Teaching Middle School Mathematics and Science Using Robotics (2008)

A Free, Fun, And Creative Inservice Opportunity

Sponsored by UNL/UNO/PKI/OPS/NSF

WHO: Middle School Teachers of Mathematics and Science

WHAT: This is a year-long workshop experience that will help middle school teachers learn how to teach engaging mathematics and science activities with the use of a set of interactive robotics kits (called CEENBoTs). Teachers will participate in an informal setting, with guest speakers, hands-on activities, fun problems, and free materials.

WHEN: The workshop dates are offered during the later part of the Summer of 2008 and include a teacher stipend for each phase of participation.

Topic	Days	Time	Location(s):
CEENBoT basics	Week 1: July 7th-11th ($400 stipend)	8:30 am - 3:30 pm	PKI & UNO
CEENBoT learning	Week 2: July 14th-18th ($400 stipend)	8:30 am - 3:30 pm	PKI & UNO
CEENBoT lesson	Create a CEENBoT lesson ($100 stipend)	Flexible	PKI & UNO
CEENBoT practice	Optional: Teachers visit CEENBoT student camp ($100 one day) *July 21 – August 1*	8:30 am - 3:30 pm (Flexible)	PKI & UNO

FREE ROBOTICS KITS: Workshop participants will also each receive 4 free CEENBoT Robotics kits, free background materials and various CEENBoT Lessons, funded by NSF.

GRADUATE COURSE OPTION: Participants will have the option of enrolling in two UNO graduate courses reserved exclusively for participants. Credit participants will be required to also write several CEENBoT lessons to share with other workshop participants.

PROJECT LEADERSHIP: The project is directed by Dr. Bing Chen, Chair of the Computer Electronics Engineering Department at the Peter Kiewit Institute-UNL, and Dr. Neal Grandgenett and Dr. Elliott Ostler, Professors of Math Education at UNO. Mr. Jim Harrington and Mr. Chris Schaben (OPS Math and Science) are also assisting.

HOW TO APPLY: To apply for a slot, send a letter of application as soon as possible to: CEENBoT Project, C/o Dr. Bing Chen, PKI, 200A, 1110 S. 67th Street, Omaha, NE 68182-0572. Or e-mail your application letter to bchen1@unl.edu. Applicants are encouraged to discuss: 1) their educational setting and backgrounds, 2) why they might want to be in the project, and 3) how the project could help their students achieve in math and science. Selection will continue until all 35 slots are filled for the 2008 Institute.

SURVEY: Teachers will be asked to fill out an optional survey at the end of the institute, regarding their perceptions of robotics and the training (IRB: UNO #173-05-EX, UNL #2005-05-EX).

CONTACTS:

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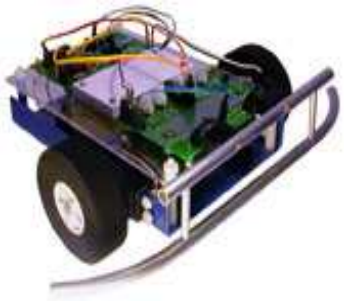
Additional Information:
CEENBoT Teacher Training Project

Dear Potential CEENBoT Participant,



Thank you for your interest in our project! Here is a bit more information. This is the itinerary for the CEENBoT Summer Institute to be held this Summer at the Peter Kiewit Institute. This two week seminar will guide you through the construction and use of your own CEENBoTs in the classroom. You will also have an option to spend a couple of days with students at the Aim for the Stars Camp to see them in action with CEENBoTs. You will also design your own curriculum activities for use in your own classroom.

This seminar will be split into three weeks (two required and one optional). Here is a listing of the topics to be covered during each week:

Week One (Required, $400 Stipend)

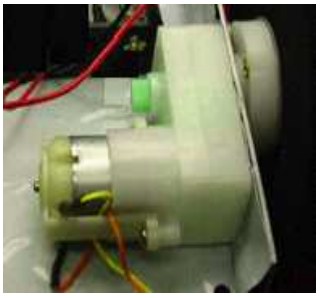
• *Electrical and electronics fundamentals:* Participating teachers will learn about current flow. They will understand Ohm's law and how it relates voltage, current, and resistance. The teachers will learn the difference between series and parallel circuits and configurations of resistors. They will use simulation software to predict circuit operation. They will be able to build circuits on prototyping boards and measure voltages, currents and resistances.

• *Digital logic and microcomputer fundamentals:* Participating teachers will learn the different logic functions (AND, OR, NAND, etc) and their associated truth tables and symbols. They will understand flip-flop devices and how they can implement counters.

They will learn the principles of LEDs and 7 segment displays. Teachers will be able to construct basic schematics and simulate circuits using software. They will understand the architecture of a microprocessor and the functions of the various support circuits.

• *Problem-based learning (PBL):* Teachers will review the instructional features of problem-based learning and interact with PBL in a CEENBoT context.

Week Two (Required, $400 Stipend)



• *Robotics fundamentals:* Teachers will learn the principles of different types of motors that could be used on robot devices. They will learn the theory of operation of different types of sensors (ultrasonic, infrared, temperature, light, etc.) and will perform laboratory exercises. CEENBoT wireless communications links will be tested.

•*Programming languages:* Teachers will learn fundamentals of BASIC, as needed, and apply this to CEENBoT applications.

•*Mapping to standards:* Teachers will explore how CEENBoT technologies and activities can be mapped to common science, math and technology standards.

Observation and Lesson Creation
(Optional/flexible, $100 per day for 2 days.)

• *Institute:* Teachers will work optionally with students to observe them and practice some sample CEENBoT PBL activities and to create a lesson of their own for their classroom.

Please note that these seminars are subject to change and we will notify you of changes as they occur. Lunch will be provided for each day of the seminar and each participating teacher will receive 4 free CEENBoTs for their classroom. A 6 hour course block of UNO graduate credit option for participation is also possible for teachers. (At standard tuition costs and rates.)

We look forward to seeing you this summer and showing you this new educational tool.

If you have questions or would like more information please contact:

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