

INTERCHANGE

April 2005

Volume 12, Number 2

From the Regional Math & Science
Center at Grand Valley State University

*Our Vision: Math and Science: Excitement in
Learning for Success in Living*

*Our Mission: Provide and coordinate
leadership, programs and services to achieve
excellence for all in the teaching, learning and
application of mathematics and science.*

In this Issue...

Results of the **Michigan Statistics Poster Competition** and information about **Summer Science Adventure Camps** are on *page 2*

Find out the top teams at the **Regional Science Olympiad**, and look into **Academic Camps for Excellence** and **Nature Center Summer Day Camps**. *page 3*

Science and Math update has stories about Lake Superior and an ancient crocodile, *pages 4-5*

Bump up student's math skills by taking **Summer Math Courses** at GVSU, *page 5*

You can start planning your summer using our **Calendar of Events**, *pages 6-7*

Chemistry camps are being offered at Calvin and teachers have an opportunity to meet the requirements to be "**highly qualified**" this summer, *page 8*

Two Spectacular World Year of Physics 2005 Events at GVSU!

The Starry Messenger

Come help us celebrate the 2005 International World Year of Physics! This year our annual Spring Science and Math Update Seminar (SSMUS) takes place on Wednesday, May 4, 2005 and features a special presentation on physics and astronomy. The Regional Math and Science Center at Grand Valley State University invites you to join us as we bring you the 21st year of the SSMUS featuring actor/educator, Michael T. Francis as "*The Starry Messenger: The Amazing Discoveries of Galileo Galilei.*" Michael Francis impersonates Galileo while dressed in 17th century costume. The dinner and evening presentation offers area science and mathematics teachers and an outstanding student an opportunity to be entertained and motivated.

This program is an interactive dramatic presentation that brings the noted Italian mathematician and scientist to GVSU to discuss his telescopic discoveries and his work, life, and times. Throughout the presentation, audience members are actively involved in experiments and demonstrations. This program will appeal to audiences of all ages.

This is also an opportunity to share a public presentation of the Mary Jane Dockeray Scholarship winners. Mary Jane Dockeray is the founding curator of the Blandford Nature Center in Grand Rapids.

Reservations for this popular event are limited. Registration brochures are available at www.gvsu.edu/rmsc. For teachers, this evening is an excellent opportunity to reward that student in your classroom who has exceeded your expectations and/or demonstrated a special interest in the areas of science and mathematics. For more information, contact the Regional Math and Science Center at (616) 331-2267.



Michael T. Francis as "*The Starry Messenger: The Amazing Discoveries of Galileo Galilei.*"

Celebrate the Sky

The Physics Department and the Regional Math & Science Center at GVSU are pleased to offer Astronomy Presentations and Guided Night Sky Viewing on the evening of Saturday, April 16th from 7:30 to 11:00 p.m. as part of National Astronomy Day.

see "*Celebrate*" on *page 2*

Celebrate

continued from page 1

The event is open to the public and all ages are welcome. Introductory events will be from 7:30 to 9:00 p.m. in Padnos Hall on the Allendale Campus and include:

- Astronomy presentations
- Astronomy activities
- Ask an Astronomer

Sky Viewing begins at 9:00 p.m. and continues to 11:00 pm behind Lubbers Football Stadium.

Telescopes and guides will be provided and you are welcome to bring your own telescope, binoculars, finder charts, and blankets if you like. All children must be accompanied by adults. The event will go on as scheduled if the sky is more than 50% clear. Cloud date is set for the following Saturday, April 23d. Check www.gvsu.edu/cthesky/ on the day/evening of the event. This event is part of the World Year of Physics 2005 and National Astronomy Day.

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These materials were developed under a grant awarded by the Michigan State Board of Education.

Results of Statistics Poster Competition

There were nearly 400 entries in the sixth annual Michigan Statistics Poster Competition for K-12. Judging of the posters took place March 12 on the Allendale campus of GVSU. Statisticians from GVSU, Kalamazoo College, Western Michigan University, and Central Michigan University had a very difficult task determining the winners from among so many interesting and well-done posters.

