



Director: Richard Waring

Mathematics Coordinator: Richard Delaware

August 1, 1996

Vol. 11, No. 1

WE SURVIVE FOR YEAR 13

We look forward to the new MPI class of 1996-97, with several new Kansas City MO District schools (Central, Lincoln College Prep, and Metro) participating for the first time. There will be some upgrades in the MPI computer lab, and an Internet connection, some new calculators (the HP 38G) for the Calculus I & II Section C to test this year, and perhaps finally tables and chairs (instead of tablet armchairs) in Room 203. Other improvements too have been made over the summer in both the Calculus Computer Lab manual, and (two) Calculator manuals, and in fact the Physics Lab manuals have been completely redone, and will appear this year in an attractive 3-ring binder for all students.

But, the MPI has had a difficult summer trying to determine whether the Kansas City MO District, after 12 years of successful participation, would be able to afford to remain with the program. Of course, the District's monetary problems, and the loss of both a superintendent, and second-in-command Willie Giles, our MPI contact since 1984, have been well-publicized. Finally, after an informative meeting of the Director, the Mathematics Coordinator, and 6 members of District administration held at the Kansas City Board of Education building downtown on July 10, and followed with more data provided to the District by the Director within a week of that meeting, we now have hope that the District will stand by the MPI program this year, and that over the upcoming academic year together we will reach a new modus vivendi.

A final note is that Tina Knutson, one of our MPI Calculus instructors from East High School, has left East over the summer and signed a contract with Truman High

School! Luckily for us, she will still teach here at the MPI, and we wish her well at her new school.

**MPI STUDENT ORIENTATION
SEPT. 4 - 6, 1996**

Each year the first three days at the MPI are spent in giving our students an overview of how we operate, a discussion of our policies on attendance, grading, etc., and two diagnostic tests. Time is then set aside for the instructors to informally 'get to know' their classes before we all become preoccupied with class work.

In particular, on the first day, Sept. 4, 1996, we'll provide each student with a packet of information and have each of them fill out a personal data form.

**STUDENTS PLEASE BRING,
ON SEPT. 4, 7 am, TO ROOM 207:**

- Your Social Security Number.
- Your daily schedule of high school classes.
- Your schedule of extra-curricular activities.
- Your counselor's name.
- Ideas for Enrichment Speakers or topics.
- \$10.00 to rent a graphics calculator. (Read below)

If you have any questions, call our MPI secretary Doris, Mon. - Thurs., 8 am - 1 pm, 235-1272. We look forward to seeing our 13th class on Wed. Sept. 4!

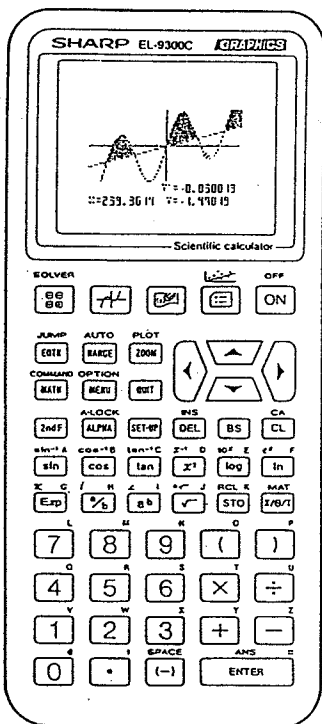
MPI E-MAIL ADDRESS:

rdelaware@cctr.umkc.edu

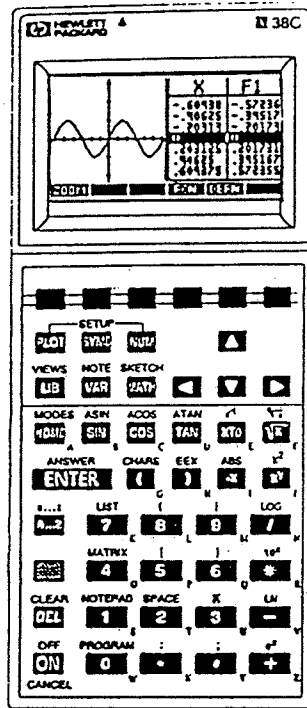
A list of known MPI Alumni e-mail addresses is available on request.

MPI GRAPHICS CALCULATORS

The MPI requires ALL students to have and use a graphics calculator in both physics and calculus. For our purposes, for all students except those in Section C (who take both Calculus I and II over the course of the year), we have selected the SHARP EL-9300C. Although the SHARP is not the most powerful such graphics calculator on the market, it is ideally suited to the MPI, and its selection of students.



For the first time this year, Section C students will be using a different graphics calculator, the new HP 38G, acting as a "test" section before possible full MPI adoption next year.



