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APRIL 2018



What's Wrong with This Picture?

Teaching Safety with Student Photos

Women Still Missing from Male-Dominated Fields

Special Pull-Out Product Guide Inside

technically speaking

Vanessa Revelli vanessa@techdirections.com



As you may know, we had a BIG problem with the print version of the March **techdirections**. The company who prints the magazine assembled some of the issues incorrectly—a first in our over 70-year history. We apologize for this and hope you will reach out to let us know which version you received, one with the pages in the right order, or one with the pages all jumbled. If you could please take a minute to email me, vanessa@techdirections.com, and let me know, I'd appreciate it. We are trying to figure out how widespread the problem is.

To fix your issue:

- Open to the center of the magazine and remove the staples.
- Close the magazine and remove the cover.
- Turn to page 3 (it follows page 18) and remove the center section. It starts with page 3 and ends with page 34. This is Section 1. The remaining pages are Section 2
- Open Section 1 to its middle, pages 10/27. Place Section 2 here.
- Close the magazine and put the cover back on.

If you would rather view the issue digitally, visit: www.omagdigital.com/publication/?i=478790

As this school year is nearly wrapped up, we are thinking about content for next year. Once again, we are turning to you, our readers, to ask for your help in shaping next year's magazine. We are wondering if there are any subjects you would like to see us cover more, things we

aren't covering at all that need to be, or things that we don't need to cover anymore. Reader feedback is very important in guiding **techdirections** to what it is intended to be—a magazine where you will find information about what is going on in the field, ideas you can use in your classroom, ways to help prepare students for a career, and products that can benefit your program.

Another way we are hoping that you can help shape the magazine is to write for us. Do you have an idea you would like to share with your fellow teachers? Please write an article for us! Writer guidelines can be found at techdirections.com/guidelines.html. If you would like to pitch an idea before you start writing, send it to vanessa@techdirections.com. We know you are all doing interesting things in your classrooms, and we would love to help share these stories!

We are also looking for cover photos. Showcase your students and program on the cover of **techdirections**! We are looking for vertical photos that show students in action. Students love to see themselves on the cover of the magazine.

Finally, did you miss any issues of **techdirections** this year? If so, you can always find them in digital form on our website: techdirections.com/past-issues.html.

Vanessa Revelli

techdirections

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About the cover: A student demonstrates a safety violation. Cover design by Sharon K. Miller.

Vanessa Revelli

vanessa@techdirections.com

First-in-the-Nation Construction Safety Sciences Program

This fall, Keene (NH) State College will offer a Construction Safety Sciences degree program. Keene State officials say it will be the first of its kind in the U.S.

Officials also said the program will focus on skills like critical thinking, identifying hazards, solving problems, and regulatory compliance, and that those completing the undergraduate degree will be prepared for jobs in the public and private sectors. The college will also begin offering a minor in sustainability, which can be useful to those pursuing careers in construction or design. Keene State officials said the two new programs will ready students for

careers by providing them with more hands-on experiences.

Keeping workers injury-free not only helps workers feel motivated and secure, but also is a way for construction companies to reduce costs.

Additional costs from injuries can include a loss of productivity if an



employee is not able to work. According to OSHA, lost productivity due to injuries and illnesses costs

companies across all industries \$60 billion annually. The agency also says that companies spend a total of \$170 billion each year on costs related to injuries and illnesses, but, with comprehensive safety programs, they can whittle that down by 20% to 40%.

Companies also pay for injuries through increased workers' compensation insurance premiums. Business's workers' comp premiums are based on an experience modification rate (EMR); the lower the rate, the lower the premium. That rate can increase as injuries rise, driving up the cost.

For more information about the new Construction Safety Sciences Program, go to: <https://www.keene.edu/news/stories/detail/1513707303477/>.

Initiative to Drive More Students to CTE Announced

Too often, CTE programs still evoke an image of outdated vocational education that does not prepare students for their college and career aspirations. In reality, CTE programs



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are relevant to all sectors and career fields, regularly engage students through work-based and hands-on learning, and provide seamless pathways between high school and college and the workplace. Today, too many students and parents are unaware of the CTE programs in their own communities, and how these programs equip students with the academic, technical, and employability skills necessary to succeed in postsecondary education and the labor market.

To address this, Advance CTE, with support from the Siemens Foundation, is conducting national research on the messages that best resonate with parents and students to encourage students to engage in CTE programs.

As part of the effort, Advance CTE will work with four states selected through a competitive process to incorporate nationally tested messages about CTE in a variety of in-person events and virtual campaigns. Each state will receive up to \$20,000 and eight months of technical assistance from Advance CTE. The selected state agencies are the Indiana, Maryland State, and New Jersey Departments of Education, and Washington Workforce Training and Education Coordinating Board.

“Students and their parents need to know there’s more than one way to succeed in college and employment, and CTE can often get you there faster and for less money, said David Etwiler, CEO of the Siemens Foundation. “It’s no secret that our economy values the skill sets provided by CTE programs, particularly those in STEM. It’s time for our society to do the same, and we’re hoping that driving communications around this value will do just that.”

“Today’s CTE programs are engaging and provide students with the opportunity to explore career options, gain real-world skills, and prepare for their future,” said Kimberly Green, Executive Director of Advance CTE. “One of the greatest challenges we face is telling the story of CTE’s success in a way that makes it a viable option for more parents and their children. We are excited to work with these states to build creative recruit-

ment efforts so that more students can find success through CTE.”

Over the course of the initiative, the four states will lead activities ranging from a day-long recruitment event for middle school students and their parents, a video campaign featuring employers and students that is customizable at the local level, a replicable social media strategy for districts, and modular lesson plans that help students explore advanced manufacturing careers. Activities will later be scaled statewide, and

lessons learned from these states will be shared across the country through the CTE: Learning that Works for America® campaign.

This work will ensure that students are being prepared for careers in their field of interest, while also creating a pipeline of talented and skilled employees in STEM industries.

To learn more, visit www.career-tech.org/recruitmentstrategies. ©

*Vanessa Revelli is managing editor of **techdirections**.*



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Microsoft's Project Natick

When I was a kid, my parents often told me to get my head out of the clouds and get serious about school, or financially I would end up underwater. Truth is, today most of us have our digital life (work done on computers and smartphones) stored

about school. Natick is a Microsoft project that is now taking storage clouds underwater (Photo 1). The judges of the World Changing Ideas Awards committee listed Project Natick as a 2017 finalist for an award for their innovative approach to cloud storage.

(For the full list of winners and finalists, visit <https://www.fastcompany.com/3068873/announcing-the-winners-of-the-2017-world-changing-ideas-awards>.)

The thinking behind the con-

can even begin. The ocean is rent free, has a built-in cooling system, and small self-contained datacenter vessels could be produced in factories for quick installation off the coast of any continent anywhere in the world.

Photo 2 shows the core Natick team that designed the water-tight vessel and decided how much cloud storage could be housed within its limited space (Photo 3). They built the Natick system to take on the characteristics of a satellite: once it is launched underwater, it will perform its tasks on its own without ever being internally serviced. Component failure that could cause data loss will be handled the same way it's handled by land-based storage centers—data storage redundancy stored in multiple locations.

