Outline

1. Building on Flipped Physics 1
   - Lessons Learned Last Year
2. Flipped Physics 2
   - Before Class
   - During Class
   - After Class
3. Early Results
   - Same Population in Flipped and Traditional Section
   - First Midterm: An 8.5% Improvement

Lessons Learned Last Year

Surprises

- Immediate video comments are far richer than "muddiest point" comments
- Students HATE having to comment
- 50% of students use Khan Academy (even in traditional sections)
- Textbook usage is significantly reduced in flipped sections
- Student are much better prepared for in-class problem solving (as long as the problem is closely tied to the concept in the most recent videos)

Outline

Before Class

- Read assigned sections from textbook? (probably not)
- Watch video lectures (~2 hr per week)
- Take a short concept quiz

Lectures

- Annotated PowerPoint with voice-over
- All figures hand-drawn
- Most videos ~5 minutes long (15 min max)

All Videos

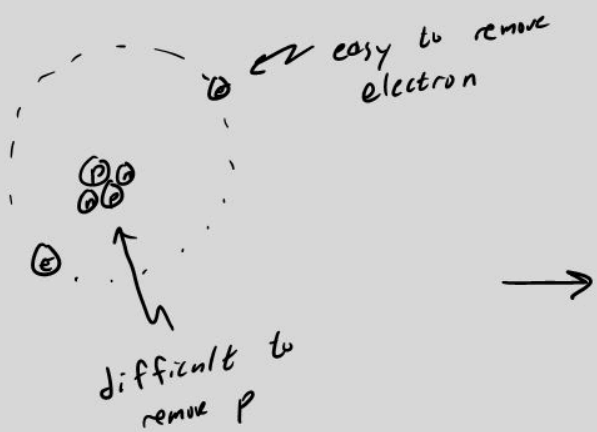
- Recorded using Active Presenter (free version)
- Hosted on YouTube (free)
- Presented using Classroom Salon (free)

Charge is Quantized

Charge always comes in multiples of e, the quantum of charge

$$e = 1.60 \times 10^{-19} C$$

Particle	Symbol	Charge
proton	p	+e
neutron	n	0
electron	e^-	-e



- Negative net charge caused by extra electrons
- Positive net charge caused by missing electrons

Lecture 09 - Ohm's Law (5)

Lecture 10 - Circuit Analysis (5)

Title						
07.2 Circuit Analysis Part 1: Potential Difference Between Two Points	5	4				2016/01/04
07.2 Circuit Analysis Part 2: Grounding	8	5				2016/01/04
07.2 Circuit Analysis Part 3: Ammeters and Voltmeters	0	0				2016/01/04
07.2 Circuit Analysis Part 4: Kirchhoff's Circuit Laws	2	2				2016/01/04
07.2 Circuit Analysis Part 5: Multi Loop Circuit Example	2	2				2016/01/04

Lecture 11 - RC Circuits, Magnetic Force (5)

Lecture 12 - Applications of Magnetic Force (6)

Lecture 13 - Biot-Savart Law, Ampere's Law (8)

Lecture 14 - Faraday's Law (5)

Lecture 15 - Inductors, RL Circuits (7)

Lecture 16 - LC Circuits (3)

Lecture 16+i - Mathematical Background (9)

