

Special Report: 12 Months of Science – See What’s Going on Each Month



**Fisher Science
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HEADLINE DISCOVERIES

Nov/Dec 2011; Issue 4

**2012
CONFERENCE
SUMMARY**
2012 CALENDAR

**THE OLYMPICS
GETS TECHNICAL**

GOING NUCLEAR

PI IN THE EYE



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Price offers in this publication are good through December 31, 2011, unless otherwise stated.



ABOUT THE COVER:

A medieval astronomical clock in Venice, Italy, modified with a globe in the center.



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12 MONTHS OF SCIENCE

2012 FUN FACTS:



Each issue of Headline Discoveries brings real-world science into the classroom with informative articles on current scientific events and innovative products that reinforce key concepts. This issue still holds true to that philosophy, but with a twist; this issue gives you a look into the future. OK, so we're only looking at events that happen in 2012, but it's still set in the future (*at least at press time*). Each article focuses on a specific month and a particular scientific event that's happening during that month. There's also a 12-month reference calendar on the last page. So make sure to hold on to this issue, we think it will be helpful throughout the entire year.

- Fisher Science Education staff

YEARLY FACTS:

- This is the only leap year with three occurrences of Friday the 13th, each three months apart (January, April and July)
- There are exactly 2012 days between the June 20, 2007 summer solstice and the December 21, 2012 winter solstice
- When viewed from above, the layout of the three Giza Pyramids in Egypt coincides with the shape that will be assumed by the three stars that make up the belt of the constellation Orion on December 21, 2012

MONTHLY FACTS:

- January**.....Transatlantic commercial telephone service began from New York to London on January 7, 1927
- February**.....Princess Elizabeth became Queen Elizabeth II of Great Britain on February 6, 1952
- March**.....Daylight Saving Time went into effect in the United States on March 31, 1918
- April**.....The first public showing of a motion picture in New York City on April 23, 1896
- May**.....The U.S. began its first regular airmail service on May 15, 1918
- June**.....The YMCA was organized in London on June 6, 1844
- July**.....Scientists set off the first atomic bomb in Alamogordo, New Mexico on July 16, 1945
- August**.....The "Lincoln" penny was issued on August 2, 1909
- September**.....The first Labor Day was celebrated as a legal, public holiday on September 3, 1894
- October**.....The White House cornerstone was laid on October 13, 1792
- November**.....Veterans Day was first celebrated in the United States on November 11, 1954
- December**.....The first human heart transplant was performed by Christiaan Barnard, a South African cardiac surgeon, on December 3, 1967

2012 Conference Summary:



Pittcon

Science Week Teacher Workshops

Orlando, FL: March 10 – 11, 2012

Conference and Expo

Orlando, FL: March 11 – 15, 2012

National Science Teacher Association National Conference

Indianapolis, IN: March 29 – April 1, 2012

National Science Teacher Association STEM Forum and Expo

Atlantic City, NJ: May 17 – 19, 2012

Biennial Conference on Chemical Education

University Park, PA: July 29 – August 2, 2012

National Science Teacher Association Regional Conferences

Louisville, KY: October 18 – 20, 2012

Atlanta, GA: November 1 – 3, 2012

Phoenix, AZ: December 6 – 8, 2012

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January

NUCLEAR SCIENCE: PAST, PRESENT AND FUTURE

By Sara Nedley



CLASSROOM DISCUSSION

- Nuclear reactors that power submarines work through a process called fission. What is fission? How does it differ from fusion?
- Many aspects of nuclear medicine rely on radioactive decay. What is radioactive decay and why is it so useful for medical applications?

It seems fitting that National Nuclear Science Week is recognized in January. Almost 50 years ago, on January 21, 1954, the U.S. Navy launched the world's first nuclear-powered submarine. Nuclear technology enabled the Nautilus to achieve higher rates of speed and remain submerged for longer lengths of time. As a direct result of the applications for nuclear science, amazing feats such as crossing the North Pole beneath the Arctic ice cap have been accomplished.

National Nuclear Science Week honors the contributions of past, present and future. From atomic structure to nuclear-powered submarines, nuclear science has helped to shape our daily lives in many ways. Nuclear applications save many lives through diagnosis of diseases, employ over half a million people at the 104 nuclear reactors in 31 states and make food consumption safer through irradiation.

