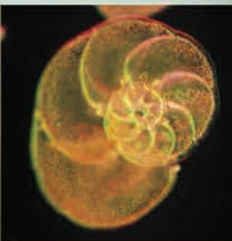


MSTA Newsletter



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From the President's Desk: Membership and Our Mission!

By Michael Sampson, MSTA President

This past weekend I attended the MSTA Regional Directors retreat with our President-Elect and Executive Director. We were there to see how, as representatives of the executive board, we could assist them in meeting their goals for the next year.

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From The Desk of Your Executive Director

By Robby Cramer, MSTA Executive Director

In the last few weeks, I have been asked at meetings with regional leaders to share what is happening now. What should science teachers be doing regarding the Next Generation Science Standards? At our last meeting, the Michigan Science Teachers Association Board of Directors voted to adopt a position paper endorsing the Next Generation Science Standards. We sent

that position paper to each member of the State Board of Education. Before addressing these new standards, the State Board of Education will settle questions surrounding the adoption of the Common Core Standards for Language Arts and Mathematics. Only then will they take up the matter of approving the adoption of the NGSS in Michigan. As you know, MSTA

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A Position Statement of the Michigan Science Teachers Association On Next Generation Science Standards

In April 2013, the National Research Council, the National Science Teachers Association, the American Association for the Advancement of Science, and Achieve, completed a two-step process to develop the Next Generation Science Standards (NGSS). Throughout this process, Michigan was one of 26 states that participated in the development of the Next Generation Science Standards. In keeping with the Michigan Science Teachers Association's mission statement to stimulate, support and provide leadership for the improvement of science education throughout Michigan, we have taken on a key role in the writing and review process for this initiative. Throughout the development of the NGSS, we observed that, with each iteration of the NGSS draft, many of Michigan's recommendations were

incorporated. We actively encouraged parents, community members, and Michigan leaders in business and industry to provide input into the Next Generation Science Standards.

We embrace the vision provided in A Framework for K-12 Science Education from which the Next Generation Science Standards were developed. We support the key dimensions, which include the Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas around which the Next Generation Science Standards were finalized. Our goal is to promote the effective, systematic, and sustained implementation of the NGSS once they are approved.

The Michigan Science Teachers Association believes that science education based upon the Next Generation Science Standards will increase scientific literacy levels of all students in our state. We contend that these standards will provide the skills needed by Michigan students as they enter the business and industry workforce needed to promote Michigan's economy. We have confidence that the Next Generation Science Standards will equip Michigan students for college, careers, and citizenship. The Michigan Science Teachers Association enthusiastically endorses The Next Generation Science Standards for all Michigan students.

members assisted with the alignment of Michigan GLCES and HSCES to the NGSS. We will continue to track bills introduced in the State House and the Senate. If hearings are held, we will have a presence in support of the new standards.

So what should you do right now in your teaching practice? Focus on a couple of the Science and Engineering Practices of NGSS. This will help your students with the existing Michigan science standards regarding the Inquiry Process, Inquiry Analysis and Communication, and Reflection and Social Implications. In turn, this will help your students' assessment scores on the current MEAP, Michigan Merit and ACT assessments for Science. Your work in this arena will help your students become deeper scientific thinkers.

Now is the time, as science teachers and leaders, that we need to continue to share our views about current educational research regarding how students learn, and best practices in teaching science. As educators from all levels, it is essential that we tell the stories about the big, important science and engineering ideas and concepts current in the world today. We need to share examples of how our students communicate the results of their investigations and discuss the quality of their scientific thinking. These glimpses of science classrooms across Michigan will enable citizens in our communities, school districts, and state to understand how science education must change to meet the world that is fast approaching. Finally,

we need to think about how to share our perspectives on the practices of science and engineering in the real world of work that are needed by Michigan's businesses and industries.

These conversations need to occur in our meeting with parents, in our community forums, and in state level meetings.

You may rely on the MSTA to keep you informed whenever there is a change at the state legislative level and it appears that our State Board of Education is considering the NGSS publicly. Look for emails to come!!

As always, thank you for your continued support of your students and science education in Michigan!

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From the President - *continued from front page*

As the goals of the group morphed into individual goals for each Regional Director, I began to think about our mission statement.

The MSTA mission is to stimulate, support, and provide leadership for the improvement of science education throughout Michigan.

I reflected on the role that the MSTA has played in the development of the Next Generation Science Standards (NGSS) and introducing them to the teachers of Michigan. I feel that the work we are doing on the NGSS is important and a huge part of our mission.

As the meeting progressed, I thought about how I could better serve the membership. So here is my question: What can the MSTA do for you? Please send a reply to this question to my email address: michael_sampson@msta-mich.org. Thank you in advance for your suggestions and I will bring them to the MSTA Executive Board at our next meeting.

An organization is only as strong as its members are and the MSTA is no different. With that in mind, I have something to ask of you. How can you serve the organization? Become

more active; volunteer for committees, volunteer to help at the conference, talk with peers about the organization and invite them to join and attend the conference.

We are all members of a great organization, let's work together to make it even better!

National Science Teachers Association's (NSTA) Learning Center

The National Science Teachers Association's (NSTA) Learning Center is a FREE Resource for all teachers. It is provided in collaboration with the Michigan Science Matters Network. The Learning Center provides the best of Onsite PD with the best of Online PD in a collaborative style with colleagues in Michigan and across the United States. Over 3500 resources are provided for you, at no cost. For more information, please visit:

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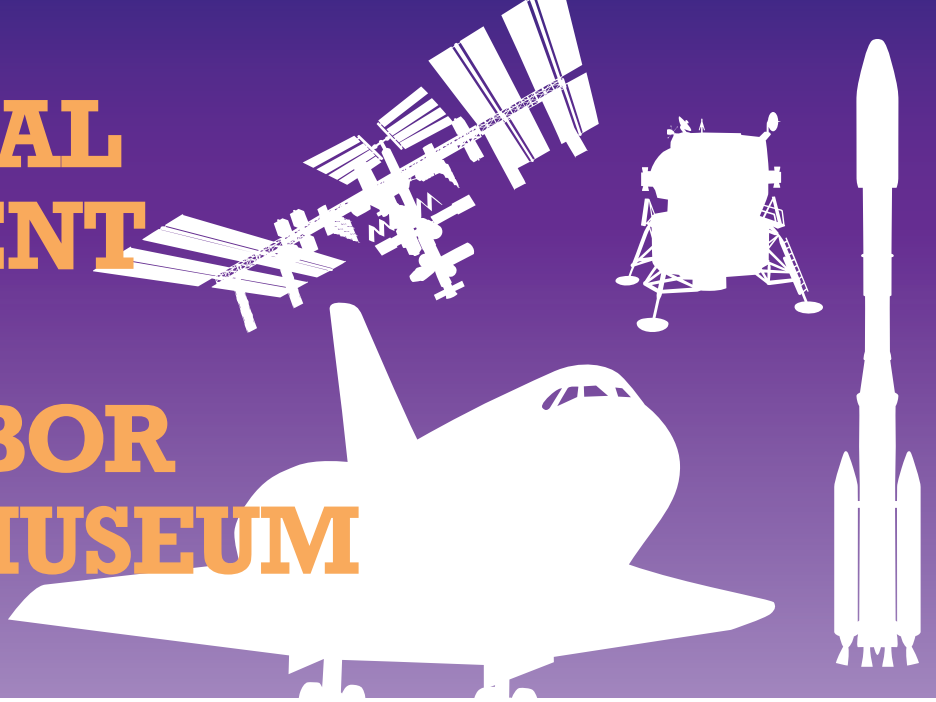


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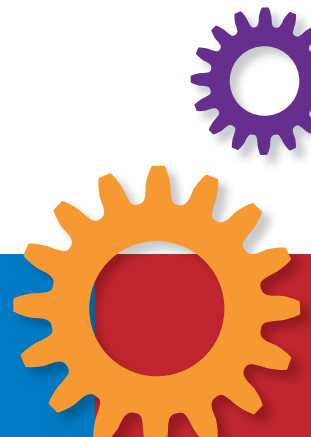
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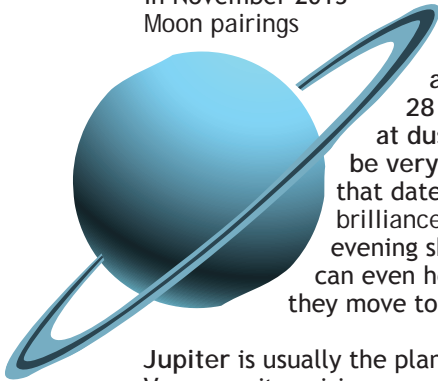
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Celestial Highlights for Nov. 2013-Jan. 2014 and School Year 2013-2014

from Abrams Planetarium, Michigan State University

Astronomy instruction for elementary and secondary students should not fail to include the inspiration of direct observation of the night sky. Among common events useful for introducing students to the sky are the monthly pairings of Venus and the crescent Moon. In November 2013



Moon pairings through January 2014, Venus will occur at dusk on Nov. 6 and Dec. 5, and on Jan. 1 and 2; and at dawn on Jan. 28 and 29. Of these, the pairing at dusk on Thursday, Dec. 5 will be very impressive, because around that date, Venus will attain its greatest brilliance and highest position in the evening sky. That afternoon, the Moon can even help the observer spot Venus as they move together across the daytime sky.