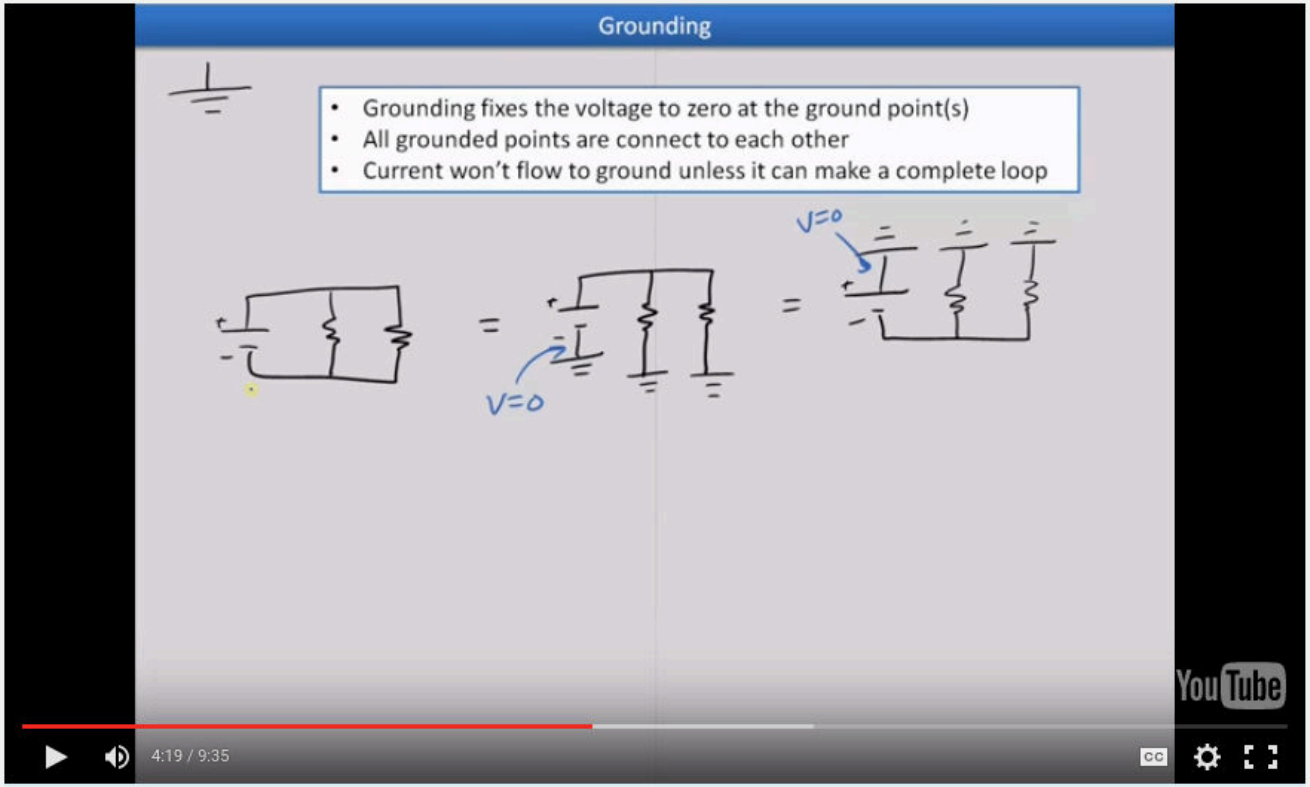
Lecture 17 - RLC Circuits (6)

Lecture 18 - Driven RLC Circuits (4)

Lecture 19 - Energy in AC Circuits (4)

Lecture 20 - Maxwell's Equations, Magnetism (9)

Lecture 21 - EM Waves (6)



Clarify

[redacted] as Anonymous | 8 days ago | 0 votes

Is the potential zero where the resistors are grounded as well or is it only where the battery is grounded?

Reply ▶ 4:19

vote | bookmark | ☆

View replies

No Tag

[redacted] | 8 days ago | 0 votes

Is there any advantage to grounding your circuit at each point as opposed to having it in one continuous loop? Also can you only do this while your circuit is in parallel?

