

# INTERCHANGE

February 2005

Volume 12, Number 1

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.*

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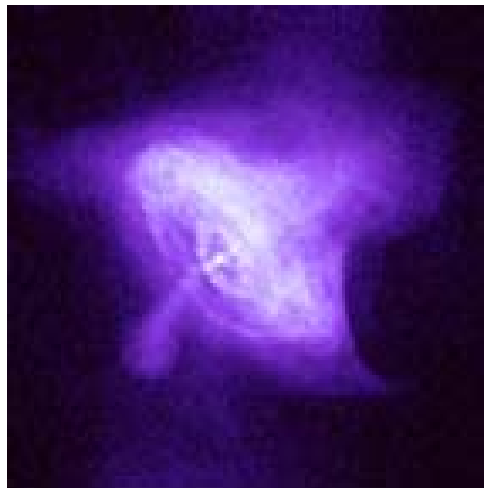
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## Public Lecture and Workshop: Chandra X-Ray Observatory

The Regional Math and Science Center at Grand Valley State University, in cooperation with the Ottawa Area Intermediate School District, invites the public to join us for a free presentation based on research conducted at the Chandra X-Ray Observatory. The lecture and workshop are part of our observation of the World Year of Physics 2005. The lecture takes place on Wednesday, March 9, 2005 from 7:00 to 8:30 p.m. on the Allendale campus of GVSU in 102 Loutit Lecture Hall. Pre-registration is not necessary.

The featured speaker is Donna Young from the Wright Center for Science Education at Tufts University. Donna is the curriculum consultant and principal author of a new astronomy curriculum called Hands On Astrophysics and the national event coordinator for the “Reach for the Stars” event for the National Science Olympiad. She is also the curriculum developer for Chandra at the Harvard-Smithsonian Center for Astrophysics.

*See “Chandra” on page 2*



Chandra X-ray image of the Crab Nebula, the remnant of a supernova

## Launch of World Year of Physics!

In January, an international launch event took place in Paris for the *World Year of Physics 2005* – a worldwide endeavor to celebrate physics and its importance in our everyday lives. The year 2005 marks the 100<sup>th</sup> anniversary of Albert Einstein’s “miraculous year” in which he published three important papers describing ideas that have since influenced all of modern physics. This year provides the opportunity to celebrate Einstein and raise a worldwide awareness of physics and physical science.

*See “Physics” on page 2*

# Chandra

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The Chandra X-Ray Observatory is the most sophisticated X-ray satellite launched by NASA and it is designed to observe distant X-ray sources from high-energy regions of the universe. Some of the spectacular images collected include the remnants of supernovae explosions, colliding galaxies, black holes, pulsars, quasars, binary stars, and the destruction of a star at the edge of a black hole.

With five years of data collection from Chandra, our theories about the evolution of stars and galaxies are being changed and reshaped. The exciting new images have offered glimpses of exotic objects like mid-sized black holes, unexpected black hole activity in old galaxies, rivers of gravity that define the cosmic landscape, surprising X-ray activity in proto-stars and failed stars, puzzling distributions of elements in supernovae remnants, unexplained dark matter, and even the

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

intriguing possibility of an entirely new form of matter—the strange quark star.

Middle school and high school teachers are offered a once in a lifetime opportunity to attend an all day workshop conducted by Donna Young on March 10, 2005 based on research conducted at the Chandra X-Ray Observatory. The cost of the workshop is \$45 and lunch is included. The workshop will take place at 303 Henry Hall on the Allendale campus of GVSU.

Some of the activities offered at the workshop will be modeling the electromagnetic spectrum, using images to investigate stellar life cycles and the evolution of the universe, and collecting data from an invisible source and downloading a set of imaging analysis software tools to learn how scientists use computers to produce images for scientific investigation and public outreach. Participants will be given complete classroom sets of all activities and materials, and additional resources to provide classroom support.

For additional information, to register for the workshop, or to obtain a brochure for the workshop or the lecture, go to the RMSC website at [gvsu.edu/rmsc/](http://gvsu.edu/rmsc/) or call (616) 331-2267.

