XAVIER

Science Journal

2007

A Publication of the NYS Science Honors Society

Xavier Chapter

XAVIER

Science Journal

TABLE OF CONTENTS

Dear Xavier Student Body,

The Xavier chapter of the New York State Science Honors Society was initiated following a meeting in the Catskills with STANYS (the Science Teachers Association of New York State). The objective of the organization was to remove science, as it was being taught in the schools, from the shelf of only those academically elite enough to meet the challenges and to call on those same students to help spread the wonder of science to all of the student body, with their leadership. With the assistance of these science honors students at Xavier, the foundations of the Medical Science Club, the Xavier Science Journal and the Oesteichthyes Society were established and they simply flourished. Mrs. Lamour was a member of the Board of Governors for a four year term and over the years the society has incorporated many projects and clubs under the umbrella of our NYSSHS. We have continued our annual Earth Day project, whereby we work with the Central Park Conservancy to beautify a section of the park. We held our annual Science and Technology Fair with the robotics competition, the bridge building competition and the competition of the science projects. We celebrated Physics Day at Great Adventure, started a Food and Science Club and held our first XRAD competition (Xavier racing and design competition).

The NYSSHS is destined to continue to showcase the marvelously talented young men that we have here at Xavier. It is due to their strengths, their ingenuity and their many talents that we can be proud of the accomplishments of our students and their faculty. I am honored to have been the moderator of these outstanding students. I look forward to the paths that the NYSSHS will take as they continue to lead the underclassmen in science filled activities and to help them to understand that science is not only in a classroom it permeates all that we do.

Daniel Soszynski '07

NYSSHS President

Mrs. Grace Lamour

Moderator, Science Department

Xavier Botball: On to Victory

Mr. Michael Chiafulio, Science and Technology Dept.

On May 19, 2007 Xavier sent two teams to Polytechnic for the NY / NJ Regional Botball Championships. Both teams faced tough competition from the 20 team field. This year's challenge was difficult and many teams struggled to consistently score points in the tournament. Xavier's two teams led by Rob Hughes, Hay Lee Chan, Danny Perez, and Andrew Vazquez defeated the other 18 teams and emerged victorious taking home first and second place overall.

In the final four of the double elimination round, the two Xavier teams had to go head to head—neither team had been beaten at that point. In a repeat of the Commons Challenge from back in Feb, the team led by Hughes bested Vazquez and Perez.

The whole day seemed to be building toward a Peddie School vs. Xavier final when Peddie got consistent results in the seeding round from their lava-blocking-bot dubbed "Godzilla." Peddie was eliminated from the head to head round without ever facing a team from Xavier. After taking the final match against a strong Rahway High School squad, the team of Hughes and Chan challenged the Peddie School team to an unofficial match on the tournament table. All of the students left at the tournament gathered around the table to watch this post-season tournament match between the two early favorites. This was the match up everyone thought would determine the champ. With nothing but bragging rights on the line, Hughes and Chan won the final match and secured the undisputed regional championship by going undefeated on the day. Mr. Chiafulio had this to say after the match with Peddie, "We didn't want any schools leaving this gym today thinking that they would have beaten us if they only had the chance to face us. So, we gave them the chance, and Xavier came out on top."

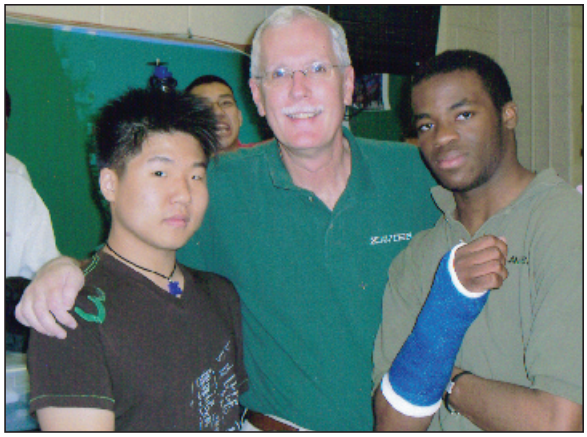
Here is a break down of Xavier's tournament winnings:

- 1st Place Trophy Documentation—Xavier team 1
- 1st Place Trophy Head to Head Round—Xavier team 1
- 1st Place Trophy Overall—Xavier team 1
- 2nd Place Trophy Overall—Xavier team 2
- 1st Place Trophy National Research and Design Website—Xavier High School

Both teams traveled to Honolulu, Hawaii in July to battle the top teams in the country at the Botball National Championships. Way to go Xavier!

Med. Sci. Welcomes Speakers, Educates Students

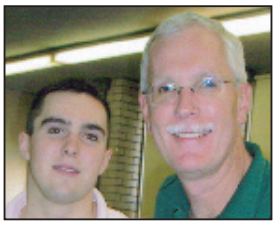
Eugene Yi '07



(L) Dr. Jacqueline Lamour, daughter of Grace Lamour, speaks at a Med Sci meeting.
(R) Dr. John Reilly, father of junior Tom Reilly, demonstrates the art of cast application.

Students who have an active interest in the field of medicine enjoyed a year full of adventure. We explored the brains of sheep, developed a cardiopulmonary lab, reviewed the state of HIV around the world, focused on the process of developing one's background for medical school and expanded the discussion to the impact of viruses and tropical medicine on the world's population. Mr. Chris Kennedy, counselor at Xavier, presented a program on schizophrenia and multiple personality disorders that elicited questions that showed an active interest in the area of psychology.

Dr. Jaccqueline Lamour, Associate Director of the Pediatric Transplant team in Columbia Presbyterian Hospital, following a pediatric transplant presentation last year, brought pediatric hearts with defects to illustrate the complications faced by her team in correcting the malformations enough to enable the patients to live their life with some stability. Dr. Lamour has set up a summer internship for Gabriel Fernandez'08, in pediatrics, under her supervision. Dr. John Reilly , father of Tom Reilly'08, an orthopedic surgeon in Staten Island Hospital was generous with his time for the third year in a row. He brought in his devices to allow the students to observe and ask questions about the updates in material and design of the new products for joint replacement and bone recovery. As always, he ignited the enthusiasm of the students by teaching them how to cast their arms and face the electric saw for cast removal. Dr. John Chau, a neurosurgeon from Staten Island Hospital, returned for the second year and showed a presentation of a neurological surgical procedure involving the brain of a patient he had recently attended.



We are so grateful for the time these great people in medicine expend on behalf of the students of Xavier.

We would like to thank Mrs. Grace Lamour for all of her efforts to stimulate the minds and interests of the Xavier students and expose for them the wonders of all aspects of medicine.

Oesteichthyes Society Wraps Up Successful Year

Brian Cummings '07

It is difficult to imagine that four years have flown by at Xavier and that I am off to pursue a course in college that may one day result in my becoming a veterinarian. My tenure in the Oesteichthyes Society has helped to pave the way to my future goals. I thank Mrs. Lamour for the opportunity she has given me.

The Oesteichthyes Society was initially started to take care of the marine and two fresh water tanks in the Bio lab and to teach the underclassmen all that it entails to take care of the animals and stabilize the tanks. Over the years the responsibilities have grown to include guinea pigs, rabbits and hamsters. Oesteichthyes is the phylum for bony fish so we hope the rest of the animals did not feel maligned being tossed into the same category. It was a matter of expedience.

I will miss the 55 plus students who arrived at 7:45 each morning and all of the wonderful excuses for why they did not. These students began their day completing rotating tasks involved with the care of the animals. Cleaning the fish or animals' tanks, controlling the pH and algae growth, feeding and giving water to the animals, or taking turns playing with the animals all required their time and it was generously given. The fish have been sent home with some students to their protective tanks. The guinea pigs will be in Mr. Chiafulio's care, and Xavier will not say goodbye to Mrs. Lamour but a warm and friendly thank you for all that she has done for us and to tell her "We'll see you later."

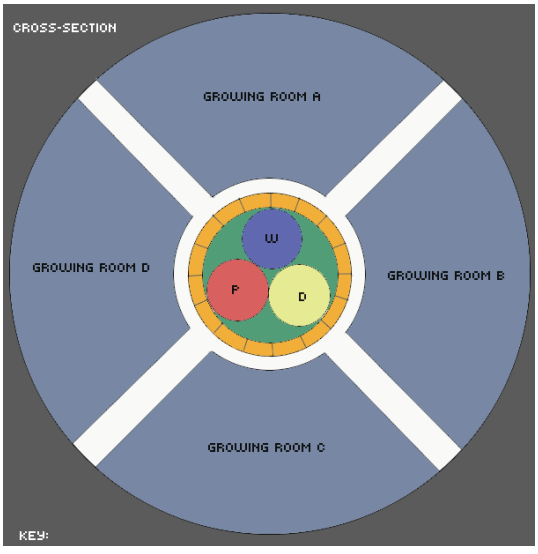
2007 Research and Design Website Challenge Victory

