TEACHING WITH CPM IN THE ERA OF COVID-19

CPM publishes newsletters throughout the year during the odd numbered months. In the past, however, we have not released a newsletter in July since teachers are relaxing, enjoying the break from the early mornings and the strict bathroom schedules. Hopefully, you are in some beautiful place, rejuvenating for a new school year. But these times are nothing like the past.

Many school districts have reached out, asking how they are going to use CPM materials in a classroom that does not look like the classroom they left. That is a good question. We have been thinking about this since schools started closing in March. We have been attending meetings and webinars, and we have been brainstorming with as many people as possible. We have been reading research on virtual learning and articles on what teachers should do.

If you are also doing lots of reading and meeting, you have probably learned what we have learned: no one really knows what school will be like in the fall. Every school district has a different plan for how they will keep students and teachers safe. These plans range from no in-person classes to no virtual classes, and everything in between.

Teachers shared with CPM some of their ideas and described what they tried during the spring. Hopefully there will be something here for all the different possible scenarios your school district might suggest for you in the fall. More importantly, let these writings assure you that you are not alone in this endeavor.

Following the teachers’ stories is a list of what CPM is working on and will provide by the fall. If you find something that works particularly well, please let CPM know! You can write to support@cpm.org, newsletter@cpm.org, or contact your Regional Professional Learning Coordinator. Don’t forget the Sharing tab in your eBook. Share your ideas. Remember: We are all in this together.
MATH: IT’S NOT THE MOST IMPORTANT THING WE DO
Kimberly Pantoja, San Jose, CA, pantoja_kimberly@cusdk8.org

Distance learning is not what I signed up for when I became a teacher. I did not even really like the online classes I took as an adult learner—so why would I ever want to teach that way? And yet, here we are. Sitting behind screens wondering if what we are doing is right, is fair, is equitable, is best.

In my classroom, math is not the most important thing we do. It might not even be the second or third most important thing we do. In my class, the most important thing we do is build relationships. We talk, we share stories, we let each other know who we really are. We build a place where it is not only okay to make a mistake, we build a place where mistakes are honored. And along the way, we do some math.

My experience with distance learning has been an overall successful journey. I teach 170 middle school students. On average, I see 160 of them in my online classes each week. Of the ten I do not see, I get an email from at least six or seven of them letting me know why they missed class. Are my math lessons riveting? Are students clamoring to learn how many cones it takes to fill a cylinder, or why something raised to the power of zero always equals one? Probably not. So, why are they coming to class, logging in to see me on a screen?

Relationships.

All year, I focused on building relationships, and with that, building a foundation of trust and mutual respect. My students come to virtual class because they respect me and they respect the effort I have put in for them. I communicate with them often. I share my joys and I share my hair-pulling frustrations. I share my struggles, both as a mom and as a teacher. Distance learning is not easy—for any of us. I do not think many students realize that it is just as hard for us to be away from them. It is as hard for us to teach as it is for them to learn. We all miss human contact and live interaction.

When my students miss class, I call them. I ask if they are okay and where their head is at. I tell them that I am not calling them to nag them about school work, or to go on about the wonders of math (and there are many!), but that I want to hear how their days are going. I have heard about lost pets, fights with siblings, worry about family finances (why is a middle schooler even worrying about these things?), and so much more.

I have shared so much about myself—how I am worried my oldest son is not going to graduate high school on time, how sad I am that I cannot go cuddle my newborn nephew, what happens when I fight with my family. These are the pieces that make us who we are. These are the connections that bind us together.

And the result? My students work for me. I have been making videos for them to work on their own time. Trying to adapt the wonderfully collaborative CPM curriculum into an individualized lesson is difficult and requires me to be not only creative, but I have also had to teach myself how to be much more tech-savvy. I end with a 7–10 minute video for each lesson. These videos take over an hour to plan, create, and edit. I have told my students this and because of the mutual respect we have built, they honor my time and efforts by engaging with the material I carefully create for them. I have no doubt that if I had not taken the time to build these relationships and genuinely develop an interest in each student, I would not be experiencing this level of student engagement.

