Intro to the Five-Step Curricular Process
by Bill Crombie, Aidan Soguero

The Algebra Project's Five-Step Curricular Process is a method that brings math learners from a shared concrete experience to a solid understanding of a targeted mathematical concept and its representation in abstract mathematical symbols. Teachers themselves work through this process as a means of reconceptualizing and looking deeper into the targeted mathematical concepts before bringing this process to their students in the classroom. This series aims to provide a complex look into each step, why it works, and how to utilize it, as well as concrete examples of its use. In this intro, we will delve into each step with enough explanation and context to give you a working understanding of each one. The later installments will provide a deeper level of understanding so that you might use the process in your own life or teaching.

Step 1: A shared concrete event

Students come to the table equipped with extensive mathematical knowledge, both explicit and implicit. Much of that knowledge is just not yet translated into an explicit representation of mathematics. But through a shared event as simple as taking the subway, as many kids do to get to school every single day, students necessarily have a fundamental idea of a trip from which can be drawn basic mathematical concepts and relations that extend from the arithmetic of signed numbers to the beginnings of algebraic equations. The issue is explicitly excavating these concrete experiences and drawing out their mathematical implications. If students build the analogy between movement on a subway and translations on a number line, then they have a grounding for understanding the arithmetic of signed numbers which is a key concept of algebra. The trips are acting as a grounding metaphor that gives students access to what might otherwise involve numerical computations in the absence of understanding. Thus the Five-Step Curricular Process is meeting students in their real-world where their everyday knowledge is engaged as the first step. This connection between students’ prior knowledge and the more abstract mathematical formulations of concepts is a critical component of effective learning in the mathematics classroom.

Beginning with real-world events, like taking the subway, is crucial to shifting students’ mindset to mindful algebraic and computational thinking, but also in empowering the students with a sense of the value of the knowledge that they bring to mathematics. By taking a trip, and discussing the trip, there is a level of accessibility and participation such that no student feels left behind. Students may not yet understand how the experience relates to (cont'd on page 7)
On the Ground with Alex Ries
by Aidan Soguero

It was a problem plaguing math classes across the school district. Dipping her head into classrooms, Alex Ries would sometimes find students had written the answer to a math problem on the board. Wanting to engage with them and learn their process, she’d ask how they got the answer. Assuming the question implied their answer was wrong (it often wasn’t!) the student would hurriedly erase the answer and return to their seat.

Now, she says, that no longer happens. When she enters an Algebra Project classroom, students are confident and more than happy to defend their thinking.

Ries, Assistant Principal at Boyd Anderson High School, has played a key role in supporting the implementation of the Algebra Project in Broward County Public Schools (BCPS) in Florida, and she has a lot of takeaways from the experience.

Formerly Co-Director of Secondary Mathematics at the district level for BCPS, Ries made the unique decision to instead work at the school level and become the assistant principal at Boyd Anderson High School in Broward. But her initial encounter with the Algebra Project dates back before then, when in February 2017 she attended an Algebra Project conference in St. Louis, with then Chief Academic Officer Dan Gohl, that would have an outsized effect on how she viewed mathematics.

She did her own research on the organization, on Bob Moses, and read up on its history. She retained interest in the Algebra Project’s work, so when another conference came along, she extended the invitation to her math team. “I wanted to make sure they saw the vision. That they understood the importance of math literacy, of equity, of academic excellence.” At the conference, it was her conversations with teachers that sealed her interest in working with the Algebra Project. As a former math teacher, she saw the math literacy effort for underserved populations as a spectacular effort.

Bringing the Algebra Project into Broward County has been a collaborative effort, she points out. Dr. Maria Lovett and Dr. Joan Wynne of Florida International University (FIU), along with others from Broward College, the Miami AP/YPP Advisory Council, and from BCPS - including Ries - started the Florida Local Alliance for Math Literacy and Equity (FLAME). Ries as Co-Director of BCPS Secondary Mathematics, with community help, began discussions towards establishing the Algebra Project, first with Hallandale High School and then Coconut Creek, and eventually brought the project to her own school, Boyd Anderson, where she serves as Assistant Principal, with the support of her Principal, James Griffin. The project has since also expanded to Margate Middle School in BCPS.

Of their greatest successes, she says it’s important to note that many Algebra Project students have scored higher on end of year exams, but to her, the greatest success is how they’ve learned to advocate for themselves, in the classroom but also spilling over into their day-to-day lives.

The pandemic presented a struggle for the program, still in its infancy. Targeting freshman in high school, the youngest cohort were 9th graders who hadn’t attended school in person since 7th grade, and it showed. Such a unique situation left many teachers unprepared to deal with a lack of maturity they had come to expect from middle schoolers but not of high schoolers. Ries commends Mr. Sellars, a teacher at Boyd Anderson H.S. who went through the AP professional development, for taking the extra time to be a mentor for these students who, she says within two months, were unrecognizable from the class she saw enter.