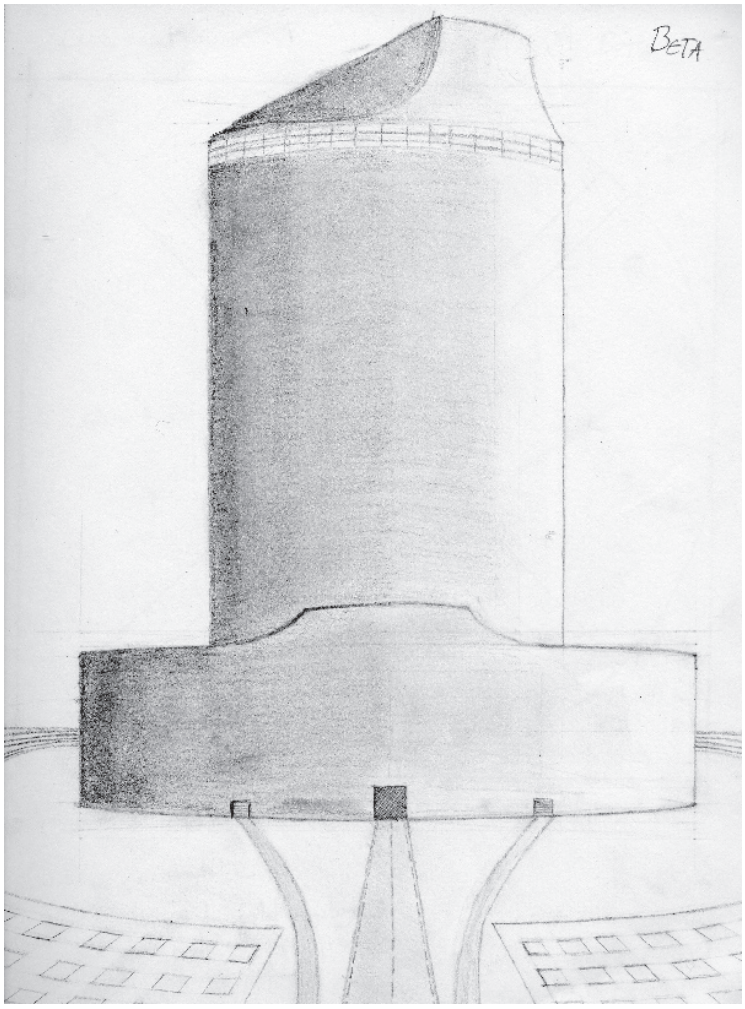
John Ripollone and Paul Kiernan '08

The Xavier Robotics Team in collaboration with the Xavier Chapter of the NYSSHS won first place in the 2007 Research and Design Website Challenge known as the "Feeding the World — Saving the Environment" project. This competition challenged robotics teams from all over the nation to build websites providing insight into robotics in agriculture in terms of current robotics, problems faced by farmers without state of the art technology and a proposal by the individual teams as to how to mend and advance modern agriculture with future technology.

Based on our research we determined the most common robots used in agriculture are known as "Agbots". These contemporary robots assist the farmers in harvesting, planting implementing pesticides as well as other tasks. Upon determining which current technology to include in our website, we needed to delve into the farming life and establish which common problems to touch upon in our creation of a more effective farm. We discovered that the most common problems faced by farmers are: 1. Weather and natural disasters; 2. Insect infestation and pollution; 3. Locality – keeping the distance between the farm and the consumer as short as possible; and 4. Man power – handling hazardous or tedious jobs. Clearly, these are unavoidable and problematic issues which the American farmer constantly faces.

Our solution was extensive. We realized that the current agricultural institution and methodology is not efficient to a degree that supports or accommodates global or general mass demand. We developed the "Agtower". As implied, this will be a skyscraper meant solely for crop development. The building would be roughly ninety stories in height and lie on a foundation of about three hundred square feet. The base of the building has a diameter of two hundred feet and height of twenty floors. It is in this part of the building where harvested crops are packaged and shipped. Otherwise,





the remainder of the building –a diameter of one hundred feet and height of approximately seventy floors- would primarily serve as the area in which the plants are grown.

Running down the middle of the tower if viewed from the top will be three columns, one meant for power, one meant for water distribution and one meant for data. Surrounding these three columns will be four quadrants sectioned throughout the rest of the building. Each quadrant is meant for a specific type of crop growth. In considering energy usage we decided on a "three-fold strategy." In short, this system implements the absorption of wind, water and solar energy so as to deplete the need for electricity.

The team's efforts at recreating modern agriculture into a more efficient exploiter of future technology were exceptionally successful. For a more extensive view of our work and illustrations pertaining to the above descriptions of the "Agtower," please visit:

http://faculty.xavierhs.org/Chiafuliom/AgBots


KEEP PARK CLEAN

Xavier Works With The Central Park Conservancy

Alejandro Alvarez '07

The Earth Day celebration at Xavier High School begins on the day of the Mother's Club fund raising event in May. The students are off from school and the time remains perfect for Mrs. Lamour and students the 55 Central to meet at to give Park through back, service, something for the community. Xavier has had a 15 year association with the Central Park Conservancy. Our students, for many years under the supervision of Kieron Lindsay planted ground cover, cleared areas, weeded, pulled out young trees and restored flowering landscapes. This year our leader from the Central Park Conservancy was Dan Ramon. The major problem for our area of the Park was soil erosion following severe rain storms. We planted 5,000 eunonymous plants in three locations to be used as sources for absorption of the water in order to prevent the wearing away of the soil. It is a wonderful image to watch as "city students," not accustomed to getting their hands dirty in the soil, grow slowly responsive to the concept of what they are accomplishing. They always enjoy the pictures of the final product and are amazed that their efforts resulted in such beauty.

Xavier has had a 15 year association with the Central Park Conservancy.

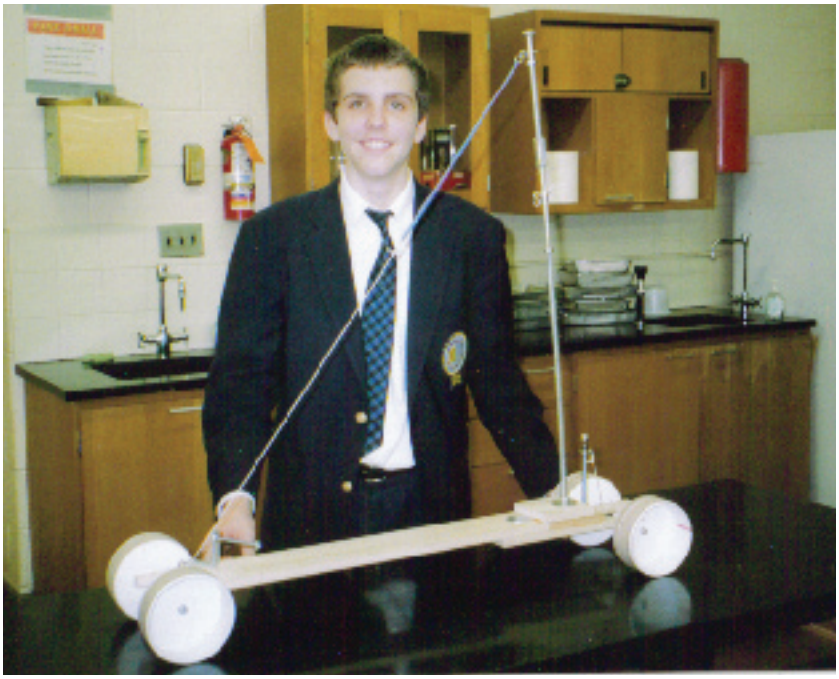
Physics Day in Great Adventure

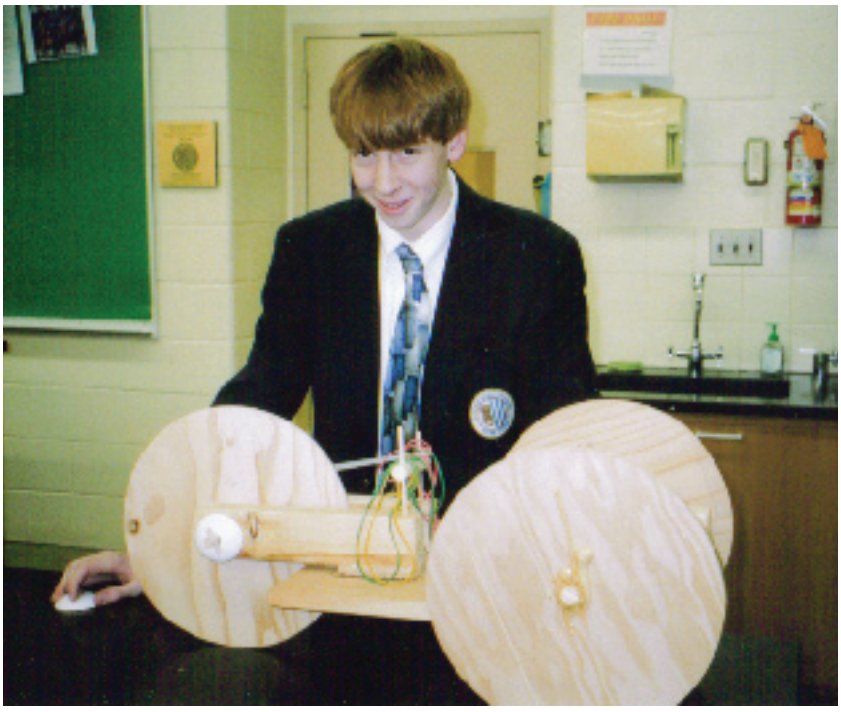
Steven Delianites and Jonathan Wlazlowski'08

May 4th was a bright sunny, warm day, just perfect for our excursion to Great Adventure! Xavier was set for its annual immersion into applied physics. Great Adventure has set one day aside in which physics students from high schools all over the region are invited to put the formulas and forces learned in the classroom to work at the park. Students are asked to feel the effects of centrifugal force, free fall, momentum, acceleration, Lenz's Law, etc. as they enjoy themselves on the various rides. Although some schools had instruments for measurements, the objectives of the Xavier students were concentrated on the forces related to the roller coaster. Using one's imagination and checking the data by repetitive rides on the coaster they returned prepared to answer a sheet of questions about the effects of the principles of physics involved. The specs for the rides can be found on www.sixflags.com. Thanks to Mr. Chiafulio, Mr. Lavy, Mr. Angus and Mrs. Valenoti for supervising a delightful, extension of academic enrichment!

