Sunday
AKRON BEACON JOURNAL

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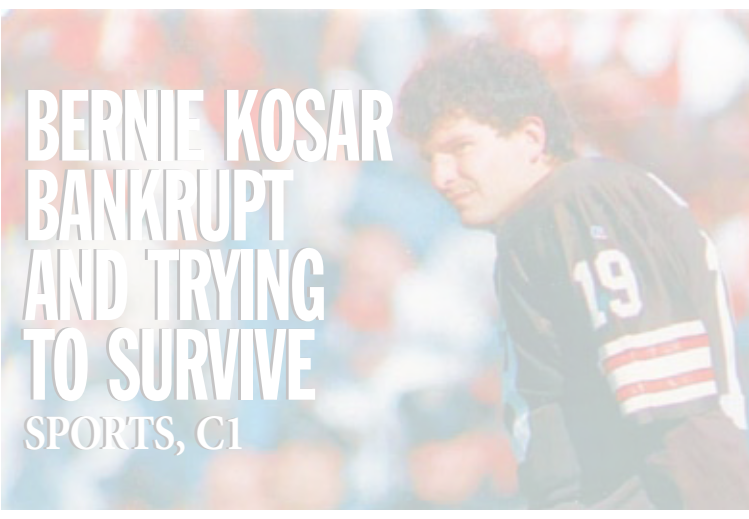
Akron's Jednota Club reels from gambling allegations
COMMUNITY, B1



Car repair shops still open near Goodyear project
BUSINESS, D1

Local band Drummer finds its own beat
PREMIER, E1

PARADE

Like 1.4 million people every year, Bob Woodruff suffered a brain injury. Now breakthroughs are bringing new hope to people with traumatic head injuries.

In today's Beacon Journal: Up to $363 in coupons

Refugees in U.S. answer call to jihad

Premed student, more than 20 others leave Minneapolis homes to join fight in Somalia

By Andrea Elliott
New York Times

MINNEAPOLIS: For a group of students who often met at the Carlson School of Management on the University of Minnesota campus, the motto "Nowhere But Here" seemed especially fitting.

They had fled Somalia as small boys, escaping a catastrophic civil war. They came of age as refugees in Minneapolis, becoming naturalized U.S. citizens and embracing basketball and the prom, hip-hop and the Mall of America. By the time they reached college, their dreams seemed within grasp: one planned to become a doctor; another, an entrepreneur.

But last year, in a study room on the first floor of Carlson, the men turned their energies to a different enterprise.

"Why are we sitting around in America, doing nothing for our people?" one of the men, Mohamoud Hassan, a skinny, 23-year-old engineering major, pressed his friends.

In November, Hassan and two other students dropped out of college and left for Somalia, the homeland they barely knew. Word soon spread that they had joined the Shabaab, a militant Islamist group aligned with al-Qaida that is fighting to overthrow the fragile Somali government.

The students are among more than 20 young Americans who are the focus of what may be the most significant

Please see **Jihad, A5**

Today's weather
80° High 57° Low
Forecast, Page B8

The Akron district's new STEM middle school bases its teaching methods on principles that show students benefit from attention-getting, hands-on lessons in the classroom

DO IT, LEARN IT

MIKE CARDEW/Akron Beacon Journal

Fifth-graders Briana Isaiah (left), Rachel Henry and Jaylan Campbell examine their ecosystem with teacher Diane Pancoe at Resnik elementary school in West Akron. Pancoe will teach social studies and English at the new STEM school when it opens this fall.

By John Higgins
Beacon Journal staff writer

The fifth-graders in Diane Pancoe's science class assembled aquariums one early May morning using sawed-off two-liter pop bottles.

Working in small teams, they planted sprigs of elodea, a water plant with tiny leaves, into gravel in the bottom of their pop bottles.

They added water, bright green globs of floating duckweed and a splotch of slimy algae.

One boy with cropped blond hair discovered something tiny moving in his pond water and his eyes widened.

"There's a bug in the algae! Mrs. Pancoe, there's a bug in here!"

