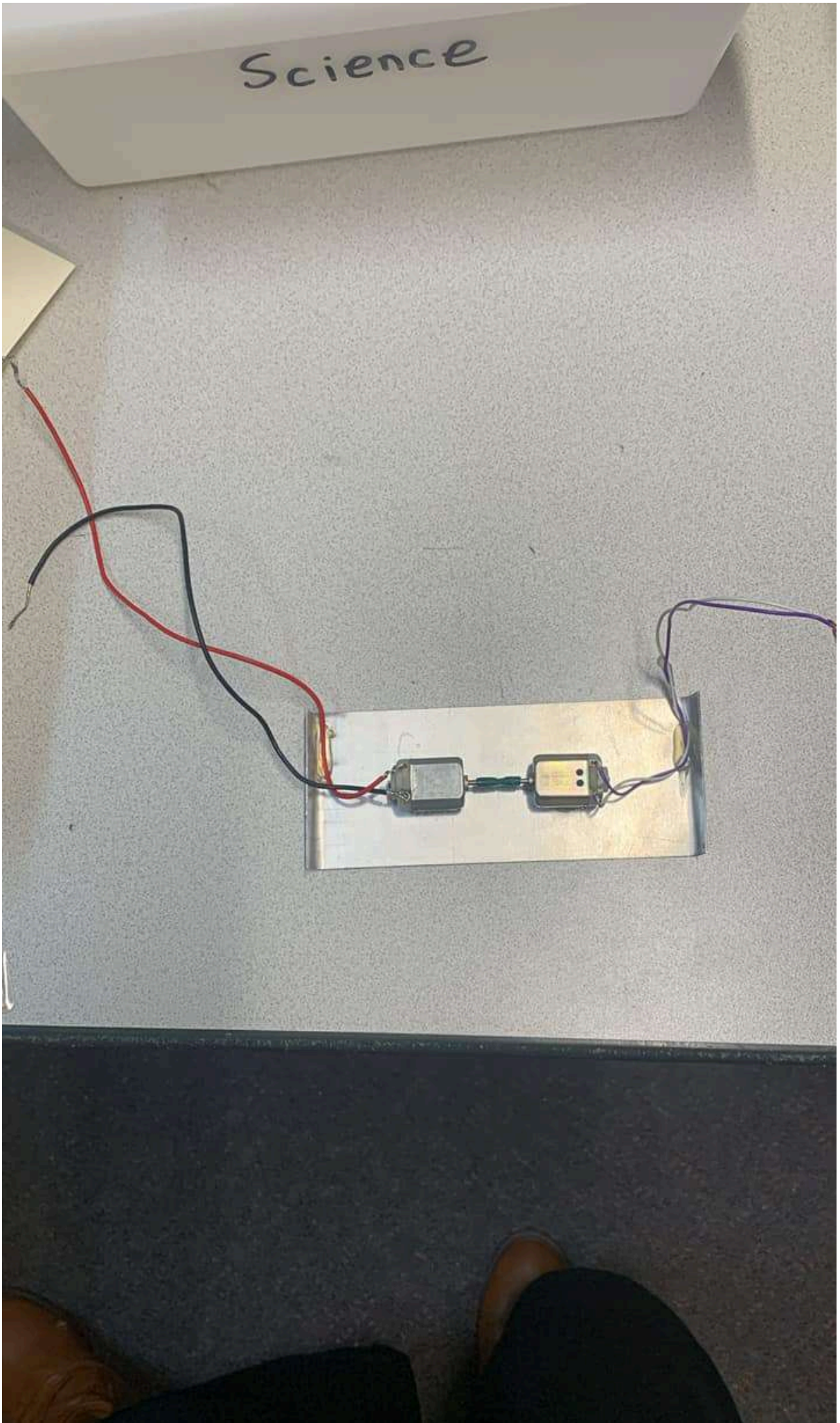
What can I do with this? I have 8 of these.


Science

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Vincent OLeary
Top Contributor
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December 6 at 3:35 AM
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Today we derived Newton's 2nd Law using activities from ISLE and it went great! I had the students explore the relationship between force and acceleration qualitatively first by pushing a truck in front of the school. I've done this activity for years and it's always a fan favorite, but this year we went back in the classroom and used ALG 3.5.1 to quickly make things qualitative and get to the equation for the 2nd Law all in a single class period.

