What worked (and didn't) in Energy Physics: Fall 2020

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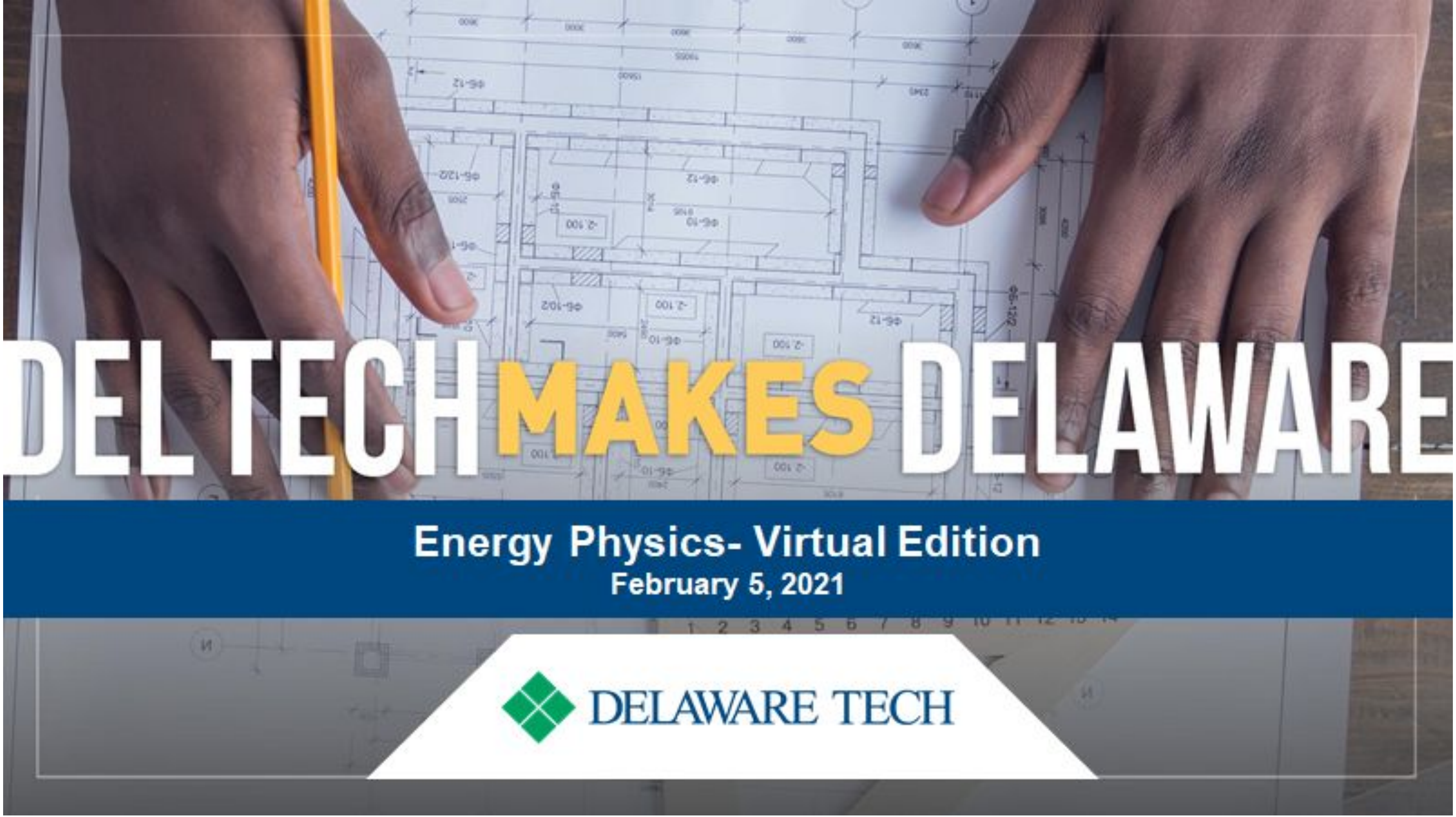
This material is based upon work supported by the National Science Foundation under Grant #2000714. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.