From January 23-27, 2012, students and teachers are encouraged to connect with professionals to gain a better understanding of all things nuclear. The National Museum of Nuclear Science and History, a Smithsonian Affiliate, has provided an excellent website full of ideas, facts and resources, <http://nuclearmuseum.org>. Each day of National Nuclear Science Week is dedicated to a particular portion of the world of nuclear science:

- **Monday, January 23:** Get to Know Nuclear
- **Tuesday, January 24:** Careers in the Nuclear Fields
- **Wednesday, January 25:** Nuclear Energy Generation
- **Thursday, January 26:** Nuclear Safety
- **Friday, January 27:** Nuclear Medicine

With all that nuclear science has to offer, it certainly deserves recognition by those who benefit from it on a daily basis ... everyone! By exciting today's generation to continue nuclear exploration, we are enabling more amazing discoveries. Who knows? Your classroom might have the next Albert Einstein or Marie Curie!

February

IT'S ALL THINGS ENGINEERING

By Alida Cataldo

In the United States, it's a week in February (except in Oregon, where the Governor declared February 2011 National Engineering Month). In Canada, it's the month of March (although it started out as a week there).

Traditionally, National Engineering Week in the U.S. is the week that includes the birthday of George Washington, himself a military engineer and land surveyor. The National Society of Professional Engineers founded this celebration of engineers in 1951. Today, more than 120 engineering companies, educational institutions, cultural groups and government agencies conduct or sponsor activities and events that spotlight engineering and technology.

In Canada, National Engineering Week originated in 1992 and was changed to National Engineering Month (March) in 2008. Engineers from northern states such as Washington and Oregon — as well as U.S. suppliers of science education materials — often participate in Canada's events.

Whether engineering is celebrated in the U.S. or in Canada, the events and activities are designed to bring out the "inner engineer" in young people, encouraging them to consider making it their career. Engineers visit schools; organizations conduct seminars, workshops and demonstrations; and

corporations sponsor competitions such as:

- Connecting a Rube Goldberg machine, in sequence, via the Internet, then lighting the entire CN Tower in Toronto purple
- Constructing paper bridges with card stock and glue, then having the U.S. Army Corps of Engineers destroy them
- Building a rocket-powered "ski lift" using energy created from a deflating balloon to carry pennies safely up a fishing line

NATIONAL ENGINEERING WEEK IS FEBRUARY 19-25, 2012

Preparations are well underway for next year, with Battelle and ASME (American Society of Mechanical Engineers) leading the event. Numerous local and regional events are planned, and the national Future City Competition is again part of the program.

Find out more about National Engineering Week at <http://eweek.org>. For details about The Future City Competition for sixth-, seventh- and eighth-grade students, visit www.futurecity.org.



CLASSROOM DISCUSSION

- Why is engineering important? How does it apply to things we use in our everyday lives?
- What types of engineering are there?

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Save the date: March 14. Join classrooms and communities around the world for the 24th annual celebration of Pi Day. First held at the San Francisco Exploratorium in 1988, Pi Day occurs on the 14th day of the third month (3.14). It's a once-a-year opportunity to contemplate all things circular, non-sequential and mathematically irrational.

What is so special about pi? For starters, this ratio of a circle's circumference to its diameter has been around for approximately 4,000 years. Millenniums before William Jones (1706) adopted the Greek letter as a stand-in for the number-that-never-ends, mathematicians have been obsessing over the

next digit. Pi? Because they can! In the sixteenth century, Ludolph van Ceulen hand-calculated pi to 35 digits; recently, Alexander J. Yee and Shigeru Kondo supercomputered their way to five trillion.

Like pi, the number of ways to celebrate Pi Day is infinite. Pie baking/decorating contests are extremely popular; pie eating (both the fruit-filled and pizza variety) even more so. Pi bees and other memorization events are held all over the country, some for academic fun, others for bragging rights. The current king of pi, Marc Umile, recited the value of pi to almost 13,000 decimal places. Choral pi readings offer students — organized into groups

representing the ten digits — a collective way to vocalize pi.

Pi activities range in scale, from circle drawing to human pi chains and marching band-style formations. In the former, participants — in one of 10 digit-identifying colors — form a line or spiral representing the expression of pi. In the latter, students take to the field to create giant "3.14s" or symbols. Pi searches are another way to honor the randomness. Now that computers have generated pi to trillions of places, all telephone numbers, birthdays, etc., are located throughout the sequence; competitors race to find first occurrences.