He seized a plastic magnifying lens from the cafeteria tray of supplies as other students leaned in.

A group at another desk also discovered bugs.

"It's a bug moving in there, Madison. Weird," one girl said at another desk. "Danny, it is a bug moving. Look!"

One by one, each child's world opened a little wider that morning at Resnik elementary school in West Akron.

The next day, they would talk about the combined aquarium-terrariums they were making: a self-sustaining world of producers (plants), consumers (crickets, pill bugs and guppies) and decomposers (snails), where the students don't have to feed anything.

"That's what they're most excited about," Pancoe said. "They don't understand: 'Why don't we have to feed the guppy? Why don't we have to feed the snails?' "

The "eco-column" project is the kind of attention-grabbing, hands-on lesson that gets taught in isolated classrooms around Akron, but will become commonplace at the district's new STEM (Science, Technology, Engineering and Math) mid-

Please see **Challenges, A8**

Sonia Sotomayor defies typecasting

Colleagues say the Supreme Court nominee doesn't fit the label of conservative or liberal

By Michael Doyle and Marisa Taylor
McClatchy Newspapers

WASHINGTON: Sonia Sotomayor is a groundbreaking nominee for the Supreme Court who defies easy pigeonholing.

She's a tough-minded former prosecutor who has denounced the death penalty.

She's a product of South Bronx public housing who excelled in the Ivy League.

She's fiercely proud of her Latino heritage but has both challenged and embraced racial discrimination claims.

Now, starting Monday, the Senate Judiciary Committee will give lawmakers and the world at large a crack at the question: Just who is Sonia Sotomayor?

"Sonia does not fit the label of a liberal or a conservative," said Hugh Mo, a former colleague in the New York district attorney's office. "She also is not going to fit the label of someone who is a so-called activist judge or a strict constructionist."

By nominating Sotomayor, President Barack Obama picked a candidate with one of the most distinctive backgrounds of any Supreme Court nominee.

Please see **Nominee, A4**

DOUG MILLS/New York Times

Judge Sonia Sotomayor, seen here on Capitol Hill in June, is to begin confirmation hearings before the Judiciary Committee Monday.

DO IT, LEARN IT

Challenges make learning more memorable

Continued from Page A1

dle school.

Pancoe, an 18-year veteran, will teach social studies and English in the new school, which opens this fall in a temporary home with fifth- and sixth-graders selected by lottery rather than academic merit, from all over the city.

The following year, they will move into a new, multimillion-dollar building under construction downtown.

Why a middle school and not a specialized high school?

Because middle school is where wonder goes to die.

Losing interest

Many of those kids who enjoyed math and science in the lower grades lose interest in middle school. By the time they move on to high school, they've decided it's not for them.

Some kids have more to lose than a sense of wonder. As one inner-city Akron teacher explained, too many middle-school girls believe the only sure path to a paycheck is having babies by age 16, not mastering math and science. And having buried four former students, he has seen how gangs too often fill the void when schools fail to engage boys.

Akron science teachers have long known that traditional read-a-chapter-take-a-quiz instruction, so often deadly dull and irrelevant to their students' lives, wasn't working for most of their kids.

As of last year, no regular Akron middle school had ever reached 75 percent proficiency on a state science test; only one has ever passed a math test.

So the science teachers turned to an old idea made new with insights from modern brain research: learning by doing.

Students solve a real-world problem or project that interests them and the teacher becomes more of a coach, guiding the students' investigation, rather than the expert dispensing wisdom at the front of the class.

Now their vision has become the organizing principle for an entire school. But the teaching methods will be dramatically different from what students, teachers and parents are used to.

Some education experts dismiss the problem-centered methods as fads. If done poorly, teachers can waste precious time and leave students worse off than if they'd stuck with the traditional textbooks and quizzes.

When they're done right, however, students experience a deep, satisfying pleasure biologically similar to addiction that makes what they've learned stick in their brains long after the test.

So this is a story about the joy of discovery: where it comes from, how we lose it and why these teachers hope they can keep it alive and thriving through the treacherous middle school years and beyond.

