

InterChange Newsletter

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

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GREEN CHEMISTRY OPPORTUNITIES FOR TEACHERS

Plan to attend the **Michigan GreenUP 5th Annual Michigan Green Chemistry & Engineering Conference**, to be held October 23-24, 2013 at the Grand Valley State University Eberhard Center in Downtown Grand Rapids. This conference is for chemists, engineers, industry CEOs, educators, students, entrepreneurs, decision makers, policymakers - anyone interested in Michigan's march toward sustainable growth - this conference is the opportunity to hear from leading experts and share innovative ideas on how we can best "green up" Michigan through green chemistry and engineering



[full story](#)

[Genetic Updates](#) [the Future of Medicine Today](#)

Attend the Genetic Update Conference led by Dr. Sam Rhine with Your Biology Students.

[Deadline for Math in Action Proposals is Friday, October 11](#)

Math in Action presents lively and informative discussions of current issues in mathematics education while providing an opportunity for practicing PreK 12 teachers, prospective teachers, curriculum directions, and college and university faculty to share ideas, concerns, and resources.

[Super STAT-urday!](#) [Registration is Filling Up Quickly!](#)

Area middle school students are invited to participate in an event being held on a November Super STAT-urday at Grand Valley State University.

[Participate in Earth Science Week 2013!](#)

Held October 13-19, Earth Science Week (ESW) 2013 will promote awareness of the many exciting uses of maps and mapping technologies in the geosciences.

[Plan to attend Fall Science Update - November](#)

The Regional Math and Science Center cordially invites you to the 29th annual Fall Science Update. This years theme is, *Next Generation Science: Bridge to the Future.*

[Math-Team-Matics](#) [Be a Part of the First Annual Competition!](#)

Join the fun and competition of Math-Team-Matics, an event hosted by GVSU Department of Mathematics and the Regional Math and Science Center (RMSC).

[Teachers Reflect on X-Sci Trip to Africa](#)

Mary Sue Stegehuis is from St. Thomas the Apostle Catholic School and Karman VanderStel from Hudsonville High School had the amazing opportunity to travel to Africa this past summer courtesy of the X-Sci (Experiential Science Education Research Collaborative) Passport to Science Program.

[Nominate a Colleague for Michigan Teacher of the Year](#)

The Michigan Teacher of the Year (MTOY) program provides a great opportunity for an outstanding teacher to lead and serve, to learn and grow.

[Calendar of Events](#)

[Connections for the STEM Classroom:](#) GVSU Faculty provide engaging ideas on current topics.

This month's topic is "Elevating Public Literacy in Geology and Adding Geology Majors to the Career Pipeline: Insights from a Dual-credit Program in Michigan" by Steve Mattox, Grand Valley State University, Sandi Rutherford, University of Wisconsin, and Chris Bolhuis, Hudsonville High School

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Green Chemistry Opportunities for Teachers

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Plan to attend the **Michigan GreenUP 5th Annual Michigan Green Chemistry & Engineering Conference**, to be held October 23-24, 2013 at the Grand Valley State University Eberhard Center in Downtown Grand Rapids.

This conference is for chemists, engineers, industry CEOs, educators, students, entrepreneurs, decision makers, policymakers - anyone interested in Michigan's march toward sustainable growth - this conference is the opportunity to hear from leading experts and share innovative ideas on how we can best "green up" Michigan through green chemistry and engineering

For more information and to register, visit the Michigan Green Chemistry Clearinghouse [website](#).

Additionally, Beyond Benign and the Washington State Department of Ecology and will be hosting a free series of three hour-long green chemistry webinars for high school chemistry teachers. Targeted to high school chemistry teachers, the webinars provide ideas on ways to incorporate green chemistry into their classroom through example activities, replacement labs and case studies. The webinars are **FREE!** But registration is required. You are welcome to register for one, two, or all three.

October 2, 2013, 6:00 p.m. - 7:00 p.m. Eastern Standard Time

[Introducing Green Chemistry into the High School](#)

This webinar will provide an explanation of green chemistry concepts. Highlights will include teachers personal experiences of how they introduced green chemistry to their students. Examples will be presented that will help you integrate green chemistry principles into your classroom.