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Roby Rod
Top Contributor
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4 days ago
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Hi everyone, I am having a bit of a wobble in confidence. I have had really positive feedback from students year upon year about my teaching (which would consist of demos, short lectures explaining new concepts, practice/activities to reinforce concepts introduced), plus very good exam results. This is my first year of trying out ISLE, I have embraced it fully as it makes total sense to me in terms of student learning. However, for the first time in my 10+ years of teaching, I am hearing a number of complaints about my teaching. People not feeling they are understanding, feeling more confused about things they understood previously, asking to change class, openly criticising my teaching style. This is quite disheartening as I am putting lots of work in these classes. I am trying not worry about my colleagues' judgement but it's hard, particularly as I have the head's daughter in my class and she is one of the non-ISLE lovers. I have given all my students a feedback form, and a number of students have made positive comments about the classes specifically referring to the ISLE features (experiments, collaborative learning), and what I am seeing in the classroom is a variety of student voices, and much more equity. However, the negative feedback is quite disheartening. Has anyone ever had this experience?

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Carolyn Sealfon
Top Contributor
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4 days ago
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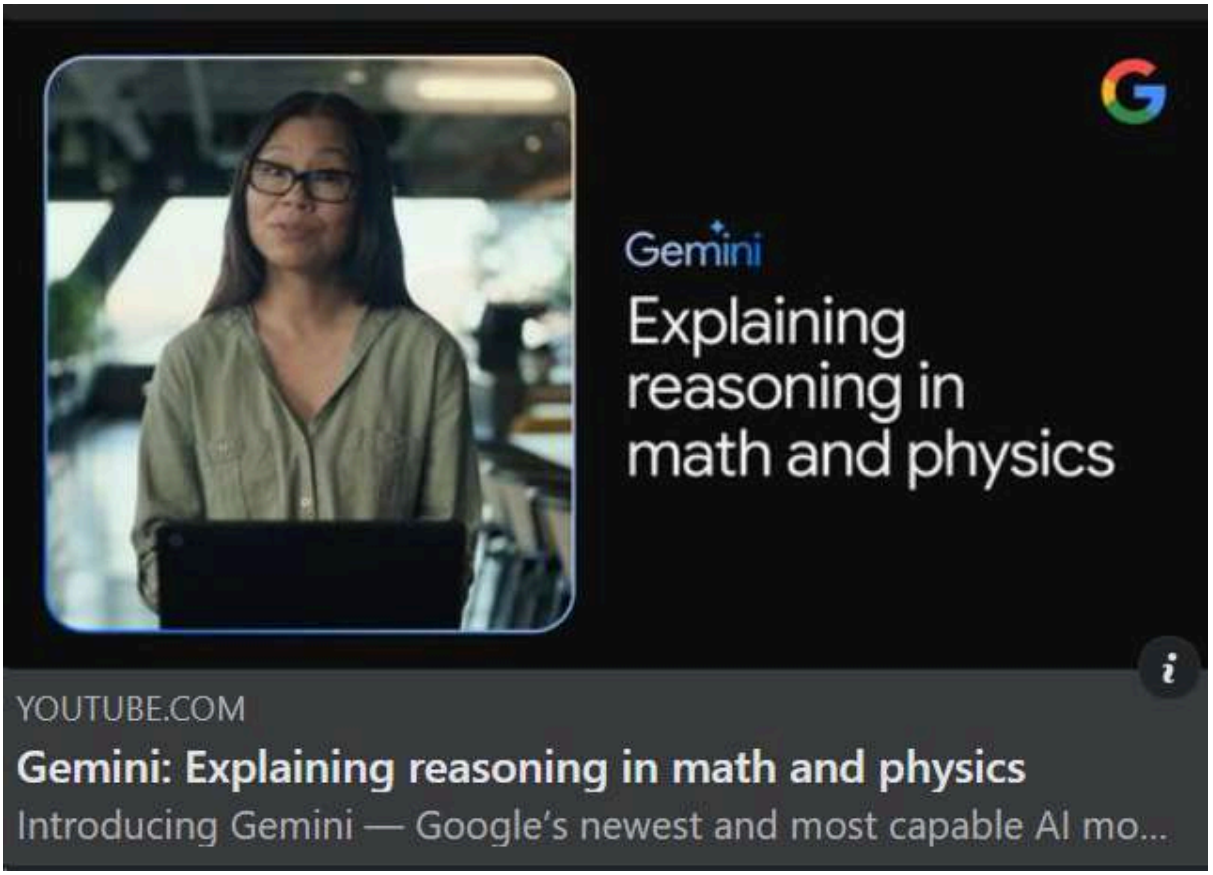
ISLE takes a lot of time and effort to learn and implement. A new reason why it is worth it: AI can now solve traditional problem sets.
https://www.youtube.com/watch?v=K4pX1VAxaAI