DEL TECH MAKES DELAWARE
Energy Physics- Virtual Edition
February 5, 2021
DELAWARE TECH

MISSION

Students are at the center of everything we do.

We empower students to change their lives through comprehensive educational opportunities and supportive services. As the state's only community college, we provide quality education that is accessible, relevant, and responsive to labor market and community needs while contributing to Delaware's economic vitality. We value all individuals and provide an inclusive environment that fosters equity and student success.

DELAWARE TECH

History of PHY 120 “Energy Physics”

Conceptual Physics

“Physics for teachers”

Not enough therr

Very little math re

General Physics 1

Higher level math required

a gatekeeper course into

grams

Energy Physics: Just right

In this cour
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Prerequisit

This course covers the fundamentals of physics concepts with an emphasis on energy principles including energy conservation, thermodynamics, energy efficiency, and principles of fluid dynamics. Prerequisites: (Test scores or MAT 020 or higher)

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Original Design of Energy Physics

First semester course

Flipped course - using free online resources for readings and videos

Class time spent working on lab assignments

COVID- since March 2020

Everything is now virtual

FIRST SEMESTER (FALL)				
SSC 100 First Year Seminar	1	1	0	
NRG 101 Intro to Energy Management	3	2	2	Fall,
MAT 153 College Math & Statistics or MAT 261 Business Calculus I	4 4	4 4	0 0	All
DAT101 Int. to Data Analytics/Visualization	3	2	3	All
PHY 120 Energy Physics	3	3	1	Fall
ENG 101 Critical Thinking & Acad Writing	3	3	0	All
TOTAL	17	15	6	

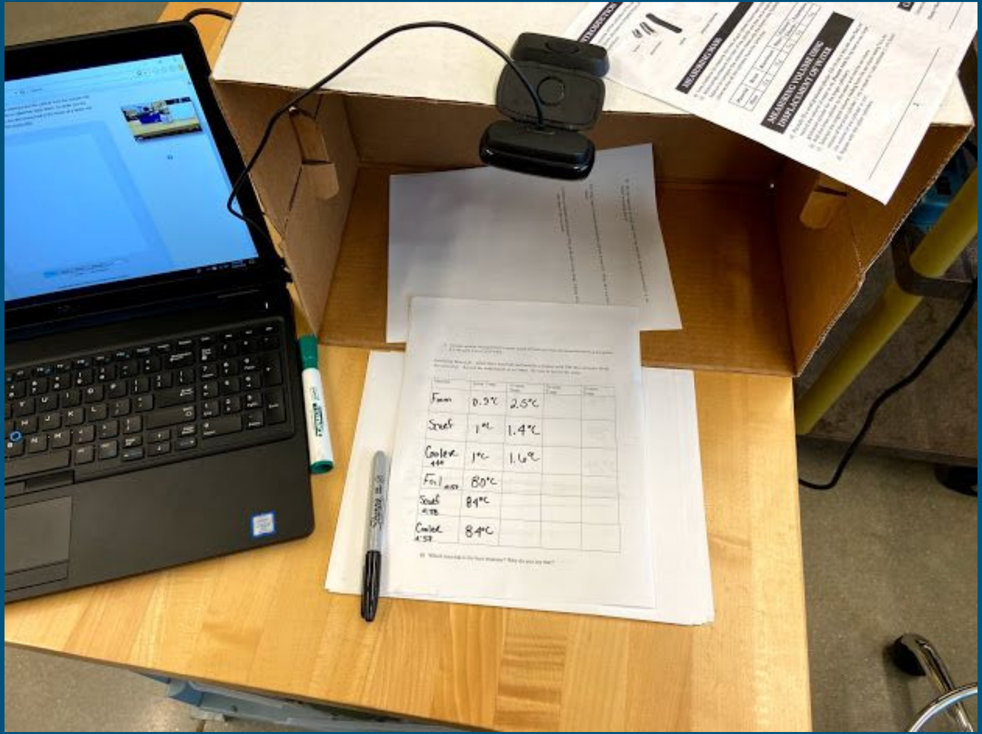
SECOND SEMESTER (SPRING)

How did your remote learning classes go?