Jupiter is usually the planet next in brilliance after Venus, so its pairings near the Moon, occurring at intervals of 27-28 days, are impressive too. The Moon must always be in crescent phase when it is seen near Venus, but can appear in any phase, from a thin crescent to Full, when it passes Jupiter. (A question for students after they have observed conjunctions, or pairings, of the Moon with these two planets over several months: Why is that?) In coming months, Jupiter will appear near the Moon on the night of Nov. 21-22 (from four hours after sunset until dawn), the night of Dec. 18-19 (from two hours after sunset until dawn), and on the night of Jan. 14-15 (from dusk until one hour before sunrise).

When students observe the Moon near a bright star or planet, ask them to check again at the same time in the following days. They'll discover for themselves how far the Moon progresses in 24 hours.

After New Moon phase (when the Moon passes the Sun, is dark, and too close to the Sun to be seen), the young crescent Moon is visible in the western sky soon after sunset. Half a lunar month (about 14-15 days) after New Moon, the Moon is Full, rising in the eastern sky around sunset. In the evenings to follow, the Moon rises later each night, until moonrise occurs too late to reasonably assign young students to watch it.

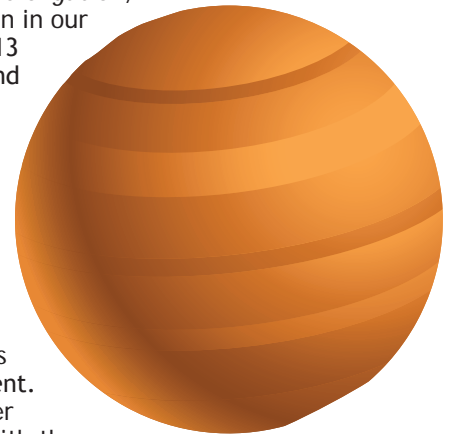
Instead, students can follow the waning Moon in the morning sky daily 45 minutes to an hour before sunrise

from the date of Full Moon until 1-2 days before the next New Moon. As an example, from Nov. 17 through Dec. 1, you and your students can enjoy watching the waning Moon pass, in turn, the Pleiades (or Seven Sisters) star cluster, Aldebaran, Betelgeuse, Jupiter, the Gemini Twins Pollux and Castor, Procyon, Regulus, Mars, Spica, Saturn, and Mercury. The Abrams Planetarium *Sky Calendar* for November 2013 at www.pa.msu.edu/abrams/msta/ provides illustrations of many of these events.

Daytime Moonwatch: Teachers may also want to take their students outdoors daily each clear school day Nov. 20-Dec. 1 to follow the Moon as it changes from 92 percent full on Nov. 20, through 52 percent on Nov. 25 (just before reaching Last Quarter phase, when it's 90 degrees from Sun), to a thin 3 percent crescent on Dec. 1, just 19° from the Sun. Best time for this project is when students are in the playground just before classes start, or right at the start of classes, as late as 9 a.m. Students can repeat this activity during Dec. 19-30 (over the holiday break), and during Jan. 19-29.

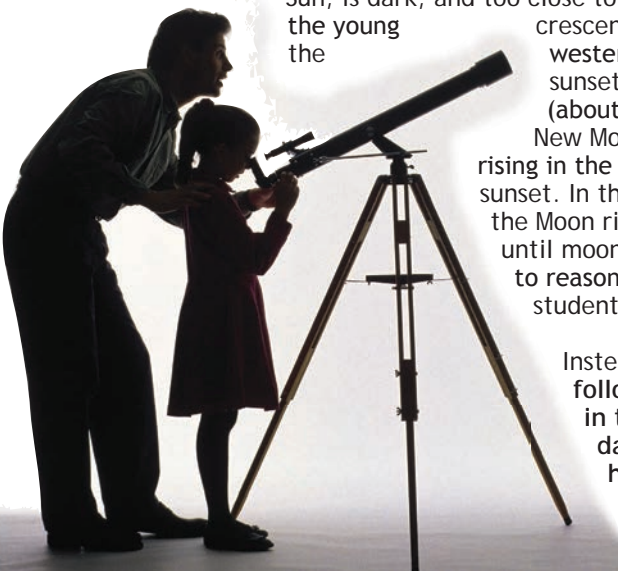
Planetary Highlights of School Year 2013-2014

Venus appears at *greatest elongation*, appearing farthest from Sun in our sky, 47° both times, on 2013 Oct. 31 in the afternoon and evening sky, and on 2014 March 22 in the morning. Through a telescope near those dates, Venus appears as a tiny "half moon." About midway between those dates, on 2014 Jan. 11, Venus passes nearly between Earth and Sun, and appears as a large, very thin crescent. Five weeks before and after this *inferior conjunction* with the Sun, Venus reaches *greatest illuminated extent*, taking up the greatest apparent area in our sky, and *greatest brilliancy* at magnitude -4.9, and appears through binoculars as a crescent about 25 percent illuminated. The 20 weeks from the end of October to late March will be an exciting time to follow Venus through telescopes and binoculars as the backlit planet swings close to Earth and displays all its crescent phases, in the daytime as well as at dusk or dawn.



Jupiter is at its brightest (mag. -2.7) and is visible all night in early January 2014 as Earth overtakes it on Jan. 5. For nearly six months after this *opposition* of Jupiter, until early July 2014, Jupiter will remain visible in the evening sky. The arrangement of Sun, Earth, and Jupiter

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Celestial Highlights

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on Jan. 5, 2014 is called an opposition, because an earthbound observer sees Jupiter on the opposite side of his sky from where the Sun is located.

If you plot the positions of Earth and Jupiter for January 5, 2014 using the orbit charts and data table at www.pa.msu.edu/abrams/msta/ you will find that Jupiter appears against the background stars of Gemini, while the Sun appears in Sagittarius, 180° away.

Mars is at its biennial closest approach (57 million miles this time) and brightest (mag. -1.5, about as bright as Sirius), as Earth overtakes it in April 2014, creating another opposition, on Apr. 8. A total lunar eclipse on the night of April 14-15 [for details, go to same link as above, then scroll down] will feature the 1.0-magnitude star Spica very close to the Moon with brilliant Mars nearby.

Saturn is at its closest and brightest (mag. +0.1) and visible all night in early May 2014, as Earth overtakes it on May 10, creating the third opposition of a bright outer planet in just over four months. Saturn will appear as the brightest “star” in the constellation Libra, the Scales.

Mercury makes several appearances during the school year 2013-2014. It climbs highest (10° up) in ESE morning mid-twilight just after mid-November 2013, and then sinks back into bright twilight in 2nd week of December. Three other planets are visible during that apparition: Jupiter well up in WSW, Mars high in SE to SSE, and Saturn, not far from Mercury. A pretty good evening apparition of Mercury occurs low in WSW twilight glow from mid-January until early February, while Jupiter gleams well up in east. Mercury’s best evening apparition of the 2013-2014 school year begins as the innermost planet becomes visible low in the WNW early evening sky in early May 2014. From then until early June, there will be four bright planets simultaneously visible at dusk, in order from west to east, Mercury, Jupiter, Mars, and Saturn.

