



August 1, 1992

Vol. 7, No. 1

**YEAR 9
POLITICS, OLYMPICS, COMPUTERS**

No year at the MPI ever begins without changes, but this year they are many. As we spend the summer listening to the presidential candidates discussing the state of American education, and what they plan to do about it, it becomes clearer that the MPI is providing an essential service to some of the best students in the Kansas City area. Letters from our alumni reinforce this conclusion. Just as Olympic athletes, even with their superior natural talent, train for years to compete successfully, so also our talented students must study for years to meet their goals. Changes in the MPI program this year are designed to sharpen our focus onto learning calculus, physics, and what sorts of pitfalls may lie ahead in college. Even the best must learn to train.

This year all classes will meet on the same floor; for the first time in 8 years a new physics text is being adopted; there are new opportunities for student participation beyond course work (see below); and both physics and calculus classes will extensively use our new computer lab (described below).

It is bound to be a busy and eventful year, and we wish you, our new class, both welcome, and stamina.

**STUDENT ORIENTATION
SEPT. 9 - 11, 1992**

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. 9, 1992, we'll provide each student with a packet of information and have each of them fill out a personal data form.

**PLEASE BRING TO
THE 'LOFT' (Room 207)**

- Social security number.
- Daily schedule of high school classes.
- Schedule of extracurricular activities.
- High school counselor's name.
- Car license number, make and model, for those ever planning to drive to the MPI.
- Ideas for Enrichment Speaker topics.

We look forward to seeing our 9th class on Wed. Sept. 9!

**TEN COMPUTERS AND
A MOUNTAIN OF WORK**

The MPI now has available, through the generosity of the Independence and Ft. Osage School Districts, 10 DTK Grafika 386/25 computers, 10 Panasonic 24-pin dot-matrix printers, and 10 rolling carts on which to keep both computers and printers. They are currently loaded with both a selection of mathematics (Derive, Microcalc, some Univ. of

Arizona programs) and physics (Precision Timer, Rotational Dynamics) software running from within Microsoft Windows 3.1. Students will have nearly instantaneous access to programs, and so can spend their valuable time learning calculus and physics. When needed for physics labs, the computers will be rolled down to the physics laboratory. When needed for calculus, they will be located in a room with tables and chairs, reserved for MPI use. The logistics of these moves, and all the details of lab-writing, and appropriate use of the machines will occupy much faculty time this year, in spite of our year-long experience with calculus and computers last year. The potential is enormous, once the birth pangs are past.

There is one final note, for those parents and students who are interested. The Student Edition of DERIVE, which includes both a student version of the Derive software and a 387+ page Tutorial Manual written by David C. Arney (1992), Addison-Wesley Publishing Co., may be purchased for \$51.00, at the UMKC Truman Campus bookstore. The software is only DOS-based; there is no Apple or Macintosh version. You must also specify either 3.5" or 5.25" disks. This is definitely a bargain for those with computers at home.

**OPPORTUNITIES FOR STUDENTS
IN SPECIAL MPI PROJECTS**

NOVEMBER, 1992

At the MPI Open House, students will demonstrate physics experiments, and calculus computer experiments for parents, teachers, school administrators, and others, for 2 hours on Sunday, Nov. 8.

FEBRUARY, 1993

1) Teams of 2-3 students will go out to local junior high and

middle schools and present Mathematics Awareness Talks or, Physics Awareness Talks to 8th graders as they are deciding what courses to enroll in for high school. This is a chance to influence the next generation of MPI students!

2) An MPI team of 8 students will compete in the annual and national TEAMS (Tests of Engineering Aptitude, and Mathematics and Science) competition held here at the UMKC Truman Campus on a Friday.

3) 10 MPI students will act as tour guides and speakers here on our annual Recruitment Day, addressing juniors from their own schools about the MPI experience.

APRIL, 1993

MPI students from the Independence District will act as tour guides for their parents and school administrators, presenting the MPI computer and physics labs, as we join for the first time the annual Independence School District Technology Fair.

