

# THE 21<sup>ST</sup>-CENTURY CLASSROOM

**LOOKING TO INTEGRATE 21<sup>ST</sup>-CENTURY SKILLS INTO YOUR CLASSROOM?**

## EDUCATOR SPOTLIGHT

**George Cachianes**  
Biotechnology teacher  
Abraham Lincoln High School  
San Francisco, CA

**Colette Cairns**  
Classrooms for the Future technology coach  
Manheim Township School District  
Lancaster, PA  
**Cable provided by Comcast**

**Mary Jo Conery**  
Assistant Superintendent for 21st Century Learning  
Catalina Foothills School District  
Tucson, AZ  
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**Sandra Keppel**  
English language arts teacher  
Akron Middle School  
Akron, NY  
**Cable provided by Time Warner**

**Peggy Skogen**  
Agriculture instructor  
Plum City School District  
Plum City, WI

## LEARN HOW FROM EDUCATORS WHO ARE DOING IT NOW.

**BY PAMELA WHEATON SHORR**

**M**ost people believe that if our schools are going to prepare kids for the future, we need to update our curriculum. “There’s been a huge shift going on in the last 50 years, and the nature of the information and skills required to succeed in a global economy has changed,” says Ken Kay, president of the Partnership for 21st Century Skills, an advocacy organization that brings together the business community, education leaders such as Cable in the Classroom, and policymakers to help give kids a 21st-century education. “We need to recalibrate our focus.”

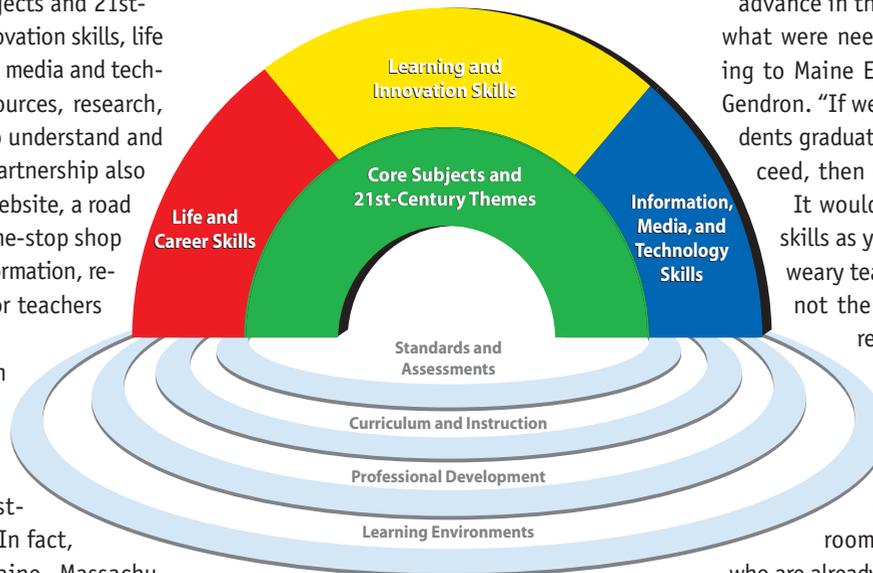
As American education stands today, say 21st-century-skills advocates, our students may have trouble competing on the world stage. For instance, American students have not scored well in international testing, such as the Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS). Kay says it’s essential for the next generation to develop global awareness, learn critical-thinking skills, work collaboratively, and learn how to innovate and to be thoroughly media and technologically literate—in addition to having a rigorous grounding in the core subjects. It may sound like a tall order, but Kay notes that in Europe, educators already are assessing students on some of these skills. “Really, it’s just a question of whether we want to have that same rigor,” he says.

# 'WHAT WE'RE REALLY TRYING TO DO IS ... PREPARE STUDENTS TO LIVE IN A WORLD OF CONSTANT CHANGE.' — KEN KAY, PARTNERSHIP FOR 21ST-CENTURY SKILLS

## DEFINING 21<sup>ST</sup>-CENTURY SKILLS

The Partnership divides 21st-century skills into four major categories—core subjects and 21st-century themes, learning and innovation skills, life and career skills, and information media and technology skills—and provides resources, research, and online tools for educators to understand and incorporate its guidelines. The Partnership also recently unveiled the Route 21 website, a road map for implementation and a one-stop shop for 21st-century skills-related information, resources, and community tools for teachers to use and share.