## Physics

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To participate in this world-wide celebration, the Regional Math & Science Center at Grand Valley, in collaboration with GVSU Physics Department, will host a series of activities throughout the year that focus on understanding the diverse phenomena of pure physics, applying physics principles in other science disciplines and the real world, and exploring career opportunities available through the study of physics. The first of these events – a public lecture and a teacher workshop -

will explore the research taking place on the Chandra X-Ray Observatory. More information on both these opportunities, *Chandra's High Energy Vision* and *Chandra and the X-Ray Universe*, is included in this newsletter and is also available on-line at [www.gvsu.edu/rmsc](http://www.gvsu.edu/rmsc).

Other opportunities for involvement in the World Year of Physics 2005 include:

- **Physics Enlightens the World** – In the WYP 2005, as many people as possible should get the feeling to be part of a great physics community spanning the whole globe. “Physics Enlightens the World” is an endeavor to achieve just that: A world-wide relay of light to commemorate the 50th anniversary of Albert Einstein’s death on April 18, 2005. For more information visit: [www.physics2005.org/events/projects.html](http://www.physics2005.org/events/projects.html).
- **Physics Across the World International Poster Competition** – a poster competition for students aged 10-16 years to make the WYP 2005. Students can create their own colorful posters to show how physics applications make their lives better and have a positive impact on their everyday lives. For more information visit: [www.physics2005.org/events/projects.html](http://www.physics2005.org/events/projects.html).

## Announcing STEPS Summer Experiences

RMSC and the Padnos College of Engineering and Computing will hold two sessions of STEPS summer camps for 80 seventh-grade girls during the weeks of June 20-23 and June 27-30, 2005. STEPS stands for Science, Technology, and Engineering Preview Summer.

This year, due to a reduced budget, STEPS will be a day camp experience. This change will allow girls to continue to be

introduced to the world of technology, science, and engineering at GVSU tuition free. Brochures for STEPS will be mailed to school curriculum directors, principals, and 6<sup>th</sup> grade teachers the second week in February and completed applications are due to the RMSC by March 18, 2005.

The STEPS girls will learn about technical engineering careers early enough to influence their choices of math, science, and technical courses in middle school and high school, preparing them for greater career options in science, technology and engineering.

These young women are exposed to many engineering processes while building a large model glider airplane. The girls craft their own foam airplanes using power tools, jigs, and fixtures with the help of engineering professors, radio-control volunteers, and other volunteers.

Volunteers are needed (1) to help girls make parts for their airplanes, (2) provide technical flying and model airplane making expertise, (3) to assist faculty and staff with activities such as plane decoration, flight simulation, engineering activities, and tours, and (4) for fly nights scheduled for Thursdays, June 23, and 30. If you are interested contact Jessica Rothe at [rothej@gvsu.edu](mailto:rothej@gvsu.edu) or (616) 331- 7189 or Margo Dill at [dillm@gvsu.edu](mailto:dillm@gvsu.edu) or (616) 331-2267 before May 27.

For more information you can go to [www.gvsu.edu/steps](http://www.gvsu.edu/steps), call (616) 331-2267, or contact your school principal or 6<sup>th</sup> grade teachers.

## Help TRIO Program

The GVSU TRiO Program will be looking for individuals to teach during the six week summer component in June and July 2005. Individuals who would like to receive more information and/or

be considered should contact the TRiO office (616) 331-3441 by March 1, 2005. A list of available positions will be sent to those individuals who contacted the office and indicated an interest.

## Summer Science Camps are Coming!

The RMSC's Summer Science Adventure Day Camps are coming in July. All camps will be held on the Allendale campus. The camp during the first week will start on Tuesday, July 5 and end on Friday, July 8. All other camps will be held Monday through Thursday. The highlight of all the camps is the field trip during which students are able to experience first hand the application of the scientific principles learned during class sessions.

A tentative schedule includes the following camps:

**Exploring Flight and Space Camp I**, for students entering grades 4, 5, and 6, studies the wonder of aviation and space. Students build hot air balloons, and build and launch Estes rockets. The highlight of the camp is a field trip to the Gerald R. Ford International Airport to fly in a Cessna airplane with an experienced pilot and a behind the scenes tour of an airplane transport facility. While there, students also tour an Aeromed helicopter facility. Two sessions of this camp are planned.