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Yuhfen Lin
4 days ago
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[Changing students' believes about learning 1]
At the end of the first week, I have students watch the TED talk first 20 hours. Here is what I put in the assignment.

For this journal, first, please watch this video, the first 20 hours,
https://ed.ted.com/on/Imq14bHp
For each module, you will spend roughly two weeks on it (some shorter modules should only take 1 week). If you factor in class-time, working with your group and time spent working on homework and reading the book. That makes about 10 hours per week. For two weeks, that gives you about 20 hours to learn a topic thoroughly.
Compare how you have studied in the past to what he suggests you to do to learn something new in 20 hours. In light of this video, how would you change your study habits to be successful in this physics class? Be specific and give examples.

Originally, I was hoping this will help students realize that they have to remove the distraction and actually do the work to learn. From student's journals I found that Kaufman's 4th point actually resonates with them the most. For years of schooling, students have learned that if they don't get something quick and easy, that means they are not "smart enough for physics". Since most of the previous school assessments has been focused on "recalls", there has been very little chance for them to be challenged with difficult questions that require them to really take time to learn for deep understanding. When we start to give students questions that assess higher level of skills, the frustration starts to build up and they either contribute that to they themselves not smart enough or the teacher didn't teach them. This video use learning to play ukulele as an example which they can easily related. Most of the kids have some experience with doing sports or playing instruments. They are familiar with this process of start out being really bad and take time to practice to get better. I haven't seen any one disagree with the points from this video.

At Chico State, some of our students actually never learn any instrument or feel that they have every learn any special skills. So last year, I added an extra credit assignment for students to learn to solve a Rubik's cube for the first two weeks in front of me. This also encourage them to come to the office hours when no one think they need to come yet. Here is the link I give to them to learn.

https://youtu.be/R-R0KrXvWbc?si=Wqr3nb9TvWpdE3km

I got a box of 6 speed cubes from Amazon for under $20 so I have enough cubes for students who want to come to the office hours to figure it out. It took me about a week to learn to solve the cube without the cheat-sheet. About a month for my 11-year-old. For most of my students, it took them about a day or two. Once they learn how to solve the cube, that give them another confidence booster as well.

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Yuhfen Lin
3 days ago
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[Changing students' believes about learning 2]
At week 2, I have students learn about mind-sets.

Please watch the following two videos before you answer the fallowing questions.
MINDSET by Carol Dweck | Animated Core Message https://youtu.be/2nF90sAW-Yg
Developing a Growth Mindset with Carol Dweck https://youtu.be/hiiEeMN7vbQ
a. Give a specific example from your own life of why failure is important for learning. Discuss how you learned from your failure.
b. Discuss: why did I have you watch these videos? What did you learn from this?
c. How is the journal theme (mindset and failure) related to how this class is run?

Since we have replaced all our assessments to competency-based assessments, for all of them assignments and tests are graded with a set of rubrics for pass/fail. Until one year my daughter was learning about mind-sets in 2nd-grade, she came home saying “I can’t do this yet, not yet!” The rhythm she had learned in school about the power of “yet”. Then we realized that we have been doing it wrong by calling it fail. We went back to all the assignments and tests change the word “fail” with “not yet”. To change the students’ believes we have to change our own mind-sets and language first.

I have to give a final in an hour and finishing grading for this class. I will type up more as I go. Sorry, it will be a bit longer.