The good news is that as such information becomes available, more and more educators and educational decision-makers are wholeheartedly embracing 21st-century skills in the classroom. In fact, nine states—Iowa, Kansas, Maine, Massachusetts, New Jersey, North Carolina, South Dakota, West Virginia, and Wisconsin—have signed on as partnership states and are currently redesigning educational policy and practice with these skills



This graphic from the Partnership for 21st Century Skills illustrates the goals of 21st-century learning and the educational infrastructure required to support that.

in mind. “The skills students need to enter and advance in the work force today are far beyond what were needed even 20 years ago,” according to Maine Education Commissioner Susan A. Gendron. “If we think we can let some of our students graduate with less than that and still succeed, then we are fooling ourselves.”

It would be easy to look at 21st-century skills as yet another set of hoops for today’s weary teachers to jump through, but that’s not the idea at all. Kay says it is about reframing what you’re already teaching so that students understand the significance of what they learn. “You’re teaching these skills in the context of all the other work being done in the classroom,” Kay notes. Meanwhile, those who are already practicing what is being preached say adding 21st-century skills to the curriculum invigorates both students and teachers by adding rigor and relevance to the old “reading, writing, ‘rithmetic” equation.

## INFORMATION-MEDIA AND TECHNOLOGY SKILLS

“Every teacher is 100 percent different,” says Colette Cairns, who taught business for 23 years before becoming Classrooms for the Future (CFF) technology coach for the Manheim Township School District in Lancaster, Penn. For any teacher wishing to incorporate technology into his or her curriculum, Cairns is part of the package deal. A teacher gets a cart with computers, an all-in-one printer, digital and video cameras—and Cairns.

In order to sign up for the cart, teachers must commit to taking 30 hours of professional development on 21st-century learning—a process that opens many eyes to the possibilities of technology. “Not all teachers have the same level of ability, and not everyone wants to do a blog,” says Cairns, “but once they see what kids can do with technology, they come

away with new levels of excitement.”

Having Cairns in the room also helps—teachers explain what they want to do, and Cairns shows them how to accomplish their goals. Already, she’s helped teachers make extraordinary changes. Students are using Google Earth to measure ski slopes in geometry, Skyping with a college professor for a videoconferenced student debate about the atom bomb, and participating in online, collaborative speech classes in which student speeches are co-written, podcast, and evaluated by students in classrooms across state lines.

Incorporating technology helps students develop global skills, Cairns notes, “and technology is their world. They’re much more engaged when they have a laptop.”

The school district continues to follow up on



The Classrooms for the Future website gives teachers valuable resources and the tools to exchange ideas.

the tech emphasis with CFF Days, professional development that allows teachers to gather new tech ideas for their classrooms from colleagues and tech coordinators, and it maintains CFF wikis that host lesson plans and discussion boards to further spread the word.

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Sandra Keppel's sixth graders used online research and hands-on activities to study animals, then produced podcasts to showcase what they'd learned.

### 21<sup>ST</sup>-CENTURY THEMES AND LANGUAGE ARTS

Sandra Keppel, a sixth grade English language arts teacher at Akron Middle School in Akron, N.Y., and a 2008 Time Warner Cable National Teachers Award winner, is filled with energy and passion. When she heard about a science project connecting schools with animal facilities across the country via the local Board of Cooperative Educational Services (BOCES) distance-learning program, she felt it would be a perfect way to imbed 21st-century themes into her core subject material. Keppel says she wanted to get her students thinking more critically and deeply about literature and its connection to our lives and to the larger human condition. "I wanted them to draw relationships between what they were reading and learning about people and about similar struggles in the animal kingdom. I wanted them to think about what it means to survive, and the decisions one makes to survive," as well as how those issues arise in public debate, she explains. Keppel's students read the books *Hatchet* and *Where the Red Fern Grows*, whose themes center on animal-human interactions. To get students thinking about how public policy is decided, students had to debate in an online blog about hunting versus survival.

