

MPI

The Mathematics and Physics Institute NEWSLETTER

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"THIS ISN'T HIGH SCHOOL ANYMORE!"

Classes at the MPI are tough! First quarter high school grades went out even though the transition time of adapting from high school to college is not yet over. Here's how we look first quarter:

	Calculus	Physics
High School A's	50%	31%
High School B's	33%	43%
High School C's	13%	24%
High School D's	4%	0%
High School F's	0%	2%

Even high school C grades are difficult to come by at the MPI... especially when you're involved in, on the average, 3.2 extracurricular activities as well as a full schedule of high school classes. But these first quarter grades are indicative of a wealth of talent on the rise!

As you can probably tell, we're very proud of our MPI students. It takes a certain level of maturity, motivation, self-discipline, and family support just to attend 7:10 am classes, let alone give a quality performance. -- Three winks of sleep for the Institute students!--

Teddy Lambson

OPEN HOUSE FALL 1986

Many of you attended our second annual open house, and were able to meet our faculty and some

of our students, and we, of course, were very pleased to meet all of you.

There were Physics labs set up, as well as Physics demonstrations, all staffed by our students who (we hope) were able to explain all the physical principles involved to our guests. There were also two rooms set aside for Mathematics, with students ready to explain some calculus at the board, and continuously running video-tapes of problem-solving sessions in action, or of earlier MPI enrichment speakers.

We hope that such personal contact with parents will help us tailor our teaching to each student, help the parents realize just what it is their children have gotten themselves into, and spread the word to others about the MPI program. Let us know what you think!

MPI ENRICHMENTS

We've had some exciting guests at the Institute since the last newsletter, most of whom were mentioned there. But now we have some student feedback to share with you.

Dr. Mel Thornton's Mathematics Workshop of Nov. 23 was two hours long, and held in the gym, where tables and chairs were set up for all MPI students and staff. We were first introduced to a little theory underlying number bases, and

practised some computations. Then, we went right to the meat of the matter -- the problems Dr. Thornton had sent ahead for us to work on. The most interesting of these, and as it turned out the most enlightening, was of the "Find the next number in this sequence" sort. (The sequence was: 10, 40, 90, 61, 52, 63, 94, 46, ---.) He listed, with our help, three distinct ways of discovering the pattern of the sequence and guessing the last --- number correctly. These advanced from easy to hard. And then, he showed a quick (slam-bang) instantaneous method of seeing the next number! Once this had been discussed, we tried to see if this fact held in other number bases, than the usual base 10 we use everyday. The point was that if a mathematical fact is really not just an artifact of the notation, it will show up in other forms. NOTE: The next number in the sequence will appear in the February newsletter, along with a quick description of the four methods of solution. Good Luck!

Another success was the visit of Dr. Don Huffman, an internationally known physicist from the University of Arizona. He spoke on the absorption of light by interstellar dust, as well as the scattering of light by our own Earth's atmosphere, which is responsible for blue skies, red sunsets, and the rare 'blue moon'. His enthusiasm for his subject, and the clarity with which he explained it was a welcome insight into the world of a working physicist. (We have his talk on video-tape for those who might be interested in seeing it.)

Our first field trip, to the UMC Research reactor and Physics

Dept. was also well-received. We began at 7:10 am in the UMKC-Truman parking lot, in two buses, and spent the first three hours encouraging and controlling (how shall we say) 'communication' between our students, either by talking or playing Trivial Pursuit and other trivial games. When we arrived at the reactor, we were broken up into four groups, each of which had one person with a dosimeter (to measure radiation exposure) clipped to his or her lapel. The tour at first took us around various displays of current reactor projects (including two two-year-old irradiated chicken legs enclosed in plastic that were still (!) edible, and not in any way radioactive), and then took us into an airlock, to enter the containment area, where the reactor was. We stood behind a window near the control room and looked deep into 30 feet of water, seeing a brilliant blue glow at the bottom, caused by the reactions of high speed radioactive particles with the molecules of the water. (In air we would have seen no glow, we were told.) Items to be irradiated for experiments were lowered into the water on 30 foot poles, and rotated from time to time by attendants inside the reactor room. After seeing the reactor, we were checked (hands and feet) one more time for possible radioactive contamination, and then left for our next stop, UMC's Physics Dept.