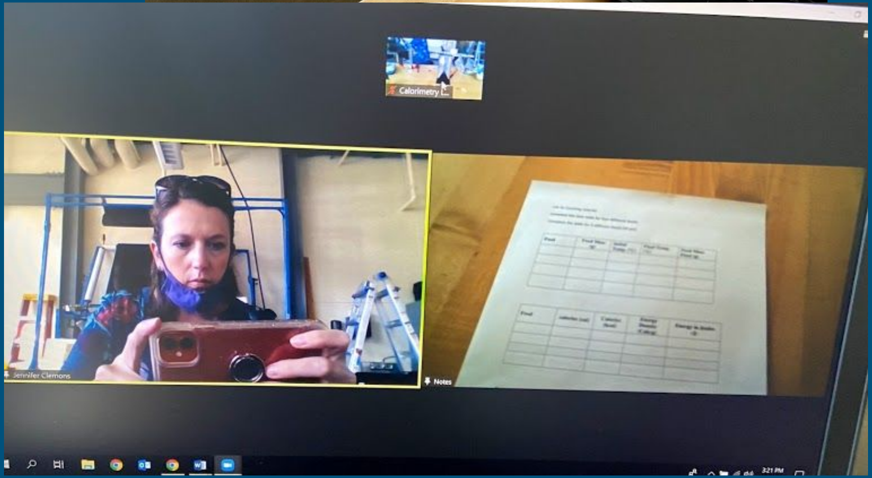
What didn’t work!

- Using the same labs, and “changing a few things”
  - Ended up being easier to start from scratch!
  - Scrapping original ideas helped me find new things that worked better in some cases.
- Talking too much
- Not waiting long enough for students to answer
- Doing the same lab and having the student “watch me”.

What didn’t work

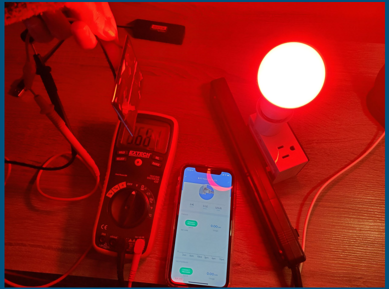


What almost worked- Calorimetry Lab



What worked!
Gas Laws

Efficiency Lab: Took the readings ahead of



Light Source	Light Voltage From Currant Meter	Light Current From Currant Meter	Output Power (W) Note: Power (watts)=Volts*Amps	Light levels in Lux
Incandescent	*119.89 V*	*0.56 Amps*		*130 lux*
CFL	*121.63 V*	*0.09 Amp*		
Red LED	*121.81*	*0.02*		
White LED	*121.75*	*0.04 Amp*		
		0.03 Amp		

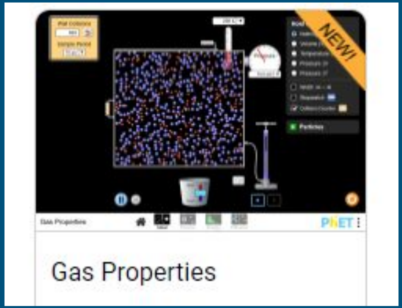
Light Source	Solar Panel 20 cm away (voltage) (V_{max} in volts)	Solar Panel 20 cm away (I_{max} in amps)	Output power from solar panel (Watts)	Efficiency (light bulb to solar panel)
Incandescent	*0.746 V*	*4.41mA*		
CFL	*0.463 V*	*0.79 mA*		
Red LED	*0.448 V*	*0.59 mA*		
White LED	*0.459 V*	*0.66 mA*		
Violet LED	*0.418V*	*0.66 mA*		