October 30, 2013, 6:00 p.m. - 7:00 p.m. Eastern Standard Time

[Connecting Chemistry Concepts to Cutting-Edge Science Innovations](#)

Connect chemistry concepts to current chemistry-related inventions and discoveries over the past 20 years in your classroom and lab. This webinar will highlight Presidential Green Chemistry Challenge Award-winning case studies. Chemistry concepts and how they apply to cosmetics, solar energy, and biomimicry will also be discussed.

November 13, 2013, 6:00 p.m. - 7:00 p.m. Eastern Standard Time

[Safer Chemistry: Drop-In Replacement Labs](#)

This webinar will focus on labs that cover the same content as traditional labs, but use more environmentally friendly materials. The emphasis will be on labs that reduce the risk in the laboratory setting by targeting the hazard rather than the exposure. Highlighted replacement labs will be:

Reactions: Single, Double, Composition and Decomposition; Flame Test and more.

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GENETIC UPDATES □ THE FUTURE OF MEDICINE TODAY

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Attend the Genetic Update Conference led by Dr. Sam Rhine with Your Biology Students.

Dr. Rhine is a physician who graduated from Harvard Medical School and Indiana University's School of Medicine. For the past 30 plus years, he has devoted himself to genetics education, developing student programs for high school Biology, AP Biology, and other life science courses. His one-day conferences are designed to teach the latest in genetics advances and active research areas.

Date: Monday, November 11, 2013

Time: Registration: 8:30 a.m., Program: 9:00 a.m. □ 1:00 p.m.

Location: Grand River Room, Kirkhof Center, GVSU Allendale campus.

This year Dr. Rhine will discuss the following topics with students and their teachers:

1. The State of the Human Genome...the Function of our 3,000,000,000 nucleotides
2. Telomeres...those Fascinating tips on all of our Chromosomes
3. Recent Advances in Prenatal Screening
4. Human Cloning and Stem Cell Technologies Update

This Genetic Update Conference is for area high school biology students and their teachers. The cost is \$20 per person. To pre-register and more information go to: www.samrhine.com. Every school must pre-register on line to attend the conference. Every school that pre-registers will receive an updated set of notes the week before the conference. Additionally, only those who are pre-registered can receive information about site parking, time changes, weather delays or postponements.

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Deadline for Math in Action Proposals is Friday, October 11

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MATH IN ACTION: STRATEGIES FOR STUDENT SUCCESS

Date: Saturday, February 1, 2014

Time: 8 a.m. □ 3:30 p.m.

Location: Mackinac Hall, Allendale Campus

Grand Valley State University Math in Action presents lively and informative discussions of current issues in mathematics education while providing an opportunity for practicing preK □- 12 teachers, prospective teachers, curriculum directions, and college and university faculty to share ideas, concerns, and resources. SCECH credits are available for most sessions. The conference consists of five hour-long sessions with eight separate interactive presentations during each. Presentations are focused on specific mathematics topics at a variety of grade levels. For more information about the conference go [here](#). To submit a proposal to speak at Math in Action go [here](#). Proposals must be submitted by Friday, October 11, 2013.

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SUPER STAT-URDAY! □ REGISTRATION IS FILLING UP QUICKLY!

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Area middle school students are invited to participate in □Super STAT-urday□ on November 9 at Grand Valley State University. During the event, participants will have opportunities to join in interactive activities with professors and learn how statistics are used to make informed decisions within a variety of disciplines.

Super STAT-urday will provide students a way in which to celebrate the International Year of Statistics through the application of statistics in a variety of fields including chemistry, geography, biology, and others! During Super STAT-urday, students will rotate in groups with their assigned counselors between rooms where, in each one, they will engage in hands-on activities that demonstrate statistical applications within a particular discipline. Register now for □Super STAT-urday□, November 9, 2013! Super STAT-urday will take place on the Allendale Campus of GVSU from 8:30 a.m. □ 4:00 p.m. The cost of this event is only \$10 per student, which includes a t-shirt, lunch, and snacks. Registration ends October 18, 2013. Please pass along word about Super STAT-urday!