Whenever a planet passes near a star or another planet, the event will be great fun to track daily for a week before and after the date they’re closest. Bright pairs in the next few months include Mercury-Saturn less than a degree apart low in ESE in morning twilight one hour before sunrise on Nov. 25 and 26, 2013; and Mars-Spica 4.6° apart on the morning of February 3, 2014. This Mars-Spica pair is the first event of a *triple conjunction* -- not a gathering of three objects, but rather a pairing of two objects three times within an unusually short time. (Mars usually takes nearly two years until it passes the same star again.) This time,

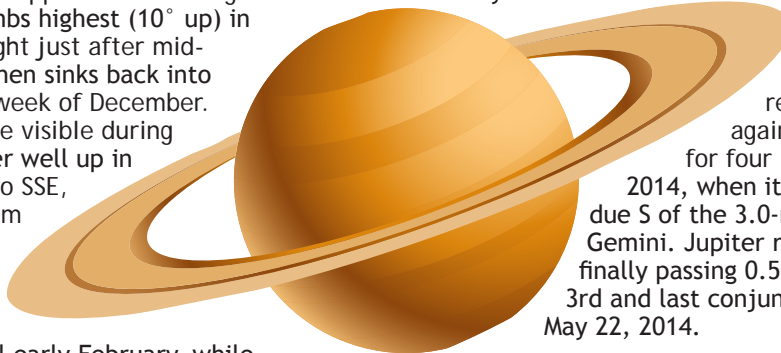
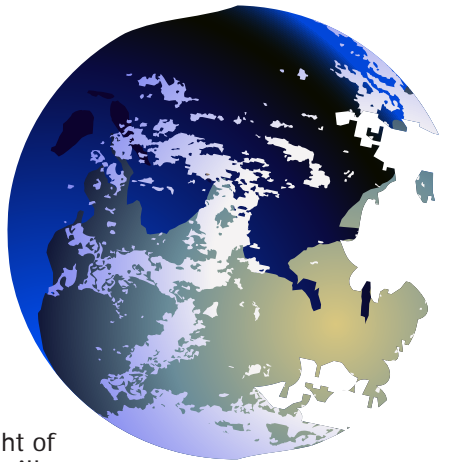
Mars will move away from Spica until they’re 6.0° apart on the night of March 1-2, and then come together for a second meeting, 4.8° apart, visible most of the night of March 24-25. Then they’ll separate, until just over 15° apart in the evening sky on May 18. Finally, Mars will pass within 1.3° north of Spica at their third and last conjunction of the series, on the evening of August 13, 2014.

In the morning sky in November 2013, bright Jupiter is a slow-moving planet, taking 12 years to make one circuit around the belt of zodiac constellations. During the 2013-2014 school year, note the changing shape of the triangle Jupiter makes with the Gemini’s brightest stars, Pollux and Castor, marking the head of the Twins. Jupiter is now participating in a triple conjunction, with a 3.5-magnitude star, Delta in Gemini. The first conjunction occurred on Oct. 4, when Jupiter passed 0.8° N of the star. The second conjunction will occur on the night of Dec. 9-10, as the bright planet passes only 1/4 of a degree N of the star.

(Use binoculars to see the faint star in Jupiter’s glare.) Jupiter retrogrades (goes west against background stars) for four months, ending March 5, 2014, when it will appear 2.3° nearly due S of the 3.0-mag. star Epsilon in Gemini. Jupiter resumes eastward motion, finally passing 0.5° N of Delta Gem in their 3rd and last conjunction, on the evening of May 22, 2014.

When Saturn first appears in the morning sky in mid-November 2013, it appears low in ESE morning twilight, to the lower left of bright Mercury. Binoculars may show the 3rd-mag. star Alpha in Libra within 2° right of Saturn on Nov. 21. On March 3, 2014, Saturn will have moved 8.3° E of Alpha and will begin retrograde motion, ending 2.4° NE of the star in the evening sky on July 24. All the outer planets appear to retrograde as the faster-moving planet Earth overtakes them. We overtake Saturn on May 10, 2014.

On our evening twilight chart for November 2013 available at the msta link on our website, planets are plotted for each day when the Sun has sunk to 9° below the horizon, at “mid-twilight”. By then, Venus and about half a dozen stars of first magnitude or brighter are easily seen. In November, from places near lat. 40° N, mid-twilight occurs about 45 minutes after sunset.



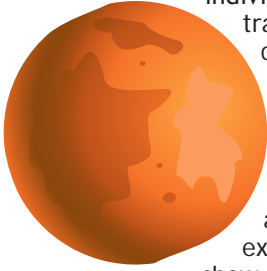
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Celestial Highlights

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Planet positions are represented by a separate dot for each date, with positions for each Friday in November (1, 8, 15, 22, 29), represented by a larger dot and labeled. Rotate the chart until the portion of the horizon circle nearest to your target objects is below them, and you'll see them depicted at the same orientation as they appear in the sky.

On the chart, stars' daily positions are plotted, not as individual dots, but instead by continuous tracks as the stars drift west (counter-clockwise around the North Star) in the course of the month, owing to the Earth's revolution around the Sun.

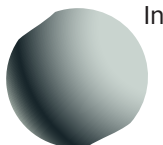


November and December are the long-awaited months when Comet ISON was expected to put on a spectacular predawn show. But sightings of the comet's brightness as it emerged from the solar glare in August seem to imply that it will fall far short of early predictions. For comet updates and suggested links, visit www.pa.msu.edu/abrams/ison/. We do know that on the Full Moon mornings of Nov. 17 and 18, the Comet will appear within 2° of Spica, first to the star's upper right, and then lower left, but may then glow dimly at 5th magnitude. On Nov. 23, as illustrated on the Sky Calendar, the Comet passes within 5° S (lower right) of Mercury, and may have reached magnitude 3. On the next morning, the Comet passes 5° S of Saturn.

This prediction has ISON finally reaching 1st magnitude on Nov. 26, but while mired in bright twilight 9° below Mercury and within 10° of the Sun. The zero-magnitude milestone may be passed on Nov. 27, with the Comet within 12° lower right of Mercury and within 6° of the Sun.

On Thanksgiving Day, Nov. 28, this Sun-grazing Comet passes within 725,000 miles of the Sun's surface and makes a sharp turn to the north, or upper left of the predawn Sun. The December *Sky Calendar* will provide illustrations of its location for selected mornings.

Even if ISON falls short of predictions, there's still much to enjoy in November and December. At sunset on Nov. 1, Venus stands in SSW 47° upper left of the Sun and reaches its greatest elongation of the current evening apparition. Telescopes reveal Venus' disk over 0.4 arcminute across to be half illuminated. Over the next ten weeks until it reaches inferior conjunction on Jan. 11, follow Venus through binoculars in daytime or early in twilight as it displays ever larger but thinner crescent phases. November, Venus sets 2.4 to 2.9 hours after the Sun for lat. 40° N. On Nov. 30, Venus at sunset will be 43° upper left of



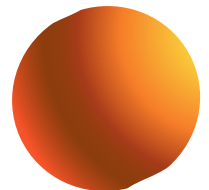
setting Sun and will show a crescent 31 percent illuminated and 0.6 arcminute across. Much bigger changes are slated for December.

Jupiter on Nov. 1 rises within 4.5 hours after sunset. In November, its rising time shifts earlier by about 4 minutes per day, until at month's end it will rise a few minutes before Venus sets.

Jupiter is also present in morning; at mag. -2.4 to -2.6 it is the brightest "star" then visible. In mid-twilight, find it very high in SW on Nov. 1, to about halfway from horizon to overhead in west at month's end. The other morning planet in view for entire month is Mars, of mag. +1.5 to +1.2. In November find the red planet just over halfway up, drifting through SE early in month, ending in SSE.

Two additional planets join the morning scene as they emerge from the Sun's glare. The November chart depicting the sky in morning mid-twilight illustrates the changes. First, Mercury pulls out from its Nov. 1 inferior conjunction on near side of Sun to be spotted by Nov. 8. Look low in ESE, to lower left of Spica. Mercury brightens, rapidly at first, then more slowly. Next, just 8-9 days later, Saturn (+0.6) emerges from far side of the Sun to appear to lower left of Mercury. The two planets form a close pair on Nov. 25-26 and switch places as speedy Mercury moves around toward the far side of its orbit. Saturn appears higher each morning because of the Earth's faster orbital motion. The sample *Sky Calendar* illustrates their arrangement on these and several adjacent mornings.

On Nov. 28, the four planets, Mercury-Saturn-Mars-Jupiter, span 120° across the sky.



December 2013

Planets: Venus is in SW sky at dusk mid-twilight, and sets 2.9 hours after Sun on Dec. 1, to 1.4 hours after on Dec. 31. Jupiter rises in ENE 2.7 to 0.3 hours after sunset, and at dawn it is in W to WNW, lower as month progresses. Mars rises in E within hour after local midnight, and passes high in S in morning twilight. Saturn rises 1.9 to 3.9 hours before sunrise, and climbs through SE at dawn as month progresses. Mercury rises in ESE 1.2 hours before sunrise on Dec. 1, to only 0.5 hour on Dec. 15. Superior conjunction occurs Dec. 29. Venus peaks at mag. -4.9. Binoculars reveal it as a thinning crescent, best seen in afternoon or at sunset. On Dec. 1, Venus is 42° upper left of setting Sun, and appears 30 percent full and over 0.6 arcminute across. By Dec. 31, Venus moves to within 17° upper left of setting Sun and shows as a large thin crescent just 4 percent full and a full arcminute across. Jupiter appears

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Celestial Highlights

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as a round dot now 0.7 to 0.8 arcminute across, accompanied by its four Galilean moons. In December 2013 and early January 2014, these two brightest planets are visible simultaneously in the evening sky. From lat. 40° N on Dec. 10, both are 3° up about 2.4 hours after sunset. Opportunities improve, with both planets 5° up throughout Dec. 21-Jan. 5, at a viewing time slipping back from 1.7 hours after sunset on Dec. 21 to only 22 minutes after sunset on Jan. 5. After Venus departs evening sky in early January, next chance to catch both planets simultaneously in evening will occur in 2015, from mid-January through July. That year, Jupiter will rise as Venus sets in mid-January, and will approach each other until they're only 0.3° apart low in the WNW at dusk on June 30, 2005. Next chance to see both planets in *morning* sky will come very soon, in Jan.-Feb. 2014, but the two will appear barely above opposite horizons. (Details in Jan. *Sky Calendar*.) Next morning chance after that will come in Aug.-Sept. 2014. On that occasion, both planets will instead appear in same part of sky (ENE), and will form a pair just 0.3° apart, on August 18, 2014.