Entries were judged in four grade level categories: K-3, 4-6, 7-9, and 10-12. Students were permitted to work in groups of up to 4 members except for the K-3 category where students were permitted to work as a class. Monetary prizes and plaques will be awarded to the winning students and their schools. The first place posters in each grade category are:

- K-3: "Animal Crackers" by Billy Walsh and Jacob Walsh, Holy Family Homeschool, Jackson
- 4-6: "Greatest Inventions of the Past 20 Years" by Logan Bedenis, Springfield Plains Elementary, Clarkston
- 7-9: "How Fast is Fast Food?" by Brad Beadling, Sam Harper, and Chris Carson, Kazoo School, Kalamazoo
- 10-12: "The Controversy of Embryonic Stem Cell Research: Life, or Knife?" by Maggie Goll, Battle Creek Area Math and Science Center, Battle Creek.

The committee wishes to express its thanks to the many teachers around the state that participated in this year's competition. We look forward to seeing your students' fantastic ideas put on poster board again next year. For a complete list of this year's winners along with photos of the winning posters, visit the competition web site at www.gvsu.edu/stat/statposter.

The competition is sponsored

by the Regional Math and Science Center and the Department of Statistics at GVSU and The Michigan Council of Teachers of Mathematics.

Sign up for Science Adventure Camps

The Regional Math and Science Center at Grand Valley State University will offer a series of Summer Science Adventure Camps (SSAC) during July of 2005. The 4 day camps are designed for students entering grades 4-8. Camps will run July 5-8, 11-14, 18-21, and 25-28. Times are 9:00 a.m. to 3:00 p.m. Topics include Exploring Flight and Space, Digging Rocks, Forensic Science, Magic and Fun with Physics, Physics of Sports, and Physical Science of Toys and Amusement Parks. The last three camps listed are new camps that have been designed as part of our celebration of World Year of Physics 2005. All SSAC camps combine classroom and experiential opportunities as students learn key scientific principles and apply them to real world situations. Camps will take place on the Allendale campus of GVSU. The camp brochure is available on our website at www.gvsu.edu/rmsc/. Class size is limited to 16 and the camps fill quickly so act now to register.

The schedule is as follows:

- Exploring Flight and Space Camp I, session 1, July 5-8, Grades 4, 5, and 6
- The Physics of Sports, July 5-8, Grades 6 and 7
- Exploring Flight and Space Camp I, session 2, July 11-14, Grades 4, 5, and 6
- Forensic Science, July 18-21, Grades 4, 5, and 6
- Magic and Fun with Physics, July 18-21, Grades 4, 5, and 6
- Digging Rocks, July 25-28, Grades 4, 5, and 6

- Physical Science of Toys and Amusement Parks, July 25-28, Grades 6, 7, and 8

Regional Science Olympiad Winners!

The 21st Regional Science Olympiad Tournament was held at GVSU on March 19, 2005. Fifty-three B Division teams and 25 C Division Teams competed in 23 events per division plus 5 trial events. More than 2000 students participated. The assistance of 300



volunteers was greatly appreciated. In recognition of World Year of Physics 2005, two special physics events, Mission Possible B and Physics Lab C, were designated. All participants in these events were presented with specially designed medals. Congratulations to all the participants! The winners are:
Division B – Middle School
The top ten schools were recognized at the Awards Ceremony and advance to the state tournament.

1. White Pines Middle (Grand Haven)
2. Lakeshore Middle (Grand Haven)
3. Allendale Middle
4. Grandville Middle
5. St. Jude
6. East Grand Rapids
7. Plymouth Christian
8. Jenison Junior High
9. Northern Hills Middle (Forest Hills)
10. Immaculate Heart of Mary

Division C – High School

The top five schools were recog-

nized at the Awards Ceremony and advance to the state tournament.