**THE 1992 MPI AWARDS PRESENTATION
AND
TOP 10 MPI STUDENTS OF 1991-92**

Our final awards presentation was held on May 14, 1992, during which we were pleased to present many of our 1991-92 students with the following variety of awards:

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

CALCULUS I

(Name)	(School)
Rodney Caudle	Wm. Chrisman
Pat Cuezze	Truman

Laura Dilley	Wm. Chrisman
Leslie Farrow	Wm. Chrisman
Chris Gross	Ft. Osage
Justin Heather	Wm. Chrisman
Scott Hummel	Ft. Osage
Brian Huss	Truman
Kim Lovitch	Ft. Osage
Kristi Lynn	Van Horn
John McCarty	Truman
Chheng Meng	Northeast
Shonn Montavy	Ft. Osage
Truc Nguyen	Northeast
Tim Parker	Truman
Tony Prettejohn	Truman
Robert Ramirez	Wm. Chrisman
Jeff Schreiner	Truman

CALCULUS I and II

Gary Cauthon	Ft. Osage
Yan Pei Chao	Wm. Chrisman
Mark Matson	Wm. Chrisman
Sonya Smith	Truman

PHYSICS

Rodney Caudle	Wm. Chrisman
Yan Pei Chao	Wm. Chrisman
Laura Dilley	Wm. Chrisman
Leslie Farrow	Wm. Chrisman
Chris Gross	Ft. Osage
Scott Hummel	Ft. Osage
Brian Huss	Truman
Kristi Lynn	Van Horn
Mark Matson	Wm. Chrisman
John McCarty	Truman
Chheng Meng	Northeast
Jerry Morton	Truman
Truc Nguyen	Northeast
Tony Prettejohn	Truman
Jeff Schreiner	Truman
Sonya Smith	Truman
Jason VanNatta	Ft. Osage
Chad Wainwright	Ft. Osage

TOP 10 MPI STUDENTS 1991-92

1) Laura Dilley	Wm. Chrisman
2) Leslie Farrow	Wm. Chrisman
3) Scott Hummel	Ft. Osage
4) Sonya Smith	Truman
5) Yan Pei Chao	Wm. Chrisman
6) Chris Gross	Ft. Osage
7) Brian Huss	Truman
8) Jeff Schreiner	Truman
9) John McCarty	Truman
10) Mark Matson	Wm. Chrisman

Finally, we list here 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:

Leslie Farrow	Wm. Chrisman
Chheng Meng	Northeast
Troy Stanton	Wm. Chrisman
David Young	Wm. Chrisman

UM Curators Award Winners:

Jennifer Barnes	Van Horn
Chris Gross	Ft. Osage
Brian Huss	Truman
Tony Prettejohn	Truman
Kristi Lynn	Van Horn
Chad Wainwright	Ft. Osage

ADVICE TO THE STUDENTS OF YEAR 9
FROM THE STUDENTS OF YEAR 8

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 1992-93?"

We were pleased at how seriously and with what maturity they wrote, and so each incoming student, after a few weeks of class, will

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:

receive a complete set of these words of advice from the 48 students of Year 8. Here are some excerpts from that document:

"When you begin at MPI, make sure that you don't fall behind. Make sure you understand each section before the next one is started, even if it means doing a couple of hours of problems each night.

Secondly, work with students from other schools. Because of your different backgrounds you can help each other.

Lastly, be committed. Don't give up. It may be difficult, but it is good experience for college."

Jennifer Barnes

"OK, guys, here's the deal. The MPI is not going to be like any of your other classes. You will actually (heaven forbid!) have to pay attention here. Take notes even if you feel like you don't have to or don't want to. And always, always turn in all of your assignments. It's not as terribly difficult as you hear, as long as you don't have premature senioritis."

Laura Dilley

"Study!!! Please!!! MPI has taught me that slacking on study time can be fatal. You can fall behind with a possibility of never catching up. Study as much as possible. Your attitude has to be positive at all times. Without a positive attitude everything can and will crumble underneath you. Most of all stay awake. I admit, the lectures have not always been my favorite part of the day, but the information that is given is very important and you could be missing out on a lot."