All MPI students are required, by Friday Sept. 6, to rent from us either a SHARP EL-9300C [Sections A, B, and D], or an HP 38G [Section C only] paying a \$10.00 one-time, non-refundable fee for the entire academic year, with an option to buy the calculator outright at any time, OR to provide themselves with an equal or better graphics calculator from among only the following models: SHARP EL-9300C, TI-85, HP 38G, HP 48G, or HP 48GX. [Information, including cost, on all these graphics calculators can be gotten from the MPI Mathematics Coordinator by calling 235-1290.] Please note that MPI support will only be given for the two calculators we rent.

The MPI rented calculators will initially be loaded with a set of AAA batteries, but as these fail over the course of the year, student-renters are entirely responsible for buying and replacing them. (Our experience has been that at most one or two replacements are needed over the year.)

At the beginning of Year 12 (1995-96), 57 MPI students rented our SHARP EL-9300Cs, and at year's end, 14 bought them. Three (3) MPI students used their own TI-85 all year, and 9 provided their own SHARP EL-9300C.

TO ALL MPI ALUMNI:

**HAVE YOU GRADUATED
FROM COLLEGE?**

**IF SO:
PLEASE CONSIDER BEING
AN MPI ENRICHMENT SPEAKER!**

CALL (816) 235-1272

Heather Cater	Truman
Julie Domsch	Lutheran
Kevin Dooley	Truman
Greg Finke	Truman
Josh Harrington	Truman
Tina Jensen	Wm. Chrisman
Scott Preston	Wm. Chisman
Matt Sheffield	Wm. Chrisman
Don Vaught	Ft. Osage
Jennifer Watts	Truman
Sam Yoo	Ft. Osage
Joe Ziolkowski	Van Horn

**1996 MPI AWARDS PRESENTATION
AND
TOP 10 MPI STUDENTS OF 1995-96**

Our final awards presentation was held on May 16, 1996, during which we were pleased to present many of our 1995-96 students with the following variety of awards (see list). Also present were 14 administrators, counselors, board of education members, the superintendent of the Ft. Osage District, and the Chair of UMKC's Physics Dept.

Certificates for Outstanding Achievement (college grade of A or B):

CALCULUS I

(Name)	(School)
Corey Baker	Truman
Alex Bates	Ft. Osage
Heather Cater	Truman
Greg Finke	Truman
Josh Harrington	Truman
Tina Jensen	Wm. Chrisman
Tien Nguyen	Northeast
Scott Preston	Wm. Chrisman
Matt Sheffield	Wm. Chrisman
Sam Yoo	Ft. Osage
Joe Ziolkowski	Van Horn

CALCULUS I and II

Ragan Buckley	Truman
Julie Domsch	Lutheran
Don Vaught	Ft. Osage
Jennifer Watts	Truman

PHYSICS

Corey Baker	Truman
Alex Bates	Ft. Osage
Ragan Buckley	Truman

We also honored the TOP TEN students (ranked according to the mean of their full-year college calculus and physics grades) by giving them a one year subscription to Scientific American magazine, and a copy of "What's Happening in the Mathematical Sciences 1995-96":

TOP 10 MPI STUDENTS 1995-96

- | | |
|--------------------|--------------|
| 1) Scott Preston | Wm. Chrisman |
| 2) Ragan Buckley | Truman |
| 3) Don Vaught | Ft. Osage |
| 4) Jennifer Watts | Truman |
| 5) Joe Ziolkowski | Van Horn |
| 6) Josh Harrington | Truman |
| 7) Tina Jensen | Wm. Chrisman |
| 8) Julie Domsch | Lutheran |
| 9) Matt Sheffield | Wm. Chrisman |
| 10) Alex Bates | Ft. Osage |

Finally, we list those MPI students planning to attend UMKC who received various scholarships from UMKC; included here are those students to whom the MPI awarded Chancellor's Scholarships:

UMKC Chancellors Award Winners:

Quoc Nguyen	Northeast
Tien Nguyen	Northeast

UM Curators Award Winners:

Josh Harrington	Truman
Tina Jensen	Wm. Chrisman
Sierra McDaniel	Truman
Scott Preston	Wm. Chrisman
Don Vaught	Ft. Osage

**ADVICE TO STUDENTS OF YEAR 13
FROM THE STUDENTS OF YEAR 12**

At the end of this last year, in May, we decided once again to have our students write however much they wanted in answer to the question:

"What ADVICE would you give to incoming students about study, attitude, or any other aspect of surviving the MPI in 1996-97?"

Each incoming student will receive a complete set of these words of advice from their peers from Year 12. Here are some excerpts from that document:

"Don't put off your homework until the last minute; I did (frequently) and it added a lot of unneeded stress to my life. Do show up on time and ask lots of questions and make some effort to do a few of the calculus problems, even though they're not collected. Don't stay up until 2 am working on homework for other classes and then come to MPI and expect to stay awake. (Mostly, use your common sense.)"

Ragan Buckley
Truman High School

"It's hard! You have to be focused and stay focused. You need to study and study a lot! You have to have a good attitude, and a positive attitude and if you can't do this then you can't make it at MPI."