Participate in Earth Science Week 2013!

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Held October 13-19, Earth Science Week (ESW) 2013 will promote awareness of the many exciting uses of maps and mapping technologies in the geosciences.

□ Mapping Our World, □ the theme of ESW 2013, engages young people and the public in learning how geoscientists, geographers, and other mapping professionals use maps to represent land formations, natural resource deposits, bodies of water, fault lines, volcanic activity, weather patterns, travel routes, parks, businesses, population distribution, our shared geologic heritage, and more. Maps help show how the Earth systems □ geosphere, hydrosphere, atmosphere, and biosphere □ interact.

During Earth Science Week bring some aspect of Earth Science into your classroom, and take your classroom outside! Your students will not only learn something new about the world around them, but will have fun discovering why Earth Science is important to society. For classrooms lesson plans and materials, follow the □ For Teachers □ link at www.earthsciweek.org.

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Plan to attend Fall Science Update - November 20

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The Regional Math and Science Center cordially invites you to the 29th annual Fall Science Update. This year's theme is, *Next Generation Science: Bridge to the Future*. The conference will take place Wednesday, November 20, 2013, from 8:00 a.m. to 3:00 p.m. at the Eberhard Center on Grand Valley State University's Grand Rapids Pew campus. The focus of the keynote speaker will be how to make scientific practices such as argumentation, explanation, and modeling meaningful and effective for K-12 classroom teachers and students.

The keynote speaker for this year's Fall Science Update is Dr. Brian Reiser from Northwestern University. He is a Professor of Learning Sciences in the School of Education and Social Policy at Northwestern University. Dr. Reiser leads the Scientific Practices Project to develop an empirically-based learning progression for scientific practices that specifies how learners can engage in constructing, applying, and refining scientific knowledge from elementary to secondary schools. He was also on several committees with the National Research Council authoring the reports *Taking Science to School*, presenting research-based recommendations for improving science education K-8, and *A Framework for K-12 Science Education* that guided the design of *The Next Generation Science Standards*.

Additionally, Fall Science Update will hold five 60 minute breakout sessions on various science topics, teaching pedagogy, and a luncheon. The sessions will provide content information on teaching strategies for K-12 teachers in biology, chemistry, Earth science, environmental science, geology, physical science, engineering, and physics. Some sessions will feature best practice teaching techniques as well as technology tools for the classroom. Once again, this year you will be able to register online or by mail for the event sessions you would like to attend.

Whether you are a new or returning teacher, this mini-conference promises to be an informative and relaxing day where you can take time to explore new trends and ideas in education. As always, this will be a day of learning and connecting with colleagues. We look forward to your participation.

The brochure and session registration form is on the RMSC website, www.gvsu.edu/rmsc. Please call (616) 331-2267 for more information.

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Math-Team-Matics ☐ Be a Part of the First Annual Competition!

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Join the fun and competition of Math-Team-Matics, an event hosted by GVSU Department of Mathematics and the Regional Math and Science Center (RMSC).

On December 7th, 2013, teams from area schools will gather for the first annual Math-Team-Matics. Teams of five mathematicians will have a friendly competition to crown the winning group.

The competition will feature four different events:

1. We begin with a Team Challenge in which students will work together to explore a topic in mathematics.
2. This event will be followed by an individual test of each students mathematical knowledge and skills.
3. The third event of the day is the Team Relay; this fast paced ☐relay race☐ requires students to solve problems that can only be solved using the answers found by the teammates in front of them.
4. Math-Team-Matics culminates with the Math Bowl, a Quiz-Bowl-style team vs. team throw down where students work together in this game of fast computation and math trivia knowledge. Friends and family are encouraged to observe this portion of the competition, which is bound to be filled with great displays of teamwork and mathematical knowledge.

Can your school bring home the inaugural Math-Team-Matics championship?

This fun and friendly competition will feature creative and engaging problems to bring mathematical practices to life and challenge the knowledge and understanding of competitors. Content for the competition will be drawn from K-8 mathematics, high school algebra, and high school geometry.

Additional supporters can accompany the team - lunch at GVSUs Fresh Express is about \$8. Schools may field more than one team as space permits.