So, math? Yeah, it’s great. And distance learning? Well, that’s not great. But it is not horrible either. I have learned a lot about myself, and I realized that teaching is about so much more than the four walls of my classroom. Making an impact happens every day, in every tiny interaction. Build those relationships. Become an active partner in taking these children and raising them into wonderful adults. And along the way, math will happen.

MY REMOTE LEARNING STORY
Danielle Boggs, Champaign, IL, DanielleBoggs@cpm.org

In my district, we were only doing asynchronous learning activities that reviewed past concepts, and offering optional extension activities that might include new content. I ran into lots of hurdles. I tried what felt like everything under the sun to try to hook students, including having students watch videos, make videos, and use Flipgrid, Quizizz, EdPuzzle, Pear Deck, and Google Forms just to try to find something that would engage everyone.

I would say my two biggest success stories were the use of Pear Deck and Google Forms, with the use of Quizizz as a not so distant third place.

My first success story includes one of my all time favorite lessons in CC3, 9.2.1, where students are introduced to the types of triangles you can make from squares. It took me a good amount of time to make a student-self paced Pear Deck that helped students explore that small, medium, and...
large squares could make no triangle, an acute, right, or obtuse triangle. I could not figure out how to make it more hands on for students to manipulate the squares, so this activity was more guided than I want it to be. I had the majority of my students engaged in the activity, however, which was very different from other activities! (Note: If you want to make a Pear Deck you must have the Pear Deck add-on.)

Second, my grade level created a Weekly Check-in Google Form that allowed us to get a read on how students were doing both social-emotionally and academically with remote learning, and I used this form each week to reach out to students and families, answer their questions, and inform them of the types of activities or assignments that might be my focus the following week.

With regard to engaging students, the majority also participated in almost every Quizizz assignment. Thankfully, they recently incorporated a lot of new features beyond just multiple choice, such as open ended questions (great for solving equations), poll questions (great for self-assessment), and more! With my Quizizz assignments I was able to analyze student's answers and use them to make videos and slides demonstrating my favorite mistakes. Then I had students do a similar Quizizz in order to show their growth in understanding. Believe it or not, it worked. At least it worked better than all the other things I tried! This way I still got to provide students feedback and still be their teacher!

But overall, students missed their friends, they missed their teachers, and they needed that human contact for their middle school developing selves. I tried to incorporate more of their social-emotional needs, as much as I could anyway. My student teacher and I put together a series of tasks on Flipgrid that included saying “hello,” sharing what you are grateful for, show & tell, learning sign language, sharing jokes, talent show, interview a family member, and magic. The videos that we created were tremendously popular, including our “Pet Padlet,” where students posted pictures of their pets, and “Inspirations and Advice Padlet,” where students posted pictures of inspirational quotes, tips, and advice to help other students get through Remote Learning.

So, the moral of my story is, if you can do synchronous, do it. But if asynchronous is all you can do, Pear Deck, Google Forms, and Quizizz were my more successful go-tos.

STICK TO THE CHECKPOINTS: HOW TO PICK AND CHOOSE IN A TIME OF CRISIS

Brianna Ruiz, Dixon, CA, BriannaRuiz@cpm.org

Going into distance learning, it was important for me to continue to provide a meaningful mathematical experience for my students and expose them to as many essential concepts as possible without overwhelming them as they navigated through countless adjustments both in and out of school. I felt that in order to do so, I needed to prioritize creating structure in my course, and providing consistency throughout my lessons. To begin this process, my department and I decided that we would use the CPM Checkpoint topics to guide our weekly instruction in an effort to keep instruction focused on essential topics, and organized for both teachers and students.

Once these topics were solidified, my colleagues and I collaborated to produce weekly classwork and homework assignments that focused primarily on a specific weekly learning checkpoint, while also providing opportunities for spiral review. Each week students were given five assignments that provided a balance of CPM core problems and skills-based problems, along with opportunities for reflection. While the content of each assignment was different, the format of our weekly assignments never changed. The number of assignments and their due dates stayed consistent.

Several students expressed their appreciation for the weekly structure, saying that it helped them to stay organized. I also found that consistency and revisitation allowed for improvement among student responses. For example, many students improved in their ability to justify their reasoning after having the opportunity to respond to similar prompts over the weeks and receive feedback.
LEARNING TEAMS COLLABORATE REMOTELY WITH GOOGLE DOCS
Geoff Brown, Chagrin Falls, OH, geoff.brown@chagrinschools.org

When our school shifted to remote instruction last March, I wanted my middle school students to interact with each other as much as possible, despite being isolated in their homes. I decided to ask them to continue to work in small teams to explore the same CPM lessons that they would have seen had they been in our classroom.