A catastrophic Natick vessel failure would be handled the same way it is handled with satellites—having multiple satellites provide system redundancy until a replacement can be deployed. Here, the other units in the underwater datacenter pod would cover until a new Natick

unit could be shipped to the location and anchored underwater. Each underwater datacenter would have lots of Natick vessels all anchored reasonably close together to provide the equivalent storage capacity of a land-based cloud datacenter.

If all the underwater testing remains positive and if their research shows enough global interest to purchase these systems, Microsoft will be ready to move forward. At that point, underwater data

storage will become a reality. Just like solar panels, cars, and other mass-produced products, the greater

Alan Pierce, Ed.D., CSIT, is a technology education consultant. Visit www.technologytoday.us for past columns and teacher resources.



Photos courtesy Microsoft

Photo 1—Your digital life is already up in the clouds. Microsoft is finalizing its research to take your digital life underwater.

or backed-up in the clouds. These clouds are warehouse-size computer datacenters, usually located in low-rent areas with access to cheaper electricity, and a very fast connection to the Internet.

Indirectly, they provide service to you since your digital life ends up on their servers from Microsoft, Google, or Apple when you backup your computer or smartphone. Just in case you feel none of your data is in the cloud, because you backup everything locally, all financial institutions and the U.S. government all use off-site secure cloud storage.

My parent's warning when I was a kid was taken out of context, since the clouds and water they were talking about meant getting serious



Photo 2—The Microsoft team that developed Project Natick in front of their test vessel

cept of building an underwater cloud was simple, though full execution required the same level of expertise as it takes to build a communication satellite network. Purchasing land for a datacenter is expensive, and it takes years to get local approval before the construction of the center



Photo 3—The team not only developed the vessel concept, they also had to determine how much hardware you can safely stuff into its limited space.

the demand the cheaper it will become to manufacture the pods.

The architects of Natick have decided that it will be cheaper to replace a vessel than to retrieve it and

clean off the sea life, so it can be opened and serviced. A properly designed unit should last long enough for its built-in storage systems to be antiquated by the time it is necessary to replace it. The goal will be to recover out-of-service units at the same time the replacement unit is installed, then fully decommission it, clean out the vessel, and completely refurbish it with all new hardware.

The goal is to have Natick cloud datacenters powered by “renewable energy sources such as offshore wind, wave, tide, or (ocean) current.” For communication Microsoft envisions plugging into the already existing “subsea cables which allow the Internet to span the oceans, connecting devices and datacenters around the world.”

At this point the Natick undersea datacenters are still listed as a Microsoft research project, and is still being tested and evaluated. If all testing proves the validity of the sys-

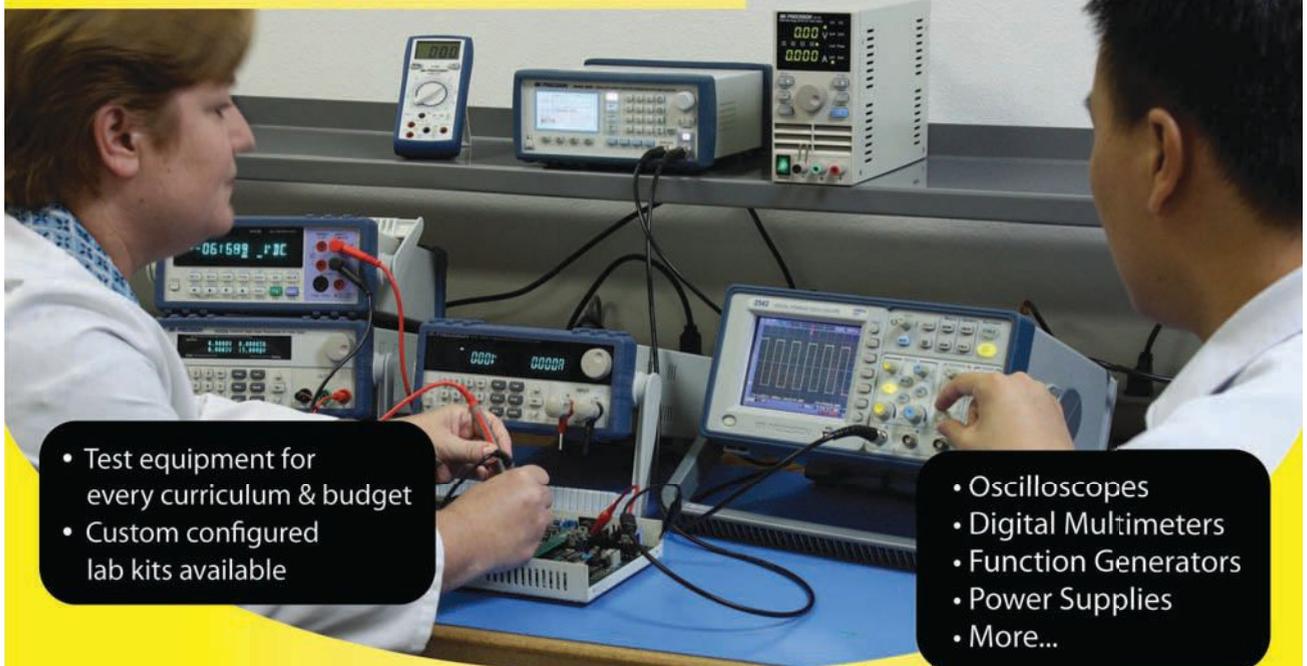
tem, and the pods are manufactured, “Natick datacenter deployment is intended to last up to five years, which is the anticipated lifespan of the computers contained within. After each five-year deployment cycle, the datacenter would be retrieved, reloaded with new computers, and redeployed. The target lifespan of a Natick datacenter is at least 20 years. After that, the datacenter is designed to be retrieved and recycled.” For more details, visit <http://natick.research.microsoft.com/>.

Taking It a Step Further

1. How would a city’s proximity to a coast line determine if it can take advantage of Natick technology?

2. Some renewable sources of energy are listed in this column. The location of a Natick datacenter could affect which type of renewable energy source would be most efficient. Research what environmental factors might influence which renewable energy source would be available to be chosen for four different locations around the world. ☺

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Frank Piasecki and His Twin Rotor Transport Helicopters

Helicopters are rotary wing aircraft that fall into two specific types. The most common use a single rotor for aerial observation or to transport a small number of passengers. Larger twin rotor helicopters carry heavier loads and are often used by the military. The double rotor design was the brain child of Frank Piasecki, who flew the world's first twin rotor helicopter in 1945 near Philadelphia, PA.

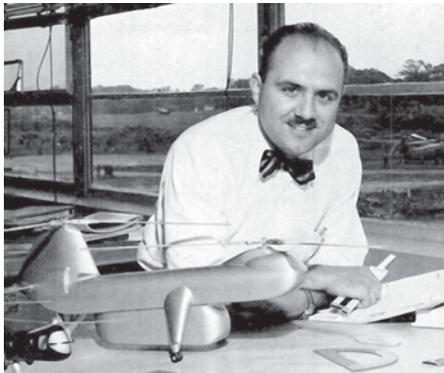
Helicopters are rotary wing aircraft that fall into two specific types. The most common use a single rotor for aerial observation or to transport a small number of passengers. Larger twin rotor helicopters carry heavier loads and are often used by the military. The double rotor design was the brain child of Frank Piasecki, who flew the world's first twin rotor helicopter in 1945 near Philadelphia, PA.

