

ignite

Winter 2018

A PUBLICATION FOR AOPS
TEACHERS AND STAFF MEMBERS



ARCHDIOCESE
of PHILADELPHIA
SCHOOLS

Going Above and Beyond (the Classroom)



“Try going beyond your comfort zone.” It’s some of the most common advice for personal growth — encouraging individuals to learn by exploring new environments and experiences.

And there’s nothing more comfortable for students *and* teachers than a traditional classroom setting, being taught from traditional materials the same way most material is taught.

That’s why in this issue, we’re putting *Ignite’s* focus on educators who are guiding students to do, learn, and grow more by taking lessons far beyond the comforts of the classroom.

For one teacher, that means asking children who have never been responsible for plants or animals to raise both — simultaneously and interdependently. For another, it’s about answering tough questions for Catholics and non-Catholics about what it means to follow the faith. And in a special English Language Arts program, it’s about asking children to put their favorite fictional characters on trial... in a real courtroom... in front of a real judge.

Scientific, spiritual, and personal growth — all possible when Archdiocese of Philadelphia Schools (AOPS) educators are willing to expand their comfort zone. I hope these unique approaches inspire you to think about leaving the borders of your classroom behind!

Peace and all good things,

Christopher Mominey

Executive Deputy Secretary for Secondary Education



RECOGNIZED BY THE HOLY SEE

What the Cross of Honor means to Sister M. Edward William Quinn, IHM

When Sister M. Edward William Quinn, IHM was told she would be the recipient of a papal award dating back to 1888, she was overwhelmed to say the least. The cross Pro-Ecclesia Et Pontifice, reserved for exceptional service to the Church, wasn't a recognition she was seeking out.

Certainly Sister Edward is no stranger to honors in general; she has received many awards throughout her 50 years in Catholic education. Her work — which has spanned everything from substitute teaching to AOPS administration — has been recognized at the local, regional, and national levels before. But which of her accomplishments earned her an honor as prestigious as the cross Pro-Ecclesia Et Pontifice?

According to Sister Edward, the Cross of Honor (as it is also called) is a recognition of collective service, more than one of individual achievement.

"I am honored to accept it as representing the dedication and efforts of so many — my Sisters, my family, and my colleagues in Catholic education," she told *Ignite*. "This award gives added meaning to the lyrics, 'Walk on with hope in your heart... you'll never walk alone.'"

Archbishop Chaput, who nominated her for the award and conferred it to her on January 21, 2018, agreed that the meaning of the Cross of Honor extends far beyond the individual whose name it bears in inscription.

"Each [Papal award recipient] represents and stands in for the many thousands of other committed Catholics who serve the Gospel every day with the same fidelity and unselfish love [as the honoree]," he wrote in a public announcement. "These special expressions of papal praise and gratitude are moments of grace for all of us, and they're meant to be a source of joy for the whole local Church."

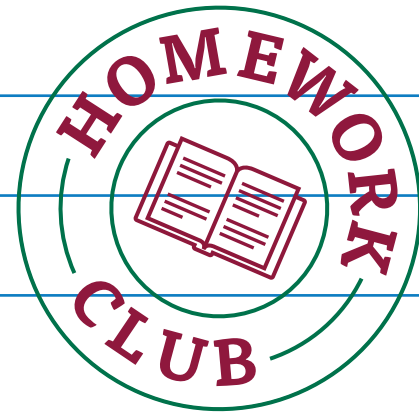
We asked Sister Edward if she had ever received one piece of advice that helped guide her teaching to a standard becoming of this honor.

"The best teaching advice I've ever received could not be limited to one 'best' thing. It has been the example of so many Sisters and colleagues who have modeled what it is to be a dedicated Catholic educator." 🌸

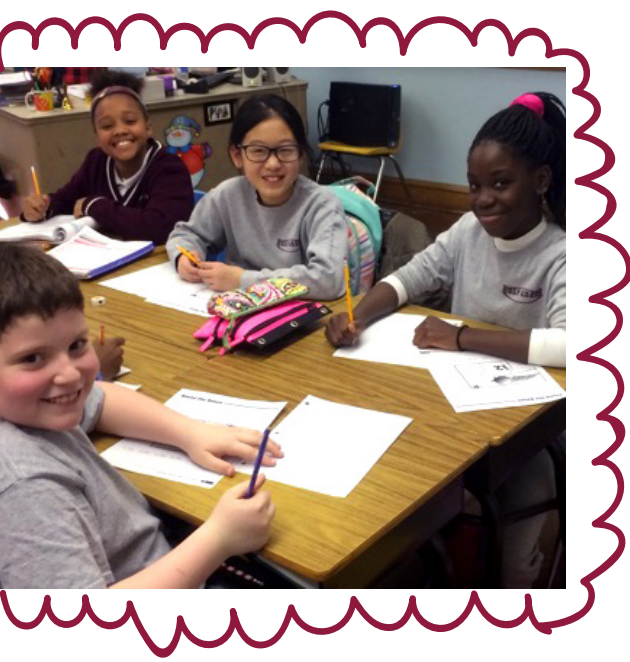
Sister M. Edward William Quinn, IHM currently serves as Assistant Superintendent for Curriculum, Instruction, and Assessment of Elementary Schools in the Office of Catholic Education.