Keppel integrated technology and media skills into the project throughout. The class took part in a

virtual tour of the Buffalo Zoo, where each class was assigned two animals to research. Students wrote reports and used computer-design software to create toys for the animals using zoological information they'd gathered via Time Warner's Road Runner Research and Enrichment service as well as cable networks Animal Planet, Discovery, and National Geographic. Through online interviews and meetings with zoo personnel, Keppel's class also learned about the skills needed for various careers working with animals. Finally, they created podcasts on their animals, demonstrating their content knowledge through the use of information media.

By reframing the unit to include such overarching themes as the rights of animals versus human survival, and by bringing the outside world into her classroom, Keppel was able to deepen students' understanding on multiple levels. She says using 21st-century skills gives kids a sense of relevance and empowerment that doesn't exist in a more traditional curriculum, and helps students see connections they might not have considered before. "My mantra is that kids are in charge of their own learning," she says. "If we just teach them to think, they can read and analyze and understand anything."

### LAYING THE GROUNDWORK

Of course, it can be difficult to make these types of changes without assistance from community and business leaders who understand the importance of 21st-century skills at both a local and national level. In Coachella Valley, Calif., the dropout rate was high, college attendance was low, and the economic base needed to be diversified, says Kim McNulty, program manager of the Coachella Valley Economic Partnership Career Pathways Initiative.

Community leaders worked on a plan to expand career opportunities for low-income youth and attract new, higher-paying jobs to the Valley. They developed a series of career paths, including multimedia, technology, health, and environmental sciences, that resulted in refocused high school academies. Long-term student goals were mapped to the California frameworks beginning at the K-5 level, middle school students visited



Students in Coachella Valley, Calif., learn about career options in media while developing 21st-century skills.

area industries to learn more about their chosen career paths, and test scores began to rise.

To those who say it sounds like a newfangled

version of career tech, think again. "By no means are we turning out trained widget makers who do nothing else," says McNulty. "Students get a rigorous education—and they see how exciting the future can be. It has really transformed the way we do education and economic development."

That kind of synergy is what the Partnership for 21st Century Skills wants to achieve throughout the country. Its own member base is richly diverse, including organizations such as the American Association of School Librarians, Discovery Education, Ford Motor Company Fund, LEGO Group, Microsoft Corporation, and the National Education Association. "What we're really trying to do is align education with the new challenges of a global economy," says Ken Kay, "and to prepare students to live in a world of constant change."

**'KIDS ARE IN CHARGE OF THEIR OWN LEARNING. IF WE JUST TEACH THEM TO THINK, THEY CAN READ AND ANALYZE AND UNDERSTAND ANYTHING.'** — SANDRA KEPPEL

## LIFE AND CAREER SKILLS

More advanced career skills are exactly what 18-year-old Hannah Iverson was looking for when she was in high school. The 2008 Wisconsin Young Entrepreneur of the Year is a recent graduate of Plum City High School in Plum City, Wisc. In fifth grade, Iverson secured a \$5,000 youth loan to begin breeding cattle. Throughout high school, she also took workshops from Semex USA and Accelerated Genetics on livestock reproduction techniques and artificial insemination to grow her herd, and found academic support and mentors through her school district's strong agricultural programs.

"I'm not advocating a de-emphasis of core classes," says Iverson, "but if schools come up with more classes on business, communications, and career skills, it will ultimately impact the quality of workers going forward."

Iverson found a mentor and soulmate in Peggy Skogen, who has been a middle school agri-science instructor for 10 years in the Plum City School District, and who also owns a dairy farm. Skogen notes that agriculture is one of the largest

industry sectors in the U.S., and it's changed enormously over the past few decades.

"We need to prepare a workforce ready to meet today's challenges," she says. "I don't want them to be blindsided." That means teaching students a wider range of information about everything from embryo transplants, genotyping, and phenotyping, to international trade law, to the complexities of food radiation and ultraviolet technology. One of Skogen's jobs is also to match students with industry mentors in a work-study program called a supervised agricultural experience (SAE), providing real-world experiences with people working in the field.