January 2014

The Moon passes all five naked-eye planets in January 2014, including Venus twice: In the early evening on Jan. 1-2, and in the morning on Jan. 28-29. The Moon is near Jupiter all night on the night of Jan. 14-15, near Mars and Spica on the mornings of Jan. 22 and 23, near Saturn on the morning of Jan. 25, and near Mercury on the evening of Jan. 31. Special rewards for sky watchers who follow the two brightest planets: Venus switches from evening to morning sky (with an overlap of a few days, when it is visible in both!); and Jupiter is visible all night early in January. Use binoculars in twilight to reveal Jupiter as a disk, and, all this month, an even larger (in apparent diameter) Venus in crescent phase. On Jan. 1, Venus is 15° upper left of setting Sun. As Venus traverses the near side of its orbit, it will pass just over 5° N of the Sun on Jan. 10-11. By Jan. 31, Venus is 29° upper right of rising Sun.

Venus-Jupiter hide-and-seek. These two planets appear on nearly opposite directions in the sky, because Earth overtakes Jupiter on Jan. 5 (creating an opposition of Jupiter), and Venus overtakes Earth on Jan. 11 (creating an inferior conjunction of Venus). Yet there are two occasions this month to see Venus and Jupiter simultaneously. The easier one is in the *evening*: Catch both planets 5° up at the same time, Venus in WSW, Jupiter in ENE; your viewing time to do so shifts from 1.7 hours after sunset on Dec. 21, to 3/4 hour after sunset on Jan. 1, and only 22 minutes after sunset on Jan. 5.

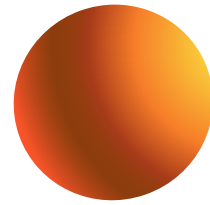
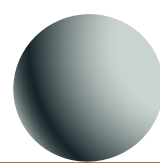
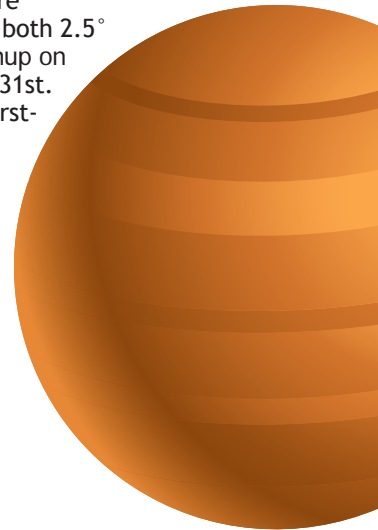
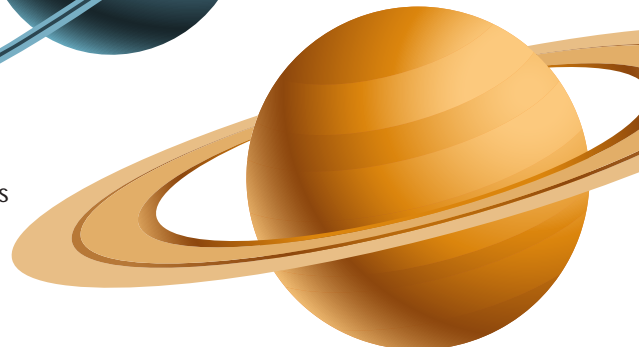
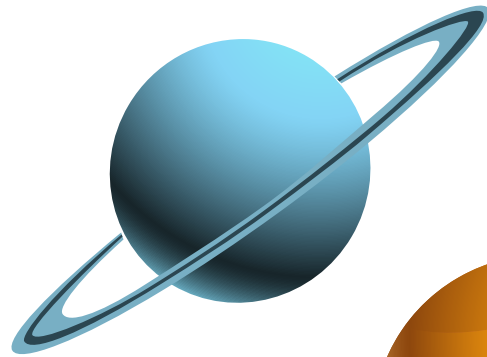
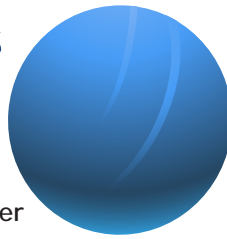
After Venus emerges into the *morning* sky, see four planets, in E to W order, Venus rising in ESE, Saturn well up in SSE, Mars well up in SSW, Jupiter setting in WNW. Visit a nearby *ziggurat* (or other place higher than surroundings) for

simultaneous views of Venus and Jupiter in morning, very low above opposite horizons. On Jan. 20, 2014, they're 2° up, 1.1 hours before sunup. In final week, you can catch both 2.5° up, but earlier, 1.5 hours before sunup on Jan. 26, to 1.8 hours before on the 31st. On Feb. 3 Mars will pass 4.6° N of first-mag. Spica, the first of a colorful *triple conjunction* between the red planet and the blue-white star in 2014; the finale of the series occurs on July 13 at dusk. Mars moves on to pass Saturn on Aug. 25. On Aug. 18 at dawn, Venus and Jupiter will appear only 0.3° apart!

The authors have several sky charts and activities/exercises for students and teachers on our website, at www.pa.msu.edu/abrams/msta

Robert C. Victor was Staff Astronomer at Abrams Planetarium, Michigan State University. He is now retired and enjoys providing skywatching opportunities for school children in and around Palm Springs.

Robert D. Miller, who provided the twilight charts, did graduate work in Planetarium Science and later astronomy and computer science at Michigan State University and remains active in research and public outreach in astronomy.



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- \$1,320 per course scholarships for all K-12 educators (DI or non-DI endorsement).
- Most courses offered online and asynchronous, with a science experiment component to be completed using science kits and activities.
- Science content developed by Lawrence Tech in partnership with the Detroit Zoological Institute, Cranbrook Institute of Science, Aquinas College, and the University of Detroit Mercy.
- Courses aligned with the Michigan Department of Education requirements for Science and the DI (Integrated Science) Endorsement.

Master of Educational Technology

- \$1,320 per course scholarships for all participants.
- 100 percent online and asynchronous format.
- This practice-oriented program is offered by Lawrence Tech in partnership with Marygrove College. Courses cover up-to-date technologies in instruction, Web-based learning tools, streaming video, electronic communication, and software and hardware options.
- Complete the seven required courses of the Master of Educational Technology degree and be eligible for the NP endorsement on your existing teaching certificate.
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Elementary Science - Classroom Tested!!

Growing 2nd Graders and Plants!

By Charles Bucienski (1st - 3rd Science Specialist, Olivet Community Schools)

Back to school again 2013 - 2014! Every year I like to start with life science. It is such a high interest area for almost all students. My one hundred and twenty second graders are working on many different plant experiments. One of our long term investigations is on plants growing in the dark vs. plants growing in the light. We just measured the plants in the dark at week three and the tallest one was at 53cm. The tallest one in the light was 26cm. We also noted that all three plants in the dark are bigger than even the biggest of the three plants grown in the light. Of course we had vast differences in color and leaf size which make for very interesting conversations and writing topics.

Another experiment we are currently testing is student-led and gives students the opportunity to change one variable which they think will improve the health of their plant vs. a control plant. The health of the plant is to be determined by color, leaf size and height of plant.

The control plant (a bush bean seed) gets put on a plant stand with fluorescent bulbs turned on 8 hours of the day, fifteen squirts of water from a spray bottle and standard garden soil in a see through cup.

Student variable choices (all bush bean seeds used again) can include only one of the following: less or more squirts of water per day, longer or shorter periods of fluorescent light exposure, placement in a sunny window, opaque cup use, Ziploc bag to reduce air amounts, placement by a small fan to increase air amounts, or soil changes which can include potting soil, sand or pebbles in any ratio they want to try. We plant each seed on the same day and graph their growth using a bar graph at week two of the investigation to determine if the plant is doing better or worse than the control plant with the student's chosen treatment. The results in early October have been interesting so far with many plants outperforming and many underperforming the health of the control plant.



By the end of October we will determine which treatments seem most beneficial or detrimental to the health of the bean plants. We will then make some generalizations to develop best practices of plant growth - only to then test these best practices on other seed types to see if they are relevant for more than just bean seeds!

Back to it!



POSITION ANNOUNCEMENT

Position Title: Affiliate Faculty member of Integrated Science (non-tenure-track)

Required Qualifications and Education: M.S. in a Science Discipline or Science Education with demonstrated interest and experience in secondary science education and a strong science background.