To enable the students to “construct viable arguments and critique the reasoning of others,” I transferred the problem number and a small amount of key information from the eBook to shared Google Docs. Each question from the lesson was inserted into a table and then each student was asked to paste their answer into the other rows of the table (Click here to see an example of CCG, Lesson 9.15). Along the way, I hoped the students would read each other’s answers and make comments.

I asked everyone to attempt the problems to the best of their ability on Mondays and Wednesdays, and then we looked at the answer key together on Tuesday and Thursday mornings (click here to see an example of the key for CCG, Lesson 9.1.5). We were often able to share creative student work from the day before. To finish the lessons, I asked students to attempt normal Review & Preview problems on Tuesday and Thursday afternoons.

I was interested when some study teams decided to work through their lessons together, at the same time, and ask each other questions. This type of collaboration shows the potential of synchronous instruction, which our school has been planning to use in the fall. In the document pictured below, each team typed comments back and forth to other teams in the shared Google Doc as they explored CCA, Lesson 9.4.2. This virtual conversation was happening on a Wednesday morning, and I was excited to see it! The next morning, I shared this image with the rest of the class during our Thursday closure session.

Looking ahead to this fall, I think this strategy might be a good one to use for as many lessons as possible, especially if our classes will be synchronous with some people in the classroom and some at home. I can imagine having a Resource Manager...
sitting in my classroom showing materials to teammates in a Zoom breakout room. Then all teammates could discuss and type answers on a shared Google Doc. Finally, a Recorder/Reporter, sitting in their house, might announce a team’s conclusion to the whole-class in a Zoom meeting.

APPENDIX:
If you are interested in using Google Docs, here are a few strategies I developed.
• I originally planned to share a template of the note guide via Google Classroom and ask the students to make copies and give writing permission to me and their teammates. But, some students filed away the copies in surprising places, so ultimately I made the copies and placed them in a shared Google Folder. This way, all students were able to view every other team’s work, but they only edit their own. However, it took 10-15 minutes to make and share all the copies each morning, and the Turn in feature of Google Classroom was no longer usable.
• It was cumbersome to view student work when I had to open and scroll through many 20-page Docs. I am optimistic that, with synchronous classes, I can circulate through the work of a few teams at a time from my computer and offer the students more immediate feedback.
• I enjoyed seeing the students access outside resources, such as Desmos and Geogebra, to attempt problems and then paste screenshots or links from their work into these shared docs. The students did a nice job praising each other for creative work!
• For the formative assessment, we analyzed the keys for the Review & Preview problem every morning after they were due. My students also used DeltaMath.com once per week for additional individual practice and formative assessment.

LEARNING TAKES TIME FOR STUDENTS AND TEACHERS, EVEN DURING REMOTE LEARNING
Jeremiah Morgan, Eagan, MN, JeremiahMorgan@cpm.org

One of the reasons I became a teacher is because of my own experience as a child. Teachers were so much more than distributors of math, science, and language arts content. They were the ones I relied on through the loss of family members and friends, through poverty, and so much more. They were also the ones there to coach me through sports and build confidence in my own resiliency for life through seemingly insignificant interactions over more than a dozen years. When the stay-at-home orders began, I felt like all of the reasons I became a teacher were put on hold as I sat behind my computer at home to deliver content.

How would I promote collaboration for my students and the math team when we were miles apart? Gradually, I learned to navigate online tools for sharing work between my students and myself. I encouraged students to form regular math teams, and they began reporting that the routines in class could be applied to outside of the classroom. Many learned to better verbalize their thinking because they could not simply point to a step on their paper. We all became better problem solvers.

How could problems written for effective teams be completed outside of school? Gradually, the answer came in a very similar way. Each day I sent out a basic slideshow with key pieces of the problems. I embedded audio of the problems being read aloud, but many students stated that they read the problems too. Then, strategically, I typed my pocket questions and animated them throughout the slideshow. Students said they liked this better because there was more think-time to answer the questions. In terms of circulation, this was my first and second pass. Students sent images of their work via email, and I would respond with follow up questioning, in effect continuing my circulation.