Reply ▶ 5:00

vote | bookmark | ☆

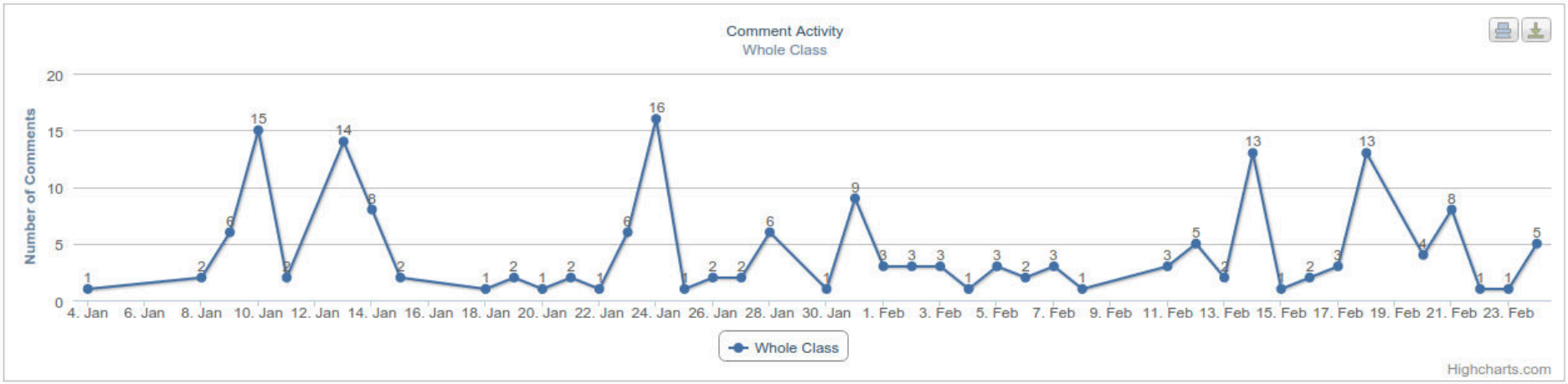
View replies

CLASSROOM SALON

SALONS DOCUMENTS ME

At a Glance | Activity Summary

Name ▾ Document ▾ Search Reset

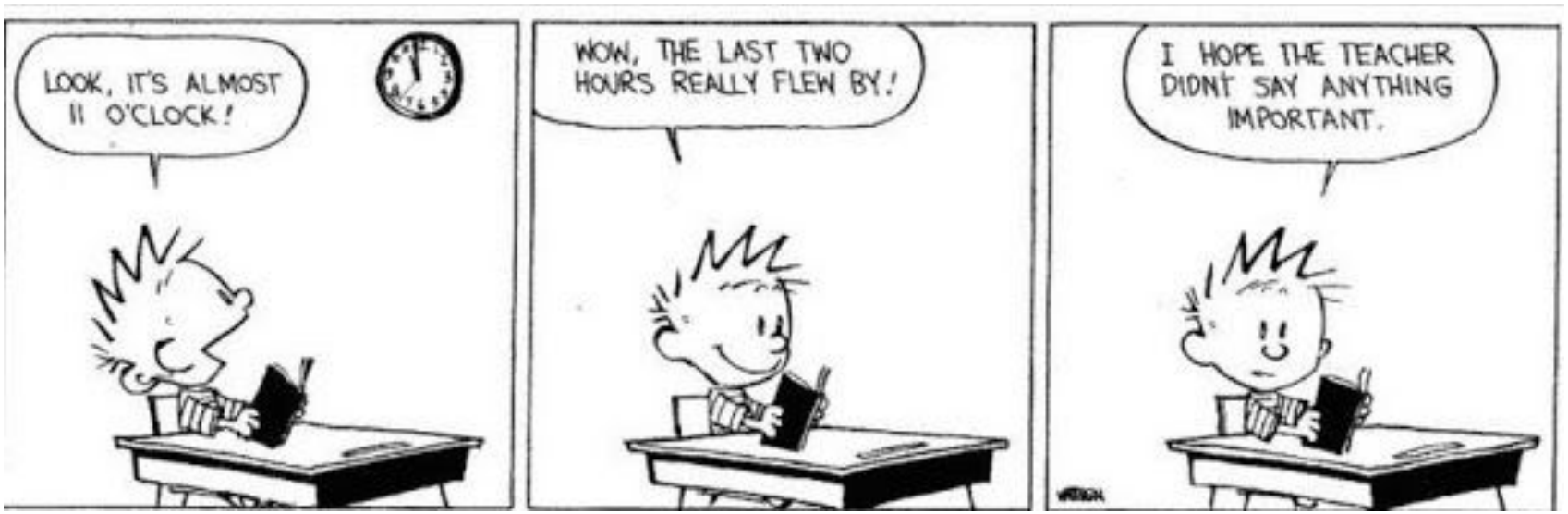


General Stats
Number of Comments: 180
Average Comment Length: 28.99
Number of Questions: 89
Number of Replies: 87
Number of Members: 37
Number of Documents: 48