Preferred Qualifications and Education: Demonstrated experience in secondary science teaching and/or experience in observing and evaluating science educators in classroom settings. Preference will be given to candidates with expertise in Chemistry, Geology, and Biology who also have broad science experience. We seek a creative and dynamic educator with a demonstrated commitment to effective teaching and academic experiences with culturally diverse populations.

Responsibilities – Essential Functions: Teaching responsibilities include content supervision of secondary science preservice teachers; modeling effective pedagogy in science content courses for preservice teachers; teaching introductory science courses (some with labs or large lectures) in candidate's areas of expertise; and other duties as assigned. The teaching load is typically 16 hours per semester. The position requires coordination and collaboration with Integrated Science faculty.

Salary: Commensurate with experience and qualifications.

Department/Division: Integrated Science Program, College of Liberal Arts and Sciences

The Integrated Science Program includes 11 tenure-track faculty and serves ~160 Integrated Science majors (www.gvsu.edu/isci) as well as ~80 secondary science content majors.

Campus: Allendale, MI

How To Apply: Apply online at www.gvsujobs.org. Attach a letter of application, vitae, statements of teaching philosophy, and the names and contact information for at least three references familiar with your teaching and experience. If you have questions about the position contact: Dr. Keith Oliver; Integrated Science Search Committee chair (oliverke@gvsu.edu).

Application Deadline Date: Review of applications to begin January 9, 2014 and continue until position is filled.

Allendale, Michigan 49401 - (616) 331-5000

For more information about Grand Valley, see our website at www.gvsu.edu

An Equal Opportunity/Affirmative Action Institution
TDD Callers: Call Michigan Relay Center at 1-800-649-3777

Molecular Modeling- Role Play

From Sandra Yarema, MSTA Director-at-Large

All matter is composed of tiny particles, either atoms or molecules. These particles are in constant motion. Since the particles are so small and not ordinarily revealed to us except by scanning tunneling microscopes, it is necessary to model their behavior to better understand the changes which occur in matter.

Goals/Objectives

NGSS

Core Idea:

PS1 Matter and Its Interactions

How can one explain the structure, properties, and interactions of matter?

The existence of atoms, now supported by evidence from modern instruments, was first postulated as a model that could explain both qualitative and quantitative observations about matter. Matter can be understood in terms of the types of atoms present and the interactions both between and within them. The states, properties, and reaction of matter can be described and predicted based on the types, interactions, and motions of the atoms within it.

PS1.A: STRUCTURE AND PROPERTIES OF MATTER

How do particles combine to form the variety of matter one observes?

While too small to be seen with visible light, atoms have substructures of their own.

Each element has characteristic chemical properties.

5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen.

Science and Engineering Practices: Developing and Using Models:

Modeling in 3-5 builds on K-2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

Use models to describe phenomena. (5-PS1-1)

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter. Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means

Crosscutting Concepts

Cause and Effect: Cause and effect relationships are routinely identified and used to explain change. (5-PS1-4)

Scale, Proportion, and Quantity: Natural objects exist from the very small to the immensely large. (5-PS1-1)

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

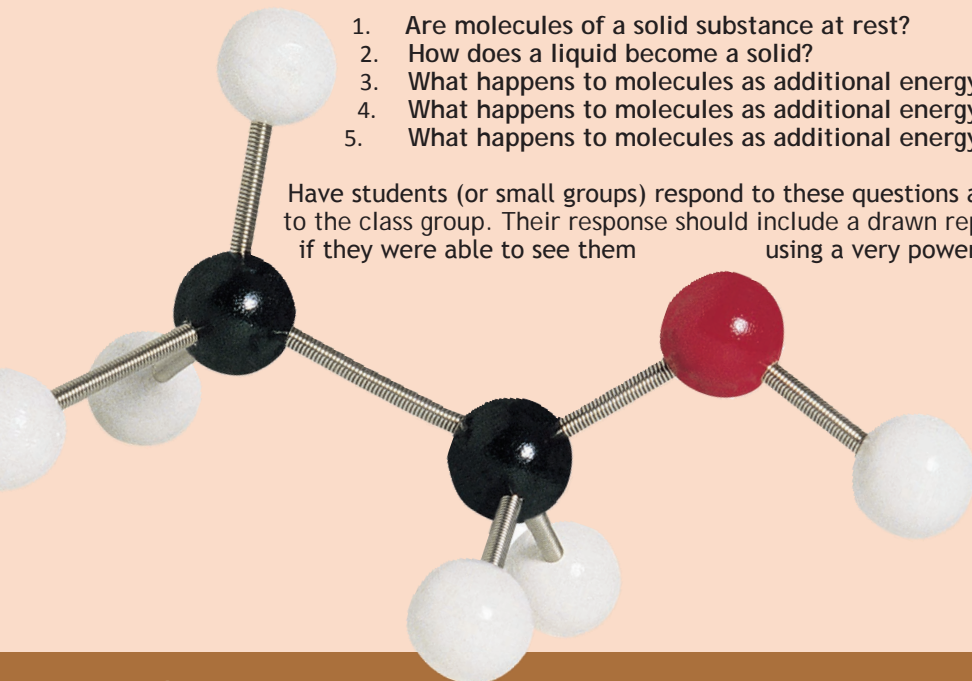
Science assumes consistent patterns in natural systems. (5-PS1-2)

Activity Directions

Discussion Questions:

1. Are molecules of a solid substance at rest?
2. How does a liquid become a solid?
3. What happens to molecules as additional energy is supplied to a solid?
4. What happens to molecules as additional energy is supplied to the melting phase?
5. What happens to molecules as additional energy is supplied to a liquid?

Have students (or small groups) respond to these questions as a prediction, first individually, then reporting out to the class group. Their response should include a drawn representation of what the molecules might look like if they were able to see them using a very powerful microscope.

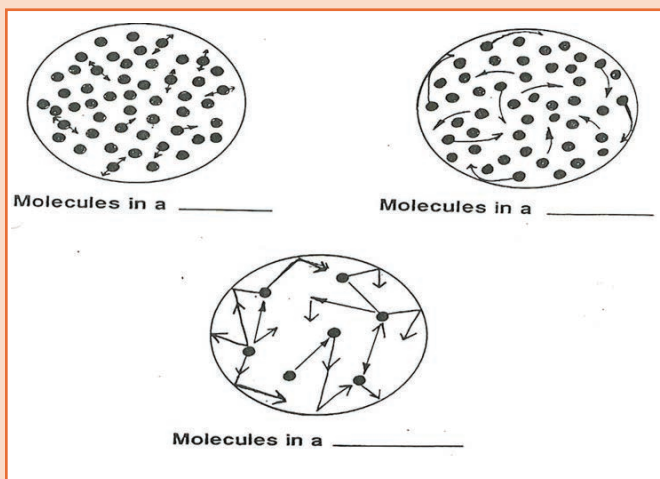


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Molecular Modeling-Role Play

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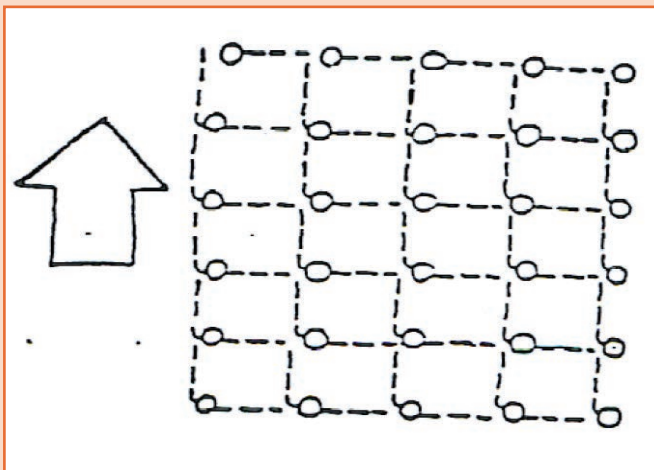
Suggested response:



Describe how students will collect evidence to support their explanation by participating in a role-play activity in which each of them will play the part of a molecule of a substance.

1. Are Molecules of a solid at rest?

Arrange the participants as in the drawing: right hand on sideman's shoulder and left hand on foreman's shoulder (Front has left hands free, right wing has right hands free).



Like this, the particles are arranged in a solid. Remember, the particles are not at rest, they vibrate. (The whole group must shiver). As more energy is added 1.) What happens to the temperature? 2.) The vibrations get more violent.

continued on page 14

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Molecular Modeling- Role Play

continued from page 13

2. How does a liquid become a solid?

Arrange participants as they were “in a solid”. Have those in front or on right wing, stretch out arms ready to catch any “loose” molecules going by. Have all participants whose last names begin with the letters “B”, “M”, and “G” to break away from the “solid” and begin moving away from their original position in the group, and then back toward those “solids” with a free hand. Some of these “liquid molecules” may be caught by a “solid” with a free hand.