XRAD (Xavier Racing and Design) Roars into Xavier







Ed Lynch '09

Walk into Mrs. Grace Lamour's classroom and it is easy to see a poster highlighting the concept of ingenuity. Given a combination of facts, information and skills in measurement , the idea is that we should be able to modify that which is learned in mechanics classes to fulfill the more practical application of a challenge in race car design.

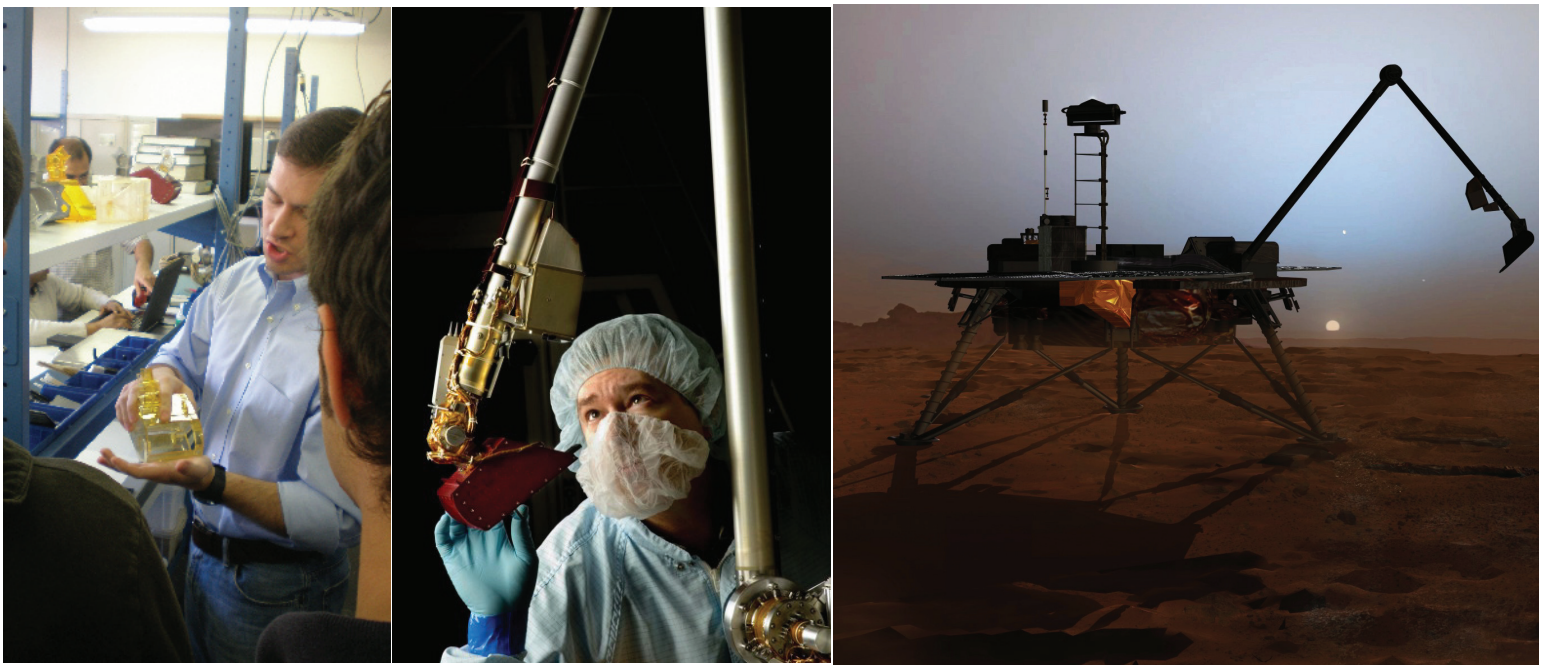
Using a modification of a Science Olympiad contest, the specifications of the car to be designed, was presented to the IPC classes. There were limitations on size, materials and projectile devices to make them go. Within the limits permitted, the students were asked to design a car and a triggering mechanism that would cause their car to travel to and stop at a 10 meter mark. There were no batteries allowed in the competition.

As the cars began to arrive it was interesting to see that we had everything from real wheels, to spools minus the thread, to CD discs to photo reels, to propellers to project the cars. One student even designed a sling shot device to propel his car. The designs were very diverse with some students losing points for exceeding the size limits. It was clear that one could not guess by the size of the car, which cars would meet the challenge. Forty one of the students were within the 90% successful completion mark of the competition.

Following the challenge, each student had to take his measurements of mass, speed, time and distance and calculate the concepts such as force, Kinetic energy, momentum, and resistance displayed by his car.

This competition made the numbers on the papers come alive and helped us to visualize where these numbers are derived from and what exactly is meant by them. Will there be an XRAD II? Yes! All IPC9 students next year will compete in XRAD.

Exploring the Honeybee Robotics Lab



(Left) Xavier students watch as a Honeybee Robotics engineer demonstrates the robotic scoop that will be used on the upcoming Phoenix project to Mars. (Center) The robotic scoop that will be used on the upcoming Phoenix project to Mars. (Right) One of two Phoenix landers that will test the Martian poles for usable oxygen trapped in the ice caps.

Mr. Michael Chiafulio, Science and Technology Dept.

On May 8th, 2007, the Xavier Robotics class paid a visit to the Honeybee Robotics Lab. Honeybee—a small firm on 34th Street—made a name for themselves by developing the Rock Abrasion Tool (RAT) used on the Spirit and Opportunity Rovers currently exploring the surface of Mars. Spirit and Opportunity were originally designed with the hope that they would last at least 90 days in the harsh Martian elements where temperatures range from -125 °F just before dawn to about -4 °F in the afternoon.[1] The fact that nearly four years after their launch the two rovers are still operational and collecting useful scientific data represents a huge success in NASA's use of robotic systems in the exploration of space.

We were treated to a tour of the Honeybee facility and an explanation of some of the factors involved in developing systems that are hardened to operate under tough conditions. We also learned about the importance of "clean rooms" when engineering parts designed for use in space. The clean room at Honeybee is small but suitable to their projects. Its purpose is to control particulate contamination, temperature and humidity so that projects can be tested in appropriate environments.

Honeybee is currently working on a specialty piece for the rovers that will explore the Martian ice caps in the upcoming NASA Phoenix project[2] scheduled to launch in the fall of 2007. The part of the rover Honeybee is contracted to create is a scoop intended to scour the icy surface of the planet's pole and deliver the samples to other instruments on the rover designed to analyze the sample. The hope is that usable ice in the form of H_2O will be found on the ice-caps to support an eventual human colony and further missions to explore deeper into our solar system.

Honeybee is currently working on a specialty piece for the rovers that will explore the Martian ice caps in the upcoming NASA Phoenix project[2] scheduled to launch in the fall of 2007.

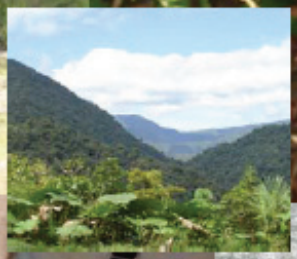
This was our third trip to Honeybee. The annual trip has served as a nice complement to the Robotics class and will continue into the future. I look forward to returning next year to hear about how Honeybee's relationship with NASA continues to shape space exploration.

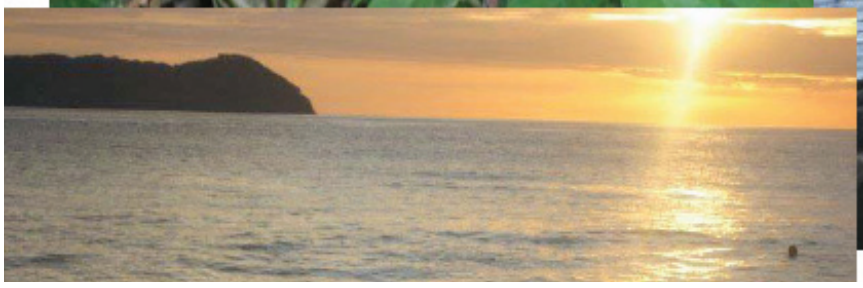
Footnotes

[1] http://hypertextbook.com/facts/2001/AlbertEydelman.shtml

[2] http://phoenix.lpl.arizona.edu/

COSTA RICA 2007





Xavier, South of the Border, in Costa Rica

Damon Kenul '07

During the February break, Mr. Chiafulio, Mr. Lavy, Mr. Angus and Mr. Suro, led an expedition of Xavier students from the snowy streets of Manhattan into the summer of tropical Costa Rica. The contrast in climate, ecosystems and culture was an unmistakable dichotomy. At Xavier, the mode in the city, for many reasons, is to cover over with cement and build. In Costa Rica the challenge is to preserve which environments are left for their natural beauty as well as those plants and animals that live within.

We, "city students," were amazed at the size and density of the plants and flowers. We came face to face with monkeys, lizards and many birds as well as insects. The diversity of types of life forms is greater in the tropics than in any other land environ. We went swimming in the frigid waters of mountain streams, walked across a rope bridge high above the canopy of the tallest trees, guided some plastic boats down through the rapids, and enjoyed the most wonderful displays of nature's beauty. Gliding on wires through the trees we had a taste of how Tarzan might feel in a more natural setting. Our immersion into nature's bountiful display was awesome. The trip will be repeated next February and I recommend this trip for its remarkable adventure.