Veronica Hooker

"Before starting the year at MPI, almost everyone has a very positive attitude about the year ahead. The key to "surviving" MPI is to maintain that positive attitude throughout the year and to not let yourself get lazy or depressed. I let myself get to the point where I didn't care anymore and that was a big mistake. Not only is MPI a place of learning, it also is a place where you learn that you are either going to have to grow up, or it's just not going to be the good year that you hoped it would be. Self-confidence, self-discipline, and a positive attitude are the keys to surviving MPI."

Mike Johnson

"Always set aside time to study both math and physics everyday. Don't try to cram for a test; make sure you learn the material as it is taught and practice what you learn! Have a good attitude--come in knowing you can do the work. Don't be afraid to ask for help and don't get too far behind--it's almost impossible to catch up. Take advantage of the problem solving sessions and your teachers availability. Learn from your mistakes. Keep going over the material learned in previous weeks because it is always popping up. It's good to work in groups because you learn better and see various ways of solving a problem that may be better or easier."

Janelle McRae

"OK, it sounds cheesy and clichéd, but you have to study once in awhile. It does help, especially if you are at all interested in maintaining any kind of grades! I am the most guilty of NOT studying, but the few times I actually cracked the books, I did amazingly well on exams! Take advantage of these HELPFUL teachers, it may be the last chance you get! MOST of all, GOOD LUCK!!"

Sonya Smith

THE 1992-93 CLASS (TO DATE)

Section A

Kristi Bass	Truman
Christina Brimer	Northeast
Mike Bush	Truman
Sayam Chaiyote	Northeast
Stacie Cole	Wm. Chrisman
Carey Driscoll	Van Horn
Amy E. Fox	Ft. Osage
Richard Fulton	Wm. Chrisman
Todd Johann	Wm. Chrisman
Chris King	Ft. Osage
Byron Lawson	Truman
Bao Nguyen	Northeast
Nicole Sandage	Truman
Jim Snider	Wm. Chrisman
Ric Stuck	Wm. Chrisman
Valerie Summers	Ft. Osage
Aisha Thornton	Northeast
Thuy Tran	Northeast

Section D

Suzanna Aguilar	Van Horn
Rachel Allen	Wm. Chrisman
Gregory Andrews	Truman
Mindi Atwood	Wm. Chrisman
Narumone Boonpluang	Truman
James Coney	Truman
Billie Cramer	Northeast
Tonya Hankins	Northeast
Derek Johnson	Truman
Amanda Koster	Wm. Chrisman
Kyle Langlands	Ft. Osage
Kory Lorenz	Wm. Chrisman
Jessie Nolle	Truman
Hai Pham	Northeast
Tara Schoenemann	Ft. Osage
Bang Truc Vo	Northeast
Deon Willis	Van Horn

Section B

Crissy Aaron	Ft. Osage
Ben Butler	Wm. Chrisman
Shelly Carter	Northeast
Christy Cramer	Northeast
Diana Dang	Northeast
Allen Eiken	Van Horn
Michelle Hastings	Truman
Tuan V. Le	Northeast
Serena Lowe	Ft. Osage
Tammy McHenry	Van Horn
Thao Nguyen	Northeast
Tung Nguyen	Northeast
Rob Quirarte	Wm. Chrisman
Angela Shipman	Wm. Chrisman
Andrea Slusser	Wm. Chrisman
Josh Souza	Wm. Chrisman
Deuandara Sysavath	Northeast
Tim Thacker	Truman

Section C
(Calculus I and II)

Ken Gilbert	Ft. Osage
Steve Lee	Truman
Mitzi Lindberg	Wm. Chrisman
Eric Swearingen	Truman
Brett Williams	Truman

These are the total of 58 students (as of this newsletter) who will be enrolled. As usual there will be additions and deletions through September.