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Bor Gregorčič
Top Contributor
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2 days ago
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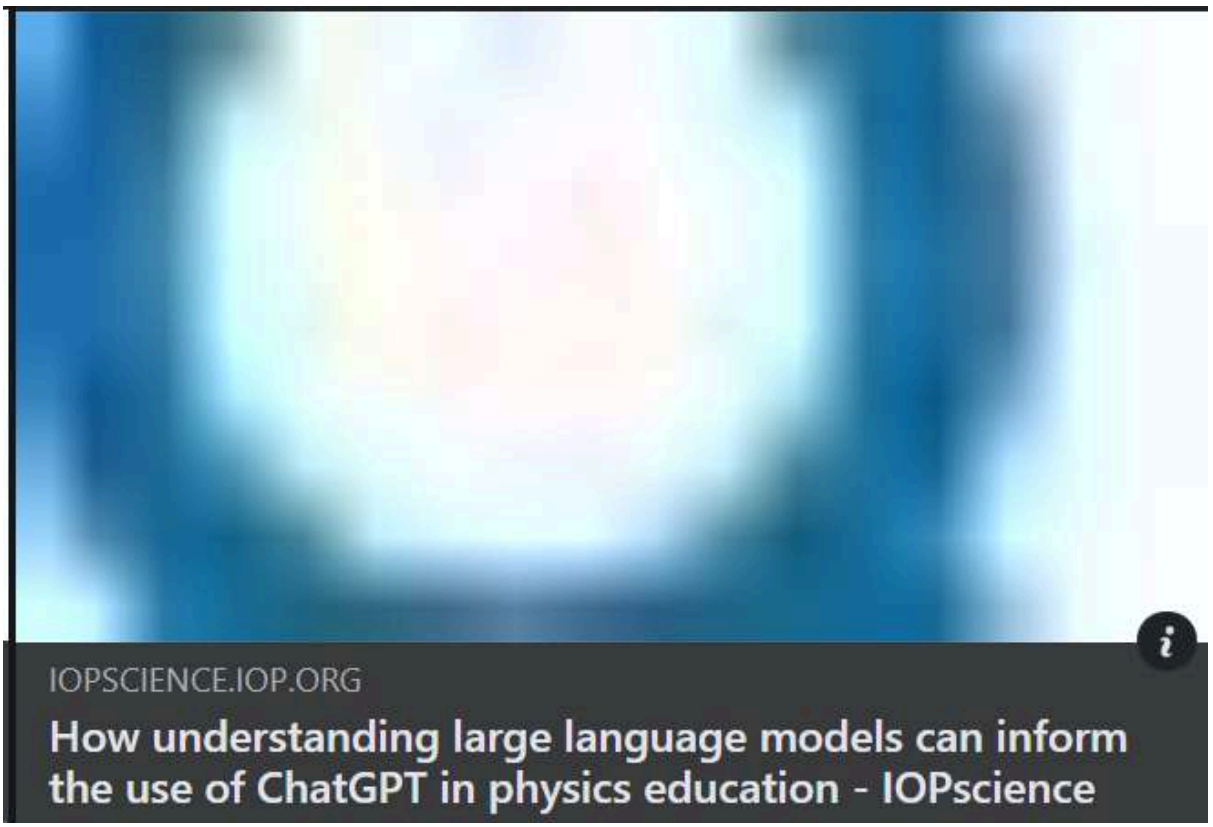
I would like to share with you a paper my PhD student and I published today. It is meant for physicists and physics teachers who do not have a lot of knowledge about machine learning and AI, but would like to better understand how Large Language Models work and how they might be put to use in physics education.



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Andres Akamine
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Hi everyone,
I am new to teaching ISLE. I am also behind schedule so I am just finishing Chapter 3 Newtonian Mechanics in the AP Physics 1 USA 2023-2024 school year with the exam coming fast in May. I am enjoying it a lot. I believe my students have a much better learning experience.
A month ago and before using ISLE, I used the AP Physics workbook and the AP Physics videos and topic questions for Unit 1. I did not use Unit 2 at all.
How do ISLE teachers use the AP Classroom materials?
My gut feeling is that I should not use AP classroom and first teach them Chapters 4,5,6,7,9 before I train them into answering test questions. Then mid April, I need to train them into MCQ and FRQ with Practice Tests.
Alternatively, I can give them the Progress Check, but some of them might require some additional lessons for the items that were not part of those chapters at that time.