**Digging Rocks Summer Day Camp** is for students entering grades 4, 5, and 6. Students will learn to identify the types of rocks and rock formations. Students explore a wide range of activities and go on a field trip, giving them hands-on geology experience. Trips include the glacial geology of the GVSU campus and the 300 million year old rock formations at Grand Lodge, Michigan.

**Science of Forensics Summer Day Camp** is for students entering grades 5, 6, and 7. Students will

learn how police detectives and FBI agents solve crimes using the science of forensics. They explore a simulated crime scene and gather evidence to solve the crime. They will be learning how to make footprint and tire casts as well as fingerprints. Special law enforcement guest speakers will visit the camp and a field trip to a police laboratory or similar facility will round out the week.

**Fun with Physics Summer Adventure Camp** is for students entering grades 4, 5, and 6 and will help celebrate the World Year of Physics, 2005, with its focus on the way physical science plays an important role in our everyday lives. This camp promises to be an exciting addition to our summer camp program.

The final brochure will be mailed in early April. If you are not on our mailing list, call (616) 331-2267 or go to [www.gvsu.edu/rmsc](http://www.gvsu.edu/rmsc).

## Register for Science Content Workshops!

February 16 is the start date for a series of workshop sessions in science content for **Physical and Chemical Changes in Matter and Energy** for 5-8<sup>th</sup> grade teachers. The sessions will take place at the Regional Math and Science Center, Grand Valley State University's Allendale campus. The dates are Wednesdays; February 16, March 2, 23, and 30 and April 13 from 4:30 – 8:00 pm.

Participants will develop a deeper understanding of matter, its composition, properties, and behavior, including energy transformations and real-world applications. They will take part in inquiry laboratory investigations and learn through group activities and discussions with their facilitators. All session content is modeled after the benchmarks for middle school science in the Michigan Curriculum Framework.

see "Science Content" on page 8

## The Power of Tsunami Education

By Pat Videtich, *Geology Department*

On December 26 when Tilly Smith, a 10-year-old girl, saw the water recede along the beach in Phuket, Thailand, she recalled a school lesson and told her mother that a tsunami might occur. As a result, Tilly probably not only saved the lives of her parents and younger sister, but about 100 other people as well.

“Tsunami” is a Japanese word meaning harbor wave. A tsunami is formed by underwater faults, volcanic eruptions, or avalanches. Tsunami are long-period waves, meaning that in deep water two adjacent crests are far apart (typically hundreds of kilometers!) and the wave height of a tsunami is very small (about 0.5 meters). As the tsunami enters shallow water the wave “feels the bottom” and slows down. The waves still in deeper water catch up causing the waves to bunch up. The portion of the tsunami that approaches land in a particular area may initially be a crest or a trough. At the beach where the Smith family was vacationing, a trough arrived first causing the sea to retreat. The natural reaction for unknowing people is curiosity and movement toward the sea. Tilly knew better. She knew a crest of a tsunami could follow retreat of the sea. In fact, a shore can be struck by a number of crests with interspersed troughs, and the first crest that hits an area need not be the highest one. People are commonly killed or injured because they think the danger is over and go to the shore to investigate the damage.

The December 26 tsunami resulted from a huge displacement of water due to movement of the seafloor along a convergent plate boundary. Because tsunami are usually generated at subduction zones and the Pacific Ocean is rimmed by such plate boundaries, most tsunami occur in the Pacific Ocean. An early warning system has been in place there for decades. If an underwater earthquake occurs that is large enough

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had more people learned about tsunamis at school as had Tilly Smith, more lives might have been saved

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to cause a tsunami, a watch is sent out. Tidal gages near the epicenter of the earthquake are monitored to determine if a tsunami did develop. If so, the watch is changed to a warning. Such a warning system is not in place for the Indian Ocean, which has relatively few tsunami. Hopefully, a warning system for the Indian Ocean will be initiated soon. Even without a formal system, with cellular phones and the internet available, had more people learned about tsunami at school as had Tilly Smith, more lives might have been saved because hours passed between the initial destruction and the impact at areas to the west.

Calling a tsunami a “tidal wave” is a misnomer as tsunami have nothing to do with tides. But,

ironically, when Tilly told the others on the beach that she feared a tsunami was coming she didn’t get the appropriate reaction because they didn’t know what a tsunami is. Fortunately, Tilly also knew the other, commonly used, but incorrect name for a tsunami and had the presence of mind to say, upon seeing no response from the adults, “a tidal wave”. People sprang to action and very quickly the beach was empty. And many lives were saved.

