

**ASEE Mid-Atlantic 2014 Fall Meeting
Agenda for Friday Afternoon Calculus Workshop**

**An Honest Approach
to
helping High School Students understand Calculus**

November 14th Friday 3:00 pm. - 5:00 pm
Room xxx

Module 1: Basic Algebraic ideas

The Structure of Calculus
Letters, equations laws and conditions; identities and conditional equations
The meaning of letters in Algebra
Changing the forms of algebraic equations, solving
Studying the algebra of straight lines
WINPLOT Free plotting software
Monotonic functions and inverse functions

Module 2: Researching the curves of Pre-calculus

Polynomials, exponentials and trig functions – reciprocals and inverses
The kinds, forms and operations on curves

Slide Show: The Natural Structure of Calculus

Slide Show: Visual Analysis

Projects: Using WINPLOT compare $y = x$, $y = x^2$, $y = x^3$, $y = x^4$, $y = x^5$, $y = x^6$
Plot $y = .2x$, plot $y = \sin(5x)$, plot $y = .2x + \sin(5x)$

Module 3: Differential Calculus

Position, direction and turning - $y(x)$, $y'(x)$ and $y''(x)$
The rules for the derivatives of the various kinds, forms and operations on functions

Conclusion

Dr. Grossfield has been a Professor at Vaughn College teaching mathematics and electronics for over 40 years. He is a Past Chair of the ASEE Mid-Atlantic Section and has been granted the ASEE 2010 Math Division Distinguished Educator Award. Dr Grossfield studied continuum mechanics under L.M. Milne Thomson, CBE at the University of Arizona and is licensed as a P.E. in New York State.

Having mastered two disciplines he has earned the right to be critical of both. He worked as an engineer before he entered the applied math doctoral program at the University of Arizona. He wanted to understand and so he avoided memorizing theorems but relied on his ability to visualize mathematics to pass his courses. This workshop reveals the results of his visualizations.

The facts you see may not be new but they will be organized in a way that will make it easier for you to help your students understand them.

Dr. Grossfield starts with irrefutable obvious facts and then adds ideas and pictures. When he is finished you stand on a hilltop and have the entire subject in view.