The Answer to Question 3?

Collaboration



Homework Club gives students a helping hand from older peers



Twice a month at Holy Cross Catholic School in Springfield, PA, a group of students, teachers, and high school volunteers joins forces to tackle one of history's most enduring struggles: getting homework done.

The Homework Club after-school program offers elementary students additional help from teachers and student volunteers from Bonner & Prendergast Catholic High School. The club primarily aims to help students better understand concepts covered in class. But students and administrators say Homework Club also shows its participants the value of working together — and giving back.

A typical Homework Club session hosts around 25 Holy Cross students, aided by two to four Bonner & Prendie volunteers. Open to first through eighth graders, the club provides a relaxed, welcoming atmosphere where students can collaborate and get personalized guidance.

“My favorite part of the club is doing my homework with the older kids.”

— Erin Saye, fourth grade

swim ^ming
run ⁿing
jump _____ing

stop ^ping
garden _____ing
play _____ing





For fourth grader Ophelia Dong, the program bridges the gap between learning concepts in class and remembering how to apply them on her own. Fourth grader Aniyah Hatcher-Scott says the extra help has helped raise her grades. And fellow fourth grader Erin Saye just enjoys the chance to work with “the older kids.”

Feedback from parents has also been positive. For parents who have struggled to understand newer approaches to teaching math, the club is a welcome opportunity for children to learn from peers.

But for Holy Cross principal Maureen Ward, who began the program in October 2017, Homework Club also takes on a deeper significance.

“It’s special to see former Holy Cross students coming back to be a part of it,” Ward says. “My favorite part is the interaction of the older students with the younger students.”

One of those returning students is Devon Gannon, now a junior at Bonner & Prendie.

“I attended Holy Cross and loved it there,” Gannon says, “so I was super excited for the opportunity to go back, see my old teachers, and help out.”

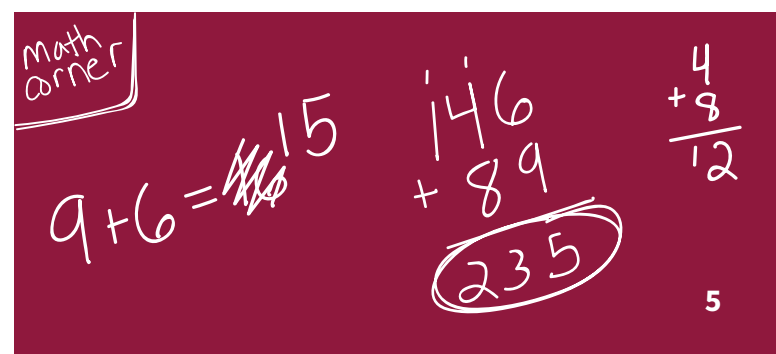
The collaboration between schools began after a chance conversation with Bonner & Prendie admissions counselor Sr. Anne Christine Kalbron and Ward. She referred Ward to Matt McShane, Bonner & Prendie’s Community Service Club moderator and a teacher in the mathematics department.

McShane says the program has been a learning experience for both the students and their older tutors.

“I’ve seen the student volunteers gain a greater appreciation of the teaching profession, as well as a greater understanding of patience and kindness as they work with younger kids,” McShane says. “It also gives Holy Cross students the opportunity to see older students from a local school doing good in the community.”

The club’s leaders hope to expand the program to more Holy Cross students and Bonner & Prendie volunteers. Coordinating schedules and participants’ transportation has proven to be the biggest challenges. But participants say the reward of seeing students grasp new concepts is well worth the effort.

“I helped one student who kept saying her addition homework was too hard, and that she couldn’t do it,” Gannon says, “But I kept encouraging her, and it finally clicked. She was so proud of herself, she started telling everyone around her that now she knew how to do it.”





THE STATE OF PENNSYLVANIA VS. *YOUR FAVORITE NOVEL*



How **Mock Trials** are Bringing **Literature to Life**

To what extent should Dr. Henry Jekyll be excused for the sinister actions of Edward Hyde? Did Catniss Everdeen's rule-bending actions at the end of *The Hunger Games* constitute a breach of contract? Could Piggy's death in *Lord of the Flies* be prevented — and even if it could, what nation's laws would even apply on the uninhabited island where it took place?

In most English Language Arts (ELA) programs, these questions of moral and legal ambiguity are literary discussion points — thematic frameworks that exemplify powerful storytelling, but don't necessarily get resolved.

But in Mary Finnegan's ELA class at St. Isidore School, morally dubious fictional characters are finally facing justice. That's because for the last year she's been casting 8th grade students into the roles of defendants, witnesses, bailiffs, and counsel for a new kind of ELA experience: literature-based mock trials.

For five to six weeks, the students gather evidence, write arguments, prepare testimonies, and practice their role-playing skills. Then with the help of staff members and volunteers from The Rendell Center for Civics and Civic Engagement, the students finally hold their mock trial — presided over by a very real judge!

BUILDING THE CASE

The literature-based mock trial program is unlike anything else Finnegan has been involved in — or involved her students in. While ELA has always been about character analysis and argumentation, this program encourages students to delve into text not just for their grade, but to prove their point for or against a fictional character on trial.