Read more at *http://faculty.xavierhs.org/chiafuliom/crsite*

Thank You Mrs. Lamour!

Thirty-eight years ago, Mrs. Grace Lamour became the first woman to teach at Xavier. In 1969, she received an offer from Xavier to teach at the school. What happened next is summarized by Mrs. Lamour's own words, "The boys were absolutely fabulous. I feel in love with the studends and the Jesuit philosophy of teaching."

After her first year teaching, Mrs. Lamour had no doubt left that she would be teaching at Xavier for as long as she was able to. She was "among giants in Jesuit education" whom she admired for their style of teaching that focused on the individual needs of the student. At Xavier, Mrs. Lamour was chairman of the science department for sixteen years and the coach of the Cheerleaders for twenty years. Mrs. Lamour was also appointed to run the New York State Science Honors Society (NYSSHS) for which she sat on the board of governors for four years. As head of the NYSSHS, Mrs. Lamour was challenged to encourage students to take a more involved role in science. Highlights of her accomplishments in this regard include the Science Journal, Medical Science club, the Osteichthyes Society, the Earth Day Central Park annual event, among others.

Mrs. Lamour will leave Xavier a teacher of thirty eight years who says that "leaving Xavier is for me very emotional because Xavier's students have made me love them." Mrs. Grace Lamour will be remembered for her remarkable accomplishments here at Xavier, and the Xavier community wishes her the best for her future, that she may have a peaceful and healthy retirement.

— Donato Quartuccia

Health & Sports

In This Section.....

Aspartame — Effective Sweetener or Killing Agent?

Vincent Russo '07

Is consuming gum, cereal, pudding, yogurt, ice cream, ketchup, maple syrup, jelly, diet soda, cookies, and hard candies worth more than your life? In each of the above products, a "so-called" deadly and destructive agent is present – Aspartame. A low calorie synthetic sweetener and sugar alternative is made from aspartic acid and phenylalanine, Aspartame is said to cause death, brain tumors, seizures, depression, menstrual irregularities, constipation, headaches, tiredness, and general swelling. But how accurate are these findings? Is Aspartame really that dangerous? Through methodical research and careful investigation, it seems as though the dangerous and harmful effects of Aspartame may be more hype than reality.

In science, whether in Biology, Chemistry, Physics or any other related scientific field, facts, not speculation or hypothesis, are what matters and what are essential in proving a point of thesis. One fact that cannot be debated is the benefits of Aspartame; they have been proven and documented by the Food and Drug Administration. For

one, Aspartame is beneficial in weight control. With nearly two thirds of Americans classified as obese, taking steps to assure appropriate calorie intake is essential to human survival. Because products with Aspartame are lower in calories than their sweetened equivalent, using products with Aspartame together with physical activity can help with weight management. Secondly, Aspartame offers people with diabetes greater flexibility and choice in controlling their total carbohydrate intake and allows them to satisfy their taste for sweets without affecting blood sugar. Also, The American Dental Association noted that Aspartame "is safe and non-contributory to tooth decay." Finally, Aspartame enhances and extends flavors such as raspberry and oranges in food and beverages, while maintaining a great taste in products.

Despite the overwhelming documentation of aspartame's benefits, unfounded allegations that aspartame is associated with multiple sclerosis, cancer, Parkinson's disease, and Alzheimer's disease have continued to spread rapidly through the media and Internet. For example, a recent study on rats in Italy found that when given Aspartame, rats developed tumors. However, the findings did not document what kind of rats were being studied, how much aspartame they were given, or what other foods or beverages were put in their diets. As a result, scientific committees around the world have found this scientific research to be invalid. Though invalid, this research has still spread throughout the Internet and media, causing panic, dread, and alarm in people who have consumed products with Aspartame. To combat this, several scientific committees, including the Food and Drug Administration, the United Kingdom's Food Standards Agency, and the French Food Safety Agency carefully assessed these "speculative" allegations again and found them to be false. In addition, leading health authorities, such as the National Multiple Sclerosis Society, and the Alzheimer's Association, have reviewed the claims given by the media and on the Internet and have also concluded that they are false. "People must not give in to the hype," said a recent spokesman from the Food and Drug Administration.

Recently, further studies have found the increased benefits of Aspartame and have left the "harmful and disease causing" speculation preached by many in the dust. In the Canadian journal of Diabetes, dated March of 2005, scientists reviewed 55 studies of the artificial sweetener to assess the link between aspartame and brain tumors, seizures and the effect on blood-sugar control. It found no evidence of a direct connection. "We looked into all of the claims and they weren't just ones from the Internet but also ones that came from research studies that had been published," said researcher Dr. Catherine Field. Aspartame has also been determined safe by the U.S. Food and Drug Administration and other scientific and regulatory authorities with more than 200 scientific studies confirming its safety.

Should you eat or drinking anything with Aspartame? The Food and Drug Administration, the Joint Expert Committee on Food Additives of the World Health Organization, the Scientific Committee for Food of the European Community and regulatory agencies in more than 100 countries have reviewed aspartame and found it safe for use. In a recent statement, The United States Food and Drug Administration said "Few compounds have withstood such a detailed testing and repeated, close scrutiny, and the process through which aspartame has gone should provide the public with additional confidence of its safety." For these scientists and professionals, they believe drinking or eating products with Aspartame is healthy and beneficial. Though the benefits of Aspartame are documented and are easily accessible, it is ultimately up to the discretion of the person if he or she wants to consume products containing Aspartame. No matter what one decides, the only advice I have to give is not to believe what theorists or speculators have claimed about Aspartame. Believe the facts – Aspartame is a safe and effective sugar-sweetener.

The Science Behind Bowling

Jonathan Wlazlowski '08

Yes, bowling is a sport, even if it is not a typical sport in which one gets hurt often or sweats profusely due to strenuous physical activity, which sometimes happens if the bowling alley is too hot. Bowling is a sport because of the sweet science behind it; ranging from the oil pattern on the lanes to the coverstock on your bowling ball, everything matters in order to figure out how to get that perfect strike. Bowlers spend hours working on their approach to the lanes and their release of the ball because if one just steps up to the foul line and throws a ball aimlessly, he or she will probably end up with a terrible score. Release is everything in bowling; how one lets go of the ball determines what type of spin the ball has, the angle it will roll into the pocket, the area between the 1-pin and 3-pin for right-handed bowlers, and finally the pin action that will result. Many things come into play when a person is bowling and many people do not even realize most of these things.

When bowling on a lane, one of the things an experienced bowler tries to determine is what type of oil pattern has been placed on the lanes so he or she can choose what type of ball to use. The oil pattern s how heavy or light the oil has been placed on different parts of the lane. Basic patterns include just having light oil near the gutters and heavy in the middle of the lane or vice versa; as one goes up to higher levels, the oil patterns get more intricate and involve the distance down the lane where the oil is placed and more extremes in the amount of oil placed. The oil patterns' importance leads into the next topic – the coverstocks, or the outer shell, of bowling balls.

Bowling balls come in many different varieties, weights, colors, and coverstocks. The most popular for beginners are balls with plastic coverstocks, which are generally cheap balls that one can roll straight down a lane and get a decent pin count. When one gets better, he or she begins to use bowling balls with Resin shells or Particle shells, for example, since when one knows what type of oil is on the lane, one has to use a ball that will work accordingly with that oil. For example, Resin balls are able to grip the lanes and absorb little oil when thrown, so they are used on light oil lanes, while Particle-covered balls grip the lane quickly and absorb more oil, so they are a good choice for heavy oil lanes. These are some of the choices that one has to make while bowling, but the hardest part is the release of the ball.

In order to score higher, a bowler should throw a ball that will hook into the pocket. When the ball curves into the pocket, it will hit the pins at a better angle and so will slice through the pocket and create a better pin reaction than if one were to throw a straight ball. When a straight ball is thrown, it will hit the pins dead on, most of the time bouncing off them, depending on the weight of the ball since the heavier the object that hits something is, the more likely it is to do more damage. The easiest way to explain how to roll a hook ball is, "To roll a hook ball, the bowler must develop a 'release,' getting the ball off the thumb and using the fingers to put side rotation on the ball. The ball will skid down the lane through the oil, and the rotation will start to move the ball ('hook') towards the pins" (Kenn Melvin, "How to Throw a Hook Ball").

So, the speed one flicks the ball off his or her fingers causes more rotation and a shorter, sharper hook that will cause better pin reaction. The hook ball is the best way to get strikes, but it is also the hardest way to throw the ball.

Bowling is a sport of sweet science, and it is difficult to master, but easy to have fun with. All that the bowler has to remember is "oil, ball, and hook," and if that bowler can put those together, it will surely account for a high score.

The Physics of Skiing

Anthony Congiusta '08

Skiing is a fun and challenging winter sport. Those who believe that this sport, along with snowboarding, has nothing to do with physics are mistaken. Gravity, friction, Newton's laws, and the physics of energy all apply to this race across the snow and contribute to its complexity.

Gravity plays a major role in skiing. It is crucial to every skier or snowboarder from simply going down the hill to doing 720s off ski jumps. By measuring one's acceleration before the jump and knowing the angle of the jump, the skier is able to find out how much hang time he or she has to do certain tricks. Also, the skier should know that acceleration due to gravity, which is the force that pulls us towards Earth, is approximately 9.8 m/s^2. These facts can help a skier improve his or her technique as well as land some insane tricks.

Friction also plays an essential role in skiing. It is responsible for allowing the skier to remain in control of his or her velocity. By applying wax to the skis, the friction between the skis and snow is reduced, increasing the skier's velocity. In ski racing, for example, it is the person with the least friction between himself, the snow, and the air that will most likely win. In order to slow down or stop skiing the skier needs to increase the amount of friction within a relatively short amount of time. This is done by pointing the tips of the skis perpendicular to the direction that the skier is heading.