Brain power

Many parents would swear that the onset of puberty somehow freezes their kids' brains until they're well into high school.

But brain researchers are discovering that the middle school years are an extraordinary period, when the brain literally shapes itself for adulthood.

There is no one spot in the brain devoted exclusively to thinking. All of our thoughts, dreams, fears and knowledge of the world reside within the networks and connections that link brain cells, called neurons, together.

"It's the network itself; that's where the information is," said Dr. Jay Giedd, chief of brain imaging in the child psychiatry branch of the National Institute of Mental Health.

Giedd has been using brain imaging since 1991 to study how the brain develops over time and what parts light up (consume more nutrients) when it performs certain tasks.

His research led to the discovery that the brain's network of connections undergoes a growth spurt just before adolescence.

MIKE CARDEW/Akron Beacon Journal photos

Teacher Diane Pancoe leads her fifth-grade science class as the students assemble their combined aquarium-terrariums at Resnik elementary school.

Giedd

The process begins with an overproduction of neural connections in the brain that peaks in size, but not function, at about age 11 (sixth grade) for girls and age 12 (seventh grade) for boys.

Then the brain takes all that excess gray matter and begins paring it down, saving the most often used connections and discarding the least used.

This idea of overproduction and competitive pruning is a remarkably broad principle in nature that applies to everything, from the shape of our brains to the shape of our galaxy.

"People argue that overproduction and then selective elimination, something nonrandom, drives all complexity in the universe," Giedd said. "Any naturally occurring complex system seems to kind of have that one-two punch."

What surprised Giedd the most about his brain-imaging work is the degree to which the brain physically changes in response to experience during adolescence.

Think of a university that has openings for 10,000 students. If 20,000 apply, the university will admit the strongest half of the admissions pool.

If 50,000 apply, the qualities of the selected applicants will be stronger and more concentrated because they survived fiercer competition.

"At the end, you still have 10,000 students," Giedd said. "So a lot of the brain stuff seems to look like that as well. By adult size, you still have that certain number of neurons and connections, but how did they get there?"

Sixth-grader Nick Anderson explains his science project on wild turkeys at Craig Middle School in Lawrence Township, Ind. Nick said he really liked his project.

Potential for learning

The pruning process continues well into the early 20s, so there's no critical window of opportunity that slams shut during freshman year.

However, the middle school years are a particularly sensitive time with great potential for learning, Giedd said.

It's when kids start specializing in the skills they'll need to be adults, forming ideas about what they're good at and not so good at. They start focusing their attention on particular interests, whether they're sports, band, academics or perhaps destructive behavior. They also could turn their attention to math and science if they thought the subjects relevant.

That's where the problem-centered methods that Akron teachers will use in the new middle school could make a difference.

A student who works on a project that she finds interesting and relevant will use more of her five senses figuring it out.

She also will involve more of her emotions struggling with the problem and eventually succeeding through trial and error. And she'll tap into more of her social skills because most problem-centered learning is done with partners or teams.

"The idea then is that it will be retained longer and better if you involve as many different circuits and senses and motivations," Giedd said.

In other words, the more intricately connected the learning is to the brain's neural network, the more likely it will survive the pruning process into adulthood.

Emotions involved

One of the most significant recent discoveries in neuroscience is how much our emotions are intertwined with higher-level reasoning and abstract thought.

"They're the same systems," Giedd said.

A lot of theory had teachers saying things like: "Well, let's settle down class, let's not get excited here, let's learn," Giedd said.

Teachers should be saying: "Hey, class, let's get excited *so* we can learn," he said.

The thrill students experience when they struggle with a problem or project and finally get it right makes the learning more memorable than if the teacher just gave them the answer.

Recent research in neuroscience shows that the same chemical that gives us the warm fuzzies when we eat a favorite dessert or linger on the front porch for that first kiss also gives us a kick when we solve a problem.

It's called dopamine. Although it is often described as the brain's way of rewarding itself, dopamine also marks the experiences that are important to remember.

"It's not so much pleasure and pain as importance," Giedd said. "Bad things can raise dopamine, too, things that might kill you – it's a signal to the brain that this is relevant. This is something that might help me stay alive or reproduce."