For St. Isidore's pilot program, which started in Spring of 2017, Finnegan selected Johnny from *The Outsiders* to

stand trial for murder. While the character dies before the end of the book (1967 spoilers!) and isn't forced to face legal repercussions, Finnegan told us the mock trial can take place at any point in the timeline — whatever is convenient to make the trial work.

From there, it's time to set up the trial. Finnegan explained that from early on, staff members and volunteers from The Rendell Center are actively working to educate students, guide the program, and ensure everything is as realistic as possible.

"The Rendell Center comes in to lead the program," she said. "They talk about the legal system and what goes on in a courtroom. They define the difference between a rule and a law, and they help students understand vocabulary, so they know (for instance) what a defendant and a plaintiff are."

Finnegan explained that legal volunteers from the center helped children differentiate between first- and second-degree murder, ultimately deciding to try Johnny for the latter.

Throughout the program, the teacher is more of a facilitator and coach. The students, meanwhile, do the vast majority of the work preparing a trial.

"The class is divided between the defense and the prosecution," Finnegan explained. "Role selection is handled by the students within their groups with the

stipulation that everyone has a job and everyone has an opportunity to speak. So we have multiple attorneys on each side, and each side has a bailiff, for instance."

"When teams are set, students go back into the text to find evidence. Each team prepares their side, preparing a legal script for the trial," Finnegan continued. "Formulating questions for the examination of witnesses and cross-examinations is a challenge. The students have to use the text to support their rationale for asking a question, and think about how the opposing side might use the answer. It's hard, but I love that it forces them to take a closer look at the text — it inspires lots of great thinking!"

When each side's script is ready, The Rendell Center sends additional volunteers, often lawyers, to polish both scripts. They ensure the terminology is legitimate and realistic, and that mistakes made by one side are objected to appropriately by the opposing counsel.

"Everything you would prepare for a real trial, these kids do on a lower level," Finnegan remarked.

With all case-work complete, it's time for practice... and lots of it. After all, students participating in The Rendell Center's program must play their roles in front of an actual judge!

ABOUT THE RENDELL CENTER

Founded in 2014 by Governor Edward Rendell and Judge Marjorie Rendell, The Rendell Center for Civics & Civic Engagement is a non-profit organization that provides programming and resources for Pennsylvania teachers and students.

[Learn more about The Rendell Center here.](#)



EXHIBIT A: Judge Rendell and St. Isidore Students

JUDGMENT DAY

At the end of the five to six week program, the mock trial is brought to life in a formal court setting — or as close to it as possible. Finnegan told us that in the program's spring session, a judge from Northampton County came to St. Isidore to hear Johnny's case. He was dressed in his full judicial robes and presided over a courtroom set up in the school's chapel. But in the fall, Finnegan's class traveled to the courthouse in Philadelphia. There, in the most official setting possible, they were fortunate to have their mock trial presided over by the Honorable Marjorie Rendell herself.

"I love seeing the excitement in the students' eyes as they enter the courtroom, and as they take the stand or approach the podium to make an argument," Judge Rendell told *Ignite*. "The students take their roles very seriously and show keen insight about the case. If only all of our citizens could have this experience before they serve on a jury!"



The students of Mary Finnegan's classroom undoubtedly share their teacher's and Judge Rendell's enthusiasm. The child who played Johnny was relieved to be acquitted (both in the spring and fall), and his classmates were enthused about nearly every aspect of literature-based mock trials:

- 1 **DANTE:** "My favorite part was creating
- 2 the script to read in front of the
- 3 judge, knowing that a real judge is
- 4 going to answer you!"
- 5 **GABBY:** "It was challenging keeping a
- 6 straight face. It's so fun, you always
- 7 want to smile!"
- 8 **KADEN:** "Doing this helped me become a
- 9 better speaker, and helped me become
- 10 better at reading."
- 11 **BRIANNA:** "I'll always remember going
- 12 to the courthouse, performing in front
- 13 of a real judge, and having fun with
- 14 all of my friends."
- 15 **JACOB:** "I told myself I could do it,
- 16 and I did!"

EXHIBIT B: Students receive instructions prior to the trial, Fall '17

EVIDENCE OF ENGAGEMENT

Literature-based mock trials engage students across a broad range of critical thinking skill sets. What could your students learn from a program like this?

Reading Comprehension

Students must have a thorough understanding of plot, setting, and character motivations to make an effective case.

Logic and Persuasion

In the framework of a trial, students learn what makes arguments sound, and how common fallacies fail under scrutiny.

Literary Engagement

Children are more likely to remember — and critically think about — story elements they have examined in greater detail.

Public Speaking

In addition to building a case, mock trial students build confidence in their ability to present in front of peers and adults.

Civic Understanding

Mock trials make abstract concepts around civic rights, democracy, and trial procedure accessible and understandable.

AN ARGUMENT FOR CIVICS

While many program initiatives covered in *Ignite* begin within AOPS walls, the literature-based mock trial program at St. Isidore started when Beth Specker, Executive Director of The Rendell Center, reached out to the school's administration.

“Judge [Rendell] and the Governor wanted to work with schools in the five-county area. They wanted a program to enhance what teachers were already doing in the classroom,” said Specker.