Piasecki was born in Philadelphia in 1919 to parents who had recently emigrated from Poland. His father, a tailor, gave Frank a present of an airplane ride when he was seven years old. Ten years later, Piasecki rode in a helicopter-like autogiro. That flight convinced him to study aeronautical engineering. He graduated from New York University in 1940.

He and close friend Harold Venzie (1914-1975), along with four former college classmates casually organized a helicopter company they named PV Engineering Forum. Igor Sikorsky (1889-1972) had flown the first open-framed helicopter in 1939 and the young men wanted to build one with an enclosed canopy.

Since they had day jobs, they worked on their helicopter during evenings and weekends. Being self-funded meant they scrounged many parts from junkyards to construct their single-passenger PV-2. It was powered by a 90 hp Franklin four-cylinder engine, which they personally financed.

Dennis Karwatka is professor emeritus, Department of Applied Engineering and Technology, Morehead (KY) State University.



Frank Piasecki in 1951

struct their single-passenger PV-2.

It was powered by a 90 hp Franklin four-cylinder engine, which they

personally financed.

Piasecki flew it for the first time outside Philadelphia in April 1943. The helicopter was tethered to the ground with a clothes line that broke during liftoff, but Piasecki was able to land

it safely. The PV-2 was the second American helicopter to fly successfully (after Sikorsky's).

The U.S. Navy was impressed and gave Piasecki a development contract for a much larger helicopter. Extremely self confident, impeccably

dressed, and looking older than his 24 years, Piasecki had talked his way into constructing the world's first two-rotor heavy-lift helicopter. He formed the Piasecki Helicopter Company, initially employing 80 people. Its name would change to the Vertol Aircraft Corporation in 1956 and then to Boeing Vertol in 1960. Boeing's current CH-47 Chinook helicopter is a direct result of Piasecki's work.

Over 13 months, Piasecki and his team members worked on their tandem rotor helicopter. It had the unusual designation of XHRP-1 but was more casually known as the PV-3 or Dogship. It first flew in 1945 with Piasecki at the controls. Its unusual banana shape ensured that the rotors did not collide. Piasecki had transformed the helicopter from an observation aircraft into one with broad commercial, humanitarian, and military applications.

The Dogship evolved into the similar-looking Rescuer, which was powered by a single Pratt & Whitney Aircraft 600 hp engine. The project was successful from the start and the Navy ordered 20 of the 10-passenger, 100-mph helicopters. They remained in service until the early 1950s.

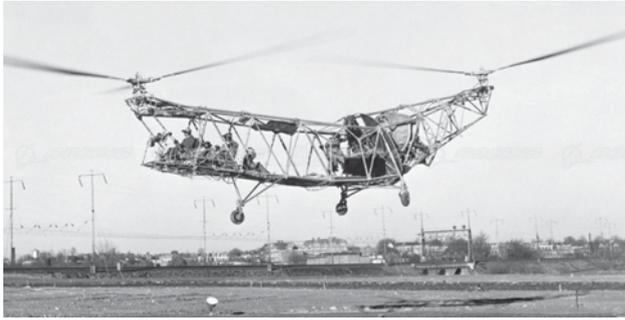
Piasecki separated from his original company in 1956 and established another where he continued to fo-



A modern Chinook helicopter

Piasecki at the controls of his PV-2





The Dogship in test flight without its fabric cover (to save weight)

PV-3 Dogship aloft



cus on innovative helicopters. He held 24 patents. Even though he was a company president, he did most of the test flying of his early experimental helicopters.

Piasecki piloted more than 20 different rotary wing aircraft. He received the National Medal of Technology from President Ronald Reagan in 1986, yet no aircraft bears his name.

Piasecki married Vivian Weyerhaeuser in 1958 and they had seven children. Always well dressed and often wearing a bow tie, Piasecki enjoyed sail boating, amateur photogra-

phy, and music. He was a concert violinist in his youth. Piasecki attended the University of Pennsylvania for a few years and served as conductor of its orchestra. Piasecki never retired and died in 2008 at the age of 88 while working on his advanced X-49 Speed Hawk helicopter. ©

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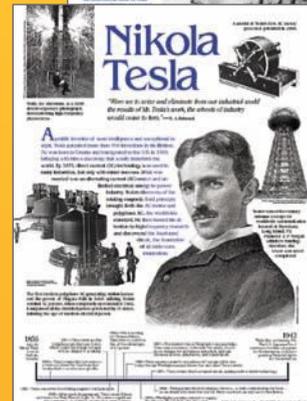


A Coast Guard Rescuer helicopter

Piasecki's last helicopter, the Speed Hawk



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What's Wrong with This Picture?

By Keith Kohlmann

EVERY few years, a photo illustrating a student using equipment in an unsafe manner slips past the editorial staff of **techdirections** and gets published. As a long-time reader, I must confess, that it has become an enjoyable “Where’s Waldo” exercise for me to open a new issue of **techdirections** and search for possible bloopers.

Instead of firing off an angry email to the editorial staff after the latest incident, I thought, “How can I use this to teach students?” We were already in the middle of our safety unit. After they learned basic shop safety rules and basic operations of some of the machines, I explained how stock photos are used in the media. Some photographers and stylists concerned with creating a good-looking image might overlook the need to accurately portray safe working habits. I issued the challenge to them to create their own photos showing both the correct and the incorrect way of working in the lab.

Middle school students love to pose for photos, and they also like to criticize those who do not follow the rules. I used these strengths to build our classroom culture of safety. We formed groups and assigned the roles of: photographer, stylist, model, and safety consultant. I helped the groups with composing the photos and special effects. The machines were de-energized during the photo shoots. Each group was responsible for producing one slide.

Keith Kohlmann is a Technical Education teacher with 24 years of experience in the Racine Unified School District. He is a frequent contributor of articles on historical topics to railroad and industrial publications.

We combined the slides from all the groups in each section of Technology Education into one PowerPoint show. Then we watched the show in each class and discussed each slide. With each serious or silly scenario, the students were engaged and learning.

Our classroom culture is one of sharing helpful assis-



tance, rather than yelling at people who are “wrong.” We ended the show with a few interesting images of unsafe workers gleaned from the web.

How many safety issues can your students find in the 12 photos on this page and on pages 21-22? How many can you? Answers are on page 26.