For additional information, please visit bit.ly/MathTeam.

When: December 7th, 2013

Time: 9:00 A.M-3:00 P.M

Cost: \$60.00 for a team of 5 and 1 coach, includes the competition and lunch at Fresh Food Co. (This cafeteria-style restaurant has a wide range of healthy offerings.)

Registration: Now through November 22nd, 2013.

Description: Open to teams of 5 students in 7th-10th grade.

RMSC Consultant: Chelsea Ridge, RMSC, ridgec@gvsu.edu, (616) 331-3172

Student Organizers: Sarah Jamison (jamisosa@mail.gvsu.edu), Andrew Otten (ottena@mail.gvsu.edu)

Faculty Consultants: John Golden (goldenj@gvsu.edu), Karen Novotny (novotnka@gvsu.edu)

Teachers Reflect on X-Sci Trip to Africa

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Mary Sue Stegehuis is from St. Thomas the Apostle Catholic School and Karman VanderStel from Hudsonville High School had the amazing opportunity to travel to Africa this past summer courtesy of the X-Sci (Experiential Science Education Research Collaborative) Passport to Science Program. Sponsored by the Merck Company Foundation, this once in a lifetime opportunity provided an extraordinary science education experience. The teachers trekked to the top of Kilimanjaro, viewed free roaming wildlife and studied geology, volcanology, botany, and biology in an amazing environment.

The whole intent behind X-Sci is to elucidate the meaning of and processes for constructing extraordinary learning experiences for oneself and others. For educators, X-Sci focuses on extraordinary professional development experiences with the point of view that teachers are uniquely attentive to learning processes and are well equipped to help the researchers articulate their constructions of identity, meaning and significance regarding these experiences.

After a very competitive application process, Mary Sue and Karman were selected to participate along with 12 other teachers from Michigan. Below are their reflections on this experience.



REPORT FORM KARMEN:

If you were offered a 20 day trip across the world, away from your family and friends as professional development, would you do it? Would you even give it a second thought? Would you think it was too good to be true? This is how I felt last December when I was awarded a 20-day Passport to Science Teacher Professional Development trip to Tanzania, Africa. It felt too good to be true every time I made it through another round of essays. This is a trip of a lifetime and I have a shot at it? were the thoughts playing through my head. Sure enough, each of the fifteen selected teachers felt like they just won the lottery!!

A partnership between the University of Colorado, Michigan Tech, and the Merck Company Foundation made this trip possible in order to improve STEM education and help teachers redefine their science identities. We were chosen to experience life, culture, and science so that we can come back and inspire others onto greater things!!! Words cant even begin to describe the blessings and changes that this trip made in my life. I saw people who worked so incredibly hard for small amounts of money just to survive. I saw kids without parents who were so happy and grateful for us being there. I saw baboons carrying their young, a lion yawn as it lay in the shade, and more zebra and wildebeest than I can count. I heard elephants breaking branches as they ate the leaves, the running of zebra, and the crunching of a giraffe eating from the acacia tree. I smelled hippos (which wasn't very pleasant) as they lay by the hundreds in a pool of water. I taught kids with ripped clothes and shoes worn to shreds, who blew me away at their depth of knowledge of math facts and the English language. I got to climb Mount Kilimanjaro, the top of Africa, which made me dig deeper into my own physical and mental strength than I have ever had to before.

Now that I am back, I only hope I can share and spread some of my passion on to others. Im challenging my class to look beyond themselves and our community, to a huge vast world that has amazing people just like us, but may not have the same advantages that we have. We are connecting with an African school to develop pen pal relationships. After this summer, I truly believe that to really learn something, we need to touch it, see it, and feel it with our emotions. I

am committed to immersing my students into hands-on experiences and activities that we learn together.

If any of you are given the opportunity for experiential learning, do not hesitate! Jump on the chance to become a stronger teacher, leader, mother, father, friend, and a more passionate human being!



REPORT FROM MARY SUE:

I am still trying to digest all that I went through over the summer. I was blessed with a scholarship to study in Tanzania for 3 weeks. It was something I had only dreamt of and so out of the realm of possibility that it hadn't even made my "bucket list."