The solid particles get extra vibrations when a liquid particle is caught, and thus keep the temperature the same.

The process that occurs fastest determines whether the process is solidification or melting. All motion should be “slow motion” so the effect can be more easily visualized. All interactions should take place within the bounds of the original solid “configuration”.



3. What happens to the molecules as additional energy is supplied to a solid?

Arrange participants as they were “in a solid”. Encourage considerable vibration as you tell them that they have gained more energy. Have only those participants whose last name begins with the letter “S” drop arms. Their bonds have broken, they have melted. The space occupied by the participants should remain constant. Maintain the same vibrations while more participants “melt” from the solid. Temperature remains constant during melting. All energy is used to break the molecular bonds, NOT to increase the molecular motion.

4. What happens to the molecules as additional energy is supplied to the melting phase?

Start with participants arranged again in the “solid” configuration. Imagine that heat is applied to this solid. Some of the bonds are broken so that participants are in groups of approximately 6 linked people. These groups can wander around moving relative to each other, but in the same space as they occupied as a solid. This “liquid phase” can change shape. Participants must continue to vibrate more violently than when they were a solid, because they have a higher temperature and heat is being applied. Try to stay in slow motion. Groupings may change. Bonds are broken and new bonds may be made. The groups get smaller as the temperature rises, which makes them more “free-flowing”.

5. What happens to the molecules as additional energy is supplied to a liquid?

Arrange participants as a liquid: groups of approximately 3 participants. These groups may wander around as long as they stay within the “original solid space”. High vibrations, more violent than before because of additional energy, break many bonds. The process of evaporation is being modeled. Randomly choose 1- 6 participants to move out of the controlled “solid-liquid” area and occupy approximately 10 times more space, out into the room. To model boiling, bonds should break within the “liquid”, not just at the edges or surfaces. All action should be slow motion.

6. What happens to the molecules after they break free?

Arrange participants as a liquid with groups of 3 randomly wandering around within a controlled space. Higher vibrations to signify more energy should be even more violent than before. (Each participant might even jump/ bounce up and down). As the bonds are thereby broken within the groups of 3, direct participants to occupy approximately 10 times as much space as they did previously, to model the gaseous state. Motion of individuals should be in straight lines. When a “molecule” collides with a wall or another participant, have them rebound off as a ball in a game of billiards.

Evaluation

Direct students to answer the 6 questions using their experience as “molecules” as evidence. They may respond using symbols, drawings, or written statements to describe and represent the motion of the molecules, the space occupied by the substance at each phase/state, and the energy applied in each situation.

1. Are molecules of a solid substance at rest?
2. How does a liquid become a solid?
3. What happens to molecules as additional energy is supplied to a solid?
4. What happens to molecules as additional energy is supplied to the melting phase?
5. What happens to molecules as additional energy is supplied to a liquid?
6. What happens to the molecules after they break free?

Adapted from *Operation Physics* (1997). Matter and Its Changes. 11B1 - 11B6D

MSTA Mini-Grant Application



The Michigan Science Teachers Association announces a \$1000.00 mini-grant for its current MSTA members.

- Up to 2 awards of \$1000.00 each will be given to current MSTA members.
- The grant deadline is June 27, 2014
- As part of the Grant process, award winners are required to write a narrative of their project to be published in the MSTA Newsletter or Journal.
- Award winners will be notified by September, 2014.
- Projects MUST be completed by June 12, 2015.
- Grant money is released upon demonstration of expenses.
- A final report must be submitted that includes evaluation of outcomes.

Grant Narrative:

- Begin with a summary of your project. (Maximum one page).
- Describe how this project relates to the MSTA mission statement, (“...to stimulate, support, and provide leadership for the improvement of science education throughout Michigan.”) the Michigan Curriculum Framework and authentic assessment in Science. (Maximum one page).
- Purpose of Grant: Give your statement of needs or problem to be addressed. Describe the target audience and how they will benefit. (Maximum one page).
- Describe the Project: Include a description of project goals, expected outcomes and how they will be evaluated. Indicate timelines when appropriate. (Maximum one page).
- Budget Details: Describe costs involved with the project. Give complete item descriptions and costs of purchases to be made. Indicate in-kind support.
- Payment: Winners will receive \$900 of the \$1,000 grant up front. Winners MUST submit an article for publication in one of MSTA’s 4 Newsletters or 2 Journals. The last publication is the May Newsletter and is the final publication with which an article must be submitted. Once the article and receipts of expenses has been received, the final \$100 will be paid to winner(s). Request for payment of the \$100 must be received no later than June 12, 2015.

Name: _____

Home Address: _____

City: _____ State: _____ Zip: _____

Phone Number: _____ Email Address: _____

School District: _____ School Name: _____

School Address: _____

City: _____ State: _____ Zip: _____

Position/Title: _____ Grade Level(s): _____

Completed application MUST be postmarked by June 7, 2014.

Mail to: Mr. Thomas P. Waclawski, 5975 Donna Court, Traverse City, MI 49684,
Phone: 231-943-4804, Email: ka8ylktom@chartermi.net



STUDENT RESEARCH OPPORTUNITY!!

The Junior Science and Humanities Symposium (JSHS): A Showcase for the Practice of Student Research

The 50th Annual Southeast Michigan Junior Science and Humanities Symposium will take place on Thursday, March 6 and Friday, March 7, 2014, at the McGregor Conference Center on the main campus of Wayne State University. The Junior Science and Humanities Symposium (JSHS) Program is sponsored by the Academy of Applied Sciences and the U.S. Army, Navy, and Air Force. Since its inception in 1958, the primary aims of JSHS are to promote research and experimentation at the secondary school level and to recognize students for original research achievements. Participation in the JSHS aligns with the need for students to apply practices of science and engineering as outlined in the *Next Generation Science Standards* (NGSS) and the supporting *Framework for K-12 Science Education*.

Every year, high school students throughout southeastern Michigan attend a no-cost, two-day symposium, coordinated by the College of Education at Wayne State University, where they present their research and participate in a number of other activities. JSHS participants have an opportunity to receive substantial scholarship awards at the regional and national levels. Over 1,000 students and their teachers participate annually, in 48 regional symposia held at university campuses throughout the United States, Puerto Rico, and Department of Defense schools in Europe and the Pacific. Five finalists from each regional JSHS are invited to attend the National JSHS free of charge; first and second finalists from each region present their research at the National JSHS, held at a selected educational institution or military base in late April or early May. The first place finalists in each category at the National JSHS (over 400 from 60 nations) are invited to attend the

London International Youth Science Forum (July, 2014) all expenses paid.

Significant awards are available to regional and national JSHS presenters. Scholarship recipients must be USA citizens or permanent USA residents.

Three scholarships are awarded to the finalists of the *regional JSHS*:

- \$2,000 to 1st place
- \$1,500 to 2nd place
- \$1,000 to 3rd place

These scholarship awards are payable upon matriculation at the university of the student's choice. The teacher of the first place finalist from each region also receives a \$500 honorarium. Finalists in each of the categories at the *National JSHS* are additionally awarded:

- \$12,000.00 to 1st place
- \$8,000.00 to 2nd place
- \$4,000.00 to 3rd place

Please visit <http://coe.wayne.edu/ted/science/jshs/index.php> to attend or to find out more about the 50th Southeast Michigan JSHS: Nurturing the Next Generation of Scientists. The deadline for Application forms for students to Present Research is January 15, 2014.

Also visit the national website <http://www.jshs.org/> for more information about JSHS- a prestigious scholarship program to engage Grades 9- 12 in scientific inquiry.

To Assign Vocabulary or Not to Assign Vocabulary?

The Benefit of Vocabulary in a High School Science Classroom

By Mary Jordan McMaster

As a seasoned Chemistry teacher, that is a question I ask myself each year. On the one hand, defining the vocabulary from each chapter is the one assignment that all of my students can complete regardless of academic ability. Yet, moments after turning in the assignment, students are unable to describe even one term. To them defining terms is a mindless activity to be completed with their iPod wailing while checking for "likes" on their latest picture on Instagram.

Research shows that a strong understanding of content vocabulary allows a student the opportunity to better

comprehend the material. Marzano (2005) even goes so far as to say that the strongest action a teacher can take to ensure student success is to provide them with direct instruction in content vocabulary.

As science teachers, we are so fortunate to have a variety of strategies to make science come alive for our students. By applying those same strategies to content vocabulary, teachers can help students construct a solid foundation for science learning. Here are a few quick activities I have used in my chemistry classroom to help emphasize content vocabulary.

continued on page 17

Some Amazing (and FREE) Field Trips for You to Take Advantage Of!

By Karen Kelly, Region 6 Director, Pierce Middle School, Waterford

As finances got tighter here in Michigan, and more families found it impossible to cover the cost of the traditional field trips I normally took my students on, I looked for more affordable ways to continue to take my content outside the classroom. I found the following options available in my area.