Lesli Cage
Van Horn High School

"My first word of advice to students is don't get discouraged. Many times I found myself saying, "I hate MPI," because I did not want to be challenged. When I think about it, the thing that caught up with me at MPI is my attitude to just give it up entirely. My attitude reflected my study habits, my comprehension of the material taught and of course laziness over all. I like MPI because it gives me the chance to get an over view of what college life is like. I know now that if I have questions, I must ask them. If I need help, get tutored. If I don't read over my notes and text constantly, I won't do so well on the test. I realize now I can't cram everything the night before the test. I've also learned that my calculator comes in handy when I didn't do my homework, but I can't rely on it. I guess another thing I would advise is that you have to stay on top of your studying and out of in front of the

TV. I love TV and the phone, but it's hard making the grade when Wheel of Fortune or your friends come first!"

Gina Calvert
Van Horn High School

"I would recommend having a study group for calculus and physics. Never let your group go. They will save your life. Don't overload yourself."

Heather Cater
Truman High School

"As you enter this new world of college-type classes, there are a few things you should consider. Firstly, do not expect to breeze through this year without working. Next, no matter how boring the lecture, DO NOT fall asleep. This will soon become a hobby and will turn into a vicious cycle of sleeping, missing homework assignments, and failing tests. Finally, have fun, it sounds like it will kill you, but if you just pay attention it should become easier and easier."

Kevin Dooley
Truman High School

"Start studying now, if you don't you'll end up being up a creek without a paddle and there's very little chance of getting your paddles back. If MPI is very important to you then it's best just to kiss your social life goodbye, for a few weeks, until you get into the swing of things. Maintain a good attitude, make lots of new friends, and STUDY, STUDY, STUDY. There's no turning back now suckers."

Cris Dykeman
Wm. Chrisman High School

"Attending MPI and keeping my grades up was one of the most challenging things I've done so far. Yes, I know just about everyone can say that, but I really feel that this experience - the challenge and the success in overcoming this challenge - is something that I will draw from next year at MU. This is truly a college prep course - it will prepare you for courses to come. At least, I hope it has prepared me for what's to come. I can't imagine a course that

is more difficult than MPI was before at the beginning of this year. My advice is to hang in there. Read the textbook before lectures and don't get behind. Memorization DOESN'T work here - you have to understand the concepts to do well on tests. Best of luck to you all! It's worth it, I promise!"

Christina Jensen
Wm. Chrisman High School

"The first thing you need to do is form a study group. Although you may begin to work more independently as the year goes on, sharing this new learning experience with others lightens the workload considerably. Also, if you have never studied for science and math tests, THAT WILL CHANGE if you wish to get an A in either class. This is college level work and if you treat it as such, everything should be fine. Finally, the lectures in either class may not be too exciting, but they are informative and worth listening to. Good notes are the key to doing well on tests."

Scott Preston
Wm. Chrisman High School

"Well, I would tell them not to expect to just come over here and make good grades without doing much work. MPI is hard!! I only knew a few people that actually did well, and they had to work for it. Also, students definitely should take advantage of the problem solving sessions. They are very helpful. The problem solving might be your only chance to get some work done. That is your chance to ask questions and get help. Another thing, don't let yourself get behind because it's real hard to get caught back up. A little more advice - STUDY, STUDY, STUDY!!!"

Christen Smith
Van Horn High School

"Keep the idea in mind that MPI grades are not the same as high school grades. It is extremely hard, so when you get something right, be happy!"

Joe Ziolkowski
Van Horn High School

THE 1996-97 CLASS (TO DATE)

Section A (23)

Yolanda Blancarte	Northeast
Tamara Calvert	Truman
Omer Choudhary	Truman
Mary Comeau	Paseo
Brian Ethridge	Northeast
Jacqueline Fairley	Van Horn
Stephanie Farnan	Ft. Osage
Keith Green	Ft. Osage
Kimberly Hammond	Truman
Duwan Hardge	Van Horn
Jeff Hendricks	Truman
Aaron Hopkins	Wm. Chrisman
Kevin Kommel	Wm. Chrisman
Robert Monnig	Truman
Angela Morris	Wm. Chrisman
Damon Motley	Ft. Osage
Chi Nguyen	Northeast
Beth Olson	Truman
Dhavel Patel	Metro
Michael Ramel	Central
Valerie Smith	Wm. Chrisman
Megan Tinkey	East
Jill Webb	Wm. Chrisman

Section B (22)

Maya Anderson	Metro
Willow Burke	Truman
Alissia Canady	Northeast
Rachel Cianciolo	Truman
Jason Cook	Wm. Chrisman
Timothy Dorsch	Truman
Chondra Edwards	Lincoln
Jay Farrington	Truman
Michael Flowers	Wm. Chrisman
Alphonzo Glover	Central
Thomas Gregory	Wm. Chrisman
Rebecca Herling	Truman
Joseph Hunter	Van Horn
Mike Hutcherson	Paseo
Matt Larkin	Wm. Chrisman
Khoi Nguyen	Northeast
Travis Patrick	Ft. Osage
Thanh Phan	Northeast
Rubin Ranat	Truman
Ronnie Simons	Van Horn
Sarah Thompson	Ft. Osage
Alison Wilcox	Ft. Osage

