

This year (2009) was a good year for inventions. Below are twelve of them. Read the descriptions, highlight your confusion, and follow the directions at the end of this handout.

The \$10 Million Light Bulb

With the flick of a switch, Philips Electronics may have just dramatically lowered America's electric bill. In September the Dutch electronics giant became the first to enter the U.S. Department of Energy's L Prize competition, which seeks an LED alternative to the common 60-watt bulb. Sixty-watt lights account for 50% of the domestic incandescent market; if they were replaced by LED bulbs, the U.S. could save enough electricity per year to light 17.4 million households. If Philips wins the L Prize, it will claim a cash award and federal purchasing agreements worth about \$10 million.

Philips' LED bulb emits the same amount of light as its incandescent equivalent but uses less than 10 watts and lasts for 25,000 hours — or 25 times as long.

The Smart Thermostat

A couple of years ago, Seth Frader-Thompson was driving a Prius. Priuses have little screens on the dashboard that tell you what gas mileage you're getting, in real time, as you drive. It crossed Frader-Thompson's mind that houses should have something similar. So he built the EnergyHub Dashboard, a little device, with a screen, that can talk wirelessly to your furnace and your various appliances and let you know exactly how much electricity (or gas) each one is using and how much it's costing you. It can also turn appliances on and off and raise or lower the temperature in your house so you can rein in the real power hogs. EnergyHub is currently partnering with utilities for trials and will be available direct to consumers in early 2010

Controller-Free Gaming

Since time immemorial — or at least since Pong — one barrier that has stood between gamers and total Tron-like immersion in their video games has been the controller: the joystick, trackball, mouse, light gun or whatever. This year Microsoft demonstrated a technology, code-named Project Natal, that enables players to control games using only body movements and voice commands, no controller required — the gamer's body becomes the controller. Project Natal uses several cameras, plus a highly specialized microphone and a lot of fancy software, to track the gamer's body and interpret his or her voice. You move your hand, and the Master Chief (or whoever) moves his hand. It's that simple. And that cool.

The AIDS Vaccine

A vaccine is not exactly a novel invention, but one that's designed to fight HIV certainly is. More than 20 years after the AIDS virus was identified, researchers have devised the first immunization to protect people against HIV infection. A six-year trial showed that the vaccine, which consists of two shots that given individually had failed to protect against HIV, is modestly effective, reducing infection 31% among those receiving the regimen vs. those getting a placebo. Scientists are still trying to figure out how the vaccine decreases infection risk, since the shots did not affect the level of virus in the blood of volunteers. And some experts question whether the small effect is indeed significant. The vaccine is not approved for use yet, but it's the first to make any headway against HIV, and that's a start.

Tweeting by Thinking

Plenty of people's Twitter feeds appear to be connected directly to their egos, but one scientist's is actually wired to his brain. In April, University of Wisconsin doctoral student Adam Wilson — working with adviser Justin Williams, above — tweeted 23 characters just by thinking. He focused his attention on one flashing letter after another on a computer screen while wearing a cap outfitted with electrodes that monitored changes in his brain activity to figure out which character he wanted. His efforts spelled out "USING EEG TO SEND TWEET," among other messages. The feat marks a major step forward in establishing communication for people with "locked in" syndrome, which paralyzes the body, except for the eyes, but leaves the mind alert. For now, though, it's slow going: with the speediest brain tweeters reportedly managing just eight characters a minute, it's a good thing they're limited to 140.

The Electric Eye

MIT researchers are developing a microchip that could help blind people regain partial eyesight. Though it won't completely restore normal vision, it will enable a blind person to recognize faces and navigate a room without assistance. The chip, which is encased in titanium to prevent water damage, will be implanted onto a patient's eyeball. The patient will then wear a pair of eyeglasses equipped with a tiny camera that transmits images directly to the chip, which in turn sends them to the brain. With any luck, human trials are only a few years away.

The Mercury Probe

If the solar system has a flame-roasted planet, it's Mercury, where the sun pushes surface temperatures to 800°F (426°C). That brutal environment is one reason no NASA probe has visited Mercury since 1975. But Messenger — the space agency's new Mercury ship — can take the heat. Having just completed a flyby a mere 141 miles (228 km) above the planet's surface, it's preparing to enter Mercury's orbit in 2011. The probe will survey parts of the world never before seen — and will do so in comfort. Covered in an insulating ceramic skin, it will endure temperatures of 700°F (370°C) on its exterior; inside, it will operate at a room-temperature 70°F (20°C).

The Solar Shingle

The Dow Chemical Co. has developed a new roof shingle that doubles as a solar panel. The shingles, which can be incorporated into rooftops alongside traditional asphalt shingles, use low-cost thin-film cells of copper indium gallium diselenide. While Dow expects to profit greatly from the Powerhouse Solar Shingle — the company predicts it will bring in as much as \$10 billion in revenue by 2020 — there will be significant benefits for consumers too. The innovative shingle is expected to cost 10% to 15% less than traditional solar panels and will be cheaper and quicker to install.

The Handheld Ultrasound

The stethoscope of the 21st century may have arrived. On Oct. 20, GE unveiled the Vscan, a medical imaging tool as compact as a cell phone and as powerful as a large ultrasound console. Doctors can use it to look inside a patient's body and instantly see fluid around the heart, for example, or a baby in the breech position. In a field where minutes can make the difference between life and death, the Vscan — not yet commercially available — could improve the way medicine is practiced everywhere, from cutting-edge ERs to makeshift village clinics.

Vertical Farming

Real estate — the one thing we're not making any more of. That might be good news for landlords but not for the world's farmers, who have finite cropland to feed a growing global population. The answer: build up by farming vertically. Valcent, a company based in El Paso, Texas, is pioneering a hydroponic-farming system that grows plants in rotating rows, one on top of another. The rotation gives the plants the precise amount of light and nutrients they need, while the vertical stacking enables the use of far less water than conventional farming. But best of all, by growing upward instead of outward, vertical farming can expand food supplies without using more land.

The Custom Puppy

In 1997, the year scientists announced they had created Dolly the cloned sheep, Lou Hawthorne began wondering what it would take to create a genetic replica of his mother's dog Missy. In 2007, his company BioArts did it, and in 2009, Hawthorne delivered puppies to five customers who paid an average of \$144,000 for copies of their canines. (The company also created, pro bono, five clones of a search-and-rescue dog that worked at the World Trade Center after 9/11.) BioArts has since said the pet-cloning market is too small to be commercially viable, but for pet owners who jumped at the chance for a second chance, the puppy love lives on.

The Nissan Leaf

It's not the world's first electric car, but the Nissan Leaf, launched in August, is the first fully electric vehicle built for mass production for the global market. To help drivers shift their thinking from gas to green, Japan's third largest automaker has about 30 partnerships worldwide focused on developing an infrastructure of battery-recharging stations to keep electric vehicles on the roads. The car's top speed is more than 90 m.p.h. (145 km/h), and its range is 100 miles (160 km) on a full charge. When it moves, it makes a futuristic sound like the flying cars in Blade Runner. Nissan will produce 50,000 Leafs each year at its Oppama plant, southwest of Tokyo, starting in the fall of 2010.

Directions: In your writer's notebook, do the following:

1. Rank these inventions in order of importance, one through twelve. One = most important, twelve = least important.
2. Defend each answer. Which one did you pick as most important and why? Which one did you pick as least important and why?