It’s precisely that mentorship that leads to the success so often seen in Algebra Project classrooms, she says. Because there is an increased expectation of school community support and because the project uses a cohort model where the same class stays with the same teacher throughout the years, the relationship teachers and students develop with each other are often like family.

Despite this structure, it comes with some pitfalls too, she has noticed. While the cohort model provides the structure necessary for students to succeed, it can sometimes leave teachers struggling. While most teachers teach the same class with the same curriculum every year, an Algebra Project teacher may go
up to 2 or even 4 years without repeating curriculum. And without additional resources from the Algebra Project, like teacher editions of all curriculum modules (currently only available for some units), or video instruction material to help remind them of the course, the teachers become reliant on the Algebra Project flying down from Boston in order to provide professional learning support. Creating a structure in which the Algebra Project can exist in Broward County led by local teachers, math coaches and university support people, with or without the help of the Algebra Project team in Boston is what is truly necessary to scale the project and make it even larger, she believes.

As for the students, her biggest concern is “Summer Melt.” She has noted how frequently teachers can view their jobs as simply making sure their students walk across the graduation stage, but what has surprised her is how often those very students, who received full honors and lucrative scholarships, then never actually show up to their first day of college, especially among first generation college students.

The issue of Summer Melt has been widely documented, and there exist organizations attempting to combat it. She hopes to integrate some of those practices in BCPS to ensure that students aren’t forgotten about once they’ve graduated.

All of these issues go back to the idea of support, which she has noted is the most important aspect of the Algebra Project. With greater support for teachers learning the curriculum and greater support for students heading off to college, she envisions an even brighter future for her students.

Summer Induction at Broward County Public Schools
by Ben Moynihan, Aidan Soguero

A one-week Preparatory Professional Development has wrapped up and a four-week Summer Induction is in progress with teachers and students in Broward County, Florida. These summer sessions have been scheduled annually since 2018 with the Broward County School District (BCPS), and are an opportunity for teachers to learn and teach with their students, and with the Algebra Project’s Professional Development Team. The sessions focus on what to teach, curricular materials, how to teach them, and pedagogical strategies for “raising the floor of math literacy.”

The Preparatory PD offers a safe space to learn a fundamental aspect of the Algebra Project’s approach, the Five-Step Curricular Process. The project’s Five-Step Curricular process helps students understand complex math through shared experiences that they observe and describe in drawings, in models, and in ordinary “people talk”. They identify key features of the shared event first developed through their own iconic representations before switching over to the more conventional abstract representations of mathematics.

The Summer Induction, now underway, is an opportunity for students and teachers to cultivate a productive classroom learning environment, without the pressures of grading and testing that are present during the school year. These summer experiences are an important step in fostering the relationships that students and teachers then can carry into the school year, augmenting the impact of the mathematical resources in the curriculum materials and pedagogical approaches that the teachers are implementing.

The importance of fostering such relationships is reflected in another major aspect of the Algebra Project’s work which BCPS has adopted, the cohort model. By having students remain with the same class and same teacher “looping” for several years, interpersonal relationships between students and between students and their teachers are cemented which is important to the whole class engaging with the mathematical content rigorously. The students’ relationship with each other and with their teacher allows them to not only invest in their own success, but also in the success of their peers.
Statement on Jean Entine’s Passing
Jean Entine (May 21, 1942 - May 17, 2022)

In the spring of 2007, Bob Moses reached out to Jean, asking if she would be willing to serve on the Board of Directors of the Algebra Project. Jean joined the Board from August 2007 to May 2013, and between 2013 and 2022, Jean continued her support of the project’s mission as an advisor. During this time she invigorated our infrastructure planning, fundraising development and national organizing strategies. She brought her decades of principled commitment to, and knowledge of, grassroots social justice organizing at a critical time for the project’s evolution. She was instrumental in shaping the AP’s 25th anniversary conference in Jackson, MS in 2008, and up to the winter of 2022 Jean championed Bob Moses’ and the Algebra Project’s call to the nation to establish a guarantee of quality K-12 public school education as a Constitutional Right for all children in America. As important as her strategic and operational guidance always has been, Jean’s kindness, clarity of purpose and no nonsense encouragement to move forward effectively has always been paramount. We will carry Jean’s memory in our hearts, and she will be sorely missed.

–The Algebra Project

generosity of spirit were boundless.

–Janet Moses

Summer Induction Math Showcase in Florida
On July 13th, The Bob Moses Research Center for Math Literacy Through Public Education will be hosting a math showcase at the FIU Biscayne Bay Campus as part of the Summer Induction in which participating students and teachers will share their approaches to teaching and learning mathematics with the community. All are invited to attend.