Specker explained to *Ignite* that for the last two years, her organization was proactively setting up mock trial programs across the state. “We need to make sure the next generation understands how our judicial system works.”

The center has already established programs at 27 Pennsylvania-area schools (including non-AOPS schools) with 937 participating students in total. St. Isidore was one of six schools piloting the program for AOPS, a trend that will likely expand given students' academic performance and content engagement thus far.

NEW YEAR, NEWLY ACCUSED

Mary Finnegan is already planning to run another literature-based mock trial for 2018-2019. The biggest challenge at this stage? Choosing a new book to base it on. While *The Outsiders* made for a fascinating story and case for her current 8th graders, 7th graders (who acted as the jury) have already seen both sides' strongest arguments play out.

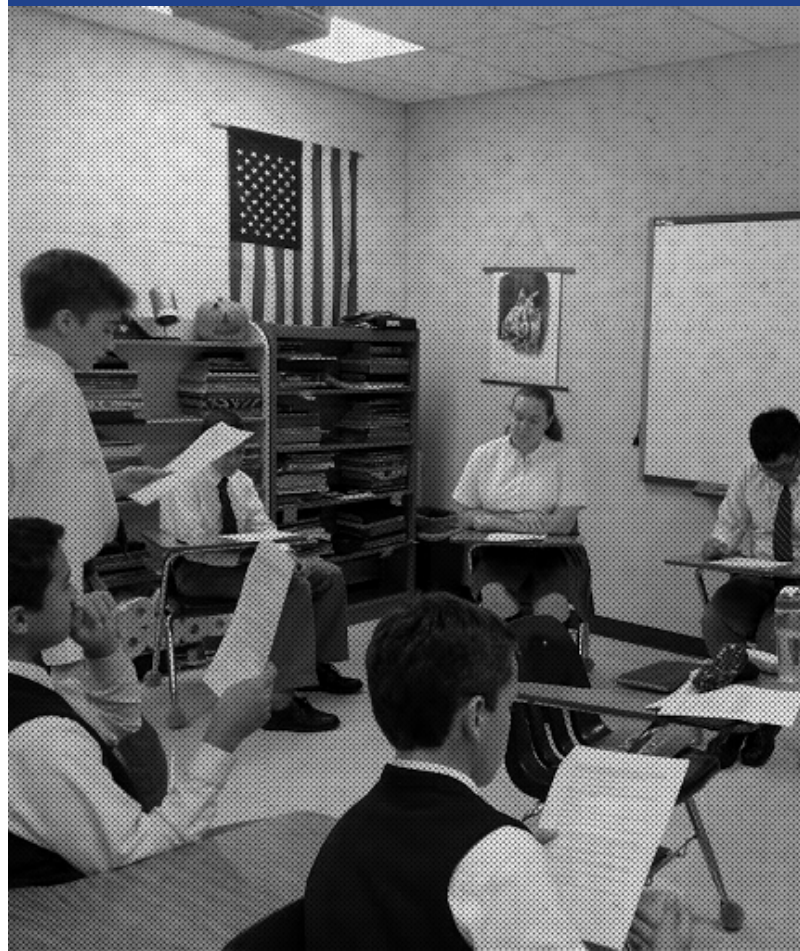
This time next year, St. Isidore's students could be hearing testimony from the likes of Beowulf or Ender Wiggin. And if The Rendell Center is successful in its mission, even more characters will be on trial in classrooms across AOPS. Will yours be among them? 🦋

START A COURTROOM IN YOUR CLASSROOM



Want to get your students involved in their own literature-based mock trial? Get started in just a few simple steps:

1. Visit The Rendell Center's website to learn more about the program.
2. Download and review the Literature-Based Mock Trial Handbook.
3. Contact The Rendell Center for help planning your mock trial.
4. Start the program and get ready for a lively trial!



THE Art OF TEACHING Arts

SPOTLIGHT ON THE ARCHBISHOP WOOD FINE ARTS PROGRAM

Archbishop Wood High School in Warminster Township boasts one of the largest, most accomplished arts and music programs in the region. We asked four of the program's faculty about their roles, their challenges, and their proudest moments.



CHRIS SEIFERT

Theater Program Director

On the first day of rehearsal, and my first day of working with everyone, I announced that the opening number of “The Addams Family” would be completely done within the following two days. I could sense everyone thinking, “Oh, yeah, sure Chris.” But then one cast member saw we were getting through a large portion on that first day, and said, “Chris doesn’t play.” And that became my motto. It’s true, we do work very hard — but we remember to have fun too.

SISTER JOANNE MONGELLI

Music Director

We are very excited about initiating music as a major next year. This is the best possible step we can take to help raise the level of our performance, and also give students time to grow their musical skills.