Interestingly, Tilly is English and lives far from the threat of tsunami and earthquakes. The take home lesson? Even though we may teach in a location far removed from the threats of tsunami and earthquakes, with today’s global environment, our children are likely to work and travel far and wide. So teach about tsunami, earthquakes, volcanoes, flooding, mass wasting, hurricanes, and other hazards. You just never know when you might save a life. (National Geographic News; National Weather Service; New York Post)

## Anyone Out There?

By Geoff Linters, *Physics Department*

Our search for meaning and our place in the Universe continues. Astronomers are scrambling to find other planetary systems like our own. So far, 100 plus (136 as of Sept 2004 — a catalog is online at [exoplanets.org](http://exoplanets.org)) extrasolar planets or exoplanets have been discovered since the first in 1995 by M. Mayor and D. Queloz (“Nature”, Vol. 378, pg. 355). You may be thinking to yourself, “How can we see exoplanets if the best tele-

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scope in the world (Hubble Space Telescope) can only see Jupiter-sized planets out to about 1/100th the distance to the nearest star (the limit for earth-sized planets is even more stringent)?”

The answer lies in the fact that there are a number of ways to “see” something in astronomy. One way is to open our eyes and look at something. We perceive size, color, depth, shape, and etc. This is the sort of seeing mentioned in the question above and we certainly won’t be able to see exoplanets in this fashion.

Another way to see is the way we see stars as twinkling white lights that look like a pin-pricks in the sky. This is a point source of light with no distinguishable features except, perhaps, color. Color is key to the preferred method of seeing when looking for exoplanets.


The preferred way to see exoplanets makes use of something called the Doppler Effect. You’ve heard it in the changing pitch of a wailing siren as it passes by you or the racing engine of a Nascar race car. This effect works the same way with light except we see it as a shift in color rather than pitch. An object moving toward us will look more blue than it really is and an object moving away from us will look more red than it really is. A heavy planet like Jupiter will make its stellar companion wobble or oscillate like the head of spinning tennis racket seen edge on. This wobble contributes to an alternately blue-shifted, red-shifted color in the star’s light. Astronomers measure this alternation and use it to deduce the planet’s mass, orbital radius, and a host of other things.

So far, none of the planetary systems discovered come remotely close to resembling our own. The planets discovered range from 10 times to 100 times the Earth’s mass and have orbits ranging from smaller than Mercury’s orbit to about six times the size of Earth’s orbit. In all cases these Jupiter-sized planets exhibit an extremely elliptical orbit precluding the possibility of any earth-sized planets in earth-like orbits. However, this method of looking



## The Earth’s magnetic field

serves us better as a shield rather than a guidance system



is highly biased towards Jupiter-sized planets with small orbits. If we are going to find another Earth, we need figure out a new way to “see”.

## Magnet Grace

*Geoff Lenter, Physics Department*

Albert Einstein supposedly got his jump-start in science when given a compass. He was amazed that the compass needle always pointed in the same direction. The compass needle is a magnet which aligns itself with any magnetic field in its vicinity, most often the Earth’s magnetic field. The Earth’s magnetic field serves us better as a shield rather than a guidance system (the Earth’s field is known to fluctuate and completely reverse direction on a timescale of tens of thousands of years.)

Magnetic fields act as excellent deflectors of radiation, the sort of radiation made up of charged particles and produced by radioactive waste from nuclear power plants. Our solar system is bathed in a constant stream of this sort of radiation flowing from the sun. The Earth’s magnetic field deflects most of this radiation, but the field is leaky and sometimes we see it on display in the Northern Lights. The Earth’s magnetic field extends far into space (from about 10 Earth radii to 200 Earth radii) and deflects radiation, sending it either to the north polar regions or to the south polar regions. During a particularly heavy storm of radiation, the charged particles make it in great enough numbers to the upper atmosphere where they cause the Northern Lights. You may have seen the wonderful display in early November (see [www.spaceweather.com/aurora/gallery\\_01nov04\\_page10.htm](http://www.spaceweather.com/aurora/gallery_01nov04_page10.htm).) The nice thing about the Earth’s shield is that it is always on and always protecting the fragile life on this planet. Next time you use a refrigerator magnet, think about the Earth’s magnetic field and what it does for you.