Addiction works the same way, using the same pathways in the brain.

"It's sort of almost eerily uniform in terms of sex, sleep, food, gambling, every substance of abuse, everything that people ever get addicted to, increases dopamine," Giedd said.

Solving problems can become, well, addictive.

"You get that thrill from learning and you want to have it again. . . . That's what you would strive for, this kind of love of learning that people don't even think is learning. They're trying to have fun and follow the dopamine," Giedd said.

That is the real potential of project-based learning: It can wire the joy of discovery into the brain itself.

No longer bored

Students at Craig Middle School in suburban Indianapolis don't need a neuroscientist to tell them that projects are more engaging.

Craig Middle School is one of several that Akron educators have visited that uses these methods comprehensively.

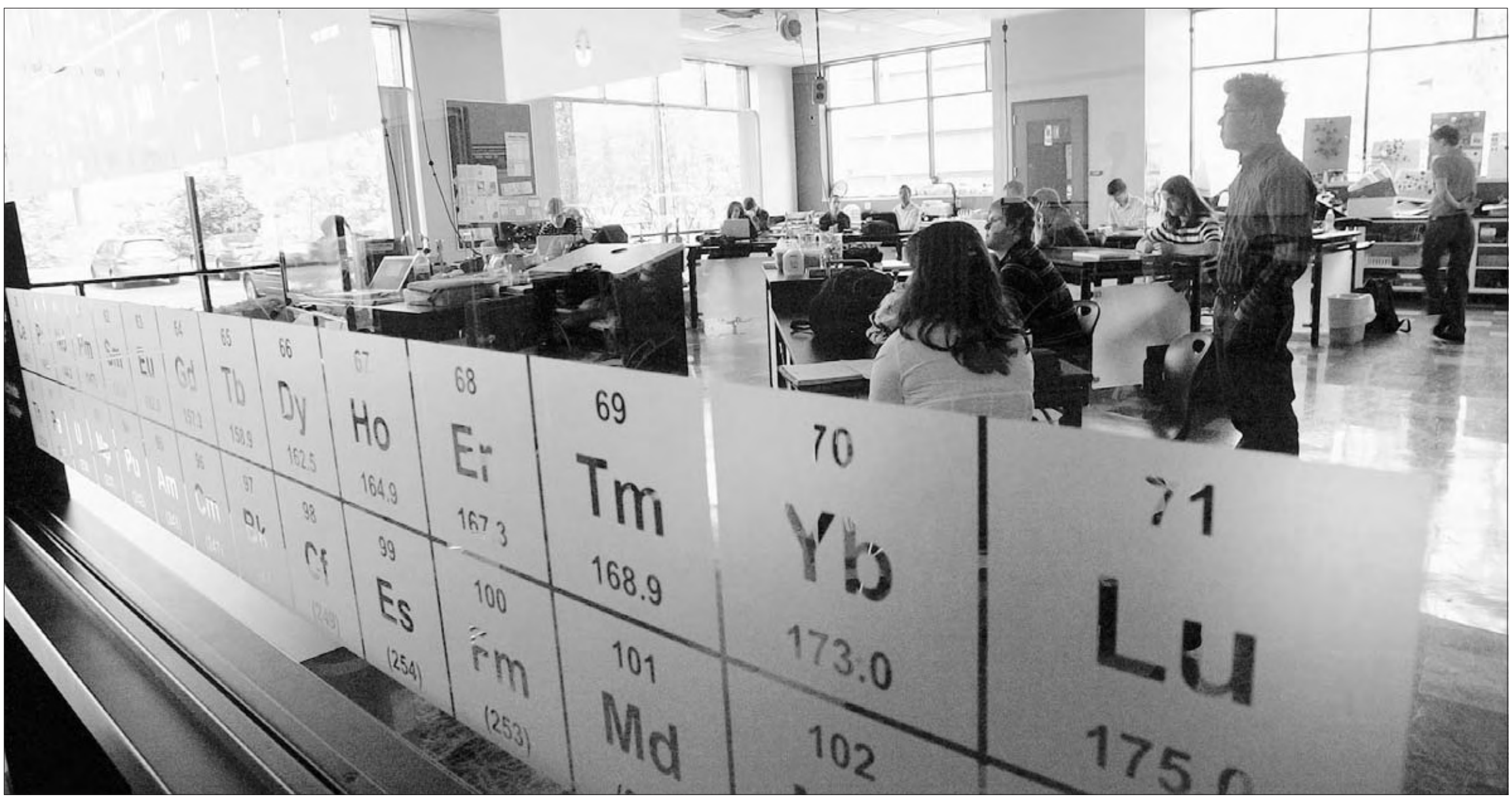
Nick Anderson, a sixth-grader at Craig this spring, describes his previous school like someone who has escaped a prison camp.