ANNE ODLAND

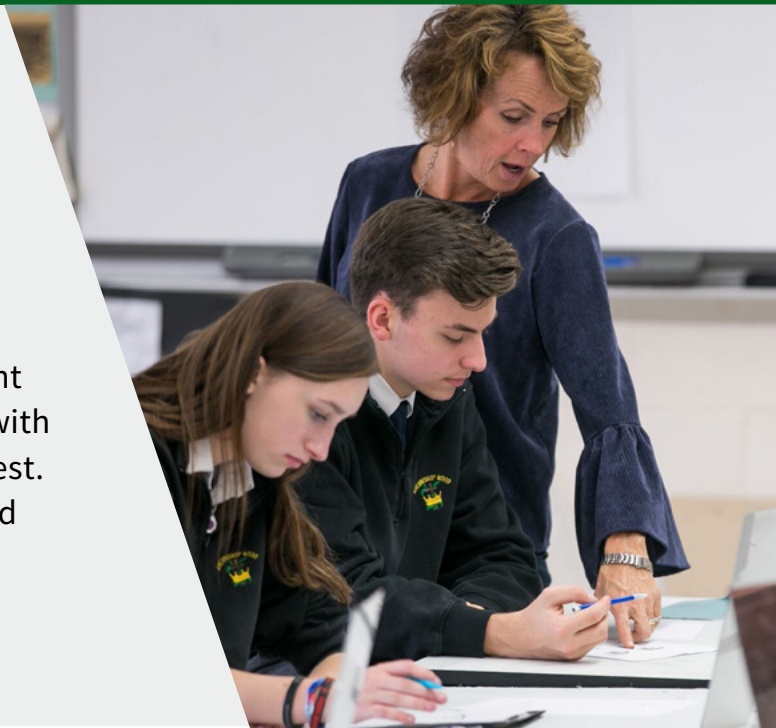
Director of Choral Activities

I wish more students knew how much fun we have in choir! Our “public face” is what they see when we sing for school liturgies and masses, but that is only a small fraction of what we do. The music we prepare for our concerts comes from a wide range of genres and styles, and we definitely include music that most everyone would have fun singing.

CHRIS TAMBURINI

Department Chair, Visual Arts Teacher

I’m proud of the fact that our visual arts department went from a department that no one was familiar with to a top contender in almost every visual arts contest. Our students have won numerous competitions and secured millions in scholarships.



Questions about Catholicism? This class answers them.

Little Flower's Catholic Lab creates a space for students to ask questions and explore their faith.

Father Joseph McCaffrey welcomes curiosity. As Little Flower Catholic High School for Girls' School Minister, he encourages students to dive deeper into the meaning and message behind Catholic theology, liturgies, and even the Latin language. Fr. Joe recently shared his techniques for engaging students and making spiritual concepts more concrete.

Q. What's your favorite part of being a School Minister at an AOPS school?

A. I enjoy seeing how retreats give students a chance to listen to God — and to showcase their creativity. Give a student a wooden cross and a paintbrush, and prepare to be amazed.

Q. What is Catholic Lab, and what inspired you to create it?

A. Catholic Lab is a class that meets once a month and gives Catholic and non-Catholic students an opportunity to ask questions and deepen their appreciation of the faith. The idea sprung from the curiosity I'd previously sensed in parents: we know what we are doing, but are often unsure why, or how it is all connected.

START YOUR OWN CATHOLIC LAB

Fr. Joe shares his top tips



Structure the program

within a recurring theology class to ensure a consistent schedule.



Use student input

to determine course topics and create more personalized lessons.



Consider pre-testing students

to gauge their understanding and determine relevant topics.

Q. How do you go about making Catholic theology more engaging?

A. We meet in the chapel, where I incorporate visuals to enhance the lesson. Students are encouraged to touch the sacred vessels, page through the Roman Missal and the Lectionary, and get a feel for the fabric and design of the chasuble.

Q. How has the program deepened students' understanding of Catholic faith?

A. One example: we had two sessions dedicated to the METANOIA rally in October. First, we discussed what the students would see, and how they should prepare themselves for the day. After the program, they shared their experiences and answered one another's questions about prayer and community service. It was special to see them gain the courage to speak about their beliefs. They were proud to witness the beauty of the Catholic faith.

Q. How do you engage non-Catholic students?

A. I encourage non-Catholic students to reflect on and share their own experiences of liturgy, praise, and worship. The benefit is their increased comfort with the Catholic faith — they feel encouraged to participate in whatever measure they are able.

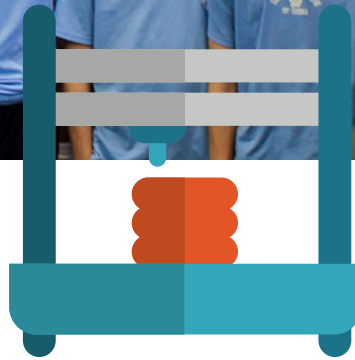
Q. How have you seen the program impact your students?

A. They are more comfortable asking questions and being in the chapel, which they now see as both a sacred and welcoming place. Their questions and posture indicate they are thinking and comprehending. For what more could a teacher ask? 🙏





TRYING THE TECH OF TOMORROW



This mentorship program provides hands-on guidance with the gadgets of the future.