Simulated Lab activities

Expanded from previous semesters

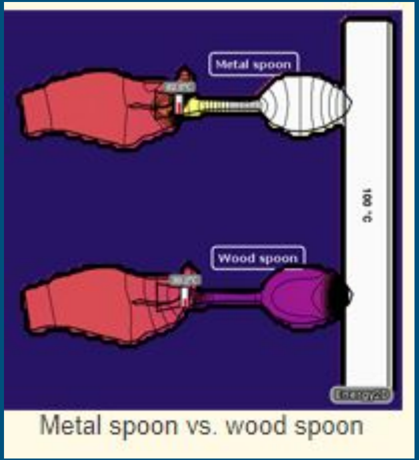
Phet- Interactive Simulations for Science and Math: University of Colorado

Energy 2D- Interactive Heat Transfer simulations: NSF

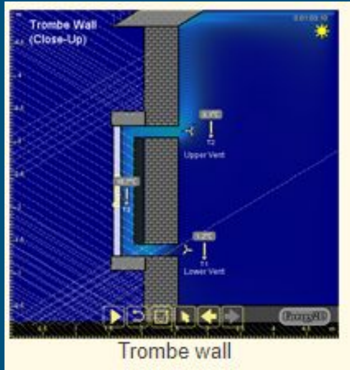


Gas Properties