25 Years of YPP Anniversary Gala
The Young People's Project will be hosting an in-person, 2 day celebration aimed at alumni, students, and friends of YPP ending with the 25th Anniversary Gala on October 1st. You can learn more on YPP’s website.

Interim Executive Director Appointed to MSRI Education Advisory Committee
Ben Moynihan, the Algebra Project's Interim Executive Director, has joined the Education Advisory Committee (EAC) of the Mathematical Sciences Research Institute, which is now the Simons Laufer Mathematical Sciences Institute. His 3 year term on the EAC began in April 2022.

Algebra Project Workshops in Missouri and New Jersey
An introductory workshop was held in Plainfield, New Jersey on June 10th, with another planned for August at Confluence Academies in St. Louis, Missouri. These events are the first step in introducing Algebra Project pedagogy and curriculum into these schools.

LA Local Alliance Runs Summer Program Based on Trip Line
The LA Local Alliance, with the University of Southern California, the Neighborhood Academic Initiative, and the LA Unified School District, is running an extracurricular Summer Math Academy based on the Algebra Project's Trip Line module. The program is working with over 100 rising 9th graders and introducing the Algebra Project to 5 LAUSD math teachers. The program will continue with monthly Saturday sessions throughout the school year.
Conference Registration and Agenda Go Live
We the People - Math Literacy for All Alliance and the Algebra Project are presenting a free, online, national conference this summer. Being held virtually July 28th-30th, registration is completely free, and we encourage you to share the registration link with your network as we create spaces for young people and teachers to lead. Go to www.algebra.org to learn more.

The Algebra Project Celebrated for Growing Access to Public School Math Education
The First National Bank of Omaha and the NEA Foundation honored the Algebra Project with their 2022 Award for Outstanding Service to Public Education. The award recognized the work of our founder Bob Moses and the Algebra Project team from 1982 to the present. The award was presented at the NEA Foundation’s annual gala event in Washington, DC, on May 13, 2022. Interim Executive Director Ben Moynihan accepted the award alongside Algebra Project Board Co-Chair LaDon Love.

Debut Bob Moses Speaker Series Conference Hailed a Success
The April 9th and 10th inaugural Bob Moses Speaker Series conference, led by Dr. Janet Jemmott Moses, featured guest speakers Paul Parravano, Danny Glover, and Dr. Cornel West, as well as series lecturers Nicholas Lemann, Dean James D. Anderson, Jarvis R. Givens, and Imani Perry. This was the first of what will become a series of conferences, and you can learn more about the initiative at bobmosesconference.com.

Danny Glover Receives Honorary Oscar for Humanitarian Work
Algebra Project Board member, actor and activist Danny Glover was celebrated with the Jean Hersholt Humanitarian Award by the Governors of the Oscars on March 25th, 2022 in Los Angeles. The Governors honored Danny for his life long commitment to social justice and artistic excellence, including his work with UNICEF, the United Nations, the labor movement, the anti-Apartheid movement, the Algebra Project, and many more. Fellow honorary recipients included Liv Ulmann, Samuel L. Jackson and Elaine May. Alfre Woodard, the celebrated actor, producer and activist, introduced Danny at the Gala.
WTP-ML4A Alliance National Conference Background Statement

From 1776 to present day, our nation has never agreed that education is a Constitutional right. Rather, as Bob Moses put it, we have implicitly agreed to “an unannounced and ‘unannounceable’” national systemic education policy of “running failing schools and rescuing what students we can from failing schools.” The year is now 2022 and the United States of America still does not have a Federal, Constitutional guarantee for quality K-12 public education. Thus, young people are citizens of individual states and not of the nation when it comes to their education. Meanwhile, individual state constitutional provisions for public K-12 education vary widely in their stipulations for “adequate”, “basic”, or “minimal” education. A national conversation about guaranteeing high quality K-12 public school education as a federal right for all young people in the nation seems as remote today as when President Grant first proposed it in his 1875 State of the Union Address to the U.S. Congress. With this conference, we seek to spark a different national conversation about quality K-12 public school education, with students and teachers, and allies, demonstrating innovative strategies for expanding access to math literacy.

Throughout his life, Bob Moses struggled alongside local and national stakeholders to broaden access to civil and constitutional protections that enable access to “full personhood” in this country. First, in the Mississippi Theatre of the Civil Rights Movement in the 1960s, a bellwether struggle to include Black Mississippians as full citizens of the nation with a guarantee of constitutional rights and protections for the right to vote and political access in America. Second, from the 1980s until his passing last summer in July of 2021, through the work of the Algebra Project, together with schools and collaborating organizations, Bob sought to catalyze multi-generational, multi-racial coalitions committed to “raising the floor” of mathematics literacy to ensure that Black, brown and poor children in the United States get the literacies they need to not only advance their educational and economic access in 21st century Information Age society, but to make full participation in American democracy possible.