Any good suggestions for the year wireframe schedule?

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Mohamed Gamal
Top Contributor
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December 16, 2023
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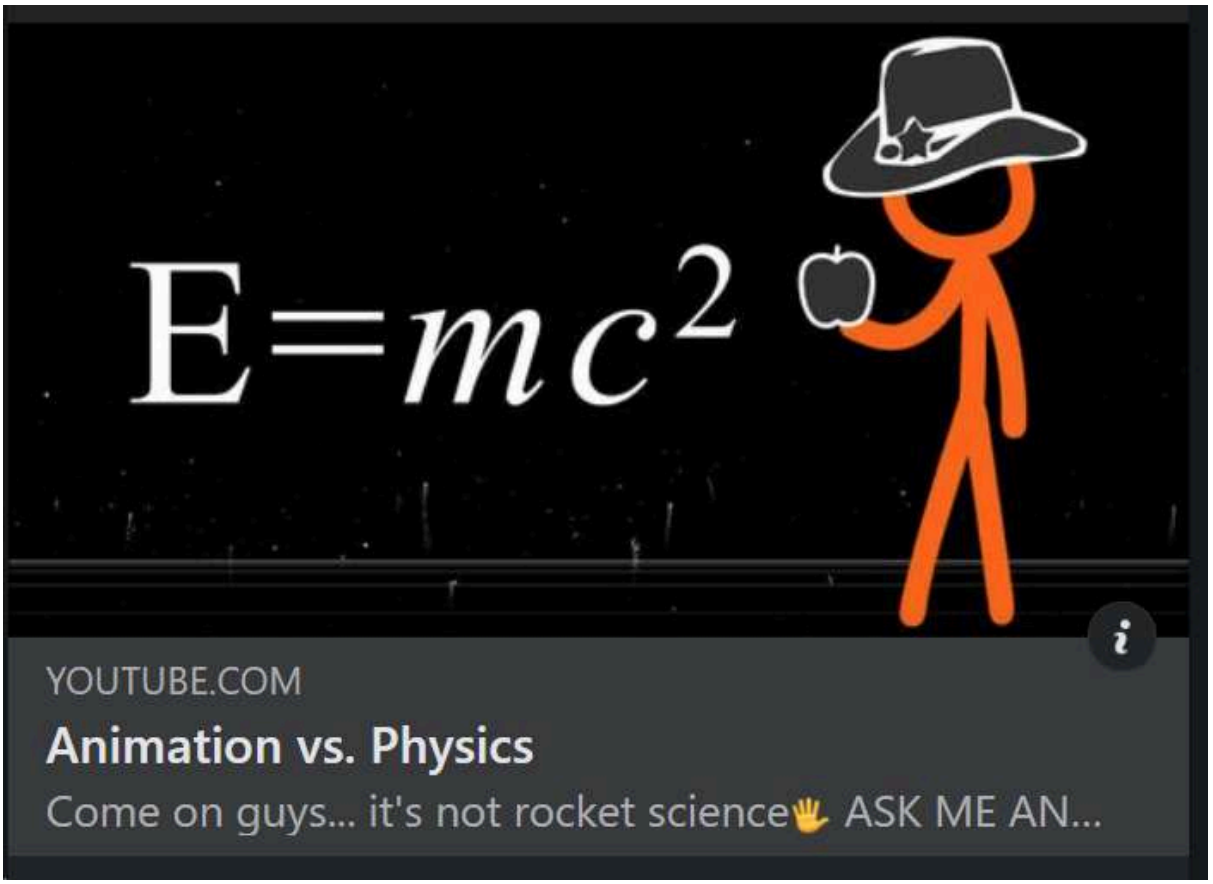
Hello everyone,
Someone shared this video with me and I would like to share it with you here.



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Roby Rod
Top Contributor
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December 16, 2023
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Dear Eugenia Etkina and community, I am looking for papers showing the effectiveness of ISLE to pass onto my school director. Ideally, papers that also include student achievement in standardised tests. Could you please post some links here?

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Robin Lewis
Top Contributor
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December 19, 2023
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Hello,
Does anyone know a good yo yo lab for uniform circular motion?