Energy Skate Park



Metal spoon vs. wood spoon



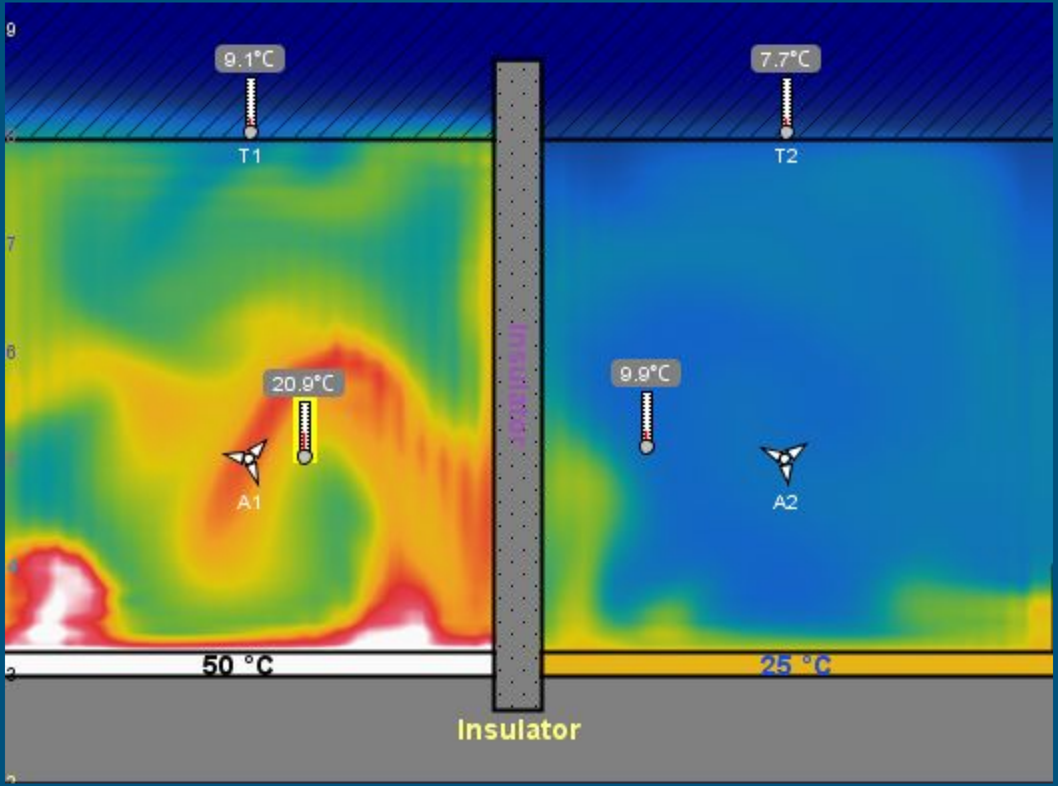
Trombe wall

Energy 2d

https://energy.concord.org/energy2d/models.html

Need to download

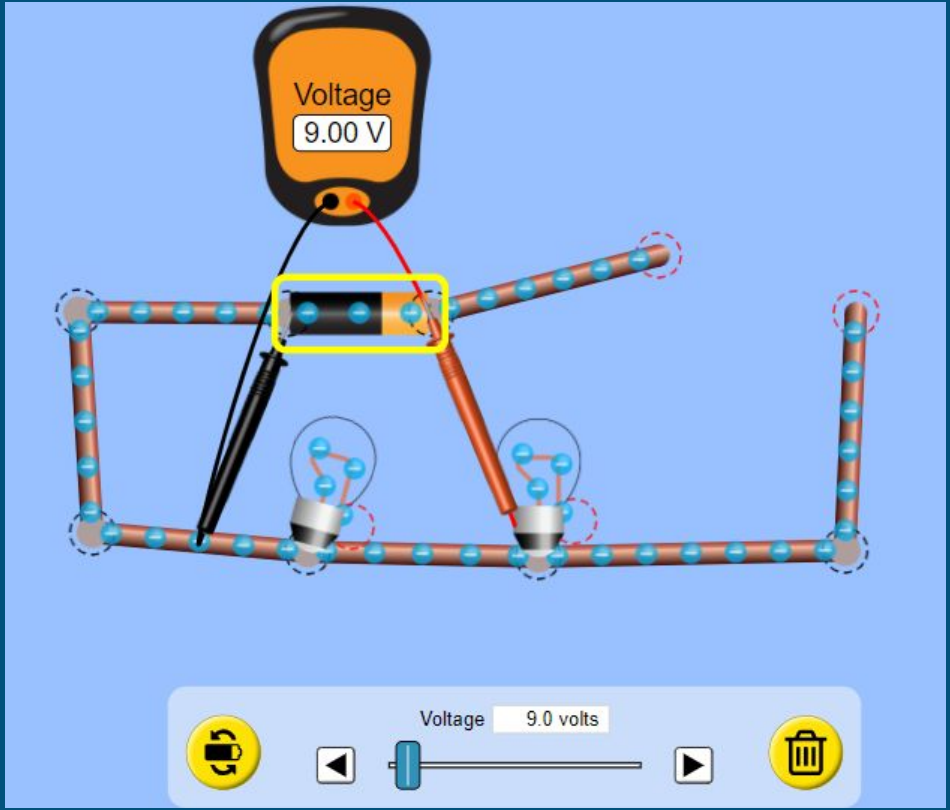
Collection of computational fluid dynamics simulations