Section C (11)

Nick Cochran	Ft. Osage
Jennifer Coonts	Truman
Sarah Crow	Paseo
Eric Fryatt	Truman
Susan Jensen	Wm. Chrisman
Brian Johnson	Wm. Chrisman
Erika Marlow	Truman
Desiree Mollett	Wm. Chrisman
Crystal Newell	Ft. Osage
Jessica Ostrom	Truman
Teresa Schlueter	Paseo

Mary Aguilar	Northeast
Andy Alexander	Truman
Ronnie Antwiler	Wm. Chrisman
Sarah Cooper	Ft. Osage
Timothy Dawson	Truman
Crystal Gearke	Wm. Chrisman
Michael Harrison	Metro
Tylena Johnson	East
Corbin Jones	Ft. Osage
Curtis King	Van Horn
Whitney Meagher	Truman
Trung Nguyen	Metro
Tuyen Nguyen	Northeast
Jigna Patel	Truman
Richard Prewitt III	Northeast
Shelley Record	Truman
Tamara Rivers	Van Horn
Kenneth Thomas	Van Horn
Shauna Tuiono	Ft. Osage
Samantha Webb	Truman
Jonathan Wilson	Ft. Osage
Daniel Woodcock	Wm. Chrisman

On April 23, we had a surprise visit from mathematician Richard Stein of Casper College, Wyoming. He was touring the country to study places using technology to teach mathematics, and found his way to the MPI while in this area. He was impressed with our facilities and the use we make of them.

On May 9, Isabel Nash of the Kansas City MO District's Gifted and Talented Division visited.

On May 16, the last day of classes this year, we are proud to say that one of our top ten students, **Josh Harrington** of Truman High School, was an Olympic Torch Escort when the Torch passed through downtown Kansas City.

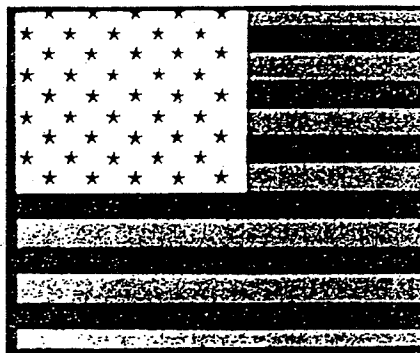
ENRICHMENTS

FOLLOW UP

March 22 Ron Schuchard, a professor of ophthalmology and physics at UMKC spoke on **VISUAL INFORMATION PROCESSING: HOW DOES THE BRAIN SEE?** Students responded:

--Mr. Schuchard talked about the way we see color, including the addition and subtraction of colors. He also talked about people's blind spots and how they compensate for blind spots. We learned about rainbows and sunsets, and in what kinds of places they appear. This was pretty good. I like visual aids, and Mr. Schuchard had lots of them. It wasn't just the same thing over and over. It had variety, and I liked that!

--He talked about color addition and subtraction methods. We stared at a green, yellow, and black flag on a piece of paper that, by color subtraction, became a red, white and blue one when we looked at a blank sheet of paper.



These are the total of 78 students (as of this newsletter) who will be enrolled. As usual there will be additions and deletions through September.

THE 1996-97 MPI STAFF

In PHYSICS:

Larry Harding (retired), formerly from Fort Osage, **Jim Graczyk** from Van Horn, with some assistance from our liaison **Roy Cook** of Northeast,

and, in CALCULUS:

Sheri Adams from Truman, **Tina Knutson** also from Truman, formerly from East, and **Al Morse** (retired), formerly from Wm. Chrisman.

Our University staff is listed in the heading of this newsletter, and our half-time secretary and assistant is **Doris Kirst**.

MPI T-SHIRTS!

Beginning in October, we will once again be selling bright blue MPI T-shirts and sweatshirts to our students. These shirts have a classy 3D graph ($z = \cos x \cdot \sin y$) on the back and our student-designed MPI logo on the left front.

--Mr. Schuchard explained that the brain is trained to do things with our vision that optometrists didn't discover until recently. He explained that the old method for determining where a blind spot on your eye was to have the person look at a graph and then plot the parts where he/she couldn't see. However, when placing two words one on either side of the blind spot, the person would read them as one word.

--We now have tests that allow doctors to see the retina. This can detect blind spots. Everyone has blind spots. Different people process visual information in different ways. The brain really affects what you see. It was fun. Very interesting presentation.

--In winter, you won't see any rainbow because you don't have any raindrops. Water is clear, but why is the ocean blue? Because of the sky. It reflects the color from the sky. In the evening, the sky is also blue but you don't see it because you don't have enough light to see it.

