



ND SUMMER RESEARCH EXPERIENCE FOR TEACHERS

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MY COURSES

- PreCalculus
- AP Calculus AB
- Honors Algebra 2
- Physics

First Year of RET (Math)– Tailored module to PreCalculus
Last Year – Tailored to Physics
This Year – Tailored to AP Calculus

- Within last three years...
 - Algebra 2
 - Geometry
 - Algebra 1



RESEARCH – LAST YEAR

- Learned about CPU's physical structure
- Limits of Moore's Law
 - Scaling
 - Thermodynamics
 - Energy Use
- Brought up in all classes

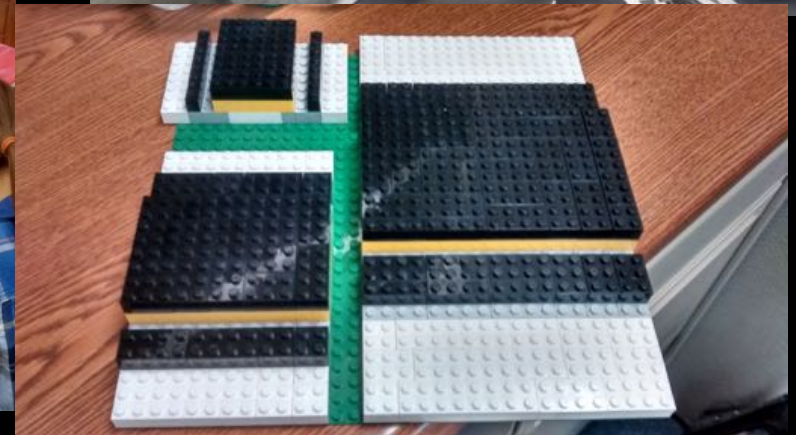
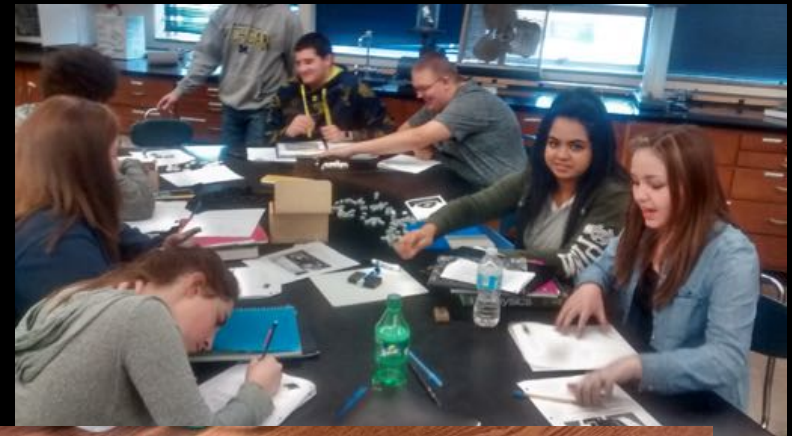
RESEARCH-THIS YEAR

- Focused on Energy Use
- Placed Computer into Case
- Hardware based Measurements
- First Attempt Failure
- Ubuntu
- Command Line
- Software based Measurements



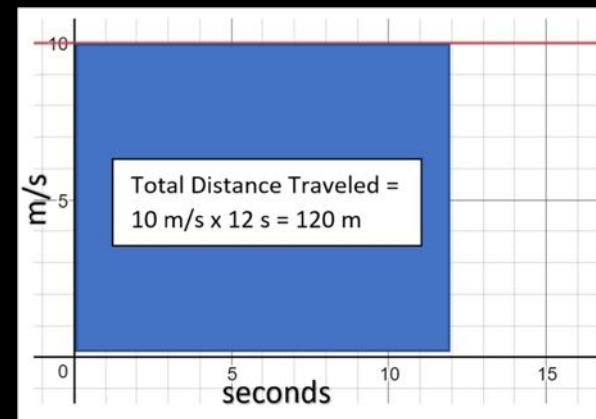
OVERALL IMPACT

- Learned a lot of very basic information of what is needed for computer science
- Be able to show many of the concepts in all of my courses