I would be traveling with 15 other teachers from across the state, two professors from Michigan Tech and our leader from University of Colorado. The purpose was to learn more about how to teach experiential science and the power of storytelling in transmitting ideas to our students. And we came back with many stories.

I can't even begin to convey the breadth of experiences we had, but here's a short list: We visited the Sukuma and Maasai tribes, learned about their culture and danced with them. (Many of us "got married" in the Maasai dance.) We awoke to the trumpeting of elephants and roars of lions. We were so surrounded by wildlife that we had to be escorted from our cabin to the dining area by Maasai warriors. One of them, Johanna, later gave us a walking tour where we discovered elephant prints and cheetah print 20 yards from where had we slept. I had coffee overlooking the vast valley where these animals go to drink water in the morning. Every sunrise was spectacular.

We safari-ed for three days and learned more about symbiosis than I learned in all my years of teaching. I brought back so many examples that it seemed as if the entire Serengeti was made to be a lesson in cooperation. We had many, many car breakdowns; 6 flat tires, a broken radiator and a broken leaf spring. There are no tow trucks, all you have is what you can dream up and your fellow travelers. We saw that when anyone's Land Rover broke down, drivers from everywhere in the vicinity dropped everything and came to help; it's a matter of survival in a place where you can't get out and walk (animals are fine with cars, but they're freaked out by people, so it's not save.) You are hours and hours away (even driving) from help, I had never experienced anything so vast and so wild. Our driver, Chris taught us that you can fix a broken radiator by pouring tea leaves into it. That bought us a couple more hours of driving. When that stopped working, a driver gave him two raw eggs, which he poured into the radiator; that gave us about three more hours. If that didn't work, he told us the next step was to use elephant dung. Who knew?

I learned about the decrease in air density and altitude sickness first hand :). Mostly I learned about compassion and brotherhood from our drivers, guides and porters, who supported me as I struggled up Mount Kilimanjaro. One of them carried my backpack, even though it wasn't what he was supposed to do. He looked after me as I struggled with nausea and encouraged me. He gave me an African name: Mama Sophie and told me, "Mama Sophie, my God, you are so strong, you walk like a 40 year old." Since he knew I was 57 I thought it was the nicest complement I'd ever gotten. I made it up to Kibo (15,500 ft.) where I rested, looked after by my guide, while the rest of the group summited. That night I developed chest pain and the following morning was run down the mountain 3,000 ft on a cross between a gurney and a unicycle. There I was helicoptered off to Nairobi Hospital. Alone, with the equivalent of \$40 and half a charge on my cell phone, I depended on my teacher friends (we all refer to ourselves as "Our Nerd Family") and my African brothers to figure out how to get me back to them. (That's another long story.)

This experience was like one long trust fall and I learned that just like in the Serengeti, we have a kind of Mutualism. And more importantly, when we create a safe place like that for each other, we are safe to take risks and that's where real learning starts. I am creating that place in my classroom this year. I tell my students about people addressing each other in Tanzania as "brotha" and sista." They love to do this, and when they bicker, I remind them, "take care of your brotha..." and they do.

I have my backpack (with a gallon water jug in it) and trekking poles in my room. My students love to take turns bringing it out at recess to experience what it's like to carry that weight around. My friend Saleh (another of our drivers from safari) posts his photos from his current safari online

which we use as a virtual safari. I have used my safari photos to teach about animal adaptations, symbiosis, the biomes (Kilimanjaro has 5 or 6 so that you can walk from a rainforest to the arctic biome in a week.) Our theme in class this year is: "Everyone has their 'mountain,' what's yours? And if you need some help, we're there for you."

When we initially met Brad McLain, our Colorado professor back in January, he told us that this trip would be transformative. I've been around a long time, and I've learned a lot of things about the world, but I have to admit, he was right. I'm not the same teacher, or person, that I was. And for that I am eternally grateful.

To learn more about the X-Sci (Experiential Science Education Research Collaborative) Passport to Science Program visit <http://www.xsci.org/>.