The possibilities for a fun-filled Pi Day are appropriately endless. For more ideas regarding bringing pi into the classroom, visit www.piday.org.

CLASSROOM DISCUSSION

- Why does it make sense that every circle, no matter its size, has the same ratio between its circumference and diameter? Have students compare area equations for circles and other shapes. Discuss a circle as infinite-sided polygon
- How can your classroom/school uniquely celebrate Pi Day?



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April

CELEBRATE EARTH AND THE "SOFTWARE" OF ITS LIFE FORMS

By Joy Jones

Not your traditional Hallmark® holidays, Earth Day and DNA Day, both celebrated in April, pay homage to the natural world. While Earth Day is celebrated extensively across the globe, DNA Day is a relative newcomer to the scene.

Celebrations of Earth Day date back to April 22, 1970, an event that drew nearly 20 million Americans. Earth Day 2012 will take place on Sunday, April 22, and focus on such environmental issues as climate change, environmental degradation, environmental health and genetic engineering. The 2010 oil spill in the Gulf of Mexico and the 2011 nuclear crisis in Japan are also expected to receive considerable attention.

DNA — THE SOFTWARE OF THE CELL

First held on April 25, 2003, DNA Day commemorates the discovery of DNA's double helix (resembling intertwined spiral staircases) by Watson and Crick in 1953. DNA is the data information center found in every cell of a living thing, from a bacterium to a human being, telling the cell what to do and when to do it.

DNA Day is set aside to enlighten students, teachers and the public about genetics and the latest advances in genomic research, some of which have been considered rather controversial. Geneticist Spencer Wells of Cornell University, for example, claims his research shows that the ancestry of all seven billion human beings can be traced back to a "small African population – perhaps numbering only 2,000 or so – living on that continent as recently as 60,000 years ago."

Beyond its role in genealogy studies, DNA is also a key player in forensic science (criminal profiling), agriculture (crop modification), medicine (hereditary disease research) and even national security (biological warfare studies).

So don't dismiss Earth Day and DNA Day as "geek holidays"; they are events we all have a stake in. To learn about Earth Day events in your area, visit <http://www.epa.gov/earthday/events.htm>. For DNA Day activities, go to www.genome.gov.



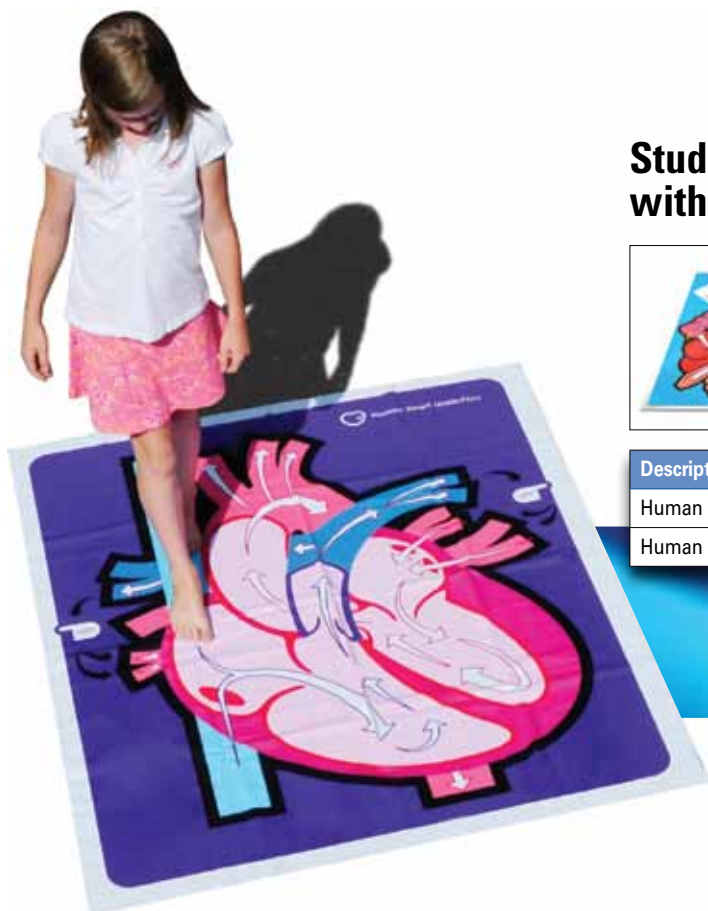
CLASSROOM DISCUSSION

- What are some "green" initiatives you have observed?
- Discuss how the various roles of DNA are manifest in everyday life

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Rapid diagnosis of cancer, genetic investigation of autism, improving mileage efficiency of hybrid vehicles, solar cells as alternate sources of energy; all are complex problems requiring the dedication of today's brightest scientific minds. These topics, and many more, are also getting attention and dedication from science's next generation, the participants of the Intel International Science and Engineering Fair (ISEF).