At the Physics Dept. we visited two labs and were told about lasers and corrosion, by physicists and graduate students. Afterward, we drove our horde to Burger King and ate lunch before the long trip home, arriving back in Independence about 4 pm.

Just before Thanksgiving, on Wed. Nov. 26 we were pleased to have Dr. John Bartling of Northwest Missouri State University, who talked to us about Fibonacci numbers both as an abstract sequence of numbers: 1,1,2,3,5,8,13,21,34,... (can you guess THIS pattern?), and as they naturally turn up in nature in the spirals of pine cones, or the heads of sunflowers, and in the famous golden rectangle of the Greeks.

UPCOMING ENRICHMENTS include:

Dr. Chip Reach of UMKC's civil engineering division, who will discuss 'Drinking water treatment' as he's done for us for two years, and we expect it to be as dramatic as always. (He's also been reading the enrichment reports our students are required to write for each speaker, and is very much aware how critical our group this year can be!)

On Dec. 19, we'll hold our MPI Christmas party in the morning with a laser show by Richard Waring, and live musical performances by our MPI students.

And lastly for now, on Jan. 7, we'll have our annual MPI Panel Discussion with Teddy Lambson and some of our students from previous years sitting on the panel and discussing just what it's like to be a first semester freshman or sophomore in college.

T.A. IS THEIR NAME AND BRAIN-WAVE STIMULATION IS THEIR GAME

Thanks to a grant from the Carrie J. Loose Trust, students at the MPI have access to all the

help they want in Physics and Calculus. This year three engineering students - two seniors and one graduate - provide assistance before (would you believe 6:45 am?), during, and after Institute hours, both at the UMKC Truman campus and at the high schools.

All three TA's are honor students. LARRY FORRESTER is a senior electrical engineering major who attended Ruskin High, and served in the US Navy before coming to UMKC. DOMINIC SCARDINO graduated from Truman High School and will graduate from UMKC in May in mechanical engineering. KEITH WILSON, a two year veteran with the MPI, recently completed his degree in electrical engineering. Keith is an alumnus of Raytown High School and now assists one of his former high school teachers, Charlie Watts, who joined the MPI staff this year.

We probably won't convince these talented fellows to give up engineering for teaching as a career, but they certainly do a fine job stimulating the brain wave connections in the heads of our MPI students.

Teddy Lambson

SOME QUOTES FROM OUR STUDENTS

" So far, MPI has been really fun this year. It's so much different than high school. To get an 'A', you can't just cram the night before a test. You have to know everything about the subject you're studying, and that doesn't guarantee anything. The first tests hit you like a brick. To do your best at MPI takes a lot of

hard work, but I feel it's preparing me for both college and my future."

John Winkler
Truman High School
Independence District

" I enjoy going to the Institute. While attending college classes, I am able to meet other students who also love mathematics. Also, the MPI activities have increased my interest in math and science."

Maria Aguilera
Fort Osage High School
Fort Osage District

"Attending the Mathematics and Physics Institute to me has been a challenge. The competitiveness that I've experienced has made me question my ability as a student. I feel that this will help me set higher goals and be a success in college next fall. I know all the students involved in this program would agree that the tutors and faculty have been a tremendous help. Their willingness to help us makes us want to learn. Also, without this program I don't think I would have met as many students from different schools in Missouri, and found out how friendly they are!"

Hoa Bui
Northeast High School
Kansas City, Mo. District

" The Mathematics and Physics Institute has not only provided me an outlet to pursue academic goals not offered at my high school, but an opportunity to interact with other academically motivated

students. The Institute's assistance in my preparation for college admission (letters of recommendation, scholarship information, etc.) has been very valuable as well. The instructors and TA's and all of the students have all contributed in making the Institute what it is - an enrichment program where I can feel comfortable, yet challenged."

Eugene Bae
Raytown High School
Raytown School District

MISCELLANY

- * Institute Brochures are always available upon request from the MPI (276-1272) or from your local high school counselors.
- * Video-tapes of some previous Institute speakers are also available.

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The MPI Newsletter is published on the first of the month during the months of August, October, December, February, and April at The Mathematics and Physics Institute, 600 W. Mechanic, Independence, Mo. 64050, phone (816) 276-1272. Please address all letters concerning this newsletter to 'Newsletter'.

MERRY CHRISTMAS !!