Your community's Department of Public Works (DPW)

GLCEs that may be covered with a visit here:

E.FE.02.11, 12, 21

E.ES.03.41, 42

L.EC.06.41, 42, E.ES.06.49, E.ES.06.50, E.ES.06.51

E.ES.07.11, 42, 81, 82

Our visit included the ground water model to represent the introduction of various contaminations onto the ground, as well as into water sources; a tour of one of the pump houses within the watershed; an explanation of the various different sizes of fire hydrants; a discussion regarding the Wellhead Protection Program; study of the Township map as it relates to the water usage; and an explanation of the meter reading program. Best part - we could walk to the facility, so no bus fees!

Your community's Water Treatment Plant

GLCEs that may be covered with a visit here:

E.FE.01.19, E.FE.01.20

E.ES.03.36, E.ES.03.37, E.ES.03.39, E.ES.03.41,

E.ES.03.42

E.ES.06.50, E.ES.06.51

If you're lucky, you'll be able to follow the sequence that the water takes from the very moment it reaches the treatment plant. When we were there, only one group got to see the first step. It made a huge impression on them, one that I wish all groups had seen!

National Weather Service Office (NWS)

GLCEs that may be covered with a visit here:

E.FE.01.19, E.EF.01.21

E.ES.02.26, E.ES.02.27, E.ES.02.28, E.ES.02.29,

E.ES.02.30, E.ES.02.31, E.FE.02.33, E.FE.02.34,

E.FE.02.35

E.ES.06.41, E.ES.06.42, E.ES.06.43, E.ES.06.44,

E.ES.06.45, E.ES.06.47, E.ES.06.48, E.ES.06.49, E.FE.06.57

We are fortunate to have a NWS office in the next community over from ours. I make this one an evening field trip, so we can witness a balloon release, as well as tour the facility. That makes it necessary for the parents to transport their child to the service office. I request that the parents stay. They actually enjoy it as much as the students sometimes! Because the parents provide transportation and stay, NO permission slip is needed. I go only to facilitate. The only drawback is that the NWS can only accommodate 15-20 at a time. To allow as many of my 120 students as possible to partake, I generally set up 4 evenings over 2 weeks. Not all students have the ability to come, due to parent availability. For that reason, this is not a field trip that is required for course credit. Once again, no bus fees!

I realize that not all of these may be options for you, but check around. You may be surprised by what you find!

To Assign Vocabulary or Not

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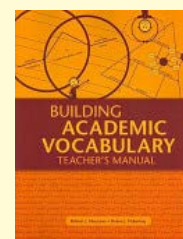
Prior Knowledge Quick Write: Students often come to a classroom with some previous knowledge about scientific topics. Students can use the new vocabulary to make connections to what they already know. Have students do a quick write in their notebook linking new vocabulary to prior knowledge. Example: "In your notebook, tell me everything you already know about atomic structure. In your description be sure to use at least five terms from the vocabulary list." During the debriefing, the teacher is able to address misconceptions students may have as well as set the stage for the new material.

Define and Draw: After students have defined the terms, assign each student a different term. Have the students draw a picture, diagram, or model that represents the meaning of the term. Number the pictures and hang them around the room. Have kids do a "gallery walk" and identify each picture with the correct term. This is a great low anxiety formative assessment that allows the teacher to listen while students come to a consensus. During the debriefing, the students can defend and

support their choices while the teacher guides the discussion and corrects misconceptions.

Concrete Vocabulary: Whenever possible, provide actual examples of the vocabulary. For example, when teaching terms like element, compound, and mixture prepare a variety of samples of each type of matter and have the students classify them. If a concrete example is not available create a model (or better yet, have the students create them). For example, when teaching molecular shapes, have students identify a tetrahedron, pyramid, octahedron, etc. before explaining how VSEPR theory predicts the geometric shape of a molecule.

So the answer to the question is yes, assign the vocabulary. However, students must also have meaningful interactions with the terms to make strong, lasting connections.



Professional Opportunities

Presidential Awards for Excellence in Mathematics and Science Teaching



Do you know or are you an exemplary math or science teacher in kindergarten through sixth grade? Please consider nominating him/her/them for the PAEMST Awards. The Presidential Award for Excellence in Mathematics and Science Teaching is the highest recognition a K-12 teacher can receive for outstanding science or mathematics teaching in the United States.

Why apply? Recipients of the award receive the following:

- A certificate signed by the President of the United States.
- A paid trip for two to Washington, D.C., to attend a series of recognition events and professional development opportunities.
- A \$10,000 award from the National Science Foundation.

In addition to recognizing outstanding teaching in mathematics or science, the program provides teachers with an opportunity to build lasting partnerships with colleagues across the nation. This growing network of award-winning teachers serves as a vital resource for improving science, technology, engineering, and mathematics education and keeping America globally competitive.

Awardees are recognized for their contributions to teaching and learning and their ability to help students make progress in mathematics and science. In addition to honoring individual achievement, the goal of the award program is to exemplify the highest standards of mathematics and science teaching. Since the program's inception in 1983, more than 4000 outstanding teachers have been recognized for their contributions to mathematics and science education. If you know great teachers, nominate them to join this prestigious network of professionals.

Nominations will soon be accepted online (www.paemst.org) for the 2014 Presidential Awards for Excellence in Mathematics and Science Teaching. Teachers may nominate themselves or someone else (e.g., principals, teachers, parents, or other members of the general public) may nominate them for this award. The PAEMST Online Application is now available. To apply, teachers must first be nominated for the award. Once nominated, teachers will receive an email with a login and password to access the online application. The application deadline for K-6 teachers (Grades kindergarten through sixth) is May 1, 2014. Secondary teachers (Grades 7-12) are eligible to apply in 2015.

The Michigan Department of Education has asked the Michigan Science Teachers Association to oversee this program for the State of Michigan. We are honored to be the host of this awards program. If you have any questions, please feel free to contact, Betty Crowder, our State Coordinator, at betty_crowder@msta-mich.org. In the meantime, please visit the Presidential Awards website to find the nomination form for the teacher of your choice! Why not you? www.paemst.org The rewards are worth the effort! You deserve it!

Professional Opportunities

.....Thanks to David McCloy, MSTA Region 8 Director

The American Chemical Society and the Michigan Science Teachers Association Announcement

The Midland Section of the American Chemical Society (ACS), with support from MSTA and Delta College, has received a modest grant to connect with educators about their needs relative to the Next Generation Science standards. We are a non-profit organization, and we cover Midland, Saginaw, Bay, Isabella and Gratiot counties; we have been promoting science of all kinds since we were incorporated in 1919.



We plan to develop a 16-unit program of hands-on activities for teachers to use in their classrooms that address the Next Generation Science Standards (NGSS) including application to challenges. The program will be promoted and rolled out sometime during calendar year 2014. Opportunities will exist for teachers in this region to participate in professional development designed around and for these new materials which will include the equipment necessary to conduct the investigations highlighted by this development. The materials will have a broad focus and are intended to be adaptable to a range of grade levels in K-12.

Coming soon will be a blog started to solicit your questions and comments related to the standards and the gaps between them and the current MI benchmarks. Our section includes many science professionals; we also have teacher members and consultants, and are also seeking input from local institutions that train pre-service teachers.

If you need further information, or want to get involved (we will be looking for local classrooms to field test the activities, for example), please email Gina Malczewski, Ph.D, Past Chair and Outreach co-chair at reginamalczewski@gmail.com.

New Resources from the American Chemical Society for Teachers!!

Thanks to Deanna Cullen, JCE Precollege Associate Editor Online, Whitehall Schools

The Precollege Division of the *Journal of Chemical Education* now offers an interactive companion Web site: [JCE Chemical Educational Exchange \(ChemEdX\)](#)! Their purpose is to deliver accessible, quality content to teachers and students at the precollege and two-year college level that will enable them to further their learning and career goals.

With ChemEdX, users have the opportunity to communicate with colleagues, share resources and experiences, and, of course, access content for learning, including activities that can be implemented in the classroom and videos that illustrate concepts and inspire critical thinking. They even have more light-hearted forums, including a "Picks" section and a place to blog, that allow users to share what they're reading and what's on their minds.

Although ChemEdX derives from the *Journal of Chemical Education*, they are a separate entity. Many of the resources readers will discover on the Web site—including some software collections and videos—come from the online presence of the journal before it partnered with American Chemical Society Publications in 2010. More recent content focuses on topical issues, trends in the field, and current approaches to chemistry education.

Professional Opportunities

DON'T MISS OUT ON THIS YEAR'S FUN!!

The MSTA Conference and Me

By *Melissa Wozniak - Rogers City Area Schools*

I was truly a lucky teacher this year. I applied for and was chosen to attend the MSTA Conference on a scholarship. I was excited since I was teaching a middle school science class, which I had never before had the opportunity to teach.