ISEF is a program of Society for Science and the Public, and the world's largest pre-college science research competition. Society for Science and the Public, a nonprofit organization dedicated to public engagement in scientific research and

education, has owned and administered the International Science and Engineering Fair since its inception in 1950. Intel has sponsored the International Science and Engineering Fair since 1997. Through a global network of local, regional and national science fairs, millions of students around the world explore their curiosity for how the world works and develop solutions for global challenges.

Long gone are the days of model volcanoes, brand comparisons and the potato clock. The Intel ISEF partners today's brightest young minds with leading scientific authorities, providing the students with the opportunity to showcase their talents and submit their work for recognition by experienced scientists. Millions of students compete each year in local and school-sponsored science fairs; the winners of these events go on to participate in Intel ISEF-affiliated regional and state science fairs. It is the winners of these fairs that get the opportunity of a lifetime — to attend and participate in the annual Intel ISEF. Each May, more than 1,500 students from more than 65 countries, regions and territories are selected as finalists and offered the opportunity to compete for more than \$4 million in awards and scholarships.

The next ISEF will take place in Pittsburgh, Pennsylvania from May 13-18, 2012. For more information visit www.societyforscience.org/IntelISEF2012 or www.youtube.com/watch?v=2-c0gGIMI_s.

CLASSROOM DISCUSSION

- Who were the winners from last year's Intel ISEF, what was their research about and why was it important?
- Even if students aren't actively participating in the competition, why is it important to get involved in this kind of event?

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June

SUMMER SOLSTICE

By Valinda Huckabay

The Earth's rotation is not perfect — it wobbles a bit, causing it to tilt or lean on its axis. This less-than-straight alignment is what causes us to have seasons. The longer days are in the summer, and the shorter days are in the winter. Spring and fall mark the transition times between these two extremes.

WHAT IS A SOLSTICE?

When the Earth is tilted, different amounts of sunlight reach different regions of the planet at different times of the year, making the days longer or shorter depending on where you are.

The term "solstice" comes from a combination of Latin words that mean "sun standing still." During the summer solstice, the sun appears to hang motionless (stand still) overhead for a longer period of time.

The summer solstice is the longest day and shortest night in the Northern Hemisphere and marks the official beginning of the summer season. The Southern Hemisphere, however, experiences the winter solstice, which is the shortest day and the longest night.

SOME INTERESTING FACTS

For many of our ancestors, the summer solstice wasn't just a longer day or shorter night. It was essential to their culture and dictated how and why they did certain things.

- Because agriculture was so vital for the survival of the population, the summer solstice heralded the turning point in the growing season and signaled the time to prepare for fall plantings and harvest

- To the ancient Egyptians, the summer solstice was so significant that they built the Great Pyramids positioned so that the sun, when viewed from the Sphinx, appeared to set precisely between two of them on that day
- In South America, the Inca (a native Indian population) celebrated the summer solstice with a ceremony called Inti Raymi, which often included food offerings and sacrifices of animals
- Recently, archaeologists discovered the remains of an astronomical observatory in a long-buried Mayan city in Guatemala in which the buildings were designed to align with the sun during the solstices. During such times, the people of the city gathered at the observatory to watch as their king appeared to command the heavens

MODERN TRADITIONS

No matter where you are on the planet, the solstice still marks the changing of the seasons. Even in our modern-day life, we note the passing of spring and herald the arrival of summer with eager anticipation of vacations, freedom from school and backyard barbecues. Though not as significant as it once was to our ancestors, we can still revel in the connection we have to the natural cycles of the Earth on which we live.

CLASSROOM DISCUSSION

- What parts of the world experience the exact opposite seasons as we do in the United States?
- What do you think our climate would be like if the Earth's axis did not wobble?

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By Patricia Rogler



The summer Olympics of 2012 will be held in London, England from July 27 to August 12, and once again, science will play a huge role in the event. Whether it's the study of gravity and applied force for the long jump and the high jump, or Newton's laws of motion relating to the shot put or discus throwing, science has so many applications in sport. In addition, the use of science has resulted in the development of better equipment, gear and techniques for athletes.