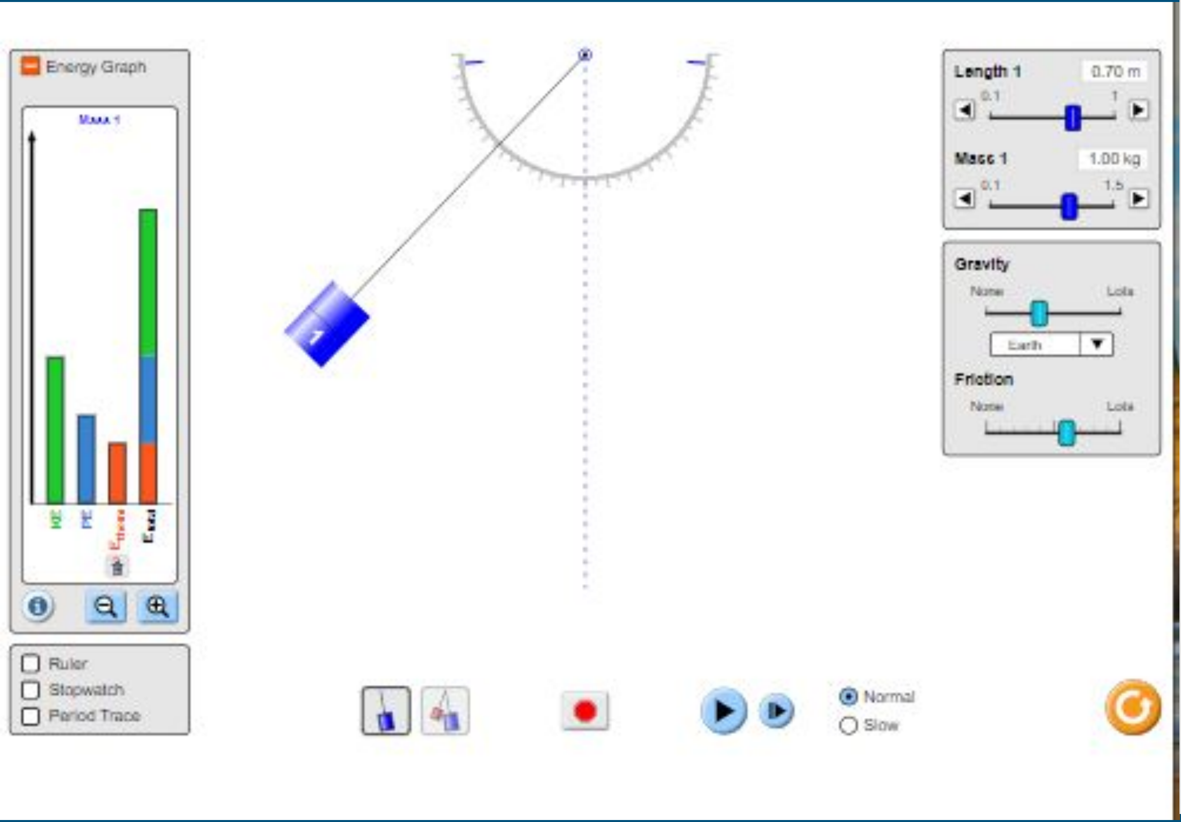
Simple Circuits

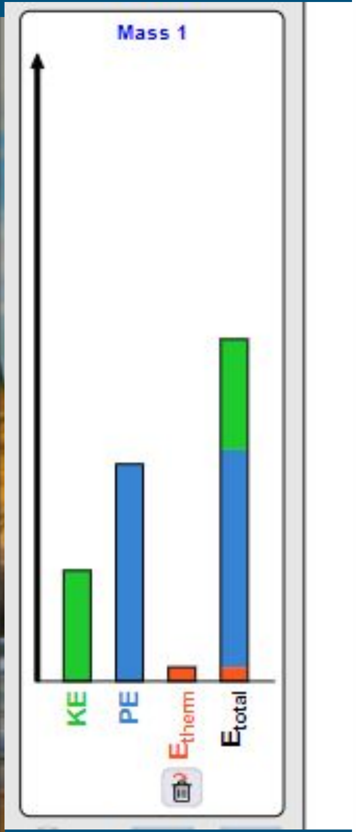
Using the simulation, we can make mistakes

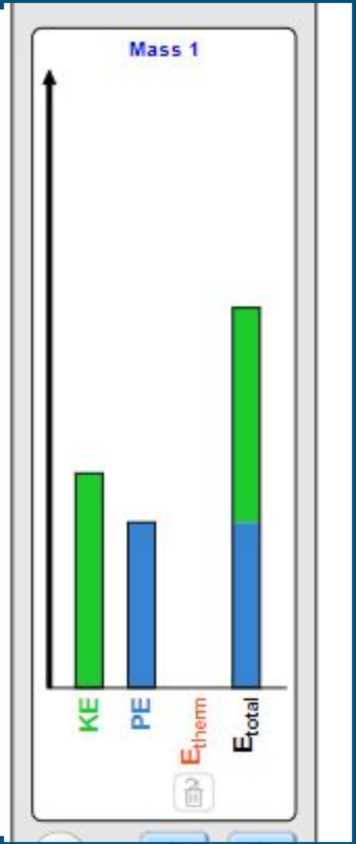
Not burning up LED bulbs or blowing fuses in multimeter