In the work of the emerging national We the People - Math Literacy for All Alliance since 2017, with many collaborating organizations and institutions, we collectively seek to develop and share structured opportunities that ensure that all students graduate high school on time. This means ensuring math literacy, alongside reading and writing, is accessible and achievable by all students, especially for students in underserved and under resourced schools. It also means ensuring all students graduate ready for college or career mathematics without remediation. In the same way we bear witness to those Black Mississippians who rose up as leaders among sharecroppers, day laborers, and domestic workers in the 1960s, we turn now to those students and teachers struggling for math literacy. Because, as Bob and community organizers like him would say, the people living with the problem everyday must be centrally involved in designing and implementing solutions to the problem.

“In this country, you have to earn your insurgency. You have to capture the imagination of the people in the federal government who actually want to close the gap between our espoused ideals and the practices that we tolerate. This gap has existed throughout our history, and there are always people trying to close it. The students in the Algebra Project and the Young People’s Project face the same problem we faced in the 1960s. America is as practical as ever; unless our youth can actually demonstrate that they are part of the solution, hammering away at the doors or in the streets isn’t going to create change.”

In a July 28th – 30th, 2022 online national conference co-hosted by the We the People – Math Literacy for All Alliance and the Algebra Project, we aim to embody Bob’s vision for students and teachers to be at the center, along with mathematicians, mathematics educators, researchers and community activists, in designing and implementing strategies that raise the floor of math literacy, because math literacy is a key feature of Quality Public School Education as a Civil/Constitutional Right. Our aim is to broaden participation in the We the People – Math Literacy for All Alliance, learn from each other, and inspire collective action that engages our local communities and the nation to continue this struggle together.*

2022 online national conference schedule.

Free online conference registration link.

*for citations, please see online version
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(cont’d from page 1) algebra, but what is important is their engagement, and not coming into the experience having already written off their ability to do the math. Instead, teachers create a classroom environment where students can affirm: “I can do this, I understand this, I do this all the time.”

Step 2: A picture/model

In the next step, students are asked to draw or model the event. In this stage, students focus on their visual representations of the event. This means that within the class, students are providing multiple perspectives on how one shared common event can be illustrated.

Students are given a wide breadth to picture their experience, such as the trip, in whatever manner makes sense to them. That may be a map, a picture, a graph, or anything else. Students are then asked to explain their pictures, first in small groups and then to the whole class. These pictures foreshadow representations that students will later make for certain mathematical ideas. In the process of sharing their pictures, students may be asked questions, and perhaps need to defend their intended meaning behind the pictures. It is important to allow students their self-expression in the process of gaining ownership over mathematical ideas and concepts before introducing the more conventional abstract representations of mathematics.

Step 3: People Talk

People Talk is the opportunity for students to discuss that shared concrete experience in their own words from their perspectives. This curricular process is where students first can put their voice on what will become the mathematical table.

In the realm of mathematics, by describing the event using their natural language and negotiating aspects of the shared experience in a conversational manner, students are developing their ownership and understanding of ideas which will ground the mathematics to be developed. Students’ voice becomes a critical driver in the growth of these mathematical concepts.

Step 4: Feature Talk

Mathematics is a conceptual language, but a language that no one speaks. Feature Talk is a construct to support students’ ability to give an interpretive reading of mathematics. At this stage in the process, two important tasks are set for students.

1. Feature identification. Students are presented with an essential or critical question concerning the shared event. First individually, and then through a discussion in their groups, students decide upon the features of the event which are most important in characterizing their response. That entails what we call feature identification.

2. Feature relations. Students are then asked to determine the relationship that they see among these features. That is known as feature relations.

It is both the set of features and the relationships among them that later will be used in capturing the mathematics in an iconic or symbolic representation.

Step 5: Symbolic Representation

In this final step, students construct symbols to represent the features they’ve identified. These symbols for the features are combined into a symbolic representation that captures the relationship among features that the students determined in the previous phase. These “symbol sentences” are constructed to do the same conceptual work as the conventional symbols of mathematics. By applying their symbolic representations to related problems, students have an opportunity to observe and understand through their symbols how the conventional symbols of mathematics work.

Within the classroom, teams of students share their symbolic representations so that each team understands how the symbols of other teams represent the targeted mathematical concepts and can be applied to additional tasks. Based on this shared understanding, the teacher acting as a representative of the mathematics community can then introduce the conventional symbols of mathematics as a means of communicating mathematical ideas, not just within the classroom but within the broader mathematics community. (This piece has been edited for space. Read the full version at www.algebra.org)
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