EVER-CHANGING ATHLETE'S ATTIRE

The science of sport has a long history at the Olympics. As far back as the 1890's, spiked track shoes were introduced for runners. In 1976, the first swimming goggles were allowed. In the 1970s ice vests were used to keep athletes cooler when competing in warm weather. In 2008, Nike developed outfits using a special light, strong fabric made from liquid crystal polymers, which could withstand high temperatures. Nike claimed that the new clothes would reduce drag by seven percent, giving their athletes a clear advantage. Sprinters have been clothed in ever-tighter, higher-compression outfits based on the scientific study of proprioception, the sense of relative positions of neighboring parts of the body. The belief is that a compressed outfit will help the brain better activate mus-

cles because it knows exactly where its limbs are. In 2008, the scientific study of fabric and friction led Speedo to develop a swimsuit that used polyurethane panels on particular body areas that cause the most friction — the torso, abdomen and lower back. The suit also has a corset-like structure that helps to streamline the body's position in order to give the athlete an advantage in the water. (Since the suit's initial debut, many suit designs were banned at international competitions and others have required modifications to lessen the suit's performance enhancement elements.)

NEW MOTION TRACKING DEVICE

The United Kingdom has invested in an underwater motion tracking device for its swimmers, which will offer coaches and athletes immediate feedback on how they can improve their swimming techniques. Water-resistant markers are painted on the swimmer to reduce drag, and underwater cameras are used to capture the swimmers form when starting, turning and gliding. The video program then suggests potential adjustments so the swimmer can achieve an optimal performance.

As many other countries have done before, the United Kingdom is using science to help improve its chances of medaling in the Olympics that they will be hosting. The ever-evolving relationship between science and the Olympics continues.

CLASSROOM DISCUSSION

- Discuss Proprioception, the sense of relative positions of neighboring body parts (e.g., touching your nose with your eyes closed)
- In what other ways has science affected, changed or evolved the Olympics?

By Terri Sota

The best show of the summer season returns next year — to a backyard near you. Premiering in mid-July and peaking in the early hours of August 13, the Perseids meteor shower promises anywhere from 20 to 80 meteors per hour, depending on the brightness of the prevailing moon.

First recorded in 36 A.D., the Perseids are the dusty remnants of the Swift-Tuttle comet, which passes through the inner solar system every 133 years (its last appearance was 1992-93). With each orbit around the sun, the ice trapped within the comet turns to gas (sublimates) and releases a trail of dust — millions of miles wide. The Earth spends close to a month each year passing through the debris. Composed of dust, dirt and ice, the largest meteors measure a few centimeters in diameter; the majority are closer to one millimeter.

Meteor showers are named for the constellation that houses their radiant (the point from which a shower of meteors appears to radiate). The Perseids emanate from Perseus; the Leonids (November) from Leo. Meteoric speed is determined by the speed the debris was traveling when it separated from its parent comet. The Perseids can travel 59km/sec., or more than 130,000 miles per hour. In low-Earth orbit, the average speed is approximately 24km/sec., almost 100 times faster than a supersonic jet's maximum speed.

Within the shower, meteors burn in a variety of colors, as a result of elemental oxidation: green is indicative of the presence of oxygen atoms; yellow reveals sodium.

The Perseids are best viewed across the Northern Hemisphere; in the south, the Perseid radiant is either too low on the horizon or completely invisible. How to ensure the best seats in the house? Find a very dark place — far removed from

street or city lights. Set the clock for just-before dawn, sometime between 3 and 4 a.m. Leave the telescope indoors to avoid shrinking your field of view. Once settled, take a deep breath, tilt your head back and enjoy.



CLASSROOM DISCUSSION

- Why do the Perseids occur at the same time every year? How long will they continue?
- Why do scientists think that meteors contain matter created at the birth of the universe?

By Pam Sherwood



Shorter days and cooler temperatures warn of the approach of fall each September, but the Autumnal Equinox makes it official (at least for those of us in the Northern Hemisphere). The Autumnal Equinox, which occurs on September 22 or 23 each year, marks the first day of the season of autumn. This is one of the two points in the year, known as equinoxes, that nights reach the same length as days. The other equinox, the Vernal Equinox, occurs each spring on or about March 20. In 2012, the Autumnal Equinox will occur on September 22, at 14:50 GMT (Greenwich Mean Time).