--Most sensitive to light at the center of our vision -- everybody has a blind spot from the hole in the back of our eyes where the blood vessels enter. Interactive enrichments are the best. This guy really had it together. A good mix of TV, overhead, slides, and other things. The visuals in this enrichment were spectacular.

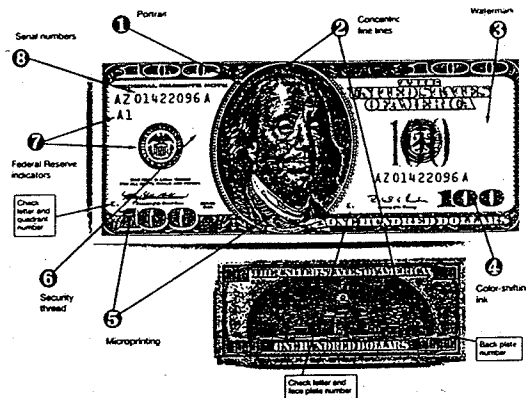
On April 12 Rhonda Strickland from the Cash Services Dept. of the Federal Reserve Bank of Kansas City, spoke on **AN OVERVIEW OF SERIES 1996 U.S. CURRENCY.**

Student comments were:

--We learned about the new series of currency that will be coming out over the next few years, with a focus on the \$100 bill. We learned about different features designed to prevent counterfeiting, and about the duties of the Federal Reserve Banks in general (machines that take old bills out of use and shred them, etc.). I thought it was pretty good. I liked being able to see one of the new \$100's. I'd heard about the changes before, so it was nice to

actually look at one. (I also liked the bags of shredded money!)

The new currency sports several security-enhancing features.



--Strickland talked about the new changes/improvements on the \$100 bill. These changes supposedly will make it impossible to counterfeit those bills. This enrichment was very interesting to me because during the summer I work as a cashier at IGA. I'll never have to ask the supervisor if the bills are counterfeited anymore.

--We have a patent on the green/black ink (How do you get a world patent on that?) We got to see one of the new \$100 bills -- I'd been waiting for that. The color-shifting ink is weird stuff and the watermark is a neat, new feature -- Disappointingly, we didn't learn how to counterfeit money; that's OK, though it was another good show.

--Ms. Strickland was an excellent speaker. She talked about counterfeit money, like how they can tell by either machines or by an individual person. She talked about the new bills that they are making, such as the hundred dollar bills, she showed us a diagram about every little detail on it. She told us how they are going to stop giving people food stamps. Instead they are going to send you a credit card with a limit on it.

[Continued after the Calendar]

Mathematics and Physics Institute

CALENDAR 1996 - 1997 YEAR 13

MPI Begins	Wed. September 4, 1996
Mid-1st Quarter Progress Reports Sent (All)	October 4, 1996
6-Week Term Grade Reports Sent (Independence)	October 10, 1996
1st Quarter Grade (FO & KC) & <u>Probation</u> Reports Sent (All)	November 1, 1996
MPI OPEN HOUSE for Parents/Teachers/etc.	Sunday, November 3, 1996
6-Week Term Grade Reports Sent (Independence)	November 19, 1996
Thanksgiving Holiday	November 28-29, 1996
Mid-2nd Quarter Progress Reports Sent (All)	December 13, 1996
Christmas Holiday	December 18, 1996 - January 1, 1997
MPI Classes Resume	Thurs. January 2, 1997
MPI REUNION & PANEL DISCUSSION	Fri. January 3, 1997
Final Exam - Calculus I - (Math C Only)	January 14, 1997
2nd Quarter/1st Semester Grade Reports Sent (All)	January 15, 1997
Martin Luther King Holiday	January 20, 1997
Mid-3rd Quarter Progress Reports Sent (All)	February 14, 1997
Presidents' Day Holiday	February 17, 1997
6-Week Term Grade Reports Sent (Independence)	February 27, 1997
3rd Quarter Grade Reports Sent (FO & KC)	March 21, 1997
MPI Spring Break	March 24-28, 1997
MPI Classes Resume	March 31, 1997
6-Week Term Grade Reports Sent (Independence)	April 10, 1997
Mid-4th Quarter Progress Reports Sent (All)	April 18, 1997
Final Exams - Calculus I (A, B, D) and Calculus II (Math C Only)	Mon. May 12, 1997
Final Exam - Physics (A, B, C, D)	Tues. May 13, 1997
MPI Picnic Breakfast (McCoy Park)	Wed. May 14, 1997
MPI Awards Presentation/Last Day of Classes	Thurs. May 15, 1997
4th Quarter/2nd Semester Grade Reports Sent (All)	Fri. May 16, 1997

On April 26 Joyce Harrison a Civil Engineer with the FAA, spoke on **AVIATION AND THE FAA.**

Students responded:

--She helped plan and design KCI Airport. She has also designed many other airports in the two-state area. An important area is that which surrounds the runway, within 500-1000 ft. This is the area in which 97% of all accidents occur, so this land is usually owned by the airport. She mentioned that only 6% of all pilots in the U.S. are women. She also talked about Global Positioning Systems (GPS) and how they can be used to direct and land planes.