Newton's laws of physics also play a large part in skiing. Newton's first law states that an object in motion will stay in motion and an object at rest will stay at rest until acted upon by an outside force. If there were no friction, skiers would not be able to stop and would therefore continue moving indefinitely. Newton's first law affects skiers in all instances, including fatalities. Sonny Bono, a well qualified skier, for example, would have kept skiing if it were not for the fact that he encountered an external force, which happened to be a tree. Newton's second law, which states that force is equal to mass (in kilograms) multiplied by acceleration (in meters per second), allows one to determine the force acting upon a particular object based upon its net weight and acceleration. If one hits an object with a great amount of acceleration and mass, the force affecting the object will be great as well. Newton's third law, that for every action there is an equal and opposite reaction, also applies to skiing. When a skier skis the slalom course, a downhill race characterized by zigzagging through obstacles, and bashes a gate, the gate exerts the same amount of force back on the skier that the skier applied to it. The reason that it bends and the skier does not is that the skier is considerable more massive than the gate; as a result, the force has very little effect on the large mass of the skier but a great effect on the smaller mass of the gate.

Kinetic and potential energy also apply to skiing. For instance, the ski lift, which brings one to the top of the mountain, provides a skier with a large amount of potential energy, as the higher you are, the greater the potential energy. Therefore, once the skier reaches the top of the mountain, he will be aided by gravity in his trip down the mountain. As the skier descends the hill, the potential energy is converted into kinetic energy. Thus, as he skis downhill, the potential energy manifests itself into kinetic energy, allowing for greater motion.

Furthermore, physics is not only for the stereotypical brainy kids; it can also be applied to any sport, even sports other than skiing such as baseball, football, and hockey. Science plays an important role in our lives. It is not just for nuclear physics, but also our recreational activities, something many tend to overlook. The physics of skiing plays an important role because by realizing all the forces that act upon us, we can perfect our technique.

The Psychology of Rampage Shootings

Thomas Reilly '08

America witnessed its deadliest shooting in modern history on April 16, 2007, when Seung- Hui Cho killed thirty two people at Virginia Polytechnic Institute, better known as Virginia Tech. The South Korean immigrant killed thirty-two people, including five faculty members and twenty-three students before committing suicide. This recent school rampage was perpetrated almost eight years to the day of the Columbine High School massacre. At Columbine, on April 20, 1999, one teacher and twelve students were murdered, and twenty-three students were wounded. The two Columbine students responsible for this tragedy, Eric Harris and Dylan Klebold, also took their own lives. In recent years, American schools have witnessed many attacks and threats. This surge in interpersonal violence has caused unrest and anxiety in our schools and campuses (Chandras et al, 2-3).

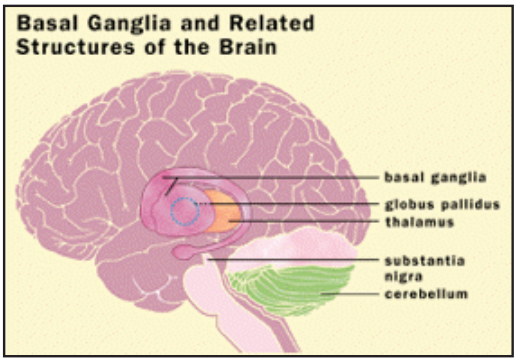
This disturbing trend of rampage shootings has led to speculation as to a possible profile of those who commit these violent acts. "According to research, factors such as family violence, violence in the community, and violence portrayed in the media incite students to commit violent acts…Easy access to guns greatly adds to the number of violent acts committed by students" (Chandras et al, 2). Since 1996, there have been no less than twenty-three incidents of student-related violence that have ended in death or injury. In addition, there have been six planned assaults that were thwarted before being carried out (Chandras et al, 2-5). The circumstances leading up to these rampage shootings can be examined, but it is extremely difficult to generalize due to the rarity of these cases.

The Secret Service completed its own study of school shootings and school-based attacks in 2002. Called the Safe School Initiative (SSI), it studied thirty-seven incidents involving forty-one student attackers since 1974. The study was done to develop information about the shooters behavior and communication prior to the attacks. Its goal was to gain information that could be useful in preventing future attacks (United States Secret Service, 1). After conducting its investigation, "The SSI study found that school shootings are rarely impulsive acts. Rather, they are typically thought out and planned in advance. In addition, prior to most of the shootings examined, other students knew the shooting was to occur but did not alert an adult...The study's findings also revealed that there is no "profile" of a school shooter; instead, the students who carried out the attacks differed from one another in numerous ways. However, almost every attacker had engaged in behavior before the shooting that seriously concerned at least one adult – and for many had concerned three or more adults (United States Secret Service, 1)." It is true, however, that all the shooters or potential shooters were male.

There are common threads shared between those who have committed or have planned to commit school violence. These students were lonely and felt rejected by others. They were either bullied or demeaned by their peers. They harbored anger toward someone or something. They were obsessed with violent acts, guns, or weapons. There was a lack of positive relationships and communication in school and at home. Family problems at home included violence, neglect, or insecurity. In many cases there was depression, mental illness, or substance abuse (Chandras et al., 6). These school shooters may have hinted or openly commented about their intentions to others. Often socially inept or rejected by peers, they tried to impress or garner the attention of a target group of peers. They intended to be noticed and accepted by those who had not given them the acknowledgement and friendship they sought. In the quest for attention, there may have been threats, promises, or hints of bizarre behavior, which had to be carried out at the risk of social failure. In essence, these shooters were trying to solve their social angst through violence. Their social ineptness and subsequent rejection by their peers had been sources of prolonged disappointment. These students may suffer from depression which leads them to feeling like they want to die. These violent actions and subsequent suicide or "death by cop" insures that they will be seen as a force to be reckoned with (Newman, 4).

The increased incidence of school violence makes prevention a necessity. School personnel, families, and students must be aware of potential problems and crises before they occur. The findings of the Safe School Initiative suggest that some school attacks may have been preventable (United States Secret Service, 1). Students and teachers must come forward with concerns about threats of violence communicated either verbally or in writing. It is up to every individual to be responsible and trust in the knowledge that sharing crucial information may save lives.

Tourette's Syndrome



Angelo Mannino '07

When many people think of Tourette's Syndrome, the first idea that comes to mind is the image of an individual shouting profanities uncontrollably. However, that is a prejudice that is given to those with Tourette's. Tourette's syndrome is a fairly rare disease, passed on genetically. A person with Tourette's has about a 50% chance of passing the gene(s) to one of his or her children, but Tourette's is a condition of variable expression and incomplete penetration. Thus, not everyone who inherits the genetic vulnerability will show symptoms. Also, there is more of a chance for a male to express the gene carrying Tourette's than females.

Tourette's, by definition, is an inherited neurological disorder with onset in childhood, characterized by the presence of multiple physical tics and at least one vocal tic. Tics are sudden, repetitive, stereotyped, non-rhythmic, involuntary movements and utterances that involve discrete muscle groups. However, most case studies of Tourette's state that the patient feels a build up of tension, and chooses to release that tension through motor or phonic expressions. These tics are characterized by movements or sounds that occur intermittently and unpredictably out of a background of normal motor activity.

Tourette's syndrome has a multitude of causes. Both genetic and environmental factors are involved in the causes of Tourette's. The origin of tics are believed to result from dysfunction in cortical and sub-cortical regions, the thalamus, basal ganglia and frontal cortex, all vital parts of the human brain. The picture above shows where the specific facets of the brain are located. The failure of these structures potentially increases in the severity of Tourette's syndrome. The diagnosis of Tourette's syndrome, according to the Diagnostic and Statistical Manual of Mental Disorders, is when a person exhibits both motor and vocal tics over the period of a year. However, the confusion between tics and seizures can occur, therefore an MRI would be required to detect any brain abnormalities.

Although there is no definitive cure for Tourette's, there are several medications that can be prescribed to help control and mediate the symptoms of Tourette's. Haloperidol is just one of the many drugs that help to relieve the patient from expressing the vocal and motor tics. Tourette's Syndrome is a disease that cannot be cured, but can be helped.

The Good and Bad of Red Bull

Alejandro Alvarez '07

The Red Bull energy drink has its good and bad sides. Some of the ways it has been known to affect people are that drinking Red Bull before exercising can increase the amount of blood, oxygen, and nutrients the heart pumps to the working muscles and strengthen heart contractions. The reason Red Bull affects how much the heart pumps is because it contains the amino acid taurine. Taurine is a non essential amino acid that may improve heart function if it is in the diet, and it is an important amino acid for preventing gall stones. Because of Red Bull's high content of caffeine (it has the same amount of caffeine as a cup of coffee) it is an efficient drink to use to increase my energy and stay alert.

The darker effects of Red Bull are that due to its high content of caffeine it can lead people to crash after its affects wear off. Also, it is suspected in the deaths of three people. Two of them drank Red Bull with Vodka and the third drank several cans of Red Bull before a heavy work out. People that have anxiety disorders or high blood pressure should be careful when drinking too much Red Bull because it has high levels of caffeine that can be dangerous. The effects of caffeine can vary from person to person so there is no safe level of how much caffeine a person can consume. Pregnant women have been warned from drinking Red Bull because the high caffeine has been linked to miscarriage. Red Bull can have significant effects on the people who use it; until researchers are able to understand why there were these deaths following the consumption of Red Bull, it would be wise to use it moderately, if at all.