"At our old school, all we would do is work and then we would go to recess and eat," he said. "They would teach like one thing the whole year. Last year they just taught us writing and that's all, just writing and reading. We would have to get this, like, writing book and do cursive for about two hours straight."

He was bored silly.

"They made us literally write about

Please see **Firestone, A9**



A periodic table of the elements is etched onto a glass window of the science lab at Metro Early College High School in Columbus. The school specializes in science, technology, engineering and math.

DO IT, LEARN IT

Firestone, Garfield already offer project-based lessons

Continued from Page A8

what they wanted us to write about, like 'where did you get your clothes?' and stuff like that," Nick said. "I would be like, 'Why can't we just pick our own topic?' And they would go berserk and ape on us."

He's not bored anymore. In fact, he has become Craig Middle School's resident expert on wild turkeys and he's working on a project in science class to attract them to an area he chose behind the school near a creek.

"I really like them," he said. "There's a guy that goes to my church and he hunts turkey and he got me really into turkey. So I went turkey hunting this spring. Came back, didn't get any, though, but that's what started me on this whole project."

He has researched the different species, what they look like, what they like to eat, where they like to roost, how they call to each other.

He's created a PowerPoint and a three-dimensional model of a turkey. He even called the Indiana Department of Natural Resources on his own initiative for some information.

He had to do a fair amount of writing, which no longer feels like a chore because it's not for a report on an assigned topic; it's stuff he needs to know for his project. Science is his favorite subject.

"I haven't planned this much, ever," Nick said. "I've never actually thought of doing a project at the beginning of the year like this. I really like it."

Great outdoors

Many of Craig Middle School's projects are outdoors, such as the butterfly garden project that Rachel Loy and Becca Sellers worked on this spring in their sixth-grade science class.

They had spent months figuring out which areas got sun and for how long, learning about different species of butterflies and their plant needs and mapping out the garden.

On a rainy day in May, they helped plant the bushes that would attract butterflies, getting soaked and muddy along with their teacher.

"It was all our research that we did, so it made us feel pretty good that we did this by ourselves," Rachel said.

"It kind of feels good that teachers trust us enough to actually go plant a garden by ourselves," Becca said.

With that trust comes greater responsibility.

They might have to juggle five projects at a time, depending on their classes, and they can fall behind fast if they procrastinate.

But ask the girls, who have become fast friends working on projects together, what it feels like to finish successfully and they talk right over each other.

Becca: "Fabulous . . . "
Rachel: "You feel really good . . . "
Becca: "You feel so happy. . . . "
Rachel: "Really smart . . . "
Becca: "Really really good . . . "
Rachel: "It's just really exciting . . . "
Becca: "A sense of accomplishment. You're proud of yourself."

Mastering skills

Project-based learning makes students feel good when they get it right, but the thrill of getting it right is more potent after they've endured the frustration of getting it wrong.

Winning every time triggers a less intense dopamine release in the brain's circuitry than winning if success is uncertain.

Students at the Metro Early College High School in Columbus, which embraces project-based learning, experience both the pain and pleasure of solving problems.

Metro specializes in the STEM disciplines: science, technology, engineering and math.

The school opened three years ago and draws students by lottery from the city and surrounding suburban districts.