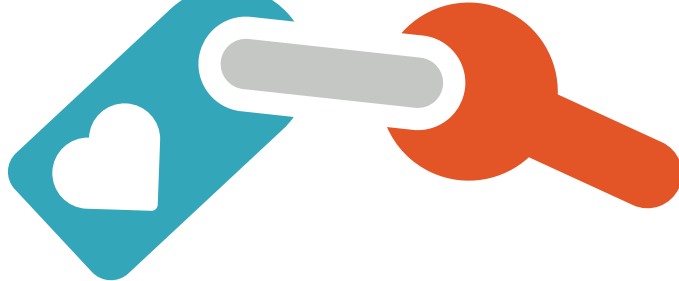
St. Katharine of Siena School 8th graders look forward to Thursdays and Fridays because that's when their creations come to life.

3D-printed pumpkins. Student-designed homes. Virtual reality and drones. At St. Katharine of Siena School in Wayne, students are gaining hands-on experience with cutting-edge technology through a mentoring partnership with the **Uncommon Individual Foundation** – or UIF for short.

Now in its third year, the partnership introduces a team of tech-savvy mentors to the school's 8th grade classes. Through a series of sessions, the mentors teach students how to design, program, and code their own creations.

"It is the way our world is moving, and we are moving with it," says Christina Elisio, the program's coordinator and technology teacher at St. Katharine of Siena. "Seeing students' faces when their designs are 3D-printed is priceless. They are so excited and proud. Moments like that make it all worth it."





A RARE OPPORTUNITY

While emerging technologies like 3D printing and virtual reality are prevalent in the headlines, they are often cost prohibitive for students – and schools.

The UIF Technology Mentoring program lets participants try out tools they may otherwise only see on YouTube.

"I thought virtual reality headsets were really cool, and I wanted to get one, but then I realized how expensive they are," says 8th grader James Manion.

"It's awesome that with UIF, we have the ability to try them out in a way that we would never be able to at home," Manion explains.

In a typical session, two or three mentors give a brief presentation covering the basics of the lesson. Then students are set free to explore programs like MakerBot and Tinkercad, asking questions as they go.

Elisio says these sessions have reinforced students' understanding of math concepts. Participants can see, for example, how adjusting the angles of their designs by just a few degrees will impact their printed products.

She admits that she's benefited from the lessons as well.

"I am learning just as much as the students are in these sessions," Elisio says. "It has been really great to learn about the new technologies and their real-world applications."

CURIOSITY, NOT QUIZZES

St. Katharine of Siena's UIF mentors – Jon Rodriguez, AJ Santos, and Shemar Coombs – bring a collective expertise across a range of subjects including mechanical engineering, bioengineering, computer science, game development, and business management.

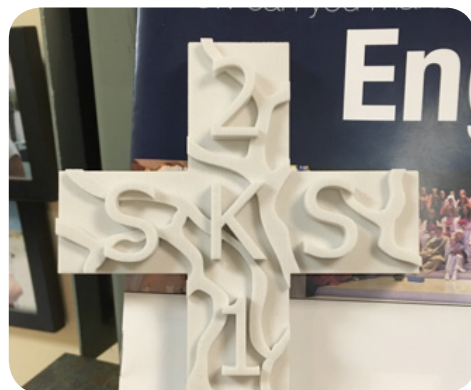
While student comprehension is important, the instructors say their main focus is encouraging participants to push boundaries by thinking outside the box.

"We try to keep the lesson part of the program to a minimum by giving students the opportunity to work hands-on with the technology," Rodriguez, Santos, and Coombs said in an email. "When students are curious and inquisitive, they ask more questions, learn more, and have fun all at the same time."

One of the first tasks the mentors assign is designing a product the students want to print. The mentors then ask students to redesign it, transforming the idea from 2D to 3D. It's the first step in encouraging students to look at objects – and challenges – from a new perspective.

St. Katharine of Siena principal Bud Tosti says this approach supports the school's mission to develop the whole child.

"We're committed to preparing our students for a future the world can't even begin to fathom," Tosti says. "And programs like UIF Technology Mentoring Program help us do that in an engaging way."



LAUGHTER ENCOURAGED

Even the most advanced gadgetry would struggle to hold an 8th grader's attention for a full hour. The UIF mentors — who are in their early 20s — engage students by fostering a fun, welcoming atmosphere.

Asked about the highlights of the program, every student interviewed for this story emphasized how much they enjoyed connecting with the mentorship team.

"They're close to our age and can relate to us," says 8th grader Riley Mazzalupi. "Some of them are students, so they can provide helpful tips for studying or ways to use technology that will benefit you."

"We can have conversations with them and make jokes with them and they will understand," adds 8th grader Danny Mendler. "They are so funny and fun to be around."

This camaraderie has expanded beyond UIF sessions. One of the mentors, Coombs, participated in the school's student vs. faculty basketball game during Catholic Schools week, helping lead the faculty team to victory.

Elisio says this approachability allows students to see class topics in a new light.

"The mentors laugh and keep a fun, light environment while also making sure all the students' questions are heard and answered," Elisio says. "I think that can be a hard balance to strike sometimes, but the UIF team pulls it off."



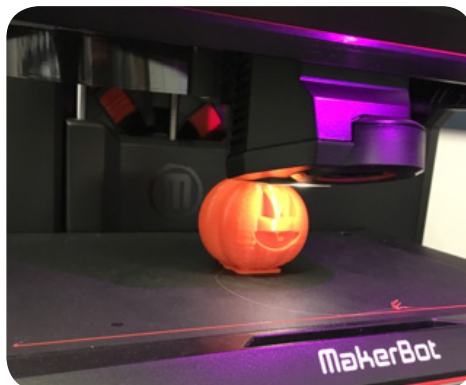
BUILDING FORWARD

Though most participating classes meet with the UIF mentors just once a week, the program's impact has been far-reaching.