An equinox occurs when the sun crosses the celestial equator and the direction of the Earth's poles is perpendicular to an imaginary straight line joining the Earth and sun. This results in all places on the Earth having the same length of nighttime. In fact, the word equinox comes from two Latin words, *aequus* (meaning equal) and *nox* (meaning night).

HARVEST MOON

The harvest moon is the full moon closest to the autumnal equinox. In 2012, the harvest moon will occur on September 29. Harvest moons rise close to sunset so that light from the setting sun and the rising moon mix together to create a kind of 360-degree, twilight glow. Harvest moons also seem to be bigger, brighter and more colorful than other full moons. The color of the moon is caused by light refracting and reflecting from a greater amount of atmospheric particles. The atmosphere scatters the bluish component of moonlight, but allows the reddish component to travel a straighter path. The moon appears larger because of the power of perception of objects along the horizon, known as the moon illusion. This phenomenon applies to many celestial objects, however, not just the moon.

The harvest moon received its name because of the role it plays assisting northern farmers working long hours to harvest crops. Its early appearance and bright light enables farmers to extend their workday beyond sunset.

These astronomical phenomena, as well as the yearly progression through the seasons, result from the Earth's 23.44 degrees of axial tilt; if the rotational axis of the Earth was perpendicular to its orbital plane we would not experience changes in the length of days or the seasons.

CLASSROOM DISCUSSION

- What season begins in the Southern Hemisphere at the autumnal equinox? Why?
- How does the axial tilt result in the changing seasons?

By Gwen Myslinski and Sara Nedley



To many scientists, October is a time to celebrate and recognize chemistry and the Earth sciences. Chemistry is the study of matter and its properties; and Earth science is all-encompassing for sciences related to the Earth. Although both branches of science are unique in their own way, many connections can be drawn between the two.

As the modern birthstone of October, pink tourmaline is a reminder of how Earth science and chemistry are intertwined. Tourmaline is a crystal boron silicate mineral; various metals can be present within the crystal structure and are responsible for its many characteristic colors. But scientists' main interest in tourmaline lies within a unique physical property of pyro-electricity. When heated and allowed to cool, tourmaline has the ability to maintain an electrical charge. The gem develops positive and negative charges and can oscillate or attract small pieces of paper, lint and dust.

EARTH SCIENCE WEEK

Since October 1998, the American Geological Institute has organized Earth

Science Week "to engage students in discovering the Earth sciences; to remind people that Earth science is all around us; to encourage Earth stewardship through understanding; and to motivate geoscientists to share their knowledge and enthusiasm about the Earth." This international event always takes place during the second full week in October (October 14-20, 2012) with several activities and contents, as well as lesson plans with which students, teachers and Earth science enthusiasts can participate. Go to www.earthsciweek.org to learn more.

NATIONAL CHEMISTRY WEEK

National Chemistry Week, coordinated by the American Chemical Society, is celebrated during the third week of October (October 21-27, 2012), and originally began as National Chemistry Day in 1987 to raise public awareness and showcase the importance of chemistry in everyday life. It was expanded to a week-long celebration in 1989 with a main focus and a theme. The 2012 theme has yet to be decided, but the focus will be all things nanotechnology. Local events will be taking place throughout the country; to see what events will be taking place in your community, visit www.acs.org/ncw.

Our planet and how it works are directly related to chemistry, and tourmaline is an excellent example. Make sure to celebrate both in October!

CLASSROOM DISCUSSION

- Discuss a recent Earth science event and how it has affected the local, national and/or international community(ies)?
- What is nanotechnology and how has it affected scientific research and discovery?

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Luminol powder	11/02/2009	1	Green	521-31-3	C ₈ H ₇ N ₂ O ₂		
Potassium Chloride 1.0M Aq soln	03/07/2010	50	Green		Mixture		
Sodium Chloride	08/22/2008	421	Green	7547-14-5	NaCl		

Aldon's new chemical inventory management system allows you to track chemical inventory at different locations, buildings or even individual classrooms.

Description	Cat. No.	Price
One-Year License	S05461	203.00
Five-Year License	S05859	796.00



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Demonstrate the critical skill of pipetting with this essential kit.