Phet- Pendulum Lab



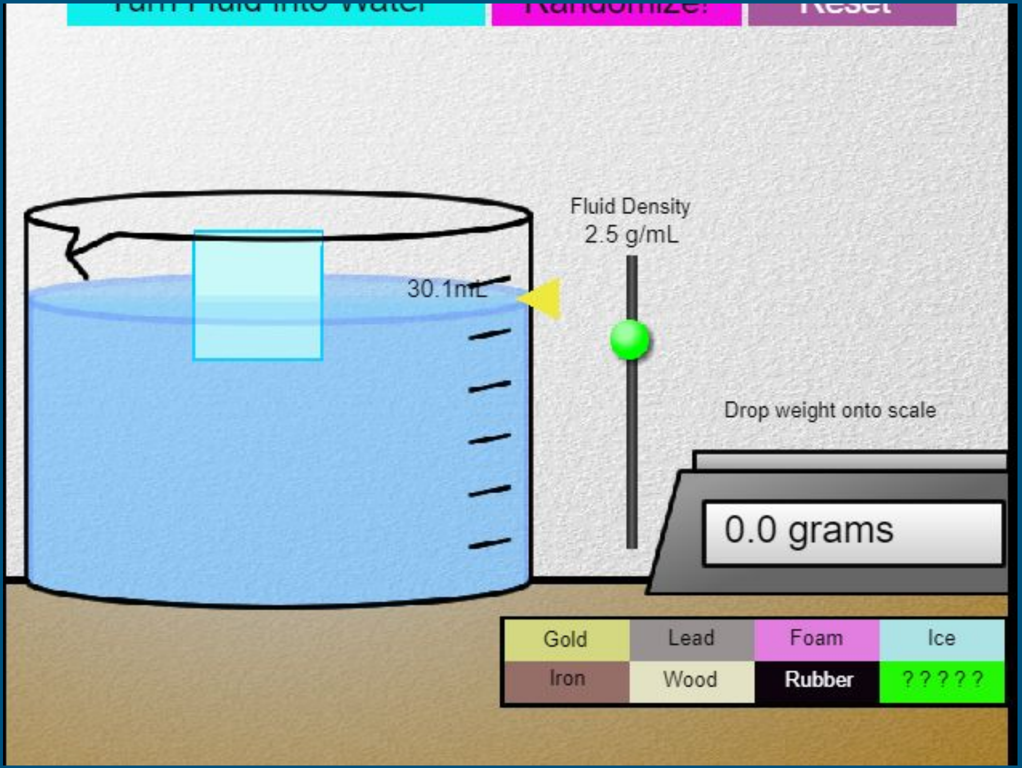




New Resources

Density simulation

Heat capacity- runs on flash (dead now)?



Course Evals

9 - What are the strengths of the course?	
Response Rate	3/7 (42.86%)

- Engages with the class to encourage learning Has a mastery of the subject matter Variety of instruction techniques Enthusiasm for the subject matter and stude
- Professor Clemons is the strength of this course, and the energy program as a whole.
- This course provides a lot of information in a small format which is very nice when going through all the content.