Technology

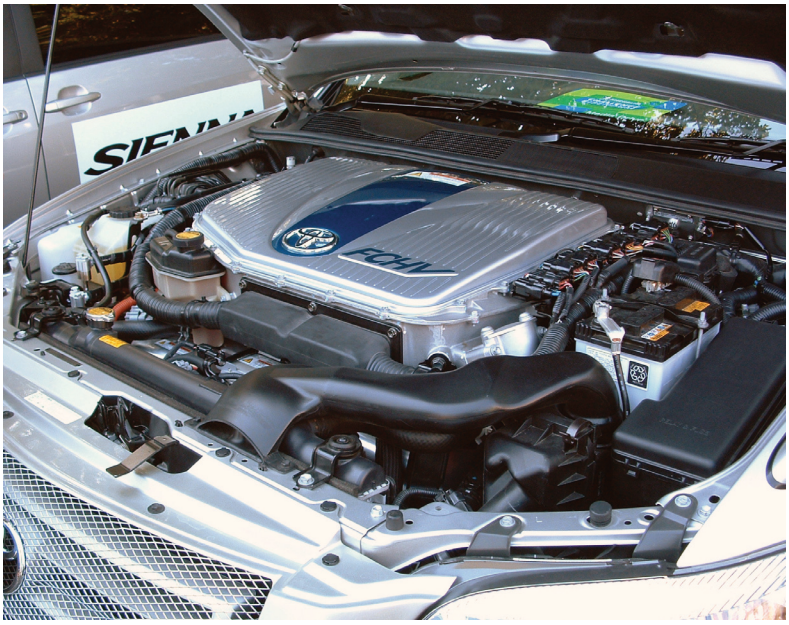
In This Section.....

Hydrogen Fuel Cells: The Answer to the World's Problem?

Donato Quartuccia '08

For well over a century now, the average consumer has been using fossil fuels as his or her primary energy source, as such fuels are used to power cars, heat homes, and generate electricity, among other things. However, such resources are finite; thus, it is essential that at some point in the near future, a switch to alternative energy be made. Additionally, burning fossil fuels continues to dispense an ever increasing amount of greenhouse gasses, such as carbon dioxide, and pollutants into the atmosphere which then create a potential for health hazards, ozone depletion, and global warming, all three of which are clear detriments to society.

Consequently, there has been a growing level of concern, especially among the scientific community, to make a push toward some sort of environmentally friendly and renewable energy source, for example solar, water, and wind energy, to continue to provide power and energy after nonrenewable sources are depleted and to slow the global warming trend. One such



Example of a hydrogen fuel cell as used in a Toyota FCHV vehicle.

alternative energy source is hydrogen power, for hydrogen fuel is renewable, does not inherently cause pollution, and has the highest energy content per weight of any other known element.

However, utilizing hydrogen is not a novel idea; in fact, in 1839, Sir William Grove proposed that hydrogen could be used as a viable energy source, and the idea became technologically viable in the 1960s with research done during the Space Race. The first hydrogen fuel cell vehicle, dubbed the Electrovan, was actually created in 1966 by General Motors.[1] And, after the oil crisis of the 1970s, it became obvious that an alternative energy source would be important since it is potentially risky to rely on imported oil and resources are limited. However, this perceived need finally began to be realized only recently. In the early 2000s, Honda and Toyota released hydrogen fuel cell vehicles and in 2002, the Bush administration agreed to fund the development of hydrogen fuel cells.[2]

With all of this information, one may believe hydrogen fuel cells undergo a complicated chemical reaction to produce energy; this is not the case. In fact, only a simple reaction would be necessary to use hydrogen as a fuel source, a reaction that produces a molecule already abundant on earth. That is, the simple formation of water by combining oxygen and hydrogen. To then break down this water would theoretically require the same amount of energy involved unless the energy were obtained from an additional source, such as the sun, water, or wind, or if a catalyst, a substance that increases the rate of a chemical reaction, were used. More common methods of splitting water, such as electrolysis, or the use of electricity to break down a molecule into its components, though, are not viable as they actually require more energy than is created through the combustion of hydrogen and oxygen gas, thus negating the benefits of the originally produced energy.[3]

The potential of hydrogen fuel cells is hindered by obstacles which will need to be overcome. For instance, cleaner

methods used to split water can be expensive with our current technology, but there are inexpensive alternatives that create a very small amount of carbon dioxide gas, such as obtaining hydrogen from ethanol, an organic compound that can be found in common plants such as corn.[4] Ethanol, which is too a renewable energy source, is actually much easier to store than hydrogen as the latter is easily combustible, creating a hazard of explosion or fire. And, the formation of water using conventional methods would have to take place in a controlled container known as a fuel cell because the amount of energy produced poses a risk for explosion. However, another issue arises in that hydrogen is best stored in liquid form, as hydrogen gas can easily escape into the atmosphere and combust with oxygen in the ozone layer, which would then deplete ozone and negate a major purpose of using hydrogen, to provide energy without harming the atmosphere. The difficulty arises in that liquid hydrogen must be maintained at temperatures below -253°C (-423.4°F), a temperature that is difficult to reach without costly equipment. However, hydrogen gas could also be pressurized or temporarily stored in other compounds to prevent its escape into the atmosphere. Lastly, another limitation of the fuel cell is that if the oxygen used were extracted from the air and not from a pure oxygen supply, it would combust with nitrogen to produce pollutants such as nitrous oxide.[5]

Despite these problems, hydrogen fuel cells hold the potential to become the world's primary source of clean energy once a cost-effective manner of producing fuel cells is established. Also, the process of wind electrolysis (different from typical electrolysis, which uses electricity), wherein water is split through energy supplied by wind turbines, would produce hydrogen fuel at an estimated cost of .29 and 1.8 US dollars (2004-adjusted), much cheaper than gasoline.[6] Hopefully, the short-term difficulties of hydrogen fuel are overcome in an effort to create a long-term beneficial energy source that would reduce pollution and create a more conducive and healthier environment for future generations.

---

[1] "Hydrogen Power." Issues & Controversies On File 16 Jan. 2004. Issues & Controversies @ FACTS.com. Facts On File News Services. <http://www.2facts.com>.

[2] Ibid.

[3] "Fuel Cells Promise Pollution-Free Energy." Today's Science On File Oct. 1997. Today's Science @ FACTS.com. Facts On File News Services. <http://www.2facts.com>.

[4] "Is Corn the Key to a Hydrogen Economy?." Today's Science On File Apr. 2004. Today's Science @ FACTS.com. Facts On File News Services. <http://www.2facts.com>.

[5] See Note 1

[6] Jacobson, M. Z., Colella, W. G., Golden, D. M. "Cleaning the Air and Improving Health with Hydrogen Fuel-Cell Vehicles." Science. Vol. 308(24 Jun. 2005):1901-1905.

A New Innovation: Air Powered Cars

Patrick Russo '08

One of the greatest recent innovations to society has been a new, air powered car considered "The World's Cleanest Car." Guy Negre, a French engineer, is the intelligent designer and inventor of this car, which is called the "e. Volution" and was created in Brignoles, France. It took him fourteen long and strenuous years of research and development to finally develop the engine used in this the e. Volution that is possible one of the biggest technological advances of our time. The car uses an engine that is an emission-free piston engine which runs on compressed air. The air engine uses pressurized gases against the piston in order to work and also uses something called bi-energy, or compressed air and fuel.

The air-powered car has many significant economic and environmental advantages; it can travel about one hundred and twenty-four miles, or two hundred kilometers, before it needs to be refueled with compressed air, causing no pollution or harm to the air. The only exhaust from the car I cold air which is at a temperature of negative fifteen degrees Celsius, or 5 degrees Fahrenheit. The source of the air inside the car's engine is a specialized carbon filter tank that holds air at a pressure of around twenty MPa. Other advantages of the e. Volution include its fast recharge time, long storage lifetime device, lower initial cost, and unique heat exchanger. In time, the air-powered cars could have a very significant effect on our lives and the environment.

Improvements in Agriculture

Kerry Jones '08

Agriculture is one of the hottest topics when it comes to genetic engineering. Why? Producing genetically modified crops, also known as GM crops, has increased due to recent success in DNA technology. Making genetically modified crops allows scientists to enhance the overall characteristics of those crops. Also, advancements in genetic engineering can improve the nutritional value of crops.