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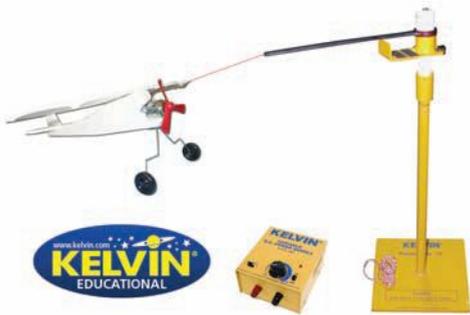


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**Spring
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Aeronautics/ Aviation

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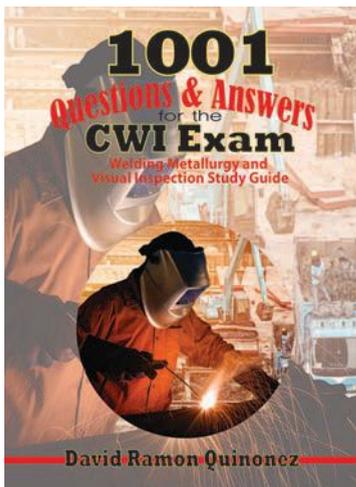
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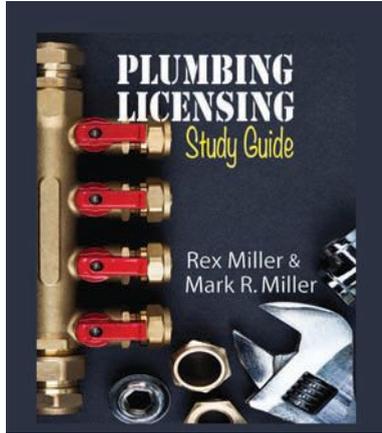
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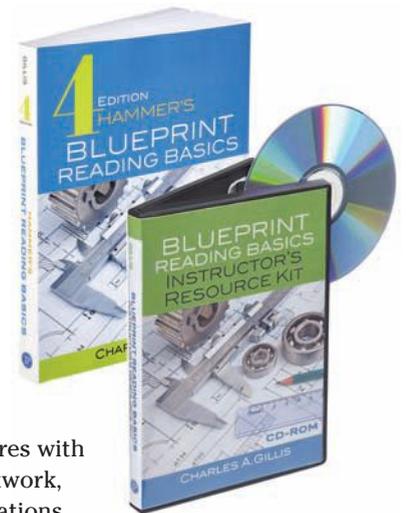
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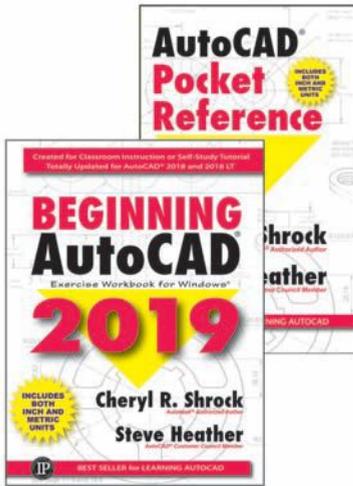


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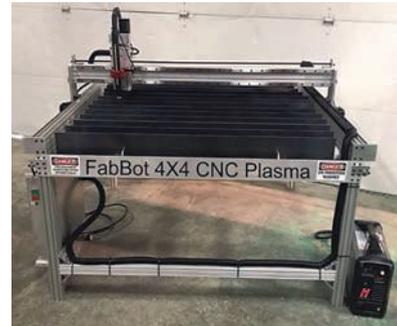
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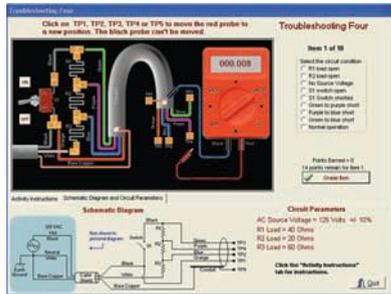
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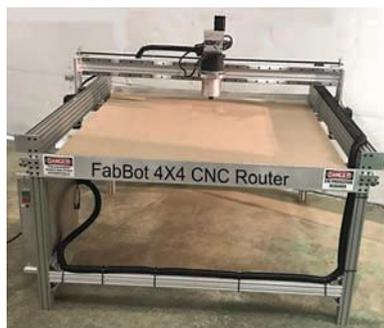
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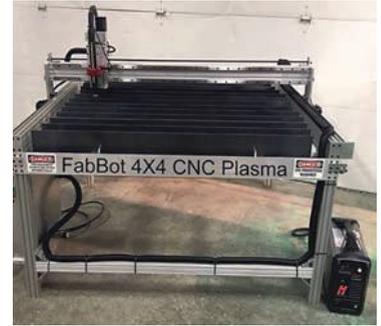
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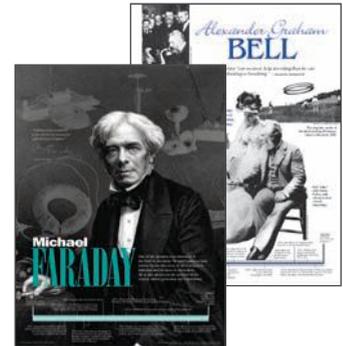
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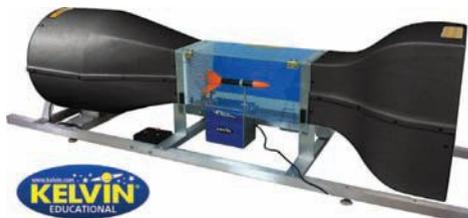
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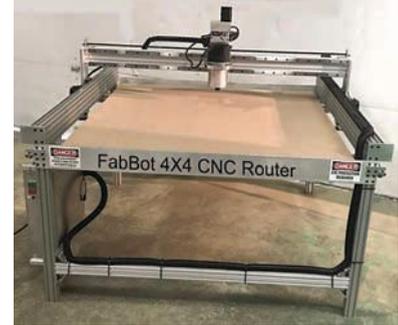
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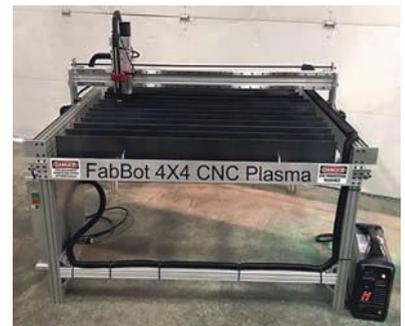


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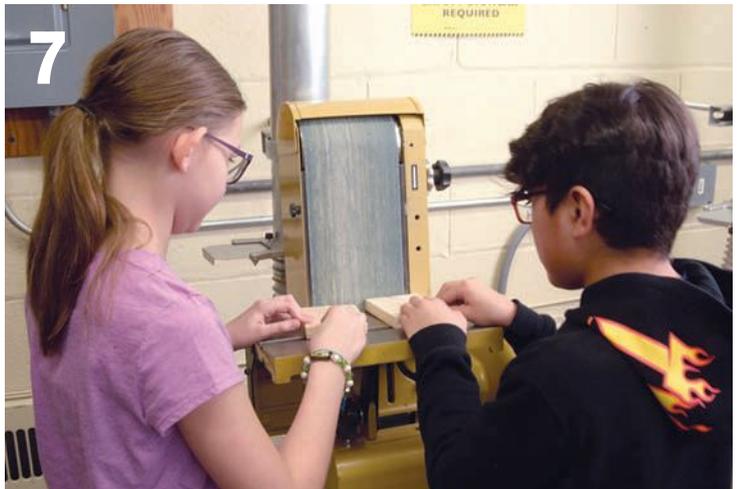
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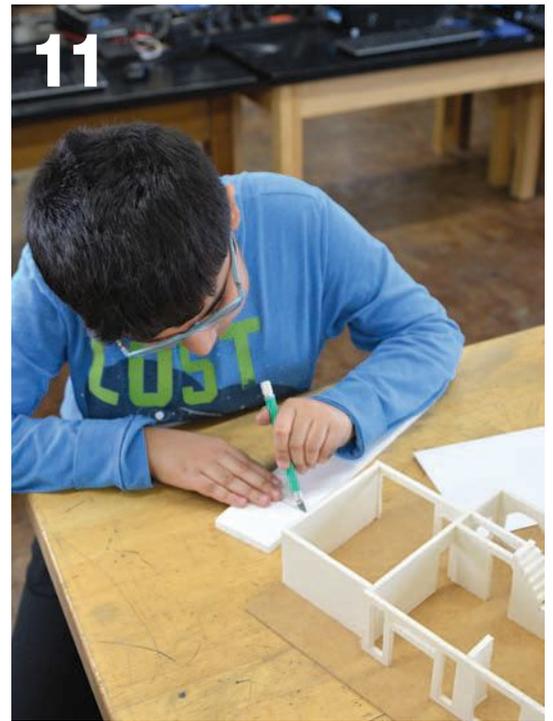
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What's Wrong with This Picture? Continued from page 12.