The sun and seven of the nine planets also have magnetic field “shields” (see [science.nasa.gov/headlines/y2004/27sep\\_shield-sup.htm](http://science.nasa.gov/headlines/y2004/27sep_shield-sup.htm)). The two planets that do not are Venus and Mars, our closest neighbors. Perhaps our “Mission to Mars” needs some rethinking. How will we shield ourselves from the onslaught of radiation there?

*These pages are produced by faculty from GVSU.*

# CALENDAR *OF* EVENTS

## FEBRUARY

### 5 Saturday

**Indian Springs Metropark Environmental Discovery Center** open house 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. For more information call (248) 625-7280 or visit [www.metroparks.com](http://www.metroparks.com).

### 7 Monday

Workshop on **Animal Kingdom** for elementary and middle school classrooms from 4:30-7:30 p.m. at the Ann Arbor Hands-On Museum. For more information call (734) 995-5439 or visit [www.aahom.org/educators/prof\\_development.htm](http://www.aahom.org/educators/prof_development.htm).

### 10 Thursday

**Criminalistics Teacher Workshop** Series for middle and high school science teachers at the Kent ISD Educational Service Center, 2930 Knapp NE, Grand Rapids, from 4:00-6:00 p.m. Workshop continues on March 3, 10, and 24. Contact Carol Goodrich at (616) 365-2339 or [carolgoodrich@kentisd.org](mailto:carolgoodrich@kentisd.org).

### 10 Thursday

Content series on **Number & Operations: Whole Numbers** for Elementary Teachers begins. 4:30–8:00 p.m. on the GVSU Allendale Campus. Visit [www.gvsu.edu/rmsc](http://www.gvsu.edu/rmsc) or contact Karen Meyers at (616) 667-2278 or [meyersk@gvsu.edu](mailto:meyersk@gvsu.edu) for more information.

### 16 Wednesday

Building Confidence through Content Series: **Physical and Chemical Changes in Matter and Energy** for the Middle School Classroom begins 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](http://www.gvsu.edu/rmsc).

### 17 Thursday

Content series on **Number & Operations: Whole Numbers** for Elementary Teachers continues. 4:30–8:00 p.m. on the GVSU Allendale Campus. Visit [www.gvsu.edu/rmsc](http://www.gvsu.edu/rmsc) or contact Karen Meyers at (616) 667-2278 or [meyersk@gvsu.edu](mailto:meyersk@gvsu.edu) for more information.

### 18 Friday

**Michigan Aerospace Challenge** by Gregg Zulauf for upper elementary and middle school teachers at the Newaygo County RESA from 8:30 a.m. to 3:30 p.m. Contact Barb Smith at (231) 767-7318 for details.

### 18-19 Friday Saturday

Connected Mathematics Phase II **CMP Users' Conference** at Michigan State University. Visit [www.math.msu.edu/cmp/Conferences/National.htm](http://www.math.msu.edu/cmp/Conferences/National.htm) or contact Judith Miller at [miller@math.msu.edu](mailto:miller@math.msu.edu) or call (517)432-3635 for more information.

### 24 Thursday

**Math In Action conference** from 8:30 - 3:00 at the Eberhard Center on the Robert C. Pew Campus of Grand Valley State University. Visit [www.gvsu.edu/math/MathInAction/](http://www.gvsu.edu/math/MathInAction/) for more information.

### 25 Friday

**Energy and Light** by Gregg Zulauf for teachers grades 6-12 at the Newaygo County RESA from 8:30 a.m. to 3:30 p.m. Continues on March 18. Contact Barb Smith at (231) 767-7318 for details.

### 25 Friday

Deadline for poster submission to **Sixth Annual Michigan Statistics Poster Competition** for K-12. For details see [www.gvsu.edu/state/statposter](http://www.gvsu.edu/state/statposter).

