Teaching Creative Reasoning

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Acknowledgement

Would like to acknowledge the innovative accomplishments being made by the staff of CETLA towards enhancing the quality of teaching at our institution and around the world.
Physics as a Research Profession

• Use of appropriate technology has been incorporated in teaching physics since its inception in ancient times

• Research inherently involves creative reasonings that expand the knowledge base

• Physics curricula have institutionalized teaching methodologies “within and outside of the box”
Institutionalized Curricula

• Physics for poets: Concepts in a box
• Physics for pre-meds: Equations in a box
• Physics for engineers: Utilitarian equations
• Physics for physicists: Equation derivations
Course Structure

• Courses have lectures, recitations, and sometimes laboratory sections
• Most conceptual learning occurs during recitations, where problem solving skills are developed
• At Howard University, we try to place all physics majors in the same recitation section, since we modest numbers of majors
• Creative reasoning is required from Problem Set 1 in all courses for physics majors
Appropriate Technology

• The most important technology used in training our students to think outside of the box is chalk and board along with pen/pencil and paper

• Colleagues found anti-correlation of web-based homework scores (in-house developed `Blackboard`) with in-class exam scores

• Quality teaching takes time. Technology often does not save time, but it can enhance teaching
Technology as a Tool

Spatio-Temporal Correlations and Risk Assessment of New Madrid Seismic Zone

Candice Ottley
BS honors, Physics/Geophysics
Howard University (2006)
1st Place Grand Prize
Inaugural COAS Undergrad Research Symposium
Geological Information Software

Earthquake of 1811
A continental Rift
Elimination of Human Biases
Conceptual Block-busting