1. Grand Haven High School
2. West Ottawa High School
3. Allendale High School
4. Plymouth Christian High School
5. Forest Hills Central High School

Academic Camps for Excellence at Calvin

This summer Calvin College in partnership with GT Resource Network, will be offering seven camps specifically designed for academically gifted and talented middle school students. Two of the camps are in science which feature integrated science experiments using modern scientific tools. In addition there is a math camp, a computer camp, an economics camp, and a camp in language arts, which will feature creative writing.

Science I: Emphasis on Chemistry: This camp is an eight day camp with daily sessions from 9:30 a.m.-2:30 p.m. It will be offered July 18-28, and will emphasize chemistry, biochemistry, and biology with activities such as computer modeling of molecules, enzyme activity, photosynthesis, and forensics. The camp fees are \$255 plus \$25 for supplies. Enrollment will be limited to 24.

Science II: Emphasis on Energy: The eight day energy camp, offered August 1-11 from 9:30 a.m.-2:30 p.m., will be broadly interdisciplinary with experiments and activities organized around the theme of energy. The camp fees are \$255 plus \$25 for supplies. Enrollment will be limited to 24.

Imaginary Worlds: This computer camp is an eight day camp with daily sessions from 9:30 a.m.-2:30 p.m. Campers will design their own computer-generated movies using updated 3-D virtual

reality software. Girls only camp will be June 27—July 8 and boys only camp will be July 11-21. The cost is \$255 plus a \$25 lab fee.

Mathematics Camp: This 5 day camp will meet July 25-July 29 from 9:30 a.m.-2:30 p.m. The camp will explore mathematical thinking strategies to solve puzzles, games, and problems. Cost is \$125 plus a \$25 materials fee.

For all of these camps there are some scholarship monies available for students with a demonstrated need. Any area teachers who know students who may be interested in the camp should contact Sue Sweetman for registration forms at swee@calvin.edu or (616) 526-6200. Other questions about the details of the camps can be addressed to Larry Louters at lout@calvin.edu or (616) 957-6493.

Nature Center Camps

Howard Christensen Nature Center is offering two 4-day sessions of Summer Day Camp from June 13-16 and 20-23. Both sessions are from 9:00 a.m.-3:00 p.m. Cost per session is \$125.00. Camps include:

- **Curious Critters** (grades 1-2): Fascination with Michigan's mammals, birds, insects, amphibians and reptiles will keep campers excited all day!
- **Wet & Woody Expeditions** (grades 3-5): Venture into the wild for daily expeditions to learn about the interactions of plants and animals that live at the Nature Center.
- **Survival on Planet Earth** (grades 6-9): Get wet and wild in the streams, swamps and bogs - discover the hidden treasures in the forests and fields - all in a wonderful natural environment!

For more information contact Ranger Steve (Mueller) at stevemueller@kentisd.org or (616) 887-1852.


A Superior Lake

Bopi Biddanda, Annis Water Resources Institute


Lake Superior, the largest of the Laurentian Great Lakes, is also the world's largest lake by surface area (82,100 km²). It is one of the deepest lakes in North America with a maximum depth of 400 m. With approximately 10% of Earth's surface freshwater (12,230 km³), Lake Superior contains more water than all the other four Great Lakes (Michigan, Huron, Erie and Ontario) combined. Without doubt, it is a major natural and economic resource to the Great Lakes region. In addition, the thermal inertia associated with this large body of water has an important moderating influence on the regional climate. Despite the significance of the lake from ecological, economic and climatological perspectives, it has been little studied owing to its large size, remote location and low human population in its watershed.