Description	Cat. No.	Price
Edvotek* Micropipetting Basics	S68632	48.65



Fisher Science Education Lets You Study Water Quality on the Go

Water pollution studies made easy and portable with this step-by-step kit.



Description	Cat. No.	Price
Fisher Science Education Water Quality Saddle Bag	S02645	195.40



TOTAL SOLAR ECLIPSE: A FEW MINUTES, EXPERIENCE OF A LIFETIME

By Sara Nedley



With all of the wonders technology has to offer, it is easy to forget to take in the miracles of nature. One of these miracles, a solar eclipse, occurs when the moon passes between the sun and the Earth. It is a total eclipse if the moon's shadow completely covers the sun. This occurs every 18 months, but it has been estimated that reoccurrence at a specific location is once every 370 years.

HOW DOES IT DO THAT?

There are many factors that determine if a total solar eclipse will be visible. Total eclipses are rare due to the alignment needed for total occlusion, as well as the narrow band in which this occurs on the Earth's surface. Also because the distance and diameter ratios are about the same (the sun is 400 times larger and further from the Earth than the moon), it allows the sun and moon to be viewed from Earth at approximately the same size. Total eclipses are also dependent on the distance between the Earth and the moon. Only when the moon is closest to the Earth can a total eclipse occur.

A total solar eclipse is marked by several phases:

- **First and second contact:** the moon's shadow becomes visible as it moves into the sun's path; as partiality deepens the sky grows darker and as second

- contact concludes most of the sun's surface is covered
- **Totality:** the moon's shadow obscures the sun's surface; the corona, solar flares and solar prominences become visible — all areas where totality is visible will be in darkness
- **Third contact:** the western sky will brighten dramatically, the corona disappears and the sun's surface becomes increasingly visible

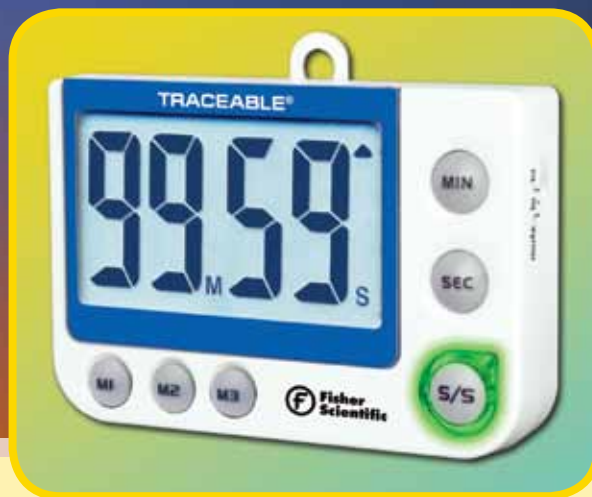
Although all phases of a total eclipse take 2-3 hours to complete, totality will only last a couple minutes as the moon's shadow moves at a rate of 1,056mph.

WHEN DO WE GET TO SEE A TOTAL SOLAR ECLIPSE?

Does all of this information have you excited to see a total solar eclipse? Unfortunately, the next total solar eclipse in November, 2012 will only be visible in the Southern Hemisphere to a very small population. The next total solar eclipse that will be visible in the U.S. will occur on August 21, 2017. The Grand Tetons, St. Louis and Nashville are just a few of the places lucky enough to be in the path of totality. Start making your viewing plans today!

CLASSROOM DISCUSSION

- Did you know the only time it is safe to look at a solar eclipse is during totality? How can a solar eclipse be viewed safely?
- There are seven other planets in our solar system other than Earth. Do solar eclipses occur on other planets?



The Timing is Perfect for Fisher Scientific's Big-Digit Alarm Timer

Easy on the eyes, Fisher Scientific's traceable flashing LED alert big-digit alarm timer can be seen from across the classroom.

Description	Cat. No.	Price
Fisher Scientific Traceable Flashing LED Alert Big-Digit Alarm Timer	S02271	20.00

By Sarah McGann

The film industry has long enjoyed the benefits of doomsday predictions, from the famous *Planet of the Apes* (1968), where Earth has been all but destroyed by nuclear war, to *2012* (2009), which depicts the 2012 phenomenon taking place. Fictional novels have done the same in works such as H.G. Wells' *The War of the Worlds* (1898), in which England is invaded by aliens, Jack London's *The Scarlet Plague* (1912), which takes place 60 years after an epidemic called the *Red Death* has swept the planet, and Douglas Adams' *The Hitchhiker's Guide to the Galaxy* (1979), wherein Earth has been destroyed and the surviving humans live among a variety of aliens throughout the galaxy.