--There were 574 million passengers of commercial airlines in 1994. Only 645,000 pilots (6% women) and 570,000 non-pilot aviation workers (2.3% women) are employed in the United States. She seems very confident that all of us would immensely enjoy a job in some form of aviation.

--She is a civil engineer and her primary job is to design airports. She primarily reviews the plans and makes sure they comply with the FAA rules and regulations. She also talked about the new advancements in navigation. She also began to talk about problems in the aviation world, such as capacity, noise pollution, etc. She did a good job. Interesting subject.

--I've heard about the GPS before, but it is one of those cool things you can't hear enough about.

UPCOMING ENRICHMENTS

One of the special features of the MPI is its biweekly enrichment series, in which on alternate Fridays either professionals in the sciences,

engineering, mathematics, etc., speak to our MPI students, or, we take a field trip to such places as the nuclear research reactor in Columbia, UMKC's Physics Dept., or Worlds of Fun for some 'hands on' physics.

As part of our early MPI orientation, Debra Gaggens of UMKC, will speak on **Friday, Sept. 6** about college admissions in general, and the importance of thinking about applications EARLY. (This is not intended to be a recruitment for UMKC, but a general discussion to help sensitize our students to the importance for colleges of deadlines.)

The October 1 newsletter will report on those speakers scheduled for October and beyond. But, during the first two weeks of classes at the MPI we will spend one day discussing a topic which is vital for study and college survival. Specifically: **TIME MANAGEMENT.** This session will be presented by Augusta Nichols from UMKC's Academic Support Services on **Friday, Sept. 13.**

On **Sept. 27,** Mitch Dobson (MPI 89-90), currently the resident Prosthetist/Orthotist at Certified Orthotics and Prosthetics Associates in Lenexa, KS, will join us for the 3rd time to speak on **PRINCIPLES AND ADVANCEMENTS IN PROSTHETIC TECHNOLOGY.**

TO THE PARENTS OF THE 1996-97 CLASS AT THE MPI

[Modified from the August 1, 1987 newsletter.]

This newsletter is written for **YOUR** information, and there will be one sent to you every two months during this year while your son or daughter is at the MPI.

We firmly believe that without your support and concern at home students cannot succeed in such a rigorous program as the MPI. Our classes are NOT high schools classes, and require both study skills and a commitment that students still in high school, however talented, have not experienced before. In both of these areas **YOU** as parents can be of enormous help.

One of the first facts we have learned to face in the last 12 years

is that many bright students never learn to study efficiently; they have often gotten along very well with a 'wait and cram' attitude, giving textbooks only an occasional cursory look in time for testing, and relying on their innate ability to absorb information and skills in the classroom. However, in coming to the MPI these same students always find themselves at first, and suddenly, falling behind.

In general, in college classes **MORE MATERIAL** is covered, and **MORE SKILL** with concepts is required, i.e., **THINKING** is expected regularly. This comes as a shock to many talented students. One of the MPI's goals is to expose students to this shock, and help them overcome it by learning effective study skills in actual practice. But **YOU** as parents can help this transition enormously, by suggesting that your children actually spend the minimum of one hour per subject, per night of study that we here at the MPI urge. They must come to realize that longer study times reflect the new rigor of the **COURSES**, not their lack of talent. This is a point of view that many students find hard to accept at first. Your encouragement can help them over this hump. Encourage them to seek the help of all the teachers involved in the program, and to put aside the false idea that only remedial students need to **TALK** about mathematics and physics. The fact is that true understanding comes only from learning to discuss and explain a subject, and this is **ESPECIALLY SO** in physics and mathematics.

Finally, we urge you to call us if you ever have a question, and we hope that you will find time to visit the MPI during our annual **OPEN HOUSE** on Sunday afternoon, **November 3, 1996**. (See the calendar in this issue; more about this in the October newsletter.)

WE HEAR FROM PAST STUDENTS

JILL BLAKE (90-91)
(BA, Chemistry)

"I am in my last year of the dual degree program. I attended North Central in Naperville, IL for 3 years then transferred to Washington University to get my Chemical Engineering degree. All I can say is math is essential in engineering

whether it be chemical or another kind. I feel like I learned a lot at MPI and I wish I would have studied even more because you just keep building upon the basics."

MATT CIANCIOLO (93-94)
(Physics Major)

E-mail received 3-31-96:

"Hello MPI! I finally got pressured in by my friends to get an e-mail account, so I can feel a little more technologically compatible. I don't know if you all remember me, but I graduated from MPI in 1993-1994, amazingly. I was wanting to give you guys my new e-mail account (matthew@creighton.edu) and tell you a little about myself since I left the lonely town of Independence.