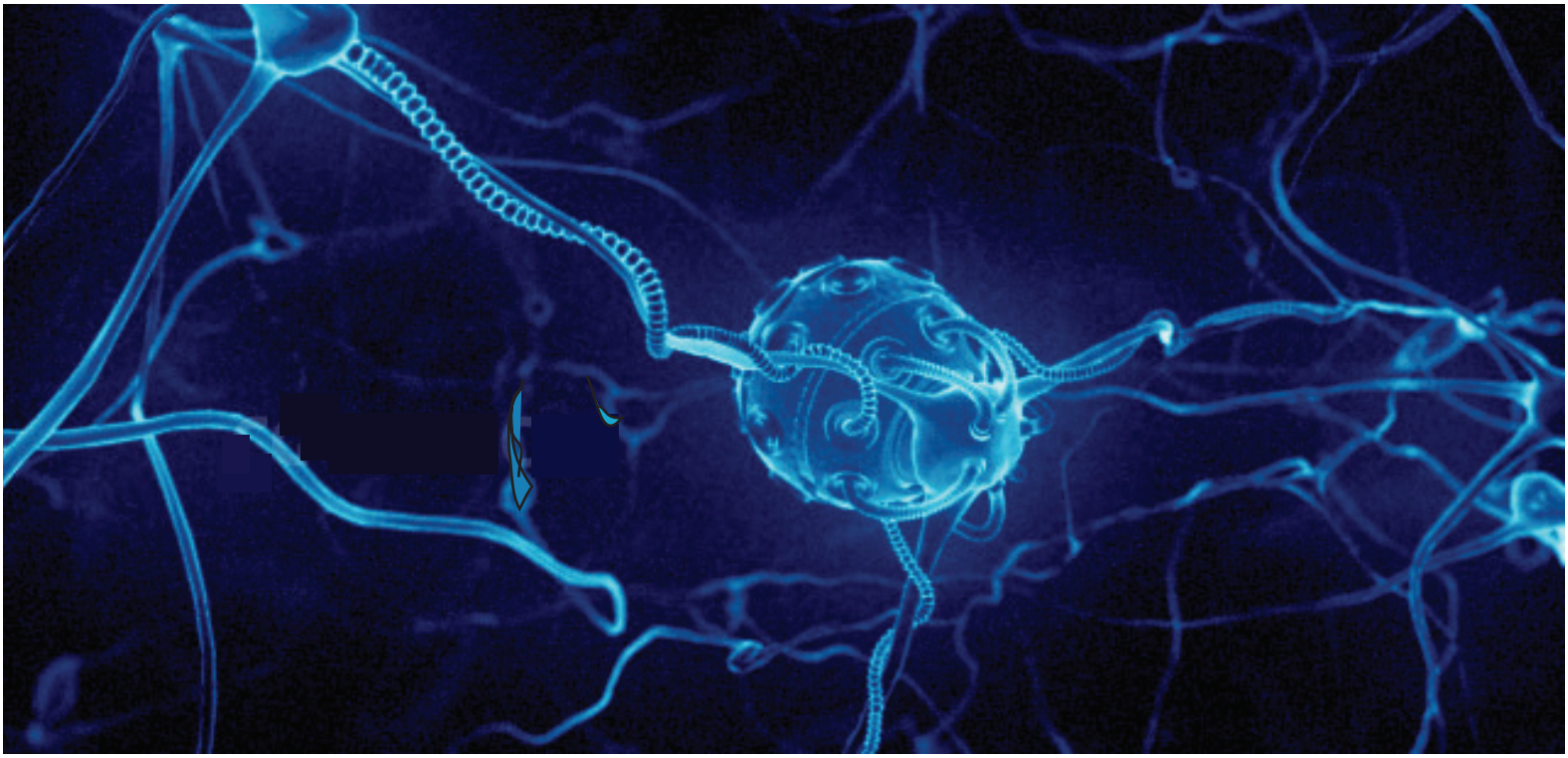
The production of genetically modified crops has increased over the past decade because scientists have found how to produce crops with more desirable traits. One way to achieve these traits is to introduce new genes into plant cells by using a plasmid from the soil bacterium *Agrobacterium tumefaciens*. The bacterium *Agrobacterium tumefaciens* produces crown gall tumors in the plants when its Ti plasmid, which are now disease-free plasmids. The recombinant plasmids are then introduced into plants growing in culture. Therefore, when the cells regenerate into whole plants, the plants will have valuable foreign genes. Another technique for modifying crops is electroportation. Plant cells are suspended in fluids that contain DNA in electroportation. The outer walls of the plant cells are forced to open for less than a second when an electrical charge is applied. Some pieces of DNA are washed into the cell in this short period. Growing crops using these technologies allows them to be more resistant to disease and spoilage. As a result, many traditional plantbreeding crops are being substituted with modernized genetic engineering. Currently, more than half of all American soybean and corn crops have been grown by those modification techniques.

Making crops fresher and healthier are just some of the benefits of genetically modified crops. The Flavr Savr Tomato was one of the first fruits to be genetically engineered. Calgene, the agricultural company that developed the Flavr Savr Tomato, created a gene that controlled the softening of the fruit. As a result of developing this gene, the genetically modified tomato could ripen and be firm enough to handle the long shipping distances. This is one reason why produce shipped from California to New York days later are still fresh. Looking at another crop, natural potatoes tend to absorb oil during cooking, which is unhealthy. Monsanto, an agricultural company, developed a potato that absorbs less oil, a task accomplished by transferring a starch protein gene from a soil bacterium. By using this starch gene, the newly modified potato was a significant benefit to the fast-food industry and potato processing companies.

One of the most recent advancements in genetically modified organisms is transgenic rice. This plant contains beta-carotene, a chemical necessary to make vitamin A. There is a significant need in the world for transgenic rice, as vitamin A deficiency is a common problem. Currently, 70% of children under the age of five in Southeast Asia suffer from this condition. Unfortunately, vitamin A deficiency leads to vision impairment and increases susceptibility to disease. With an increase in production of this transgenic rice, it could help to eliminate this form of vitamin deficiency in humans.

While the modification of transgenic rice has been an agricultural success, still other advancements are on the way. Currently, researchers from the University of California are trying to develop flood-resistant rice and corn crops. In addition, field testing is underway for tomatoes that contain lycopene, also known as cancer-fighting tomatoes, at Purdue University. Genetically modified crops have become far more popular in recent years. The unveiled technology has dramatically improved food production. Advantages such as making crops easier to cook, less likely to freeze, and fresher, have been made possible through the use of genetic engineering. For certain, the era of transgenetic crops has just begun.

A Look Through the Eyes of Nano Robots



Michael Ogoszewski '07

Imagine "exploring" the human body. Go back into the childhood memories of Ms. Frizzle and The Magic School Bus and join them on their miniature adventure exploring the microscopic universe. Then, one might understand the world through the "eyes" of nano robots. The molecular scale of these microelectronics allow for a potential advancement in the way we see our molecular universe.

In 1959 physicist Richard Feynman gave a talk about exploring the limits of miniaturization. He set out from known technology, surveying the limits set by physical law and ending by arguing the possibility, even inevitability, of "atom by atom" construction. What at the time seemed absurdly ambitious, even bizarre, has recently become a widely shared goal. Decades of technological progress have shrunk microelectronics to the threshold of the molecular scale, while scientific progress at the molecular level, especially on the molecular machinery of living systems, has now made clear, to many, what was envisioned by a sole genius so long ago. To understand the potential of molecular manufacturing technology, it helps to look at the macro scale machine systems used now in industry. Picture a robotic arm that reaches over to a conveyor belt, picks up a loaded tool, applies the tool to a work piece under construction, replaces the empty tool on the belt, picks up the next loaded tool, and so on-as in today's automated factories. Now mentally shrink this entire mechanism, including the conveyor belt, to the molecular level to form an image of a nano scale construction system. Given a sufficient variety of tools, this system would be a general-purpose building device, nicknamed an assembler. In principle, it could build almost anything, including copies of itself.

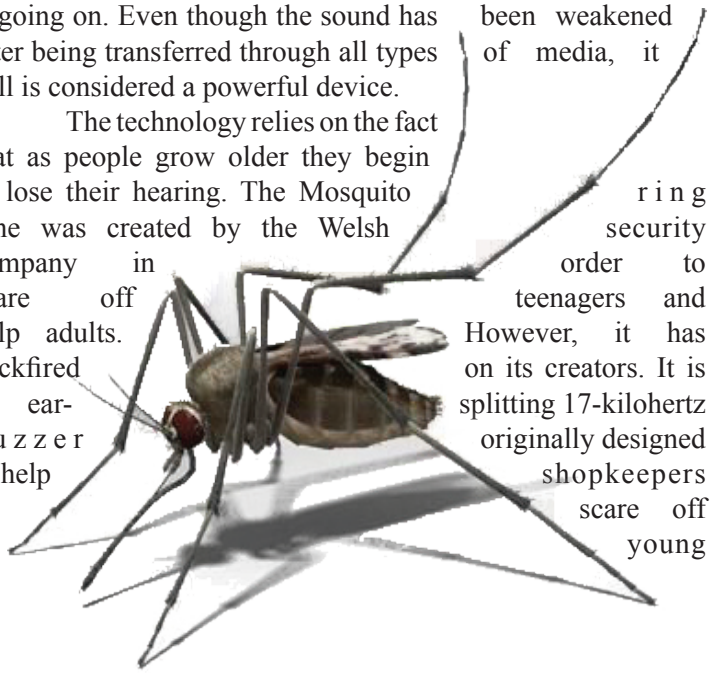
Inspired by molecular biology, studies of advanced nanotechnologies have focused on bottom-up construction, in which molecular machines assemble molecular building blocks to form products, including new molecular machines. The ability to construct objects with molecular precision will revolutionize manufacturing, permitting materials properties and device performance to be greatly improved. In addition, when a production process maintains control of each atom, there is no reason to dump toxic leftovers into the air or water. This improvement will not only help in manufacturing and medical fields but also in conservation of the environment. Improved manufacturing would also drive down the cost of solar cells and energy storage systems, cutting demand for coal and petroleum, further reducing pollution. Such advances raise hope that those in the developing world will be able to reach First World living standards without causing environmental disaster.

Low-cost, lightweight, extremely strong materials would make transportation far more energy efficient and-finally-make space transportation economical. The old dreams of expanding the biosphere beyond our one vulnerable planet suddenly look feasible once more. NASA has set out to build these nano robots by 2013 because of the upcoming space mission that will take humans to Mars. The robots will be inserted into their bodies and will continually fix whatever problems that the body encounters on the many-year mission. For one, it will stop bone decay, which is inevitable during the mission. This will truly expand our capability of traversing the universe and beyond.