Working with colleagues from Minnesota (James Cotner, Edward Stets) and Japan (Wataru Makino), I examined the organic carbon budget for Lake Superior. Because carbon is a central element of life, taking inventory of carbon helps us understand the behavior of entire ecosystems. Lake Superior is a unique, ultra-oligotrophic (very low productivity) system with many features similar to the open ocean environments, such as the dominance of microorganisms and dissolved nutrients in biogeochemical processes. Photosynthesis by phytoplankton in the sunlit surface waters is the primary

source of reduced carbon to the Lake Superior ecosystem. The rates of photosynthesis here are among the lowest measured in any aquatic ecosystem – likely a result of very low water temperatures and ultra low nutrient concentrations prevalent in the lake. River inputs of organic carbon are about 10% and atmospheric fall out contributes about 2% of the total carbon annually entering the system – with the remaining 88% of the carbon being synthesized by



The rates of photosynthesis here are among the lowest measured in any aquatic ecosystem



in-lake phytoplankton. The main loss of carbon from the lake is through biological respiration, with only a tiny fraction (~0.5%) being buried in the lake sediments.

Inexplicably, the measured rates of lake respiration were higher than the rate of carbon input to the lake – suggesting that sources of organic matter entering the lake are likely underestimated. The most probable explanation is that primary production in the lake is underestimated by modern radio labeled methods involving collection of samples on filters that do not account for the production of dissolved organic carbon fractions - which may be substantial. The dissolved organic carbon pool in Lake Superior is ~10 times as large as the particulate organic

carbon pool, and most of the production and consumption fluxes in this system are likely to pass through this large dissolved carbon pathway mediated by microbial autotrophs and heterotrophs. Improved knowledge of microbial processes and dissolved organic matter biogeochemistry of the lake could help us understand the inner workings of this lake better in the future – a future in which climate change is predicted to impact the Great Lakes region substantially.

Results of this study are reported in a research article: “Organic carbon biogeochemistry of Lake Superior” (Aquatic Ecosystem Health and Management, v. 7, p. 1-14, 2004).

Missing Links

Stephen Mattox, Department of Geology

A common expression in geology is “more gap than record.” It refers to the nature of Earth's layered rocks. At any one place, say here in Michigan, the rocks are a record of processes and environments that continued for hundreds of millions of years, but such vertical stratigraphic records also have “gaps” or missing rock record spanning millions to hundreds of millions of years. The gaps are represented by buried surfaces of erosion or non-deposition, called unconformities. Absence and discovery play a central role in science, perhaps in geology more so than the other disciplines because what is missing in one place might be found in another. Like the rock record, the fossil record for various groups of plants

SCIENCE AND MATH UPDATE

and animals are incomplete. Paleontologists are always looking for the new fossil that will fill the gap in the record, missing links if you prefer.

Lucas Buchanan (below), a researcher at Monash University in Australia, recently found a crocodile skull in an ancient lake bed in Queensland. The find fills a gap in the fossil record as well as our knowledge of reptiles. Crocodile fossils are known from the Cretaceous, about 65 million years ago, and from the Oligocene, about 30 million years ago. Buchanan's find, from a layer about 40 million years old, sheds new light on how crocodiles evolved over time.



The second discovery dispels a common notion that our mammalian ancestors were small and rodent-like, cowering in fear from aggressive dinosaurs. Yaoming Hu of the American Museum of Natural History in New York recently discovered a mammal fossil, *Repenomamus giganticus*, in China. This mammal was over a meter long with a jaw about the

size of a fox. Most startling was the presence of a baby *Psittacosaurus* dinosaur skeleton in the mammal fossil. Not only could *R. giganticus* survive against the dinosaurs, but he could eat them for lunch.

Over the miniscule amount of time we have studied the planet the "gaps" both in the details of the fossil record and in our knowledge of how life changed over time have gotten smaller. Perhaps because some more rocks were newly exposed, or a new

Most startling was the presence of a baby *Psittacosaurus* dinosaur skeleton in the mammal fossil

generation of paleontologists has keener eyes or the last remote regions of the world are being explored. Perhaps most importantly many of the gaps or "missing" links are still out there waiting to be discovered by the young paleontologist sitting in your classroom!