THE 1992-93 STAFF

Our staff once again includes those high school teacher veterans of the past eight years:

In PHYSICS:

Larry Harding from Fort Osage,
Calvin Nelson from Northeast,

and, in CALCULUS:

Sheri Adams from Truman,
Joe Kaifes from Van Horn, and
Al Morse from Wm. Chrisman,

while our University staff is listed in the heading of this newsletter. We should also mention our half-time secretary and assistant Doris Kirst.

PREVIOUS ENRICHMENTS

On Thurs. April 30, 1992, MPI students were treated to a surprise half-hour visit from Dan Eberle of Crowder College, one of the designers and builders of the Crowder College Solar Car STAR II. He had the car with him, and we were able to examine it up close in the parking lot; two students even climbed inside the driver's position. For those interested, he left us with a 58 min. video tape describing the car's races in Australia, and across America. It is currently on its way to Japan for a race, and in late spring of 1993 will pass through Kansas City in another competitive race across America. We hope to see it then in action!

Crowder College offers a 2-credit summer course to high school juniors and seniors called 'Cars For The 21st Century' in early June. This last summer (1992) tuition was \$71 and dorm rooms with meals for two weeks were available for \$150. For more information contact Mary Ann Schumaker, Program Coordinator, at Crowder College, Neosho, MO, (417) 451-4700.

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 have a field trip to such places as the nuclear research reactor in Columbia, various science exhibits, or Worlds of Fun for some 'hands on' physics.

The October 1 newsletter will report on those speakers scheduled for October and beyond. But as part of our first three days of orientation, Jan Longhorn of UMKC, will speak on Friday, Sept. 11 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.)

During the first two weeks of classes at the MPI we will also spend two days discussing four topics which we have come to believe are vital study and college survival skills that are too often not directly addressed. Specifically, these are: NOTE-TAKING, TEST-TAKING, READING A TEXTBOOK, and lastly, and perhaps most importantly, TIME MANAGEMENT. These sessions will be jointly presented by Augusta Nichols from UMKC's Academic Support Services, and the MPI mathematics coordinator.

TO THE PARENTS OF THE 1992-93 CLASS AT THE MPI

[Reprinted in part 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 eight 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 8, 1992. (More about this in the October newsletter.)

PAST STUDENTS WRITE TO US

SETH McMENEMY (88-89)
(Electrical & Computer Engineering
Major)

"The MPI instruction was excellent. Many of the introductory

courses in college are taught by grad students who are, themselves, a little shaky at the material. Even courses taught by PhD's are poor many times. The MPI instructors seemed to combine experience of 'education' with their particular fields (math or physics) resulting in an excellent preparation for college.

I began college as a Mechanical & Aerospace Engineer. Had I continued I would've graduated in 3½ years with both bachelors, because of the head start MPI gave me. I am now pursuing an Electrical and a Computer Engineering degree. The combined program is a 4½ program. With the MPI I was able to change majors mid stream and I will graduate in 4 years. The MPI relieved me of having to take the introductory 'weed out' courses, that many students find as stumbling blocks, without putting me at a disadvantage to my peers.

I believe the program should be expanded and more emphasis of MPI should be given to entering high school students so they can make plans early. I really didn't know about MPI until my Jr. year in H.S.; I was lucky enough to have met the requirements. More contact should be made with students at a younger age, and provide them w/sample curriculums that will prepare them well for MPI. Unlike AP classes that teach students how to take a particular test, the MPI teaches students how to take a college course."

JAY EIFLER (88-89)
(Electrical Engineering Major)

"My participation, as I have mentioned before, was very important. The college preparation in studying basic, course material and attitude were enough to drive me towards excellence. Hopefully, I can live up to what MPI purported to do--make great professionals.

Gearing students to the MPI, say starting in 8th grade would be better too. Offer high schools recommendations on what students can do to prepare and what they can expect from MPI. Don't underestimate the importance of MPI. Sell it."

