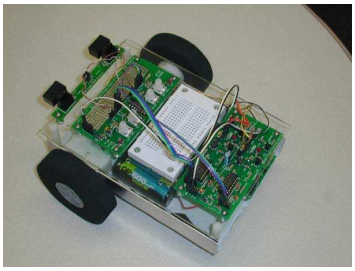
Teaching Middle School Mathematics and Science Using Robotics (TekBots)



A Free, Fun, And Creative Inservice Opportunity

Sponsored by UNL/PKI/UNO/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 TekBots). 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 2006 and include a teacher stipend for each phase of participation.

Topic	**Days**	**Time**	**Location(s):**
TekBot basics	Week 1: July 10th-14th ($400 stipend)	9:00 am - 3:00 pm	PKI & UNO
TekBot lessons	Week 2: July 17th-21st ($400 stipend)	9:00 am - 3:00 pm	PKI & UNO
TekBot practice	Optional: Teachers can observe and help out at TekBot student camp ($100 per day) *Two days out of July 24 - August 4th.*	8:30 am - 3:30 pm	PKI & UNO

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

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 TekBot lessons to share with other workshop participants.

PROJECT LEADERSHIP: The project is funded by NSF, and is directed by Dr. Bing Chen, Chair of the Computer and Electronics Engineering Department at the Peter Kiewit Institute-UNL, and Dr. Neal Grandgenett, Professor of Mathematics 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: TekBot Project, C/o Dr. Bing Chen, PKI, 200A, 1110 S. 67th Street, Omaha, NE 68182-0572. Or e-mail your application letter to bchen@mail.unomaha.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 2006 Institute.

CONTACTS:

Bing Chen
(402) 554-2769
bchen@mail.unomaha.edu

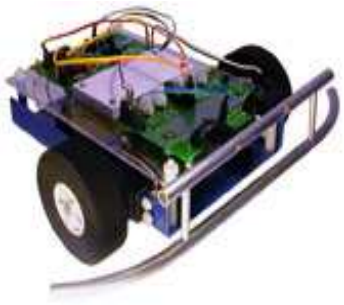
Neal Grandgenett
(402) 554-2690
ngrandgenett@mail.unomaha.edu

Chris Schaben
(402) 557-2450
Chris.Schaben@ops.org

Jim Harrington
(402) 557-2442
James.Harrington@ops.org

Additional Information:
TekBot Teacher Training Project

Dear Potential TekBot Participant,



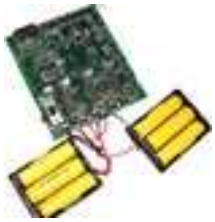
Thank you for your interest in our project! Here is a bit more information. This is the itinerary for the TekBot Summer Institute to be held this Summer at the Peter Kiewit Institute. This two week seminar will guide you through the construction and use of your own TekBots in the classroom. You will 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 TekBots. 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)
Dates: July 10th-14th

• *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.

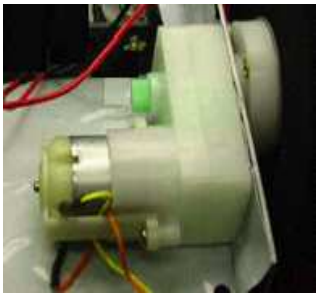
• *Digital logic and microcomputer fundamentals:* Participating teachers will learn the different logic functions (AND, OR, NAND, etc) and their associated truth tables and symbols. They will understand flip-flop devices and how they can implement counters.



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 TekBot context.

Week Two (Required, $400 Stipend)
Dates: July 17th-21st



• *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. TekBot wireless communications links will be tested.

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

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

Weeks Three and Four
(Optional, $200 for any 2 days.)
Dates: July 24 - August 4
• *Institute:* Teachers will work optionally with students to observe them and practice sample TekBot PBL activities.

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 TekBots 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:

Bing Chen	*Neal Grandgenett*	*Chris Schaben*	*Jim Harrington*
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