GVSU Offers Summer Math Courses

Michigan's new Grade Level Content Expectations (GLCE) document has raised the bar as to what students are expected to know and do in mathematics, while NCLB has defined criteria necessary for teachers to be highly qualified in mathematics. This June, the RMSC will be offering three workshops / courses

designed to give teachers the content knowledge and pedagogy they need to effectively teach mathematics.

The middle school offering, *Geometry for Middle Schools Teachers*, is designed to assist teachers both in meeting NCLB highly qualified teacher requirements and delivering effective classroom instruction. The elementary school offerings, Building Confidence Through Content: Number and Operations/ Rational Numbers and Algebra Concepts I, is designed to build knowledge of mathematics as well as provide a wealth of classroom applications. Save the dates for the following courses! More details will be available in the near future on the RMSC website at www.gvsu.edu/rmsc.

June 20 - July 1 Monday-Thursday (two weeks) GVSU's **Geometry for Middle School Teachers** by Dr. Char Beckmann. Classes meet on the Allendale Campus on Monday through Thursday from 9:00 a.m. to 4:30 p.m. each week. Available for 3 graduate credits.

June 20-23 Monday-Thursday GVSU's **Number and Operations: Rational Numbers** by Drs. Esther Billings and Pam Wells. For teachers grades K-6. Classes meet on the Allendale Campus on Monday through Thursday from 8:00 a.m. to 1:00 p.m. Available for 1 graduate credit.

June 26-30 Monday-Thursday GVSU's **Algebra Concepts I** by Drs. Esther Billings and Pam Wells. For teachers grades K-6. Classes meet on the Allendale Campus on Monday through Thursday from 8:00 a.m. to 1:00 p.m. Available for 1 graduate credit. More details available at www.gvsu.edu/rmsec.

CALENDAR OF EVENTS

APRIL

13 Wednesday

Building Confidence through Content Series: **Physical and Chemical Changes in Matter and Energy** for the Middle School Classroom continues at GVSU Allendale campus from 4:30 to 8:00 p.m. For more information contact the RMSC at (616) 331-2267, or visit www.gvsu.edu/rmsc.

22 Friday

Earth Day Events. From noon -2 p.m. at the Wittenbach Agriscience and Environmental Center and Wege Natural Area, 11715 Vergennes, Lowell, MI. Call (616) 987-1002 for details.

23 Saturday

The NEW **Indian Springs Metropark Environmental Discovery Center** (in conjunction with the National Weather Service Weather Station, White Lake) is holding an open house from 9:00 a.m. to 3:00 p.m. There will be presentations on programs, professional development, volunteer and other educational opportunities, environmental laboratory demonstrations, and guided trail walks. Visit www.metroparks.com or call (248) 25-7280 for more information.

MAY

14 Sunday

Migration Bird Count at Howard Christensen Nature Center from 8:00a.m. to 5:00p.m. This is part of a continent wide survey to document bird locations on a given day during bird migration. It's a fun process that helps teachers, students, and citizens. Contact Ranger Steve (Mueller) at stevemueller@kentisd.org or (616) 887-1852.

16 Monday

Guided Wildflower Walk. From 7 – 8 p.m. at the Wittenbach Agriscience and Environmental Center and Wege Natural Area, 11715 Vergennes, Lowell, MI. Call (616) 987-1002 for details.

JUNE

13-17 Monday-Friday

WMU's **Michigan Ecology in Your Schoolyard** by Mark Fitzpatrick for teachers grades K-8. Classes meet at the Blandford Nature Center in Grand Rapids on June 13-17 from 8:30 a.m. to 4:30 p.m. (plus June 15, 7:00-9:30 p.m.) for three graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

WMU's **Groundwater Teacher Training Camp** by Dr. Duane Hampton for teachers grades K-12. Classes meets on the Battle Creek campus on June 13-17 from 8 a.m. to 5 p.m. for two graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

20 - July 1 Monday-Thursday

GVSU's two week **Geometry for Middle School Teachers** by Dr. Char Beckmann. Classes meet on the Allendale Campus on Monday through Thursday from 9:00 a.m. to 4:30 p.m. each week. Available for 3 graduate credits. More details available at www.gvsu.edu/rmsec.

