



## Views You Can Use

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Dear

Schools are at various stages in the process of reinventing themselves to bring a more rigorous and relevant education to all students. Realizing this, we have organized The Whole School Reform Symposium for K-12 — Best Practices to Engage 21<sup>st</sup> Century Learners, which will be held on February 8-10 in San Diego. Each school team that registers for the symposium will be asked to complete a brief online survey to identify its needs. Using this information, we will recommend a customized schedule of sessions. We hope you will take advantage of this symposium focused on individual school needs. For more information, visit [www.leadered.com](http://www.leadered.com).

Sincerely,

## Biotechnology

### Want to be Vaccinated? Have a Banana

For the past decade, scientists have looked to such foods as potatoes and tomatoes as vehicles to immunize people, especially those in the developing world who cannot afford traditional vaccines. Recently, biotechnology researchers at the Bhabha Atomic Research Centre in India have succeeded in producing a hepatitis B antigen (an immune-triggering protein) in bananas. The researchers argue that bananas are a better choice than potatoes because they can be eaten raw, are an ideal meal for infants, and are available year round in the tropics and subtropics. The next step is for the researchers to increase the level of the antigen in bananas to make the vaccine effective. Worldwide, there are about 350 million carriers of hepatitis B, with one million new cases annually. The virus can lead to liver cancer and cirrhosis.

Sources: [www.medicalnewstoday.com/articles/69502.php](http://www.medicalnewstoday.com/articles/69502.php)  
*Scientific American*, July 2007, Volume 297, Number 1

## Thoughts into Action

Neuroscientists have significantly advanced brain-machine interface (BMI) technology in recent years. For instance, severely handicapped people who cannot contract arm or leg muscles can compose and send e-mails and operate a TV, using only their thoughts to execute these actions. If researchers at the University of Pittsburgh have their way, these individuals and others one day may be able to feed themselves with a robotic arm and hand that moves according to their mental commands.

The researchers recently developed technology that allows a rhesus macaque monkey to control a robotic arm mentally to feed itself pieces of fruit. The robotic arm movements were triggered by electrical signals generated in the monkey's brain when the animal thought about an action. The monkey not only mentally guided a robotic arm to reach the food, but also opened and closed the robotic hand, or gripper, to retrieve it. Moreover, the animal used its eyesight for feedback about the accuracy of the robotic arm's actions, as it mentally moved the gripper to within one-half centimeter of a piece of fruit.

Source: [www.sciencedaily.com/releases/2007/11/071107210708.htm](http://www.sciencedaily.com/releases/2007/11/071107210708.htm)

## **Information Technology**

### **Countertag: New Firewall Protection on the Go**

Radio-frequency identification (RFID) tags, electronic chips that range from the size of a grain of rice to a credit card, already are used for everyday convenience, from tracking cattle to E-Z Pass toll collection. Their uses are expanding, as they are tucked inside Malaysian passports to record travel history and implanted in patients' skin so that doctors can monitor medical conditions. For privacy advocates, the growing uses of RFID tags — and the tag readers that virtually anyone could obtain — pose privacy and safety issues. With an eye on these concerns and potential problems, researchers at the Free University in Amsterdam, Holland, have developed the RFID Guardian, a portable battery-powered personal firewall that allows a user to block nearby tag readers. The researchers are working to integrate the “countertag” system into a PDA or cell phone.

Sources: [www.rfidguardian.org/index.php/Main\\_Page](http://www.rfidguardian.org/index.php/Main_Page)  
<http://en.wikipedia.org/wiki/RFID>

### **Africa and the Global Connection**

At the end of October, more than 1,000 heads of state and other leaders from 10 African nations met with global technology experts at the Connect Africa Summit in Rwanda. The goal was to find ways to close the digital divide between the continent of Africa and the developed world. The focus was on increasing Internet and computer access through affordable means to stimulate economic growth, employment, and the development of public services for the nearly 1 billion people who live on the continent. Only 4 % of the African population has Internet access. “Our cities remain unconnected – to say nothing of rural Africa. Plans to link our continent with the rest of the world remain largely unrealized,” said Rwanda President Paul Kagame. By supporting economic opportunities in the developing world through affordable technology, companies such as Microsoft benefit by unlocking new markets.