MATHEMATICS AWARENESS WEEK 1992

TEACHER COMMENTS

The MPI observed national Mathematics Awareness Week, April 27-May 1 this year by coaching and sending teams of three students to give 30 minute presentations to 14 grade 8 classes at five different junior high and middle schools. Here are some comments from the teachers of those classes:

"My students enjoyed the presentation of the MPI students. They told me that they found it worthwhile and informative. They indicated they know more about the Math Physics Institute than they knew before the visit. It is interesting for them to have students talk to them, encourage them, and to teach what lies ahead."

Sam Brock
Bridger Junior High

"The MPI students presented an interesting and well-prepared program. They were very enthusiastic about the various math topics and wanted my students to see the fun side of mathematics. Even though they didn't fully understand everything they were shown, my students enjoyed what the MPI students shared with them. I look forward to next year's presentation."

Karen Bogard
Bridger Junior High

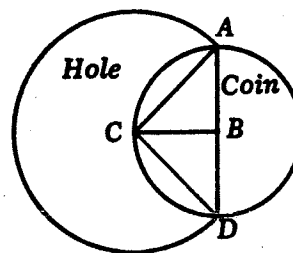
"Since Scott Hummel had to make the presentation alone, I assisted him. He did a fine job. A little more preparation or practice would help, but I saw improvement over last year. The list of math questions to ponder was a nice addition and helped Scott fill the time. It also generated good discussion."

June Langley
Ft. Osage Junior High

**A SOLUTION TO
MATHEMATICS CHALLENGE #23**

Recall the problem statement:

A coin collector had a table with an exactly circular hole in it, where long ago had been an inkwell. He had two pure gold coins of the same thickness; the larger one exactly fitted the hole, and the smaller one, when slid gradually over the hole, tipped into it when its edge reached the center of the hole. (See figure below.) If the larger coin weighed 6 oz., what was the weight of the smaller coin?



SOLUTION:

When the small coin reaches the point where it tips, its diameter AD must be a chord of the circular hole. The point on the small coin's edge that touches the center of the hole, C, will lie on CB, where B is the center of the small coin. Also, CB is perpendicular to AD, because AC =

DC, both being radii of the hole. Since AB and CB are radii of the small coin, $AB = CB$. So, $AC = \sqrt{2}AB$. Since the coins have the same thickness, their weights are proportional to their areas, which in turn are proportional to the squares of their respective radii.

In other words, since $AC = \sqrt{2} AB$, we have

$$(AC)^2 = 2(AB)^2$$

$$\pi(AC)^2 = 2\pi(AB)^2$$

(Large Weight) = 2 (Small Weight).

Hence the large coin weighs twice as much as the small one, which therefore weighs 3 oz.

[From: Mathematical Brain Benders by Stephen Barr]

**A SOLUTION TO
PHYSICS CHALLENGE #14**

Recall the problem statement:

DON'T ROCK THE BOAT

Suppose you are in a rowboat in a small swimming pool. In the boat is a large rock. If you drop the rock into the pool, does the water level rise or drop?

SOLUTION:

The level drops. When the rock is in the boat, a total weight of water equal to the weight of the rock and boat is displaced. When the rock is in the water, it sinks and displaces a volume of water equal to its volume, which weighs less than the rock. The total weight of water displaced by the boat and rock is now less than initially, so the water level drops.

MATHEMATICS CHALLENGE #24

A man is standing in a flat field, 1 rod (more than 5 yds.) due

east of a post, and facing north. He walks straight north until he is directly northeast of the post; then--always in a straight line--he walks northwest until he is directly north of the post; then west until he is northwest of it; then southwest until he is west of it; and so on, in a kind of segmented spiral. When he is again due east of the post, how many rods is he from it? Give the formula, with D = distance from post in rods, and N = number of segments walked.

[From: Mathematical Brain Benders by Stephen Barr]

PHYSICS CHALLENGE #15

Some spectators and players claim that some pitched baseballs swerve drastically just before reaching home plate. Is this sudden deflection possible?

[From: PASCO Scientific Lab Notes]

MPI T-SHIRTS

Beginning in about 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.

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The MPI Newsletter is published five times a year 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) 235-1272. Please address all correspondence concerning this newsletter to 'MPI Newsletter'.