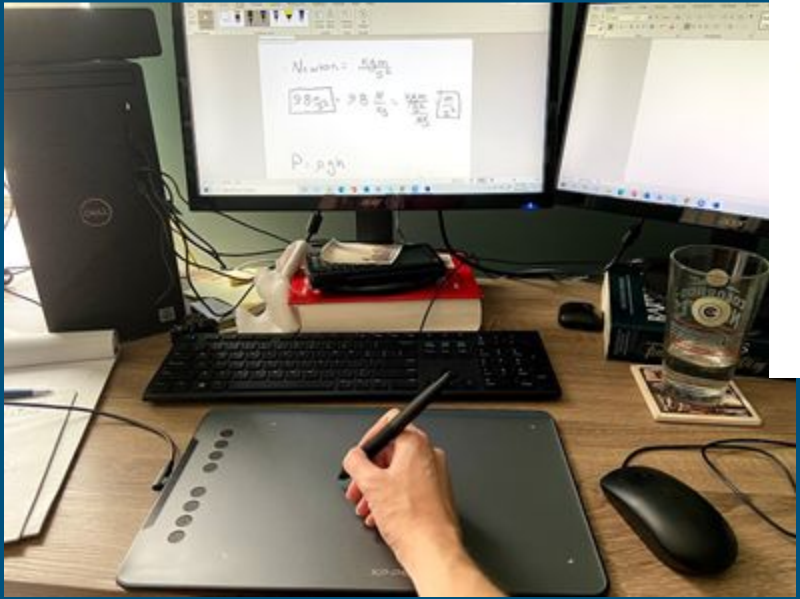
10 - What areas of this course could be improved?	
Response Rate	3/7 (42.86%)

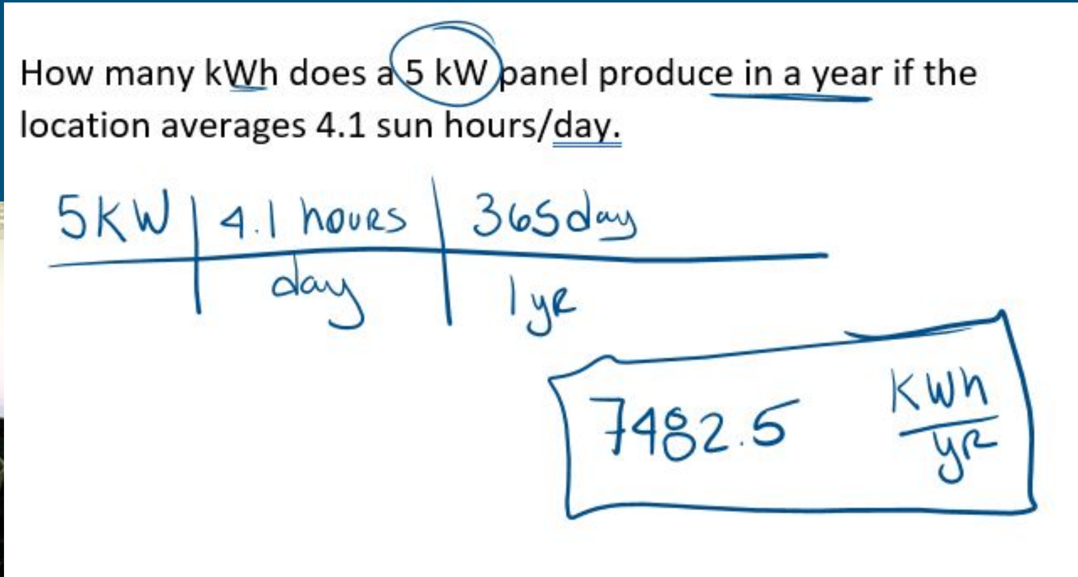
- I feel this course is fine how it is right now.
- More in person instruction - even though that was not of her doing!
- This semester was a tough one, being virtual removes the interaction between students, teachers, and groups. Professor Clemons did an amazing job of working through all of this w

Takeaways

- Celebrate small wins. Acknowledge things are hard, and don't always work out.
- Wait a long time for responses
- Greet students
- Office hours before class (same zoom link)
- Breakout rooms are your friend
- Multiple cameras to show different views
- XP-Pen

XP-Pen





Start at ~$30

One pictured was $70 in Sept 2020 (cheaper now)

Drawing or writing on word/pdf documents

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