Turn the page for more photos.

What's Wrong with This Picture? Continued from page 21.



Answers on page 26.

In Spite of a Growing Shortage in Male-Dominated Vocations, Women Still Aren't Showing Up

One group of prospective tradespeople is forgoing the highest-paying fields—women.

By Kelly Field

In a classroom of a technical college an hour from Atlanta, Kimberly Hinely picks up a welding torch and lowers her face shield. Sparks fly around her as she melts the metal, joining iron to iron.

Three months into an evening welding program where she's the only woman, the 44-year-old former tattoo artist said she feels like "one of the guys."

"I don't like working with women—their drama," she said. "I've always gotten along with guys well. I'm a real smartass."

When she finishes the certificate program at West Georgia Techni-

cal College next year, Hinely will be trained in a field the Bureau of Labor Statistics says pays \$40,000 a year, money that will help support her four kids, aged 7 to 25.

60% of them to women. Yet just 6% of those in welding—the most popular program among men—went to women.

So where are all the female students? They're in the salon next

crimination in American education.

Experts offer several reasons for this split, including gender stereotypes and the threat of workplace harassment in male-dominated jobs.

But employers and advocates

A welding student in a classroom at West Georgia Technical College



Photo: Terrell Clark for The Hechinger Report

door, learning about cosmetology, and in the nursing classroom nearby, administering "rag baths" to mannequins. And when they graduate, they'll earn barely two-thirds of what Hinely stands to make, according to the Bureau of Labor Statistics.

At a time when there is an acute shortage of welders and other tradespeople, hardly any women are being trained for these and other well-paying jobs. This more than 40 years after Congress banned sex dis-

agree it's hurting both women and the economy, leaving families stuck in poverty and businesses scrambling for workers in fields, such as IT and advanced manufacturing, where they're growing troublingly scarce.

So-called middle-skill jobs, such as welding, automotive repair, cosmetology, and medical assisting, account for 53% of United States' labor market, but only 43% of workers are trained to the middle-skill level, according to 2015 data from the Nation-

"We're missing something obvious that would help employers and help the economy."

Barbara Gault, executive director, Institute for Women's Policy Research

cal College next year, Hinely will be trained in a field the Bureau of Labor Statistics says pays \$40,000 a year, money that will help support her four kids, aged 7 to 25.

During the last academic year, U.S. colleges and trade schools awarded nearly a million certificates, almost

Kelly Field writes for The Hechinger Report. This article was originally published on The Hechinger Report website, www.hechingerreport.org. The Hechinger Report is a nonprofit, independent news website focused on inequality and innovation in education.

al Skills Coalition, the most recent available. Middle-skill jobs require more than a high school diploma but less than a bachelor's degree.

Getting more women into nontraditional certificate programs could help lift more families into the middle class and ease a labor shortage that is expected to only grow worse as more baby boomers retire. Yet not much is being done to change the enrollment pattern.

"We're missing something obvious that would help employers and help the economy," said Barbara Gault, executive director of the Institute for Women's Policy Research.

Women make up 55% of middle-skill workers, but 83% of those in jobs that pay less than \$30,000 a

"We're trying to take away the element of fear that they're not qualified, or don't have the strength," to do traditionally male jobs.

Donna Armstrong-Lackey, vice president, Carroll County, Georgia Chamber of Commerce

year, according to the Institute for Women's Policy Research. And the median wage for women with a certificate is \$27,864, compared to \$44,191 for men, the Georgetown University Center on Education and the Workforce reports.

Much of that gap is due to occupational segregation—women clustering in low-paying careers including cosmetology and child care and men in more lucrative professions such as welding and automotive repair.

There's been some progress. Before the passage of the Title IX gender equity law in 1972, there were almost no women or girls in vocational programs leading to careers in fields dominated by men.

Today, women and girls make up about a third of students in so-called nontraditional vocational

programs—those in which three-quarters or more of the workforce is male.

But many certificate programs are still dominated by one gender to a surprising extent. 94% of welding

the result of discrimination.

In the 40 years since it passed, the nation has spent millions encouraging girls and women to pursue degrees in science, technology, engineering, and math. Fewer resources

Andrea Laminack, a female welder, talks to Nikki Bond, a prospective student, at an open house at West Georgia Technical College for women interested in vocational trades.



Terrell Clark for The Hechinger Report

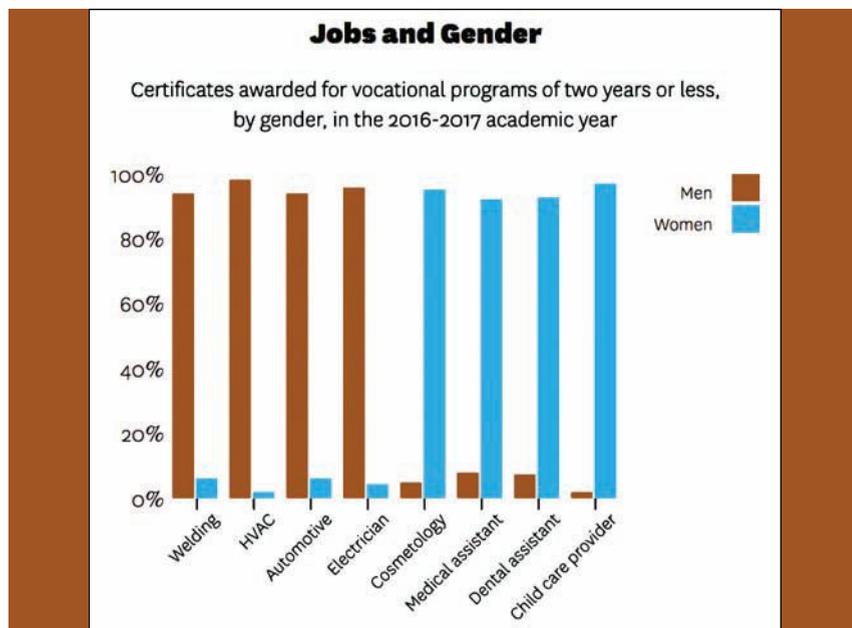
certificates went to men in the last academic year, and 95% of cosmetology certificates went to women, an analysis of data provided by the U.S. Department of Education shows.

In some high-growth, high-paying programs, such as information technology and advanced manufacturing, the share of women and girls is smaller than it was a decade ago, according to the National Alliance for Partnerships in Equity.