## MARCH

### 2 Wednesday

**Interdisciplinary conservation ethics** curriculum targeted for grades 6-12. 8:15 a.m. to 3:30 p.m. at the Mecosta Osceola Career Center, Big Rapids. Developed to create an ecologically literate citizenry. Increases awareness of relationships with the land, informs how to make responsible choices for a sustainable future and teaches social, collaborative and critical thinking skills. For more information contact Charmaine Lucas at [charmaine.lucas@mi.nacdn.net](mailto:charmaine.lucas@mi.nacdn.net), or (231) 796-0909 x3

### 2 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](http://www.gvsu.edu/rmsc).

### 3 Thursday

**Criminalistics Teacher Workshop** Series for middle and high school science teachers at the Kent ISD Educational Service Center, 2930 Knapp NE, Grand Rapids, from 4:00-6:00 p.m. Workshop continues on March 10, and 24. Contact Carol Goodrich at (616) 365-2339 or [carolgoodrich@kentisd.org](mailto:carolgoodrich@kentisd.org).

### 7 Monday

Workshop on **Math** for elementary and middle school classrooms from 4:30-7:30 p.m. at the Ann Arbor Hands-On Museum. For more information call (734) 995-5439 or visit [www.aahom.org/educators/prof\\_development.htm](http://www.aahom.org/educators/prof_development.htm).

**9 Wednesday**

Public lecture on the **Chandra X-Ray Observatory** by Donna Young from the Wright Center for Science Education at Tufts University. 7:00 to 8:30 p.m. on the Allendale campus of GVSU in 102 Loutit Lecture Hall.

**10 Thursday**

**Animal Taxidermy** at Howard Christensen Nature Center from 9:00 a.m. to 3:30 p.m. Learn to prepare scientific bird and mammal study skins for use in the classroom. Study skins can be passed among students and used in a variety of teaching circumstances. Fee \$15.00 - materials provided. Bring brown bag lunch. Contact Steve Mueller at (616) 887-1852 or [stevemueller@kentisd.org](mailto:stevemueller@kentisd.org).

**10 Thursday**

**Chandra and the X-Ray Universe workshop** at 303 Henry Hall, GVSU Allendale, from 8:30 a.m. to 3:30 p.m. Contact Karen Meyers at (616) 331-2515 or [meyersk@gvsu.edu](mailto:meyersk@gvsu.edu). Registration deadline is February 24.

**10 Thursday**

**Criminalistics Teacher Workshop** Series for middle and high school science teachers at the Kent ISD Educational Service Center, 2930 Knapp NE, Grand Rapids, from 4:00-6:00 p.m. Workshop continues on March 24. Contact Carol Goodrich at (616) 365-2339 or [carolgoodrich@kentisd.org](mailto:carolgoodrich@kentisd.org).

**10 Thursday**

Content series on **Number & Operations: Whole Numbers** for Elementary Teachers continues. 4:30–8:00 p.m. on the GVSU Allendale Campus. Visit [www.gvsu.edu/rmsc](http://www.gvsu.edu/rmsc) or contact Karen Meyers at (616) 667-2278 or [meyersk@gvsu.edu](mailto:meyersk@gvsu.edu) for more information.

**12 Saturday**

**Public Museum Collections Exploratory** at the Public Museum of Grand Rapids from 1:00-3:00 p.m. Explore behind the scenes at the Public Museum to discover how animals are stored and used for study and research. Butterfly collections will be used as the learning tool. Co-sponsored with the West MI Butterfly Assoc. We will be working to develop opportunities for people to work on a broad variety of natural history related projects. Contact Steve Mueller at (616) 887-1852 or [stevemueller@kentisd.org](mailto:stevemueller@kentisd.org).

**15 Tuesday**

**Amusement Park Physics: Understanding Your Thrills** by Gregg Zulauf for teachers grades 5-8 at the MAISD Regional Math/Science Center from 8:30 a.m. to 3:30 p.m. Contact Barb Smith at (231) 767-7318 for details.

**19 Saturday**

**Michigan Science Olympiad Regional Tournament**, GVSU. See [www.gvsu.edu/mso-r12/](http://www.gvsu.edu/mso-r12/) for details.

**19 Saturday**

**Karner Blue Butterfly Ecosystem Management** from 2:00-4:00 p.m. at Grand Valley State University. Butterfly and plant community interactions. Presentation detailing the management, planning and research associated with preserving the Federally Endangered Karner Blue Butterfly. Learn how schools, students and teachers can get involved. Contact Steve Mueller at (616) 887-1852 or [stevemueller@kentisd.org](mailto:stevemueller@kentisd.org).