Top Contributors
David Nero: 66 comments
Christine [redacted]: 20 comments
Anna [redacted]: 9 comments
Maddie [redacted]: 8 comments
Jacqueline [redacted]: 8 comments

In Class

- Review material based on results of comments on *Classroom Salon*
- Use demonstrations and clicker questions to reinforce concepts
- Practice problem solving



TPS

The potential across a real battery in a circuit is measured to be 1.4 V. Then, the positive terminal of the battery is grounded. When the potential across the battery is measured again, it will be

a) 1.4 V

b) 0 V

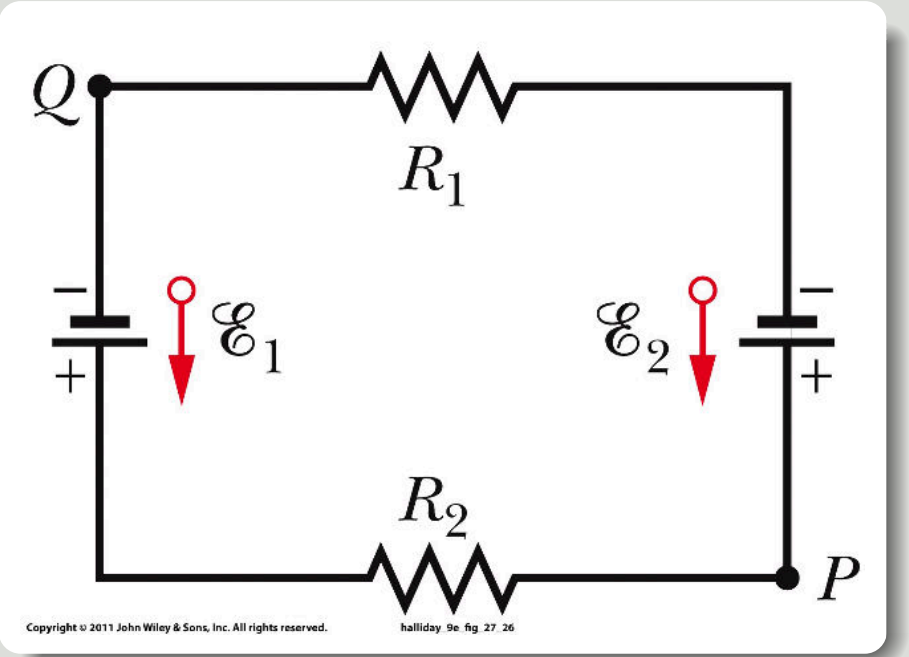
c) -1.4 V

d) between 0 V and 1.4 V

e) between -1.4 V and 0 V

Practice Problem

$\varepsilon_1 = 6$ V, $\varepsilon_2 = 3$ V, $R_1 = 4\ \Omega$, and $R_2 = 8\ \Omega$. Point P is grounded. Find the potential at point Q.