Title IX made it illegal for schools

have gone into persuading them to trade their blow dryers for welding torches, however.

In the 1980s and 1990s, Congress required states to set aside a share of their federal job-training funds to eliminate sex bias in career and technical education. But policymakers eliminated most of those rules in 1998, replacing them with a requirement that states increase participation and completion rates for both men and women in programs where



Source: U.S. Department of Education

to steer students into particular fields based on their gender, and required institutions to ensure that disproportionate enrollment was not

they're underrepresented.

Congress added teeth to that law in 2006, threatening states with the loss of federal funds if they failed to

meet specific targets. So far, though, no states have been stripped of their funds despite the fact that only six states have consistently met their targets since the law was enacted.

In addition to recruitment methods that favor one sex, career counseling that channels students into stereotypical fields, and fear of sexual harassment, the biggest contributor to the gender divide in certificate programs may be socialization, said Mary Alice McCarthy, director of the Center on Education and Skills at the New America Foundation.

Even today, “men are much more sensitive to salary signals than women,” McCarthy said. “It goes deep into our understanding of our roles as caregivers or providers.”

Over in the cosmetology classroom, Kaylie Hudson, 31, was giving a bob to a brown-haired mannequin with a mullet while other students practiced their skills by giving discounted haircuts to locals. She said she hadn’t given much thought to how much she might earn as a hairdresser. Her dream is to open a salon that would give cut-rate cuts to low-income women “so they feel better going into job interviews.”

94% of welding certificates go to men, and 95% of cosmetology certificates go to women.

In fact, with her certificate in cosmetology, she’s likely to earn less than the average high school grad, according to the Georgetown center. That begs the question of why women would pay for certificate programs—even taking on debt to do it—to end up with little to no earnings boost.

For Lorelei Shipp, 44, who is cutting her friend’s hair in the salon next door, it’s about freedom and flexibility. As a hairstylist, she expects to make half what she earned as a cus-

tomor service manager in the corporate world, “but the work-life balance will more than make up for it.”

DeeDee Patterson, an instructor in

they’ll be stereotyped as too feminine.”

The median salary for male cosmetologists is \$39,100, according to



Terrrell Clark for The Hechinger Report

Jessie Green, 22, curls 19-year-old fellow student Jordan Brown’s hair in a practice salon for cosmetology students at West Georgia Technical College.

the cosmetology program, can count on one hand the number of men she’s taught in the past eight years. She said male hairdressers are in high demand because “women want to look good for men, and men know what looks good on women”—and often out-earn female colleagues. But just as women are afraid they’ll be perceived negatively by co-workers in male-dominated fields, men considering cosmetology “are afraid

the Georgetown center; for women, it’s \$24,700.

Students who break with gender norms are often following family members into a trade. Brandon Harris, 19, the only man in the nurses’ aide course, has a mother and aunt who are nurses. Channa Cassell, 18, one of three women in the morning welding course, has welding in her blood: her father, uncle, and grandfather are all welders. Even so, her

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Why are my pages out of order?

We had a BIG problem with the print version of the March issue of **techdirections**. The company who prints the magazine assembled some of the issues incorrectly—a first in our over 70-year history.

I apologize for this. **Please let us know which version you received**, one with the pages in the right order, or one with the pages all jumbled.

Please take a minute to email me, vanessa@techdirections.com, and let me know. We are trying to figure out how widespread the issue is. For an easy fix, please see page 2.

What's Wrong with This Picture? Answers

1. No safety glasses. Cutting toward hand.
2. Hair not tied back when using spindle sander.
3. No safety glasses. Cutting toward cord. Cutting toward table.
4. No safety glasses. Stock not clamped. Drilling into table. Lanyard around neck.
5. Blade guard too high on band saw. Phone in hand.
6. No safety glasses. Don't hold a nail for someone else.
7. No safety glasses. Only one person allowed on a machine.
8. No safety glasses. Stock not clamped. Hair not tied back. Hoodie string and bracelet near drill bit.
9. No safety glasses. Lanyard around neck. Stock not clamped. Helper not paying attention. Drilling into table.
10. No safety glasses. Crowding around machine. Cutting toward hand.
11. Cutting toward fingers with X-Acto knife. No cutting board under stock.
12. Hair not tied back when using disk sander.

family was “a little shocked” when she announced that she would follow in their footsteps.

Parents often discourage their daughters from going into welding, seeing it as “dark, dirty, and dangerous,” said Monica Pfarr, executive director of the American Welding

But it can be a tough sell. When Armstrong-Lackey asked one petite young woman if she was considering a career in welding, the woman quickly responded, “I’m too little.”

Armstrong-Lackey told the woman that her own daughter “is your same size and she’s getting a welding cer-

Brandon Harris, 19, tests the water temperature before giving a “rag bath” to a mannequin in a class at West Georgia Technical College to become a nurses’ aide.



Terrell Clark

Society Foundation. In an effort to change that image, the foundation has started sending a tractor-trailer truck to state fairs with an exhibit inside promoting the highly technical, well-paying jobs available to welders. The trailer gets 28,000 visitors a year, she says.

In west Georgia, the community

tificate.” She urged: “Don’t discount it.”

Across the hall, Nikki Bond, 32, was chatting with West Georgia Technical alumna Andrea Laminack, 39, about what it’s like to be a woman welder. Bond, a mother of three, had already registered for the certificate program in welding, but was nervous



Terrell Clark

Chelsey Houston, 20, and Siera Gunn, 23, fold linens at West Georgia Technical College to prepare for a test to become nurses’ aides.

college and local employers recently tried another tack, holding an open house for aspiring tradeswomen. Carroll County, where the college is located, will need to produce 4,000 more graduates of all kinds by 2020 to meet employer demand, and it won’t get to that goal without women, said Donna Armstrong-Lackey, senior vice president of the Carroll County Chamber of Commerce.

“We’re trying to take away the element of fear that they’re not qualified, or don’t have the strength,” to do traditionally male jobs, Armstrong-Lackey said, at the open house.

and seeking reassurance.

Laminack, who is pregnant and has a 14-year-old daughter, told her there will be challenges, but to focus on her love of the work.

She said she was picked on by male colleagues when she started her job. They’d leave notes on her welds with insults such as “ugly,” and “due in 2020,” a reference to what they considered her slow pace.

“I had to grow a thicker skin, but I’m providing well for my family” she said. “The money keeps me from running away.” @

Institutional Innovation:

The Classroom of the Future for All Types of Students

By Shalina Chatlani

WHEN it comes to how higher education leaders can get more students to their institutions, the same advice comes up over and over again—build partnerships with local K-12 districts. A plethora of these types of examples exist in everything from summer camps for high school students to mentorship programs. But, what if your institution could build a far-reaching partnership with hundreds of businesses, several school districts, other universities, and the local community at the same time?

That's exactly what Northwest Missouri State University did when partnered with the city of Gladstone, MO, and the North Kansas City School District to construct the Northland Innovation Center (NIC)—a building designed to educate students from the kindergarten to the postsecondary-degree level, with a particular focus on targeting the school-to-college-to-career pipeline through an interactive, project-based learning environment.