Skogen feels that including life and career skills in the high school curriculum enhances student learning and gives it added relevance, particularly in an area where many of the students will ultimately end up working on their family farms. "I don't know how teachers teach without these skills," she says.



**Above: Student Hannah Iverson (in red), with (from left) Wisconsin State Superintendent of Schools Elizabeth Burmaster, teacher Peggy Skogen, and Jack Fischer, Secretary of Commerce.**



**Right: Iverson puts the finishing touches on a heifer before it enters the show ring.**

## LEARNING TO TEACH 21<sup>ST</sup>-CENTURY SKILLS AND GLOBAL AWARENESS

Mary Jo Conery is assistant superintendent for 21st Century Learning at the Catalina Foothills School District in Tucson, Ariz., but she's got her eye on far-off China. Conery's district has embraced 21st-century skills—to the point where its professional development literally plays out on the global stage. Conery is one of only a handful of educators whose entire job centers on 21st-century teaching and learning. Her job was created after the community put 21st-century skills in its revised strategic plan. "A 21st-century educational system cannot be an additional layer," says Conery. "It needs to be part of what teachers do."

One of the district's key mandates is building cross-cultural awareness and 21st-century themes, such as an understanding of the global economy. For the past two years, district teachers have traveled to Beijing, Nanjing, and Shanghai, China to bolster their own knowledge base. "As part of

their experience in China, teachers participate in discussions on critical issues relating to modern China, including politics and international relations, China's economy, and the basics of the Chinese language," Conery explains. She says the goal is to increase staff members' own global awareness and worldview by examining the role of China in the 21st century and to develop background knowledge to facilitate discussions and lessons on the interconnectedness of China and the U.S. on a global scale. The district also wants teachers to understand the Chinese K-12 education system and to obtain firsthand knowledge of how another culture approaches the tasks and challenges of everyday life.

The experience manifests itself in different ways when teachers return to the U.S.

Collin Flynn, an eighth grade social studies teacher in the district, uses the experience in cur-

riculum development, asking students to reflect on economic questions dealing with outsourcing of labor to China and the impact of free-trade agreements; cultural questions such as whether Google should continue to do business with a government that restricts Internet search capacities of its citizens; and political questions such as the long-term relationship between mainland China and Taiwan. Flynn says students are then asked to write persuasively on global issues, using technology skills in their research and media-presentation skills to communicate their ideas. Students also can participate in simulations or capstone projects to broaden their base of knowledge about China as a player in the world economy. "We're redesigning our professional development based on what needs to be a priority," adds Conery.

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### INNOVATION AND COLLABORATION SKILLS

Walk into the science lab at Abraham Lincoln High School in San Francisco, Calif., and you're likely to meet the CEO of a biotech firm taking a science test. Nearby, the company's CFO is struggling over the annual report. Company scientists are cutting, sequencing, and recombining DNA samples.

The tasks are on par with what you'd see in a real business environment, except these corporate honchos are actually students, taking part in an innovative program that teaches kids how to think out of the box and into the lab. In an era when many students feel they do little more than regurgitate facts, giving kids a new way to approach learning can open up new horizons for learning.

George Cachianes has taught biotechnology at Lincoln for 13 years, after leaving the biotech firm Genentech. Cachianes decided his students would be better prepared for science careers if he ran his lab in the same way that industry does. He divides his students into lab groups that mimic existing biotech companies. The groups approach each lab assignment through the prism of that corporation, researching and attacking the problem as the companies would in real life. Every six weeks, students cycle through corporate roles, communicating with real scientists at existing corporations to learn about their roles, learning to function as a team and completing high-level scientific research such as DNA sequencing and protein purification, while simultaneously developing management, collaboration, creativity, and research skills.

Cachianes' real-life approach to science instruction has been adopted at four other area schools and has created a sophisticated group of young scientists who are eager for new challenges. In 2007, a group of graduating students from Cachianes' program was asked to enter a global contest in the relatively new field of synthetic biology, under the guidance of a molecular biology professor at the University of California. The team was one of six finalists out of 57 teams from 20 countries.