It is governed by a confederation of the 16 Franklin County public school districts and students stay enrolled in their home district while they attend Metro.

Akron will belong to a network of Ohio STEM schools, but it will be the only middle school.

Metro squeezes a year's worth of material into 12-week sessions that concentrate on the most important concepts.

Students must demonstrate mastery in a subject before moving on, so there's no chance of sliding by with a C or even a B.

The accelerated schedule means upperclassmen are taking classes at nearby Ohio State University. It also means that even the brightest students will need help from peers and teachers.

"It humbles you a little bit because you have to realize you can't do it all alone," said sophomore Jana Al-Akhras, who spent eight years in private school before coming to Metro and was always at the top of her class.

But getting help is not the same as getting the answer.

For example, she once had to make a robotic device in an engineering class that sorts marbles by color.

It looks like a tabletop contraption made of interlocking plastic building blocks, a few wires, a motor and a light sensor. It might have a real-world application, say, in a recycling station that must separate metal, glass and plastic.

Students have to build the sorter and figure out how to move the marbles from a hopper to a light sensor, and then separate them into different bins. Then they have to program it using software that interprets the readings from the sensor and tells the robot what to do.

"I almost tore my hair out," Jana said. "It made me so angry. It was a project that I would lose sleep over."

She'd stay after school for hours and come in before school, programming it.

"I would just go to my teacher and be like, 'Please, I will do, like, 20 papers, just let me off of this project. I don't care. I'll represent what I know about it. I just don't want to build it. I don't want to program it. I don't want to do it.'

"And he was like: 'No. You can have help. I'm not going to tell you how to do it.' "

She plays soccer and trains in martial arts, but she said nothing she had done before was so exhausting.

"It was possibly the biggest weight off my shoulders ever," she said of finishing the project. "I thought I'd accomplished things. I'd gone through conditioning for different things and this was 10 times worse than any type of conditioning I had ever done."

Seeing is believing

Akron educators had to look no further for examples of project-based learning than Firestone and Garfield high schools, where students also build marble sorters in a rigorous four-year program called Project Lead the Way.

The program uses a national curriculum focusing on the STEM disciplines that exposes students to design and engineering principles, computer-integrated manufacturing and digital electronics.

In a course about electronic circuitry, they must complete something called the date-of-birth project, which teaches them about digital electronics and the wonders of the integrated circuit chip.

It takes several weeks just to understand the concepts behind digital circuitry, the technology behind laptop computers, cell phones, iPods and practically every other electronic gizmo.

Then they must wire the circuitry necessary to make the numbers of their birthday appear in a seven-segment LED display panel common in alarm clocks and other electronic devices.

They use a suitcase-size training device to construct their circuits, test them with real voltage and solve the problem.

Allison Latham, a junior at Firestone last spring, didn't feel like she had a "gift" for understanding circuits just by reading about them, so she didn't find the textbook very useful.

She had to see how it worked inside the suitcase, which is called a digital analog trainer.

It allows students to practice circuit configurations to see whether they'd work in a real application.

The trainer is a black box with input knobs and switches that feed wires to a panel dotted with little holes called a breadboard.

First, she had to plug the breadboard full of pre-engineered integrated circuit chips and a spaghetti-like tangle of multicolored wires that would light up the display.

It took a few weeks to correct loose wires, malfunctioning chips and short circuits.

She eventually got the segments in the display to light up every number and dash in her date of birth, 01-21-92, except for the pair of 2s.

She spent days and days trying to light up those 2s. She knew it had to be a loose wire, but where?

Finally, one day the frustration overcame her and she just mashed all the spaghetti down with one hand.

And then it happened.

The numbers of her birthday flashed on the display at her command, even the 2s, proving that after so much trial and error, her circuits finally worked.

And then the dopamine lit up the circuitry of her brain.

She jumped up and down and screamed.