I am currently in my second year at Creighton University, but actually, credit wise, I am considered a junior on the academic level, due to the eight hours of credit I received at MPI. It's funny because I remember back to my junior year in high school and I decided to go to MPI because I liked mathematics. However, I didn't want to do physics, because I did not know what it was. Mrs. Adams wouldn't let me just do Calculus, so I struggled through a year of introductory physics and I learned to like the science field a little more. Ironically, I am proud to say that I am a full-fledged physics major at Creighton. Actually my degree will be a BS in the physics of medicine, which is a brand new major offered. My goal is to go to medical school and become either a pediatrician or a radiologist. Last year, I took General Physics II: first semester this year I had Modern Physics (relativity and quantum mechanics); and this semester I am taking Medical Physics, where we learn the basics of radiation, ultrasound, NMR's, and MRI's. It is really an exciting and fast-growing field and I am ecstatic about entering into it. I also get an opportunity to volunteer and do research in radiological physics at St. Joseph's hospital, right across the street. I also am going to get a co-major degree in Studio Art, because drawing and painting is a hobby of mine. I plan to study for and take the MCAT (medical school

admissions test) this summer and may have a chance of applying to medical school during my junior year and get in before actually graduating. This has its benefits (money), but it also has its drawbacks (not graduating). So this will be a tough decision for me, so wish me the best.

I highly recommend Creighton for any kind of undergraduate study. They also have probably most graduate programs (medical, dental, occupational therapy, physical therapy, graduate physics, and other graduate programs). Creighton favors undergraduates, when accepting applicants for graduate programs and the overall Jesuit quality of education is life-encompassing. I think MPI was so important to get me adjusted to the type of classes you take in college and highly recommend high schoolers who are interested in any type of math, science, health field, or anyone who just wants to get college credit in high school (which does help you register earlier, because you have more credits).

So I would like to say a hello and wish the best of luck in the future to all my fellow MPI alums "Barrows, Mark", and my wonderful partner "Amy (slacker)" if you all still stay in contact with MPI. If any of you get a chance, look me up and give a call or write me if you have e-mail, because I would love to hear from all you guys. Also to all those currently attending MPI, good luck in your life pursuits in whatever pleases you. I believe MPI is so good, I even convinced my cousin (Andy Alexander) and my sister (Rachel Cianciolo) to sign up for next year, so I especially wish them the best. To all the teachers of MPI, thanks for your persistence and faith in the students, for education is the key to the advancement of our society. Thanks for your time and concern."

CHARITY CONEY (93-94)
(Mathematics Major)

"MPI has greatly benefitted my math career. So far I have had Calc. I, II, & III, Statistics, Discrete, and Differential Equations. I sometimes reflect on the projects and lessons from MPI. I think MPI helped build my confidence and prepared me environmental-wise for college. The

course work makes sense the more math I take. I can now see that there is a reason for being able to derive a function or integrate one. I am grateful for my MPI experience.

I appreciate the physics because now I don't have to take any more. I keep thinking I should try another physics class, but I'm still a little intimidated by the word.

Keep up the good work. Don't get discouraged. Sometimes those average students (like me) actually, finally do succeed in math. Thanks for all your hard work."

ALEX MAGINNESS (93-94)
(Mechanical Engineering Major)

"The courses at MPI were good at preparing me for the types of classes I would see in college. The teaching and overall attention were far better than I see now.

The enrichment sessions were my favorite part of the MPI program. They enable students to see what kinds of professions exist.

If you visit MU in the future be sure to ask about the Formula Car of which I am a design team leader."

NICOLE LanFRANCA (94-95)
(Communication Major)

"MPI taught me to reason through problems using everything I know. It's not enough to only use the information from the last lesson; to be successful, one must call up everything he or she has been exposed to.

Most importantly, I developed a sense of confidence and preparedness for college life. I also learned a lot about responsibility. No one can make you be determined. You have to want to do your best.

"What was best about the MPI" for me? NEED YOU ASK? RACHAEL AND PIPA! A close second place would be all of the drama that transgressed at MPI: Mr. Waring saying, "It's slicker than snot on a door knob." Mr. Delaware's ridiculously cheesy jokes. You know. The most basic stuff.

It's an unreal experience. If an individual feels like he or she can handle the work load, it will be a year he or she will never forget.

Thanks, MPI staff! You really did help me get ready for college, and I am in debt to you. In addition, MPI made my senior year what I never thought it would be. How could I have guessed that Rachael, Pipa, and I would spend dozens of evenings at the blue card table in my basement making ourselves nauseous with coffee, twizzlers, calculus, and physics? But it was worth it. I have two amazing friends, a 4.0 in college, and a faint memory of an insane computer program called Derive...

Hi Mrs. Adams! Hi Mr. Delaware! Hi Mr. Waring! HOPE YOU ALL ARE WELL!"