Cachianes believes that the cooperative-learning model deepens student understanding and raises the bar on instruction as well. "It's a much higher level of teaching," he says. "I can take a very difficult idea and give them three minutes to talk about it. If an individual doesn't understand something, the students can ask as a group, or explain it to one another." ❖

*Pamela Wheaton Shorr has written about education and educational technology for more than a decade.*

### A RESOURCE LIST FOR 21<sup>ST</sup>-CENTURY SKILLS

**If you are unsure about incorporating 21st-century skills into your classroom, start slowly and build as you learn. Here are some of the many terrific resources to get you started.**

#### GENERAL SITES:

##### GATEWAY TO 21<sup>ST</sup> CENTURY SKILLS

State-education affiliates and the National Education Association have partnered with The Gateway to 21st Century Skills to provide free resources to make lesson planning easier.

[www.thegateway.org](http://www.thegateway.org)

##### ROUTE 21

Developed by the Partnership for 21st Century Skills, this site is a roadmap for implementation, with resources, definitions, helpful resources and links, white papers, videos, and background materials.

[www.21stcenturyskills.org/route21](http://www.21stcenturyskills.org/route21)

#### TECHNOLOGY SKILLS AND 21<sup>ST</sup>-CENTURY LEARNING:

##### CHARLOTTE AREA MATH EDUCATORS' WIKI

Learn how to set up a podcast, share documents with your students using Google Docs, add music and narration to PowerPoint, or start an RSS feed, courtesy of math teachers in Charlotte, N.C.

[collabvsl.wetpaint.com/page/howto](http://collabvsl.wetpaint.com/page/howto)

##### MUSEUM OF WEB ART

Use this virtual experience highlighting some of the strange and wonderful things that have shown up on the Web to give students a sense of what fooling around with technology can create.

[www.mowa.org/enter.html](http://www.mowa.org/enter.html)

##### TEACH YOUTH RADIO

Looking for a quick way to bring writing and technology into your curriculum? This site offers directions and lesson plans on creating a radio broadcast, as well as samples of student work.

[www.youthradio.org/fourthr/index.shtml](http://www.youthradio.org/fourthr/index.shtml)

##### WETPAINT

If you want to learn about wikis, this is the site for you. An education "ambassador" (in the form of a high school English teacher) is on hand to answer wiki-related questions

[www.wetpaint.com/category/education--wikis-in-the-classroom](http://www.wetpaint.com/category/education--wikis-in-the-classroom)

#### CAREER AND ECONOMIC SKILLS:

##### ECEDWEB: ECONOMIC EDUCATION WEB

Need lesson plans that put our economy in context? Lessons for K–12 at this site.

[ecedweb.unomaha.edu/lessons/lessonsk-5.cfm](http://ecedweb.unomaha.edu/lessons/lessonsk-5.cfm)

##### MERLOT: MULTIMEDIA EDUCATIONAL RESOURCE FOR LEARNING AND ONLINE TEACHING

Peer-reviewed online teaching and learning materials about world languages, health sciences, information technology, math, engineering, and more.

[www.merlot.org/merlot](http://www.merlot.org/merlot)

##### NEUROSCIENCE FOR KIDS

News articles on discoveries in brain research and links to *Brainworks*, a television show hosted by Dr. Eric Chudler.

[faculty.washington.edu/chudler/neurok.html](http://faculty.washington.edu/chudler/neurok.html)

#### MULTICULTURAL UNDERSTANDING: INTERNATIONAL COMMITTEE OF THE RED CROSS: EXPLORING HUMANITARIAN LAW

The International Committee of the Red Cross offers a program for teenagers called Exploring Humanitarian Law, designed to introduce 13- to 18-year-olds to the basic rules and principles of international humanitarian law.

[www.icrc.org/web/eng/siteeng0.nsf/iwplist74/c50f98d90b6532c8c1256c71004d147b](http://www.icrc.org/web/eng/siteeng0.nsf/iwplist74/c50f98d90b6532c8c1256c71004d147b)

#### READ AROUND THE PLANET: PACKET FOR TEACHERS

Read Around the Planet is a celebration of the NEA's Read Across America. Classrooms use interactive video to connect with other classrooms around the world, with students reading aloud to one another.

[www.twice.cc/read/RAPTeacher.pdf](http://www.twice.cc/read/RAPTeacher.pdf)