20-23 Monday-Thursday

GVSU's **Number and Operations: Rational Numbers** by Drs. Esther Billings and Pam Wells. For teachers grades K-6. Classes meet on the Allendale Campus on Monday through Thursday from 8:00 a.m. to 1:00 p.m. Available for 1 graduate credit. More details available at www.gvsu.edu/rmsec.

20-24 Monday-Friday

WMU's **Matter Matters** by Gregg Zulauf for teachers grades 6-12. Classes meet at the MAISD Regional Math/Science Center, Muskegon, on June 20-24 from 8:30 a.m. to 4:00 p.m. for one or two graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

20-24 Monday-Friday

WMU's **Crime Scene Investigation (CSI) and Science – Secrets Revealed** by Dr. John Goudie for teachers grades 4-12. Classes meet at the Kalamazoo Area Math and Science Center on June 20-24 from 8:30 a.m. to 4:00 p.m. for two graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

26-30 Monday-Thursday

GVSU's **Algebra Concepts I** by Drs. Esther Billings and Pam Wells. For teachers grades K-6. Classes meet on the Allendale Campus on Monday through Thursday from 8:00 a.m. to 1:00 p.m. Available for 1 graduate credit. More details available at www.gvsu.edu/rmsec.

27-July 1 Monday-Friday

WMU's **Astronomy for Elementary Teachers** by David Nette for teachers grades K-6. Classes meet on the Battle Creek Kendall Center on June 27-July 1 from 8:30 a.m. to 4 p.m. for two graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

CALENDAR *OF* EVENTS

27-July 1 Monday-Friday

WMU's **On/Minds-On: Exploring the Nature of Science and Scientific Inquiry** by Dr. Renee' Schwartz for teachers grades K-12. Classes meet at Room 1127 Wood Hall, WMU Campus on June 27 to July 1 from 8:30 a.m. to 4:00 p.m. for two graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

JULY

5-8 Tuesday-Friday

Exploring Flight and Space Camp I, session 1 for students grades 4, 5, and 6. 9:00 a.m. to 3:00 p.m. on the Allendale Campus of GVSU. Additional details at www.gvsu.edu/rmsc/.

The Physics of Sports for students grades 6-7. 9:00 a.m. to 3:00 p.m. on the Allendale Campus of GVSU. Additional details at www.gvsu.edu/rmsc/.

11-14 Monday-Thursday

Exploring Flight and Space Camp I, session 2 for students grades 4, 5, 6. 9:00 a.m. to 3:00 p.m. on the Allendale Campus of GVSU. Additional details at www.gvsu.edu/rmsc/.

11-15 Monday-Friday

WMU's **Crystals, Minerals and Rocks for Elementary Teachers** by Dr. John Grace for teachers grades K-6. Classes meet at Room 1206 Wood Hall, WMU Campus on July 11 to 15 from 8:30 a.m. to 4:00 p.m. for two graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

WMU's **Constructing Ideas in Physical Science** by Dr. Robert Poel for teachers grades 6-9. Classes meet at the Southwest Regional Campus on July 11-15 from 8:30 a.m. to 4:00 p.m. for two graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

17-22 Sunday-Friday

WMU's **Environmental Education and Outdoor Science** by Dr. Mark Jenness for teachers grades K-12. Classes meet at Higgins Lake, Ralph A. MacMullen Conference Center, Roscommon, MI on July 17 to 22 from 8:00 a.m. to 5:00 p.m. for one or two graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

18-21 Monday-Thursday

Forensic Science for students grades 4, 5, and 6. 9:00 a.m. to 3:00 p.m. on the Allendale Campus of GVSU. Additional details at www.gvsu.edu/rmsc/.

Magic and Fun with Physics for students grades 4, 5, 6. 9:00 a.m. to 3:00 p.m. on the Allendale Campus of GVSU. Additional details at www.gvsu.edu/rmsc/.