IVAN BIRD (89-90)
(BS Civil Engineering)

E-mail received 7-29-96:

"What I do here at Harvey Jones Engineering (www.haj.com) varies from day to day. However, I generally have three main areas of responsibility. First, I am the office "computer nerd," therefore, I am in charge of maintaining the office work stations (doing tape backups, fixing bugs, working miracles when things crash, etc.). I also update our Web Site, distributing e-mail, and convince my boss that we NEED new hardware and software.

My second area of duties involves going "into the field" as a member of a land surveying crew. That's fun, because I see a lot of wildlife (deer, turkeys, coyotes, hawks, owls, rabbits, etc.) I also get to go places that normally most people don't get to go. Places behind buildings, in fields, in rock quarries, in mines, and other obscure areas. Working outside is hot in the summer and cold in the winter, but luckily my third area of work involves sitting in my comfy chair in the climate controlled office. As a designing civil engineer, projects I work on include several different systems. Some of the projects require roadway design. This involves planning the horizontal

layout (the curves and straight sections) as well as the vertical layout (the hills and level spots). Curves have certain design requirements based on the vehicle's speed, and hills (known as vertical curves) have certain requirements as well. Linking the curves together in an economical plan that works is the challenge!

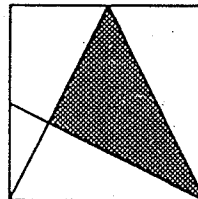
Another area of design involves water. I design systems to supply water to a project, systems to remove water from a project (sanitary sewers), and systems to remove rainwater. I think I enjoy designing the hydraulic systems the most, because I like pipes and water and stuff.

Well, that's about it. You can see that I have lots of variety in my job. I like it that way."

A SOLUTION TO MATHEMATICS CHALLENGE #43

Recall the problem statement:

The shaded triangle below is formed by drawing segments from corners of a square to the midpoints of opposite sides, as shown:

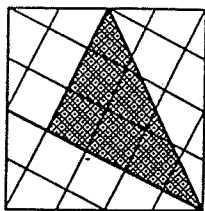


Show that this triangle is in fact a right triangle, with its sides in the proportion 3 to 4 to 5.

[From: "A Round-Up of Square Problems", Duane Detemple & Sonia Harold, Mathematics Magazine, Feb. 1996, p.16.]

SOLUTION:

By sketching a few more lines in the square above, we generate the following elegant "tiling" solution:



To verify that this is really a solution, first note that each side of the outer square is divided into equal quarters, and through these quarter-points we have drawn one set of parallel lower-left to upper-right lines, and a second set of parallel upper-left to lower-right lines. By construction, the distance between the lines within each set is the same for both sets. But this is not enough to guarantee that the tiles so created are really squares; they could actually be diamond-shaped! So we can't yet conclude that the lower angle of our shaded triangle is actually a right angle.

However, if we use the common width of these tiles as a measure, we immediately see that the lower two legs of our shaded triangle have lengths 3 and 4 in this measure. Also, the third leg of our shaded triangle, which is by construction a line from a corner to the midpoint of a side, has the same length as the entire line lying along its base, which we see is of length 5 in this measure. So, by the Pythagorean Theorem ($3^2 + 4^2 = 5^2$) our shaded triangle must in fact be a right triangle, and we're done!

A SOLUTION TO PHYSICS CHALLENGE #34

Recall the problem statement:

A beach ball can be suspended by blowing air from a fan upward on it. If the ball is pushed aside a small distance in any direction it will return to its original position when released. Why?

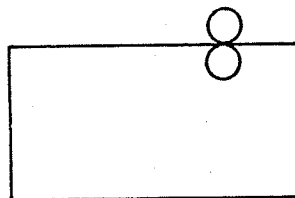
SOLUTION:

Bernoulli's equation deals with fluid flow, and in this physics

challenge, air is the fluid. Bernoulli's equation predicts that where the velocity of flow is higher, the pressure is lower. When the ball is displaced slightly, the velocity of the air over the surface of the ball on the side where a force was applied to displace the ball is greater than the velocity of air on the opposite side. This results in a pressure difference between the two sides of the ball and hence a force which returns the ball to its original position.

MATHEMATICS CHALLENGE #44

Two identical coins touch the sides of a rectangle at the same point, one from the inside and one from the outside, as shown below:



The coins are rolled (in the plane) along the perimeter of the rectangle until they come back to their initial positions.

Suppose these identical coins each have circumference "c", and that the height of the rectangle is twice the circumference of the coins, while its width is twice its height.

How many complete revolutions will each coin make during its journey?

[From: Quantum Magazine, July/August 1996, Brainteaser B178, p.15.]

PHYSICS CHALLENGE #35

No doubt you've noticed how an effervescent tablet (for instance, Alka-Seltzer™) dropped into water first sinks to the bottom, giving off lots of bubbles, but soon floats to the surface, continuing to release bubbles of gas.

Why does the tablet rise?

[From: Quantum Magazine, May/June
1996, Brainteaser B173, p.15.]

Editor/Writer: Richard Delaware

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