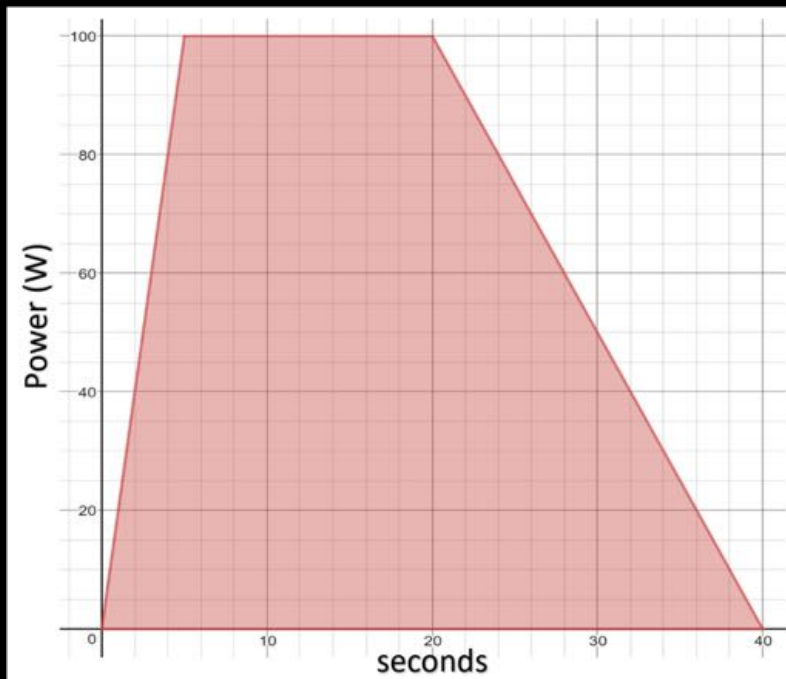


MODULE THIS YEAR

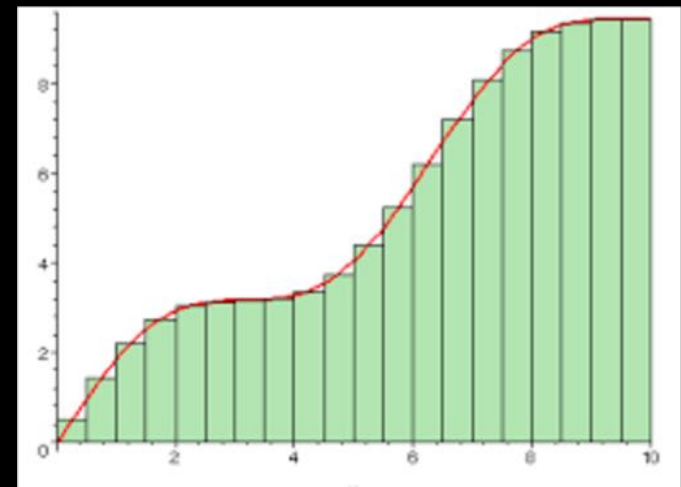
- Energy Use of Programs – Riemann Sums – Intro to Integrals
- Area under a curve and what it means
- Start with very basic situation – Square
 - Velocity vs. Time to find Displacement
 - Power vs Time to find Total Energy



RIEMANN SUMS



- Build up difficulty
- Discuss and Perform Left/Right/Trapezoidal/Middle Riemann Sums



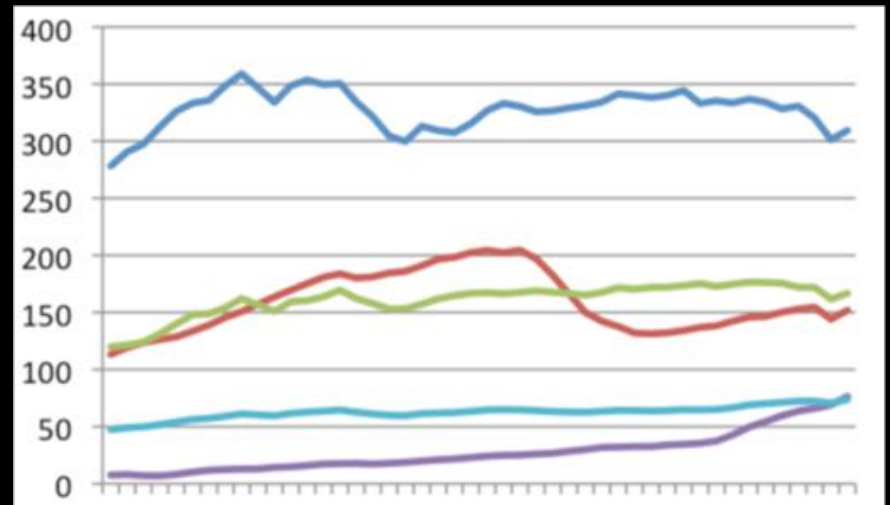
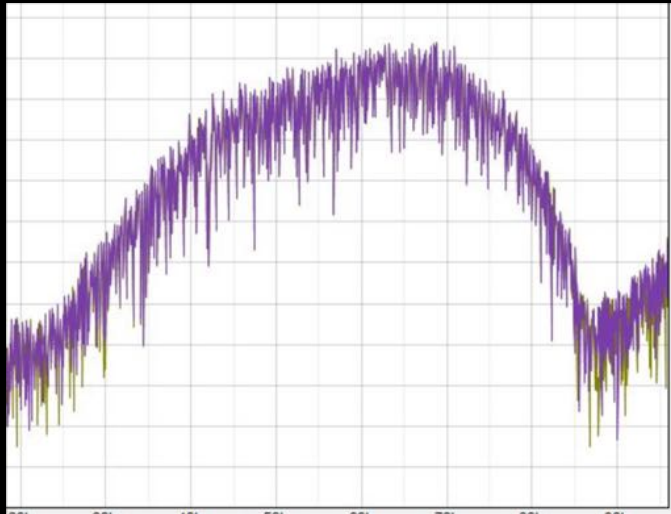


DISCUSS MEASUREMENTS

- Hardware and Software Methods
- Teach how both measure and show results
 - PCM – Software measures CPU Power
 - NVProf – Software measures GPU Power
 - NI & Current Clamps – Hardware & Data Management Software
- Possible to get graphs for all of them to present to students

STUDENT CHALLENGE

- Use data from a certain program running and determine the amount of energy it required.



PURCHASES

- Laptop and Accessories
 - School Computer is Old, Slow, Sometimes Usable PC
 - Allows me to easily work at home
 - Will run Data Management Software
- Computer and Hardware
 - Purchased Last Year





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