Source: <http://marketplace.publicradio.org>

## **Nanotechnology**

### **Atomic Imaging — 100 Times Faster**

The scanning tunneling microscope (STM), a type of electron microscope that has enabled major discoveries in the fields of nanoscience and semiconductor technology, is an essential imaging tool for studying individual atoms in three dimensions. But the imaging process of reconstructing the surfaces of

individual atoms has been slow. To speed up the process, Cornell researchers added a simple radio transmitter, making STM imaging at least 100 times faster. This new use of an existing technology, called reflectometry, also could give STMs significant new capabilities, including the ability to sense temperatures in spots as small as a single atom and for motion detection so sensitive it could measure movement of a distance 30,000 times smaller than the size of an atom.

Source: <http://people.ccmr.cornell.edu/~blakely/2001-01/ICSFS10.pdf>

### **Diamonds Deliver**

Researchers from Northwestern University have shown that nanodiamonds are an ideal vehicle for delivering a chemotherapy drug without harm to healthy cells. To make the material effective, the researchers manipulated single nanodiamonds, each only two nanometers in diameter (a blood cell is about 7.5 nanometers), to form aggregated clusters of nanodiamonds, ranging from 50 to 100 nanometers in diameter. The drug, loaded onto the surface of the individual diamonds, is not active when the nanodiamonds are aggregated; it only becomes active when the cluster reaches its target.

For their study, the researchers used living murine (type of small rodent) macrophage cells (cells that contribute to the immune system), human colorectal carcinoma cells, and the chemotherapy drug doxorubicin hydrochloride. The drug was loaded onto the nanodiamond clusters, which carried the drug inside the cells. Once inside, the clusters broke up and slowly released the drug.

Sources [www.northwestern.edu/newscenter/stories/2007/10/dean.html](http://www.northwestern.edu/newscenter/stories/2007/10/dean.html)  
<http://www.nsti.org/news/breaking.html?id=231>

### **Education by the Numbers**

While the majority of high school teachers believe that meeting state standards prepares students for college-level work, most postsecondary instructors disagree, according to the *ACT National Curriculum Survey Results 2005-2006*. Among the findings:

- 74% of high school teachers said that meeting state standards prepare students for college-level work.
- 65% of postsecondary instructors said that state standards prepared students poorly or very poorly for college-level work.

Here are the findings broken down by subject:

- In English, 76% of high school teachers said that meeting state standards prepare students for college-level work, while 33% of postsecondary instructors thought the same.
- In reading, 72% of high school teachers said that meeting state standards prepare students for college-level work. Only 36% of postsecondary instructors agreed.
- In math, 79% of high school teachers said that meeting state standards prepare students for college-level work, while 42% of postsecondary instructors believed this to be true.
- In science, the percentages were 67% of high school teachers and 32% of postsecondary instructors.

- 95% of high school teachers and 59% of postsecondary instructors said they are familiar with their state's standards.
- 32% of high school teachers said that students today are better prepared for college-level work, while 13% of postsecondary instructors agreed.
- Although high school teachers tend to have a more positive view of state standards, the majority of both groups (68% of high school teachers and 86% of postsecondary instructors) think that student preparation today for college-level work is the same or worse than student preparation five to 10 years ago.

Adding more state standards to prepare students for college-level work is not the answer, according to ACT, the not-for-profit education organization that published the survey. Instead, high school educators should consider incorporating fewer and more targeted state standards focused on the essential knowledge and skills in each content area instead of many standards covering a broad array of topics and skills. This could bring state standards more in line with what postsecondary schools require of entering freshmen.

Source: *Aligning Postsecondary Expectations and High School Practice: The Gap Defined*, 2007