18-22 Monday-Friday

WMU's **Activities in Outdoor Education** by Larry Fegel for teachers grades 3-9. Classes meet at the Outdoor Discovery Center, Holland, MI, on July 18-22 from 8:30 a.m. to 4:00 p.m. for two graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

WMU's **Sound and Simple Machines** by Dale Freeland for teachers grades 7-12. Classes meet at Room 1413 Wood Hall, WMU Campus on July 18 to 22 from 8:30 a.m. to 4:00 p.m. for two graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

WMU's **Atmospheric Science** by Dr. Joseph Stoltman for teachers grades 7-12. Classes meet at Room 1413 Wood Hall, WMU Campus on July 18 to 22 from 8:30 a.m. to 4:00 p.m. for two graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

25-28 Monday-Thursday

Digging Rocks for students grades 4, 5, 6. 9:00 a.m. to 3:00 p.m. on the Allendale Campus of GVSU. Additional details at www.gvsu.edu/rmsc/.

Physical Science of Toys and Amusement Parks for students grades 6, 7, and 8. 9:00 a.m. to 3:00 p.m. on the Allendale Campus of GVSU. Additional details at www.gvsu.edu/rmsc/.

25-28 Monday-Thursday and August 1-4

WMU's **Classroom Science Centers and Teaching Collections** by Dr. Mark Jenness for teachers grades K-8. Classes meet on the Battle Creek Kendall Center on July 25-July 28 and August 1-4 from 8:30 a.m. to 4 p.m. for three graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

25-29 Monday-Friday

WMU's **The Geology of Lake Michigan's Shoreline** by Dr. Ronald Chase for teachers grades K-12. Classes meet at the Traverse City EUP Campus on July 25-29 from 8:30 a.m. to 4:00 p.m. for two graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

AUGUST

1-5 Monday-Friday

WMU's **Becoming a Master Teacher of Physical Science** by Gregg Zulauf for teachers grades 6-12. Classes meet at the Grand Rapids Graduate Center - Beltline in Grand Rapids on August 1-5 from 8:30 a.m. to 4:00 p.m. for two graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

8-12 Monday-Friday

WMU's **Teaching Science with Toys Using Inquiry-Based Instruction** by William Burd for teachers grades 2-6. Classes meet at the Stevenson Center for Higher Education, Muskegon, on August 8-12 from 8:30 a.m. to 4:00 p.m. for two graduate credits. For additional details see "Summer Science Workshops" at www.wmich.edu/science.

Calvin Offers Summer Chem-Camps

Calvin College will be offering a chemistry camps this summer that are specifically designed for students who have just completed the fifth, sixth, or seventh grade. The camp program will feature demonstrations, and many hands-on experiments designed to teach introductory chemical concepts in a way that is fun and entertaining. Each weeklong camp will meet for 2 1/2 hours either in the morning or afternoon. The morning and afternoon sessions will have different activities, but teach similar chemical concepts. There will be a total of four camps during the weeks of June 20-24, and June 27-July 1. We will also offer an all girls camp during the week of July 11-15. The cost of the camp is \$95 plus a \$15 materials' fee to cover instruction, materials, and a camp T-shirt. Enrollment in each session will be limited to 24 and reservations will be made on a first come first serve basis. There are

scholarship monies available for qualified students with a demonstrated need. Any area teachers who know students who may be interested in the camp should contact Sue Sweetman for registration forms at (616) 526-6200 or swee@calvin.edu. Camp Directors are Larry Louters, Calvin College and Sharon Piers, West Catholic High School.

LTU Offers Free Courses

Lawrence Technological University is Southfield, Michigan, received a grant to assist inservice teachers to meet the requirements to be highly qualified. Qualified science teachers can earn up to six credits (two courses) this summer with free tuition, free books, and a small stipend. Classes are taught with classroom and online components. See www.ltu.edu/arts_sciences/master_science_ed/index.asp for more details.



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