Of all the theories depicted in film, television and fiction, the 2012 phenomenon has the most significant historical background. According to its supporters, the world will end on December 21, 2012, the last date that appears on the Mayan Long Count calendar. This date marks the end of a cycle the Maya called a "baktun," which is a period of approximately 400 years, and this baktun is the 13th and last of these cycles on the calendar. The Maya believed in "world ages" that repeated cyclically, rather than as a linear passage of time, and in order to best represent these cycles, the Maya created the long count calendar. Since the last world cycle ended after 13 baktuns, doomsday supporters believe the end of the world will correspond with the end of the calendar on December 21, 2012.

There are more critics of this theory than supporters, however. David Webster, a professor of Archeological Anthropology at The Pennsylvania State University, points out, "The Maya, of course, would simply have begun another cycle, just as they did before, and their world would have gone on." In other words, the long count calendar is only ending because the Ancient Maya no longer exist



to ensure the continuance of the calendar." According to Sandra Noble, executive director of the Foundation for the Advancement of Mesoamerican Studies in Crystal River, Florida, "For the ancient Maya, it was a huge celebration to make it to the end of a whole cycle." To consider December 21, 2012, a doomsday event, she continues, is "a complete fabrication and a chance for a lot of people to cash in." Given the number of movies, television shows, documentaries and novels dedicated to such ideas, she certainly makes an excellent point.

CLASSROOM DISCUSSION

- If you had unlimited resources and one year left to live, what would you do?
- Do you think there is any credibility to the theory that the world will end on December 21, 2012?

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Binocular Camera Head; Head Type: 45° Angle	S98251	1249.00
Monocular Camera Head; Head Type: 45° Angle	S98250	849.00



2012 OVERVIEW

January 2012

M	T	W	T	F	S	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

February 2012

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29				

March 2012

M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

April 2012

M	T	W	T	F	S	S
						1
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16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

May 2012

M	T	W	T	F	S	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

June 2012

M	T	W	T	F	S	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

July 2012

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						1
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16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

August 2012

M	T	W	T	F	S	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

September 2012

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
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17	18	19	20	21	22	23
24	25	26	27	28	29	30

October 2012

M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

November 2012

M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

December 2012

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

2012 HOLIDAYS AND SCIENCE EVENTS

Jan 1	New Year's Day	Mar 14	Pi Day	May 28	Memorial Day	Oct 21-27	National Chemistry Week
Jan 16	Martin Luther King Jr. Day	Mar 17	St. Patrick's Day	Jun 14	Flag Day	Oct 31	Halloween
Jan 23	Chinese New Year	Mar 20	First Day of Spring	Jun 17	Father's Day	Nov 4	Daylight Saving Time Ends
Jan 23-27	Nuclear Science Week	Apr 1	April Fools' Day	Jun 20	First Day of Summer	Nov 11	Veterans Day
Feb 2	Groundhog Day	Apr 1	Palm Sunday	Jul 4	Independence Day	Nov 13	Total Solar Eclipse
Feb 12	Lincoln's Birthday	Apr 6	Passover	Jul 21	Ramadan Begins	Nov 22	Thanksgiving Day
Feb 14	Valentine's Day	Apr 6	Good Friday	Jul 27-Aug 12	2012 Olympics	Dec 8	Hanukkah Begins
Feb 19-25	National Engineering Week	Apr 9	Easter	Aug 13	Perseids Meteor Shower	Dec 21	First Day of Winter
Feb 20	Presidents' Day	Apr 22	Earth Day	Sep 3	Labor Day	Dec 21	"Doomsday"
Feb 21	Mardi Gras	Apr 25	DNA Day	Sep 16	Rosh Hashanah	Dec 24	Christmas Eve
Feb 22	Washington's Birthday	May 5	Cinco de Mayo	Sep 22	First Day of Autumn	Dec 25	Christmas Day
Feb 22	Ash Wednesday	May 13	Mother's Day	Sep 25	Yom Kippur	Dec 26	Kwanzaa Begins
Feb 29	Leap Day	May 13-18	ISEF	Oct 8	Columbus Day	Dec 31	New Year's Eve
Mar 11	Daylight Saving Time Begins	May 19	Armed Forces Day	Oct 14-20	Earth Science Week		



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