The New Buzz: A Mosquito Ring Tone

Tarun Behl '07

A new type of ring tone that is unable to be heard by most parents has been discovered in today's world. The insect-buzzing ring tone is called the mosquito ring tone because of its small, discreet sound. Students have used it to send and receive text messages without alerting any adults. The ring tone, which began in Britain, has traveled to America through the Internet. It has become a problem in schools and areas where cell phone use is prohibited, but using the discreet ring tone, students can transfer information while teachers are ignorant to what is going on. Even though the sound has been weakened after being transferred through all types of media, it still is considered a powerful device.



The technology relies on the fact that as people grow older they begin to lose their hearing. The Mosquito ring tone was created by the Welsh security company in order to scare off teenagers and help adults. However, it has backfired on its creators. It is an ear-splitting 17-kilohertz buzzer originally designed to help shopkeepers scare off young people who are loitering without bothering the adults. Most human communication is in the range between 200 and 8,000 kilohertz. Most adults begin to lose their ability to hear frequencies higher than 8,000 kilohertz. Many older adults began to develop what is known as presbycusis, or aging ear. It is the loss of the ability to hear higher-frequency sounds. The common ring tone is at a 14.4 kilohertz which is able to be heard by everyone. Donna Lewis, a teacher in Manhattan, used the ring tone in a classroom of first graders. Every one of the students could hear it while the adults in the room could not hear anything. Students have used this inability to their own advantage of passing messages without their knowledge.

The noise which was originally used as a security device, was pirated into a ring tone. The Welsh company does not receive any funds from the selling of the Mosquito ring tone because it was stolen by teenagers and transformed into a ring tone. Several freshmen at Roslyn High School have managed to upload the high-pitched sound into their cell phones and sent it to all of their classmates. From there, it has been transferred to almost everyone. It has become a new way of avoiding any attention by adults while students are able to use their cell phones freely. Despite the probability of one or two adults who are able to hear the sound, the majority of adults are left ignorant to what is going on around them.

While the threat of teenagers using their cell phones during school is not harmful. There are some concerns of teenagers becoming distracted with a constant use of their cell phones. There is a threat of cheating on tests and quizzes. There is a developing concern that teenagers who are using the mosquito ring tone are also damaging their own hearing as they are putting their ears against a frequency that is above the common noise level of 8000 kilohertz. While the mosquito ring tone is commonly identified as a sound which is used to go around the attention of adults, students are also damaging their own hearing while using it.

Nintendo Wii: The New Age of Console Gaming

Winston Wong '08

The Nintendo Wii is one of this year's most unique gaming systems. Already sold out in most stores, finding one seems to be a bigger challenge than actually playing one. It is estimated that 4.62 million Wii's have been sold worldwide. So, what is so special about the Wii? For one thing, the Wii is the first and only console to introduce a remote control that does not involve simply pressing buttons. The Wii remote actually corresponds to the movement of the person controlling it; the users can control the game with physical movements as well as traditional button presses. The controller is wireless; it connects to the console via Bluetooth technology. Nintendo includes a wrist strap on the controller so that users will not unintentionally drop or throw the controllers. This seems to have been a problem when the Wii was first sold. However, Nintendo is offering stronger strap replacements for any Wii owners.

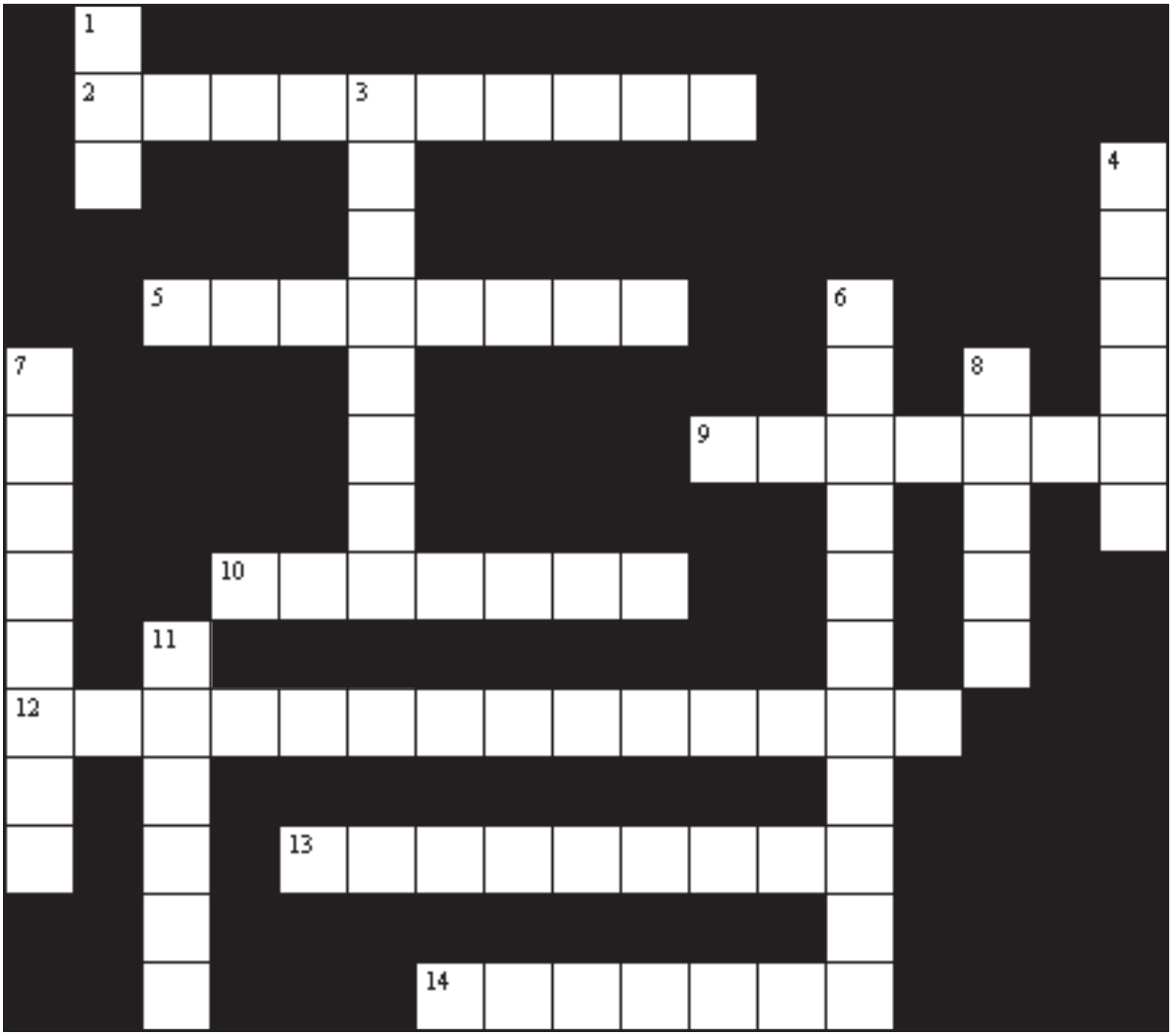
The Wii remote actually corresponds to the movement of the person controlling it; the users can control the game with physical movements as well as traditional button presses.

The Nintendo Wii is also the only console that can run popular games such as Zelda and Super Smash Brothers. For die-hard fans, the Nintendo Wii is a must-get if they want to play the new generations of these games. "The Legend of Zelda: Twilight Princess" has already been released and "Super Smash Bros. Brawl" is estimated to be released on December 3, so if you're hoping to play it by then, be sure to get a Wii as soon as possible!

IF you were complaining about the Nintendo Gamecube being not able to connect to the internet like PS2 and Xbox 360 could, Nintendo has fixed that problem for its gamers. The Wii is able to connect to the Nintendo Wi-Fi connection service through its built-in Wi-Fi or through a USB-to-Ethernet adapter. There is no additional cost to connect to the Wi-Fi service. In addition, to make life easier for gamers who prefer older games, the Wii is also compatible with Gamecube games. However, there is one little catch to this. Playing Gamecube games on the Wii requires the use of the Gamecube controllers as well as the Gamecube memory card.

Of course, I am not saying that the Wii is better than all the other game consolers. If you're a Playstation fan or an Xbox fan, I'm sure that the 360 and the PS3 have their own special features. If you are ambivalent between all three game consoles, as I was, my best advice to you is to choose the one in which your favorite game is compatible. I certainly don't regret choosing the Wii; "The Legend of Zelda: Twilight Princess" is the best Zelda series released yet!

Science Puzzle

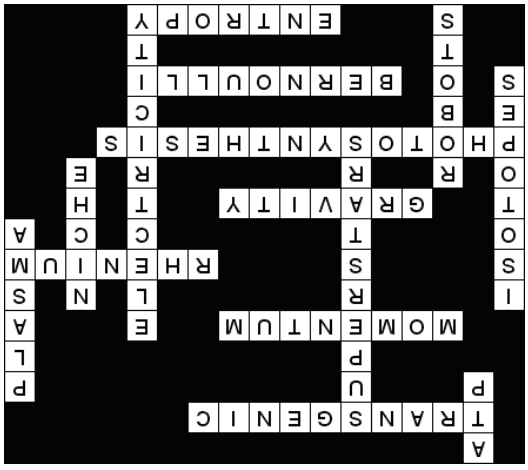


Across

2 Tangeloes and Raddocabbages
5 What ya' got when ya' just can't stop
9 75th on the Periodic Table
10 Mass 'n' acceleration
12 Restores Oxygen to the environment
13 Who would answer: "How high can I fly?"
14 Falling apart

Down

1 "Man-made" energy
3 Lamour's special students
4 What's the matter? (Hint: #4)
6 Discovered by kite and key
7 A few neutrons away
8 Where animals find there special place
11 Rosie Jetson and R2D2



Answers