**21 Monday**

**Mathematics “GLCE” Update** by Dave Krebs and Laura Holwerda for teachers grades 3-8 at the MAISD Lighthouse PC lab from 4-6:00 p.m. Contact Barb Smith at (231) 767-7318 for details.

**21 Monday**

Workshop on **Chemistry** for elementary and middle school classrooms from 4:30-7:30 p.m. at the Ann Arbor Hands-On Museum. For more information call (734) 995-5439 or visit [www.aahom.org/educators/prof\\_development.htm](http://www.aahom.org/educators/prof_development.htm).

**23 Wednesday**

**International Chemistry Olympiad qualifying exams** at Grand Valley State University from 8:30-11:00 a.m. Contact Julie Henderleiter at (616) 331-2542 or [henderlj@gvsu.edu](mailto:henderlj@gvsu.edu)

**23 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](http://www.gvsu.edu/rmsc).

**24 Thursday**

**Criminalistics Teacher Workshop** Series for middle and high school science teachers concludes at the Kent ISD Educational Service Center, 2930 Knapp NE, Grand Rapids, from 4:00-6:00 p.m. Contact Carol Goodrich at [carolgoodrich@kentisd.org](mailto:carolgoodrich@kentisd.org) or (616) 365-2339.

**28 Monday**

Scott Weidensaul presents “**Ghost With Trembling Wings**” at the Grand Rapids Audubon Club. Meeting is at the Grand Rapids Theological Seminary Auditorium at Cornerstone University at 7:30 p.m..

**29 Tuesday**

Content series on **Number & Operations: Whole Numbers** for Elementary Teachers concludes. 4:30–8:00 p.m. on the GVSU Allendale Campus. Visit [www.gvsu.edu/rmsc](http://www.gvsu.edu/rmsc) or contact Karen Meyers at (616) 667-2278 or [meyersk@gvsu.edu](mailto:meyersk@gvsu.edu) for more information.

**30 Wednesday**

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## Science Content

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GVSU Chemistry professors are teaching this series. They are well versed in inquiry teaching methods, strategies for dealing with misconceptions, teaching vocabulary, focusing instruction, and chemical and physical science content.

To receive more information or a registration brochure, contact the Regional Math & Science Center at (616) 331-2267 or download a registration brochure from the website at [www.gvsu.edu/rmsc](http://www.gvsu.edu/rmsc). Late registrations will be accepted.

## Chemistry Exam Offered

The West Michigan Section of the American Chemical Society will once again be sponsoring the qualifying exams for the International Chemistry Olympiad (ICHO). Area high school students are invited to take the local qualifying exam at GVSU on

Wednesday, March 23 from 8:30-11:00 a.m. This exam is a 110-minute, 60 item multiple choice test covering the essentials of introductory chemistry. Any teacher wishing to have their students take this exam should register their students. Please contact Julie Henderleiter at (616) 331-2542 or [henderlj@gvsu.edu](mailto:henderlj@gvsu.edu). Registration is needed by March 14.

The students with the top ten scores will be invited to take the National Qualifying Exam at Grand Valley State University on April 14. The top three scorers on this exam will win a \$50 prize. Their teachers will be awarded \$50 for science supplies. There are about 1000 students across the nation taking this exam. The top 20 are invited to an IChO training camp in Colorado Springs in early June, and the top students there go on to compete internationally. This year's competition is in Taipei, Taiwan, from July 16-25.

Take advantage of this opportunity to show West Michigan's excellence in chemistry!

## Join Math In Action

The Math In Action Conference will be held this month on February 24, from 8:30 a.m. to 3:00 p.m. at the Eberhard Center on the Pew Campus. The conference brings together mathematics educators from across western Michigan to discuss current issues and share innovative teaching ideas.

This year's conference is organized around the theme "Assessment Through Algebra and Number" and features plenary speaker Dr. Edward Roeber, of the Michigan Department of Education, who will address impending changes in school accountability. Four concurrent sessions will be held throughout the day where participants experience sample lessons in an active learning environment.

The last day to mail your registration is February 10th! Details on the program and registration forms can be found on our website, [www.gvsu.edu/math/MathInAction](http://www.gvsu.edu/math/MathInAction). Free parking is available.



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