Elisio applied for and received a UIF grant for \$25,000 to be used toward the school's STREAM efforts. So far, the school has used the funds to purchase two 3D printers. Students have designed and printed objects including keychains, snowmen, and pumpkins. Sixth and seventh graders — who participate in UIF sessions a few times a year — have gotten to join in the fun too.

"Just today, I printed test pieces during my 7th grade class, and my students couldn't get enough," Elisio says. "They stood in front of the printers the whole time — they were so excited to see the finished products."

And for some students, the program embodies the opportunity to build something bigger, fostering a spark of an interest that's worth pursuing into the future.



"The UIF program has opened my eyes to a whole new world of technology," says 8th grader Amy Werner. "I never knew 3D printing was so accessible, or that it would be something I would be interested in. It's now definitely something I plan to carry on to high school." 🦋

TOP 5 APPS FOR TEACHING THE MATH OF MONEY MANAGEMENT

Looking for more ways to make math engaging?
Inspire your students with these five apps.

[Source: Common Sense Education](#)



01

Motion Math: Pizza!

Buy ingredients, build pizzas, and keep customers happy without going over your \$50 budget.

Ages: 9 and up

Platform: iPhone, iPad

Common Sense Rating:



02

Sushi Monster

Use addition and multiplication to serve the right sushi — or risk facing a monster's temper tantrum!

Ages: 7 and up

Platform: iPhone, iPad

Common Sense Rating:



03

RollerCoaster Tycoon Touch

Make money for your park with the right combination of rides, restaurants, and activities.

Ages: 8 and up

Platform: iPhone, iPad, Android

Common Sense Rating:



04

MathTango

Complete math puzzle games and missions to build your island and fill it with cute monsters.

Ages: 6 and up

Platform: iPhone, iPad

Common Sense Rating:



05

Dinorama

Learn to budget by managing a dinosaur theme park, from selling popcorn to hiring employees.

Ages: 7 and up

Platform: iPhone, iPad

Common Sense Rating:



Fish, Friends, & Fresh Food

AQUAPONICS ARE
BRINGING A COMPLETE
ECOSYSTEM INTO PJP



In American folk legend, Tisquantum of the Patuxet is said to have taught early European colonists about the nutritional chain from fish remains to crop growth. While the story itself has never been verified, the relationship between animal and plant life, and our ability to sustain ourselves from it, has always run true.

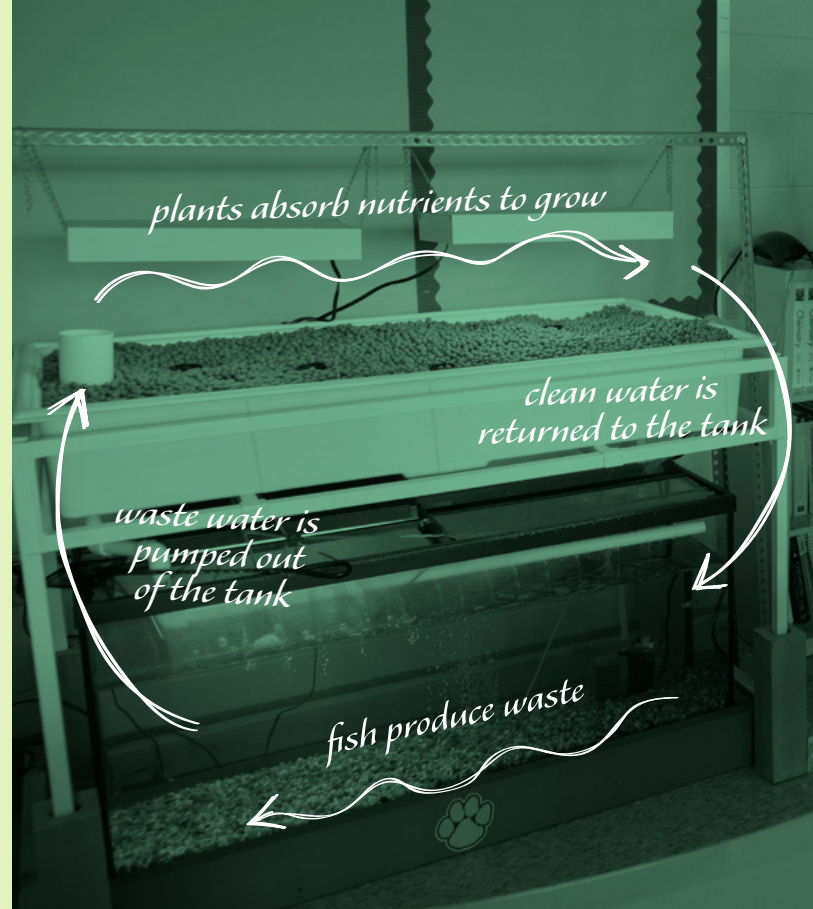
At Pope John Paul II High School (PJP), Science Department Chair Clayton Cottman is keeping that lesson (and approximately 4 goldfish and 2 Koi) alive today for his students. After attending a workshop on aquaponics last fall, he has set up a lab at PJP that is putting students in charge of feeding fish, plants, and people in need — simultaneously.