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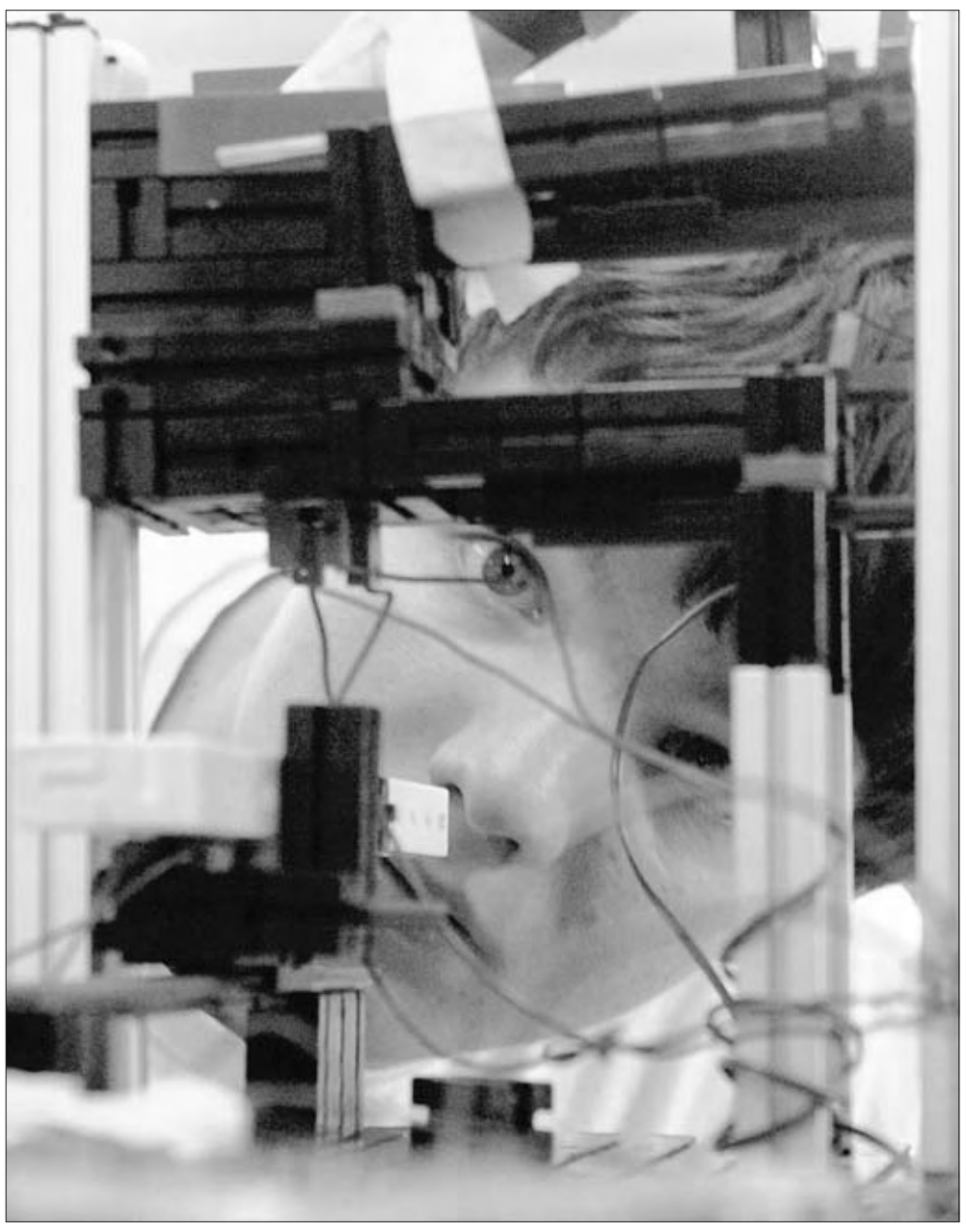
MIKE CARDEW/Akron Beacon Journal photos

Hannah Haller, 12, (left) teases Rachel Loy, 12, with her dirty hand as they work on a sixth-grade science butterfly garden project at Craig Middle School in Indiana.



Marcus Dempster of Firestone High School takes a closer look at his team's marble sorter, which is part of a four-year program called Project Lead the Way.

Jana Al-Akhras ponders a math problem at Metro Early College High School. The school embraces project-based learning.