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Nominate a Colleague for Michigan Teacher of the Year

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The Michigan Teacher of the Year (MTOY) program provides a great opportunity for an outstanding teacher to lead and serve, to learn and grow. The program is sponsored by the Michigan Department of Education (MDE), the State Board of Education (SBE), and Meemic Insurance Company.

Requirements for MTOY include:

- Be a Highly Qualified Teacher in good standing with her/his district/employer.
- Serve as an ambassador for all Michigan teachers and for the MDE calling positive attention to education as an honorable profession, urging students and others to consider teaching as their chosen profession. The MTOY works to elevate the teaching profession and serves as an ambassador for the MTOYs own district.
- Inspire and challenge colleagues through professional development sessions and keynote addresses.
- Act as a role model for innovation in education.

The nomination window is open now through November 4, 2013. The nomination form and program details are available at www.michigan.gov/mtoy.

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Connections for the STEM Classroom

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ELEVATING PUBLIC LITERACY IN GEOLOGY AND ADDING GEOLOGY MAJORS TO THE CAREER PIPELINE: INSIGHTS FROM A DUAL-CREDIT PROGRAM IN MICHIGAN

Steve Mattox, Grand Valley State University, mattox@gvsu.edu, Sandi Rutherford, University of Wisconsin, srutherford@wisc.edu, Chris Bolhuis, Hudsonville High School, cbolhuis@hpseagles.net

The geosciences face numerous well-documented challenges: Citizens with limited knowledge or numerous misconceptions regarding complex issues, a shortage of geoscientists to replace the retiring workforce, and a lack of diversity. Geology also faces significant challenges in high school education: the small number of Earth science certified teachers, geology being taught by teachers without Earth science certification, geology as an elective (not required) by the state, and the nearly complete absence of geology as a stand-alone course. Because of the low number of high school geology courses nationwide the College Board has decided to not offer an AP exam in the subject. We find ourselves in a Catch-22, if there was greater numbers there would be an AP exam but without an AP exam it is difficult to generate the student numbers. We think there is a way to build an educated public and strong career pathway from the bottom up.

With early outreach efforts and two grants from the National Science Foundation, we have built a network of high schools with colleges and universities that award dual-credit for physical geology. Since 2001, 617 students have taken the exam with 401 earning credit. More than 40 have selected geology or Earth science as a major at seven Michigan colleges and universities. This spring students at 10 high schools will take the exam. In 2015, we plan to be collaborating with 15 teachers, half of which serve diverse student populations. Credits are awarded to students entering CMU, EMU, GVSU, Hope College, LSSU, NMU, UM Dearborn, WMU, and Wayne State. A passing score is worth four college credits, a value of at least \$1,600 in college tuition.

The exam is commonly given in the spring. It has four parts: about 75 multiple choice, several short essays, and lab exams for rock & minerals and map skills. Most students need about four hours. The exam is the same as we use in the introductory college course.

Success relies on an interconnected web of program advocacy, high school and college administrators, high school science department peers, geology departments, teachers, and students. Key parameters include number of years in the program, administrative and fiscal support, teacher enthusiasm and ability to attract students, student motivation, and willing college and university partners. Barriers include limited number of Earth Science certified teachers, especially in areas with diverse student populations; lack of peer or administrative support; course instability; competition with existing AP courses; rigid thinking by university departments or administrators; and uncertainty concerning district response to Next Generation Science Standards.

We welcome new schools and teachers. Ideally we are seeking schools with high diversity and the class will be taught by a teacher with an Earth science or geology major and a Masters in a Earth science, geology, or science education. If you don't quite fit these criteria you can still participate but we cannot offer NSF funds for summer training and materials. However, we can seek alternative ways of helping you prepare and supplying your classrooms.

How can you help?

- if you are interested in the program please contact us,
- if you know of a teacher that might be interested in the program please have her/him contact us,
- if your local high school does not offer a dual-credit geology course please ask the principal and district to support this program, to elevate the geosciences and save families tuition dollars,
- if you are a geoscientist please consider giving a career talk at a local high school, and,
- if your alma mater is not in the list above please contact the geology department chairperson and ask why they are not supporting geoscience literacy and a career pathway for new majors.