After Class

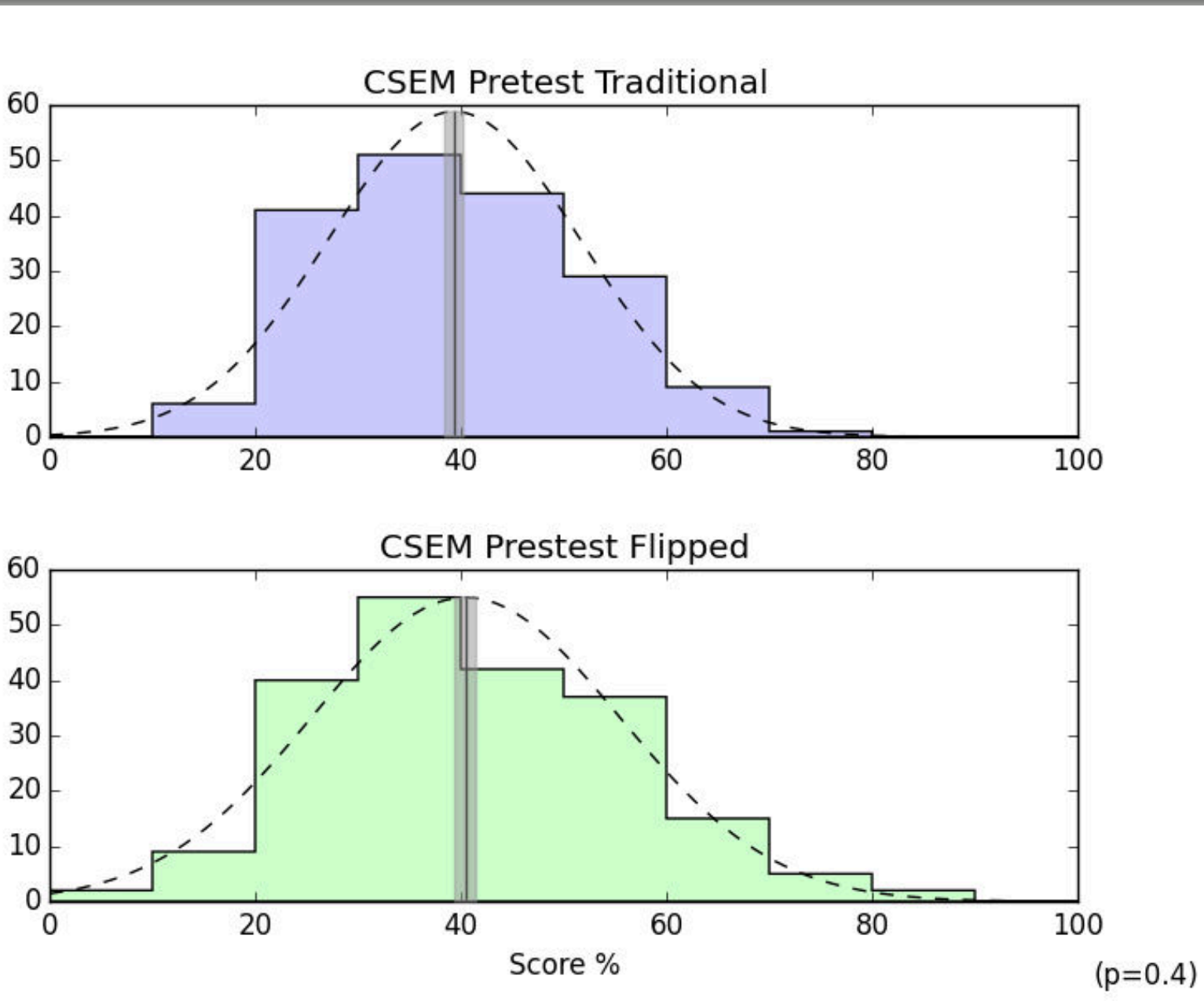
- Read assigned material from the textbook? (probably not)
- Re-watch portions of video lectures?
- Complete a concept-rich group problem and follow-up group quiz in recitation
- Complete weekly homework
- Attempt suggested problems from textbook and watch video solutions?

107 Recommended Problems With Video Solutions

- Same style as lecture videos
- Length widely variable depending on difficulty of problem (~minutes long)
- Questions from the textbook
- Quantity and difficulty similar to assigned homework
- Popular with students for exam preparation

Outline

Conceptual Survey in Electricity and Magnetism (CSEM)



First Midterm: An 8.5% Improvement