I was extremely impressed with the conference. From the moment I picked up my packet, the registration workers were welcoming and so helpful, since I was a first time attendee and scholarship recipient, and they answered any questions without hesitation. Once registered, I had the wonderful experience of attending great sessions.



One session topic that I am currently using in all of my classes is from a session presented by Bethany Beaudrie. She showed how to incorporate technology in the form of the FREE web-based application, Socreative.com .

I was blown away not only at the ease of the application, but how well the students responded to it. The ability to have this as part of my science class, as well as being able to incorporate it into other disciplines as well, is so helpful. This application also allows for data tracking, which we all know is so important! I would highly recommend any teacher that uses technology in their classroom check out this fantastic site and enjoy!

I also attended a session that discussed the use of STEM through cooking. What a fantastic idea! I wish that our district was large enough to be able to incorporate this type of hands-on learning.

The last activity for me was the vendor exhibits. I was stunned at the amount of resources I was able to bring back with me, along with some great ideas to implement when I returned to the classroom. Overall, I cannot express my gratitude to the MSTA for allowing me this opportunity to better myself through this excellent professional development opportunity. I look forward to being a participant for many years to come.

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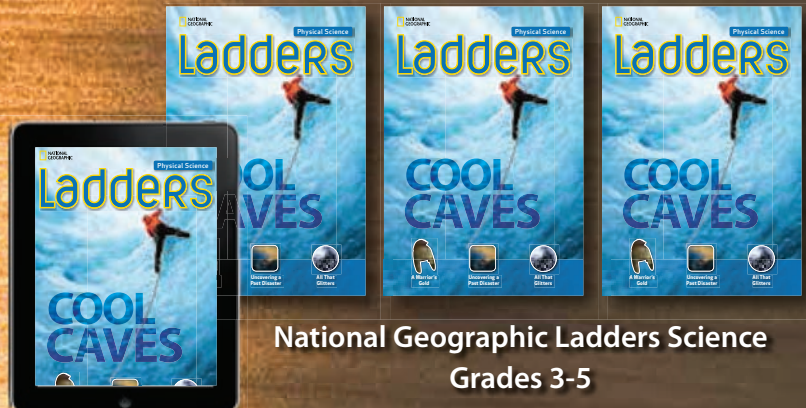
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The Fledgeling



The Fledgeling flies! MSTA science lessons for elementary teachers is published as a recurring feature in the MSTA Newsletter. Establishing good science practices are essential for a solid science program. This is true for all age groups. Through hands-on, Inquiry based science, special needs students are achievers too! The Fledgeling is edited by Sally DeRoo, MSTA.

GO GREEN THIS SEASON, THINK WEEDS!

Decorations and weed projects are very interesting. The weeds (Plants) show a variety of patterns and grow just about everywhere!

Teachers

Weeds projects are wonderful as the source for supplies is endless. Teasel is especially unique! It does however, require some planning. Since Teasel is found in large patches in dry areas along roadsides and open, fields, it would be best for YOU to collect the Teasel heads. Parents supervising students would be ideal.

Teasel is abundant. The weed crop along the roadsides and fields, is a good source. The tap roots and endurance of weeds have given us a major crop.

So, let's be creative and use the weeds for marvelous seasonal decorations. Teasel are the tall prickly stemmed weeds with large "bottle brush" heads.



Teasel

CHRISTMAS TREES AND HOLIDAY DECORATIONS MADE FROM TEASEL

You will need:

- Leather gloves (a must), paper grocery bags, newspaper, sharp cutting shears,
- A quantity of Teasel, cut in various stem lengths.
- Fast drying glue - Small open container (cup, jar)
- Styrofoam forms: Cone for a Christmas Tree (square or other shapes for center pieces, etc. Save pieces from packing boxes-recycle)
- Spray paint, green or color of choice
- Spray snow - Decorations of choice
- Small decorative items to embellish the holiday creations!
- Crayons, markers, newspaper, pencils, ruler
- Plastic or paper plate to fit the base of the cone.

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Christmas Trees and Holiday Decorations Made from Teasel

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DIRECTIONS:

TO BEGIN:

- Locate a patch of Teasel.
- Teasel heads vary in size. Cut the stems and place the “head down” in the paper bag.
- They will be easy to remove if you don’t crowd them.
- Using several bags, you can place the various cut stems in separate bags.

STARTING A PROJECT - CHRISTMAS TREE:

1. **Cut the bags down** the side and open. Lay out the Teasel on the newspaper. Be sure the Teasel is dry.
2. **Visualize a finished project!** The tree will have the traditional pyramid shape when complete.
3. **Draw a picture** of the “visual” tree project.
4. **Determine the size** of the project, draw and label the measurements.
5. **Arrange Teasel stems** of various lengths on a flat surface. A pyramid pattern will help determine the cut sizes needed.
6. **Place the Styrofoam** cone on a secure surface. Lay the long stemmed Teasel in a circle around the base of the cone.
7. **The base or first** layer of Teasel will support the tree and prevent it from falling over. The cut stems at the base should be the longest.
8. **Dip the end** of each stem in glue and gently force it securely into the base. Continue the lower ring of Teasel until the base circle is complete. Each proceeding layer of Teasel should be about an inch shorter than the previous circle.



Stagger the Teasel to fill in the spaces between the Teasel heads.

When the last or shortest ring of Tease, the top row, is in place, stand a single Teasel upright at the top.

Painting and Decorating

1. **Complete the Teasel Tree** by spray painting color of choice to match your Holiday Décor.
2. **Painting should be done** in an open area, caution as fumes of spray may be toxic. **THIS IS A TEACHER JOB!**
3. **When the paint is dry**, add spray snow and additional decorations. Careful with the spray snow as it will stick to decorations.
4. **When the tree is complete**, secure it with glue to a suitable sized plastic or paper plate.
5. **ENJOY YOUR CREATION!!**

TABLE AND DOOR DECORATIONS:

Just select the Styrofoam form you plan to use. As with the tree, arrange the Teasel by height to form the desired look.

A large oval or square with tall stems in the center and shorter cuts in descending rows, makes a striking table center piece.

Add pine cones, nuts or milkweed pods to your creation. Consider spray painting the pods and nuts red, gold or silver.

Fancy ribbon, colored foil and/or wrapping paper can easily finish any exposed Styrofoam edges.

Before you start a door decoration or hanging decoration, consider how the project will be hung!

Students may collect pine cones and add them to the tree’s décor.

FOLLOW UP QUESTIONS AND SOME ANSWERS FOR DISCUSSION!

Did you know that dried Teasel Heads were split, fastened to boards and used to comb wool? Teasel is an invasive species. Teasel is a native of Europe and Asia. It is well established in the Midwest.

The semiannual prickly stem leaved base can be seen in lawns and fields each spring. This “weed” is not welcomed by bare-footed folks!

The beautiful purple flower heads add color to fields and road sides. The soft seed fibers are a favorite of Finch for nesting material.

Fledgling continued on page 24

WHITE PINE is the Michigan State Tree

Fledgling continued from page 24

This season the White Pines are really shedding their needles. Many folks are worried about their trees. Should they worry or is the shedding a natural, seasonal event?

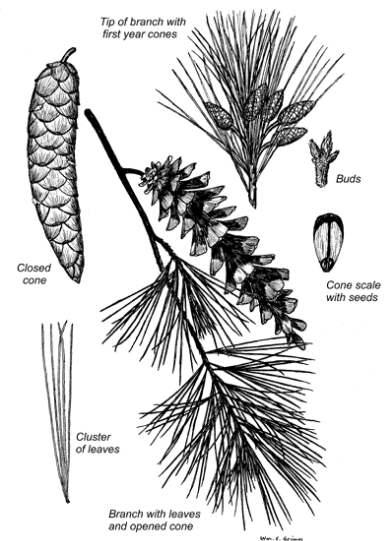
Leaves on deciduous trees change from green to a variety of yellow, oranges and red. The green pigment “chlorophyll” is used during photosynthesis, the food making process.

When the chlorophyll is no longer present, the other pigments stored in the leaves can be seen.

Summary

ASK QUESTIONS AND MAKE A LIST OF ANSWERS BASED UPON PAST KNOWLEDGE AND OBSERVATIONS

- What do you know about plants?
- Do all trees have the same shape?
- Do all leaves have the same shape and pattern?
- Do evergreens have leaves?
- What is the difference between a Conifer and a Deciduous Tree?
- Conifers never shed (lose) their needles - leaves? (True or false, explain)
- Start a vocabulary list of new science words.
- Take a Nature Walk. Notice the changes in plants (trees, shrubs, flowers, and grasses).
- Start a Science Journal to record your observations. Younger children should record using picture observations.



Teachers, We need your feedback!!

Let us know if you have used some of the activities or suggestions given in the Fledgling. We would like to hear from you. Send us pictures of your students. Do offer suggestions for future material.