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Paul Wolf
Top Contributor
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December 19, 2023
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Wanted to post a quick success story. I used the PUM materials to teach my "regular" physics class this year. We ended on the momentum unit and I gave them about a week to work on the vehicle project at the end of that unit. They didn't have time to write a full lab report, nor did I have time to monitor their data collection, so those parts were lacking.
But we did have some great discussions about momentum. I had a class of 5 and told them that they needed to come up with two different designs. One group did a water rocket strapped to a skateboard, and the other did a "Newton's Cart."
After we tested both setups we had a discussion about the rubric, and I was really pleased with their problem-solving and testing of hypotheses. They were able to articulate ideas about how changing the mass of the load predicts an increase in the distance traveled for a

given rubber band stretch/bottle pressure, and about how the conservation of momentum predicts the ability to create a vehicle like the one they made.

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Elisabetta Sassaroli
December 20, 2023
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I recently read this book “The double bind in Physics education”, by social scientist Maria Ong that some of you might find interesting as I did.
From the book’s overview: “The Double Bind in Physics Education follows 10 women of color from their entrance into the undergraduate physics program at a large research university through their pursuit of various educational and career paths. Despite the ideals of objectivity promoted in STEM disciplines, the women profiled here encountered continued patterns of systemic oppression within their departments. In their stories, Ong identifies overt behaviors and microaggressions that harass, exclude, and otherwise disadvantage women of color and members of other minoritized groups. To provide equitable opportunities, she argues, greater work must be done to dismantle institutional norms and replace them with a culture of inclusion”.
On a personal level, by reading the book, I have come to realize that I have witnessed, and on some occasions, experienced the behavior described in the book. I have now gained a clearer understanding of my own experience related to the situations described in the book. Previously, I viewed them as "normal," accepting them as the way things work in real life. But as a matter of fact, such behavior is hurtful and impede people from reaching their full potential and from becoming active and productive members of our society. I think we should all contribute to creating a culture that values the well-being and potential of every individual.

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Carol Burns
December 21, 2023
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I teach a university course for preservice elementary/middle grades teachers. For many years the text for the course has been Physics by Inquiry v1 and 2 (McDermott). I have two questions - -
**Is anyone using ISLE materials for a similar course? I would like to try that next year.
**I am not having luck accessing the instructor resources for the McDermott books. The students books say things like "get the bag of supplies from your instructor" It would be

much easier to prepare for class if I had a list of supplies. Can anyone help me find a copy of the instructor book that is mentioned in the introduction of the McDermott books?

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Robert Selkowitz
December 29, 2023
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I ran across this on a friend's feed today. I am convinced it's done with camera and editing effects of some sort as opposed to really being what it portrays (I don't want to call it a fake, which carries negative baggage). It's wonderful!
I am trying to turn it into an activity for my AP 1 students. It reminds me of three-act math setups. I think I can show them this and nudge them toward suspecting and then collecting evidence that it's an illusion. I haven't built this sort of activity before and would appreciate advice on how to frame a successful prompt.
If this works the way I want it to the students will get a chance to review energy, momentum, kinematics, experimental/measurement uncertainties, and all sorts of other cool things along the way. More thoughts below.

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Matthew L. Jacobs
Top Contributor
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December 30, 2023
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"A high school physics teacher tried to steer her away from science..."
from
"Physics For The 21st Century, Unit 10"
by Dr. Peter Fisher, former head of Physics Dept. at MIT.
https://web.archive.org/.../cou.../physics/unit/text.html...

FROM CONTROVERSY TO CREDIBILITY

Vera Cooper Rubin at the Lowell Observatory. Kent Ford has his back to us. © Bob Rubin.

Vera Cooper Rubin faced several obstacles on her way to a career in astronomy. A high school physics teacher tried to steer her away from science. A college admissions officer suggested that she avoid majoring in astronomy. Princeton University did not grant her request for a graduate catalogue in 1948, because its graduate astronomy program did not accept women until 27 years later. Senior astronomers took a scornful view of her first paper, presented in 1950, on galactic motions independent of the classic expansion of the universe. And when she and collaborator Kent Ford expanded that research in the 1970s, they met so much dissent that they shifted to another field.

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