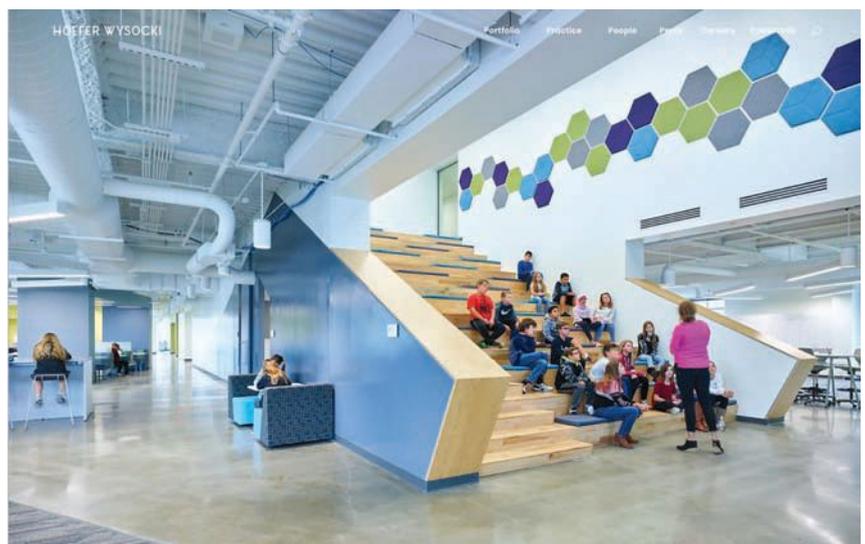
Tapping into a National Innovation Model

The decision to build the center came at an opportune time for all parties involved, said Northwest Missouri State University president John

Shalina Chatlani is associate editor, higher ed, Education Dive. Article courtesy of www.educationdive.com

Jasinski in an interview. Gladstone and the North Kansas City Schools District were looking for an opportunity to uplift its SAGE program, which serves academically gifted students from kindergarten to 8th grade.

partner with the Northland Caps, a branch of the nationally recognized innovation model known as the CAPS Network—or Center for Advanced Professional Studies—that is in 12 states, according to its website. The program focuses on facilitating



North Kansas City School's SAGE Center

At the same time, Northwest MSU wanted to expand its offerings to the city of Gladstone. Maximizing economies of scale, the institution and district worked together with the state to construct a building that could serve students across all levels in a unique, experimental learning environment.

But, said Jasinski, while the building was a partnership with the district and the city, it really served as a conduit for the institution to

profession-based learning, innovative curriculum responsive to workforce needs, real-world professional and experiential learning, skill and entrepreneurship development across the K-12 pipeline.

By participating in this program, said Jasinski, the university accessed larger partnerships across local industry leaders, the other seven surrounding Missouri school districts, and the local Metro Community College, among other institutions in the

area. All the while, Northwest MSU could strategically use the building for students, while also focusing on workforce needs like digital media

in pursuing teaching careers. They have a chance to come to the NIC and get college credit and get on a pathway to teaching and working

with younger students all in the same building."

"There are other CAPs models out there, but I can attest the Northland model has been very successful and has exploded in popularity, helping more and more students receive

nology-entrenched workforce. This occurs as students earn high school and college elective credits while participating in internships with partner businesses.

The decision to build the center, according to Blue Valley Schools Superintendent Todd White, who spearheaded the K-12 aspect of the project when he was superintendent of the North Kansas School District, was made in an effort to meet the needs of the community, as well as create more space for the growing numbers of K-12 students in pre-existing schools.

But, the focus wasn't just on building partnerships to target the pipeline; it was also about creating more engaging and strategic learning environments for advanced pupils. To achieve this end, the building's design had to be deliberate, he said.

"[This] could be a once in a lifetime opportunity so we really had to think ... what are our kids doing now and in 25 or 30 years," said White. To achieve that goal, he said he, Jasinski and other partners went into the

"I can attest the Northland model has been very successful and has exploded in popularity, helping more and more students receive college credit, and address professional skills outcomes."

and design, engineering, advanced manufacturing, and global business.

"Through this we were able to put together a fast-track program with Metro Community College and a concurrent enrollment model where we remove time and costs to degree completion by having that be done at the NIC," said Jasinski. "We also have worked with Northland city schools to pilot and implement a grow your own program which helps their high school students who are interested

college credit, and address professional skills outcomes," he added.

Informed by Pedagogy and Local Needs

The NIC is a 95,000-square-foot facility on a five acre-campus in Gladstone completed in August 2017. The partnership's leaders prioritized a pedagogical design approach that would be based on project-based learning and educating students to be ready for a collaborative, tech-



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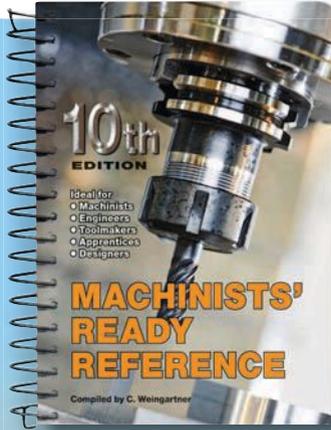


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workforce and observed the needs of industries to inform the building's design and how students could learn in it.

He added they also visited the CAPs program at the Blue Valley School District in Missouri to understand how the facility could create unique opportunities.

Investing in the Innovation Mindset

In terms of how that goal of coming up with a unique design actually played out, Hosam Habib, lead designer at Hoefler Wysocki, the design partner chosen to construct the building, said there were a lot of strategic discussions. Partners focused on creating a campus where students would want to spend time as college students, while at the same time creating a secure environment for younger students.

The focus, though, was on creating a facility that could "give a glimpse to the younger student

about what it's like to go to college," said Habib. "And vice versa—the higher education student, who perhaps wants to be a teacher, can see what it's like to have a school where there's robots ... and can see what their future students may be like,"

Habib said the space was designed to "be shared without any walls, and where there is cross pollination that creates innovation instead of the silos of walled off classrooms." With multiple entrances that could create secure spaces for younger students, but also open arenas and lounges for older students to gather—including a 14-foot-wide hallway with writable walls and touch screens—the building was made to feel unique, but still a traditional and collaborative college setting where students

could facilitate the exchange of ideas.

Investing in such an approach is much different than most education-business partnerships. However, Jasinski said these arrangements are not only key to preparing students for an evolved work environment, but also worthwhile to education.

"I'm talking about the whole pipeline; we all have to be interconnected and work together. There's not one

The building was made to feel unique, but still a traditional and collaborative college setting where students could facilitate the exchange of ideas.

specific path that works for everyone," said Jasinski.

"It's important to listen, learn, respond and be agile," he said. ☺

More than Fun Answers

Fill'er Up!

You would need to buy 10.739 gallons of gas to break even.

Your car uses 21/32 gallons of gas to get to Loveland and back. So, it costs $21/32 \times \$3.76 = \2.47 just to drive down and back. Since there is a difference of 23¢ per gallon, you would have to buy $\$2.47/0.23 = 10.739$ gallons to break even.

Ready to Ride

The actual discount is 36%.

Let x = original price. After the first 20% discount, the cost of the bike is

$x - 0.20x = 0.8x$. After the second 20% discount, the cost is $0.8x - 0.20(0.8x) = 0.64x$.

So, the discount is $100 - 64 = 36\%$.