Schools that teach learning by doing

These schools routinely use the kind of problem-centered or project-based teaching methods that Akron educators will use in the new math and science middle school.

National Inventors Hall of Fame School... Center for Science, Technology, Engineering and Mathematics School

Grades: 5-8

Enrollment: Initially fifth- and sixth-grade classes, 100 students each from Akron, plus 10 from out of the district. Eventually school will have a maximum of 400-500 students.

About: Scheduled to open in the fall of 2009 in a temporary home at 400 W. Market St. in Akron. The following year it will open in a $14.5 million new building on Broadway in downtown Akron.

Admission policy: Geographic lottery representing each cluster of the district with some slots reserved for open enrollment from outside the district.

Web site: http://www.akronscienceschool.com/

Affiliation: Ohio Stem Learning Network: **http://www.osln.org**

Illinois Mathematics and Science Academy

Grades: 10-12

Enrollment: 650

About: Founded in 1995 in Aurora, Ill., IMSA is a residential college preparatory program specializing in math and science.

Admission policy: Illinois residents chosen through competitive process that considers performance on projects, extracurriculars, as well as test scores and grades.

Web site: https://www3.imsa.edu/

Affiliation: National Consortium for Specialized Secondary Schools of Mathematics, Science and Technology **http://www.ncsssmst.org/**

Metro Early College High School

Grades: 10-12

Enrollment: 277

About: Established in 2006 to focus on science, technology, engineering and math (STEM) disciplines. It is a public school that receives significant support from Battelle, Ohio State University, the National Coalition of Essential Schools and the Knowledgeworks Foundation. It is operated by a confederation of Franklin County's 16 school districts. Students who attend Metro will be concurrently enrolled in their home district and will remain a part of the public school system in Franklin County in Columbus.

Admission policy: Students chosen by lottery from each district. Students interview at school to determine if it's a good fit for them.

Web site: http://www.themetroschool.org/

Affiliations: Ohio Stem Learning Network: **http://www.osln.org**
National Coalition of Essential Schools: **http://www.essentialschools.org/**

The Mott Hall School, P.S./I.S. 223

Grades: 5-8 (will change next year to be 6-8)

Enrollment: 420

About: Established in 1985 in New York City to serve talented and gifted children.

Admission policy: Competitive admission limited to children living in the Harlem-Washington Heights area of Harlem; includes standardized test scores, sufficient scores on math and reading tests, letters of recommendation from former teachers, letter from parents, portfolio and interviews.

Web site: http://www.themotthallschool.org/

Craig Middle School

Grades: 6-8

Enrollment: 1,260

About: Opened in the fall of 1970 as a junior high school in Lawrence Township, on the northeast side of Indianapolis. Regular neighborhood school that integrates project-based learning throughout its curriculum.

Admission policy: Residency in admission area.

Web site: http://craig.ltschools.org/

SOURCE: Beacon Journal research

BEACON JOURNAL SERIES TAKES A LOOK AT NEW MATH AND SCIENCE MIDDLE SCHOOL

Akron Public Schools have spent five years designing a $14.5 million math and science middle school where students will learn in dramatically different ways than they have in traditional classrooms.

Every detail of the new school, which opens this fall in a temporary location, has been planned to grab and keep a student's interest by solving real-world problems and exploring the concepts underlying mathematical formulas rather than just memorizing them for a test.

Years of planning, millions of tax dollars and the contributions of practically every significant public and private institution in Akron are riding on the effectiveness of these methods.

What do they actually look like and feel like in the classroom?

The Akron Beacon Journal, with the assistance of a fellowship from the Hechinger Institute on Education and the Media, will explore that question from the perspective of students, teachers and parents in a periodic series as the school begins operation.

Today's story focuses on students.

Coming next: The teachers' perspective. Students say problem-centered learning is more relevant, fun and memorable than traditional read-a-chapter, take-a-quiz instruction. Teachers who do it regularly swear they'll never go back, but they acknowledge it takes a lot of training and preparation to do it right.

– Beacon Journal