CREATING AN ECOSYSTEM

At a fundamental level, aquaponics is the combination of aquaculture (the cultivation of fish) and hydroponics (the cultivation of plants without soil).

Normally in an aquarium setup without live plants, heavy filtration and water changes are required to prevent the accumulation of fish waste from harming the fish. Too much excrement can quickly spike the levels of ammonia in the aquarium, sickening or killing fish.

In a well-balanced ecosystem, nitrifying bacteria break down this ammonia into nitrites, and then nitrates — forms of nitrogen that is useful to plants. Fish eat and create waste; bacteria break down that waste into their own waste; and plants feed on bacterial byproducts to grow.



KEEPING IT ALL IN BALANCE

The aquaponics project at PJP focuses on a specific type of plant — the kind humans can harvest and consume as food. Brussel sprouts, spinach, corn, and lettuce are just some of the vegetables grown by 12th grader Brian Williamsen.

“Getting the fish acclimated and getting the plants growing isn’t easy,” Williamsen told *Ignite*. “Fish require a lot of care and need the perfect conditions.” As someone with experience growing and harvesting vegetables, Williamsen knew how important the details are to caring for plants, and was quickly learning how those same lessons apply to raising fish.

Classmate Mark Mellensky shared Williamsen’s thoughts on the importance of ecosystem balance.

“You have to be patient,” Mellensky said. Prior to this project, he had never raised fish before, but was excited to test his skills in the aquaponics lab. “The water pH level has to be just right; keeping it at the right level can be hard to balance!”

“The most difficult part is maintaining the pH of the water,” Cottman agreed. While baking soda was previously being added as needed to the tank to reach a neutral pH, the teacher shared that one of his students is working on a more precise solution to the problem:

“[He] is learning how to calculate the amount of baking soda needed through stoichiometry and acid-base reactions,” Cottman said. By combining science, math, and an understanding of ecological balance, Cottman’s classmates are learning what it takes to keep the system going — and growing.

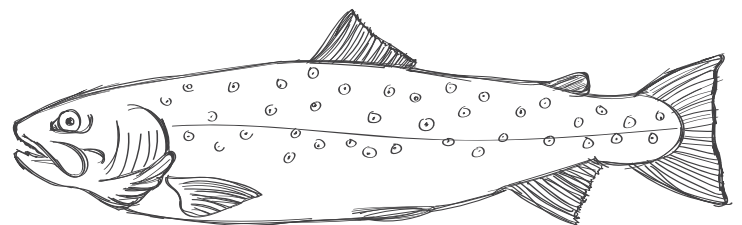


fig.1 trout

VEGGIE TALES

Of course, the fish are only one half of the aquaponics balance, and the shared health of the project's plants is just as critical to Cottman's lesson plan.

"Ecosystems are not isolated, but connected," he noted. "An imbalance in one can have effects on many others."

This lesson certainly wasn't lost on Mellensky and Williamsen, who pointed out the intricacy of keeping plants flourishing, even when fish were doing well.

"I have experience growing plants outdoors as well as indoors," Williamsen said, but he still had to improvise to find ways of preventing plants from being "too thin and tall." Many plants in the aquaponic setup were quick to sprout, but ended up faltering just two weeks into the experiment. The students had to experiment with the levels of nutrients, moisture, and natural and artificial light to stabilize plant growth.



fig.2 spinach



CROP ROTATION

With his first iteration of aquaponics successfully underway, Cottman is looking forward to expanding the scope of the experiment — on both halves of the equation.

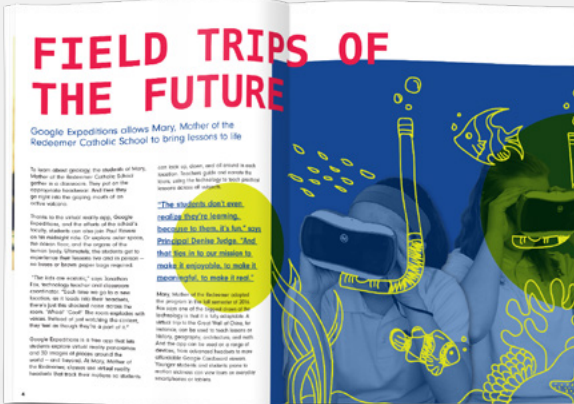
"The aquarium will be turned into a model of a freshwater creek or stream in the spring with the addition of freshwater plants and local freshwater species of fish, like catfish and perch," he told us. "Then the hope is to install vegetable gardens on the campus where the seedlings from the system can be transplanted and grown for local food banks."

As for Williamsen and Mellensky, who graduate this year, they've learned a great deal about ecosystems, chemistry, and the interdependency of plant, animal, and human life. Nurturing so many living things can be both challenging and rewarding.

"I think [after all this] I might try a hydroponics setup at home..." Williamsen concluded, "... just one that doesn't use fish." 🐟

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