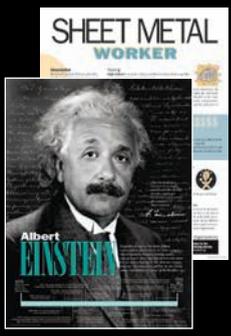
Units of Measure Answers

- | | |
|------------------|----------------|
| 1.—H Diamond | 8.—Light bulb |
| 2.—E Tuning fork | 9.—I Pressure |
| 3.—G Loudspeaker | gauge |
| 4.—D Thermometer | 10.—C Electric |
| 5.—F Eyeglasses | motor |
| 6.—B Magnet | |
| 7.—J Boat | |

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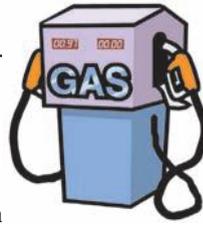
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Fill'er Up!

A gas station in the town of Loveland sells gas at \$3.76 per gallon while the stations in Fort Collins sell gas at \$3.99 per gallon.

If Loveland is 10.5 miles from Fort Collins and your car gets 32 mpg, how many gallons of gas would you need to buy in order to “break even,” that is, to drive from Fort Collin to Loveland and back and spend the same amount for gas as you would if you bought your gas in Fort Collins?



Puzzle devised by David Pleacher, www.pleacher.com/mp/mpframe.html

Ready to Ride

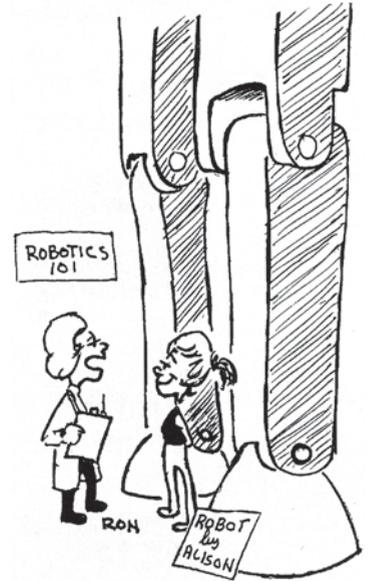


Mr. P's son-in-law bought a new mountain bike that was on sale for 20% off.

However, if he went to the store at 6:00 AM on July 4, he would receive an additional 20% off the sale price.

What was the actual percentage that his bike was discounted?

Puzzle devised by David Pleacher, www.pleacher.com/mp/mpframe.html

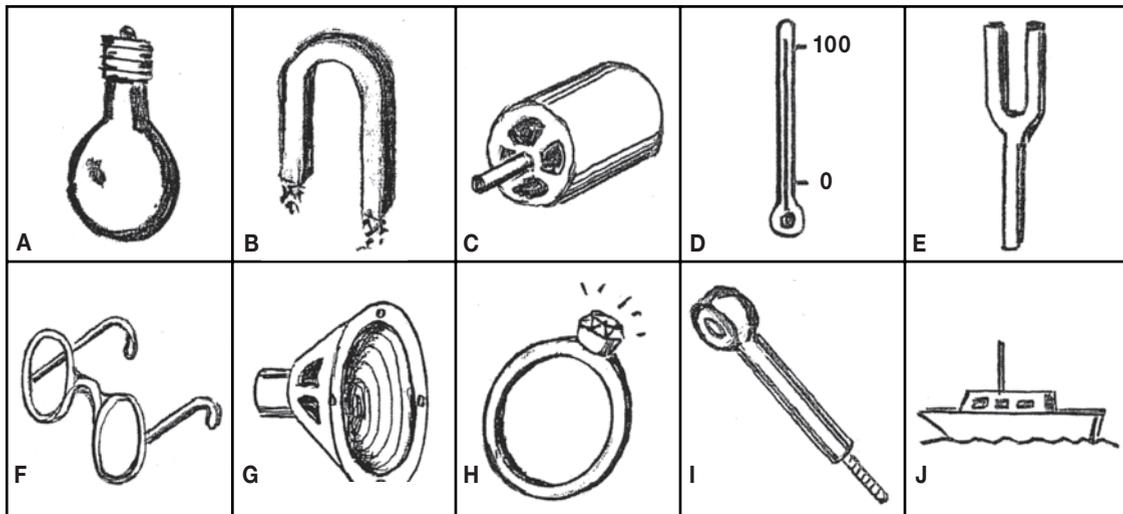


“So, Alison, how long have you been such an underachiever?”

Units of Measure

Numerical measurements require the correct units to properly specify an amount. See if you can match the units (1-10) with the drawings of the devices (A-J) with which they are used.

- | | | | |
|----------------------------|-----------------|---------------------------------|----------------------------------|
| 1. Carats | 4. Degrees (°C) | 7. Knots | 10. RPM (revolutions per minute) |
| 2. CPS (cycles per second) | 5. Diopters | 8. Lumens | |
| 3. Decibels | 6. Gauss | 9. PSI (pounds per square inch) | |



See answers on page 29.

We pay \$25 for brainteasers and puzzles and \$20 for cartoons used on this page. Preferable theme for all submissions is career-technical and STEM education. Send contributions to vanessa@techdirections.com or mail to “More Than Fun,” PO Box 8623, Ann Arbor, MI 48107-8623.

Get Students Motivated!

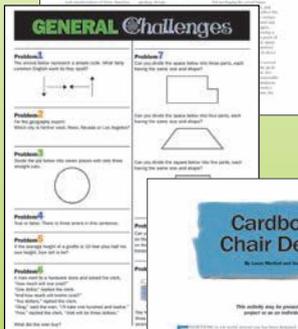
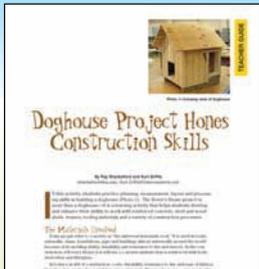
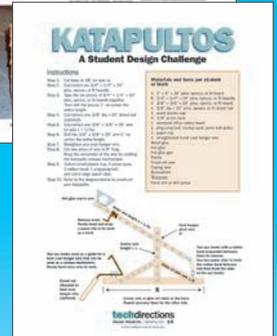
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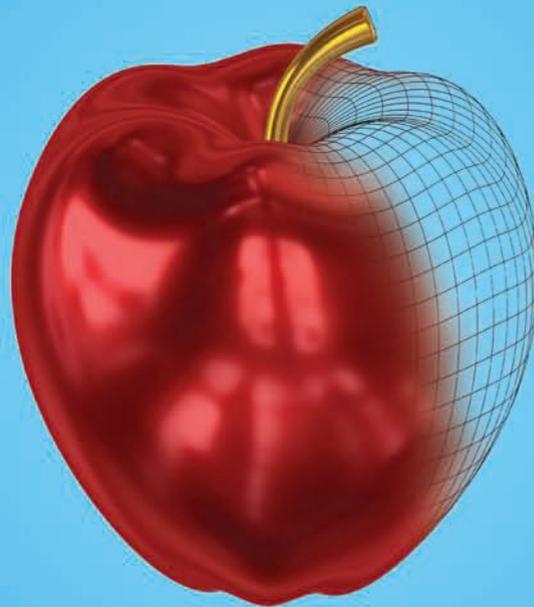
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