In some ways, learning in this new environment created natural opportunities for interleaving the problems. When students scheduled time with classmates or me, they left problems and came back to them throughout the day. Many times questions were sent to me via email that I did not open for many hours. Often, students said something similar to, “Thanks, I was able to figure it out after a little time.” But, they also were able to think about the question one more time. I also got back some of those interactions that I missed from the classroom, as students asked for advice beyond mathematics.

Distance learning is something that I never want to take part in again. There were many students for which this environment created unfair inequities. I want our communities safe and healthy, but I also believe in the interconnectedness of being together in the same building for learning. The energy that comes from teams collectively sharing in the responsibilities of problem solving is in some ways unreplicable. CPM is doing amazing things to support the professional development for teachers in the classroom and through distance learning environments so that they can better serve our students no matter the problems we face.
WHAT ABOUT THE GAPS?
Gail Anderson, Lansdale, PA, GailAnderson@cpm.org

In the 1980s, Just-in-time Manufacturing became popular in American companies. Just-in-time is a protocol companies use to get their product to customers right when they need it, instead of stockpiling goods in warehouses that may end up obsolete before they are ever sold. Companies developed a mindset of watching the market, surveying customers, and becoming flexible enough to respond to demand. This mindset allowed them to respond quickly to surprises in the market (such as a pandemic!), while saving money and better supporting their customers.

If you teach CPM, you probably have already done some form of just-in-time academic support with your classes. For example, I remember a time when I noticed most of my teams were stuck on a problem because students forgot how to use trigonometry to determine missing side lengths. I paused the class, asked a team who had solved the problem to briefly explain their solution method to the class, and that resulted in a mini-lecture on sine, cosine, and tangent. The rest of the class was able to immediately apply the “renewed” knowledge in the context of the current lesson, and we were able to move on.

The joint statement released by NCTM and NCSM, *Moving Forward: Mathematics Learning in the Era of COVID-19*¹, suggests that this approach also makes sense on a larger scale.

There are better options than using testing at the beginning of the school year to assess a laundry list of prerequisite understandings from previous grades that would consume a significant amount of instructional time. Prerequisite skills or understandings that may have been missed as a result of COVID-19 could be strategically taught right before the connected unit of study or incorporated as spiral review or as part of instructional routines and procedures. Teaching these skills as connected to grade-level or course-level content deepens students’ mathematical understanding.

Studies in colleges have similarly shown that student success rates are higher when students are enrolled in grade-level courses with access to support as they need them, rather than when they are enrolled in a non-credit remediation course designed to “fill the gaps” first.² Consider this: would you rather be told “take exit 45, turn left at the light, and then take your third right” in the morning before you leave the house or when you are a couple miles from the exit? You can count on encountering significant gaps in student learning this fall, even more than in the past. You have a lot of ground to cover this year, and you will likely have quite a bit less time in which to cover it. Every moment you have with your students is precious. You will want to use this time to focus on opportunities for learning, and leave the gap-filling for when it is relevant and necessary.

**Educators should view students in terms of their strengths, not weaknesses, and avoid the urge to immediately reteach all the skills we think students should have learned before arriving at school this fall.** It is more productive for teachers to think of learning opportunities that are most important for students in relation to the mathematics learning progressions.

Consider starting the year on a positive, optimistic note. For example, instead of giving your students a pretest, constructing a list of the gaps in their knowledge, and then spending the first half of the semester (or more) teaching what you wish they had learned last year, look for what they do know and remember. The joint statement by NCTM and NCSM recommends:

> Educators should view students in terms of their strengths, not weaknesses, and avoid the urge to

¹ https://www.mathedleadership.org/docs/resources/NCTM_NCSM_Moving_Forward.pdf

continued on page 7
immediately reteach all the skills we think students should have learned before arriving at school this fall. It is more productive for teachers to think of learning opportunities that are most important for students in relation to the mathematics learning progressions.

As an alternative to a preassessment, perhaps you can use a team assessment. CPM’s team assessments are designed to give students an opportunity to practice collaboration and communication while applying and connecting mathematics skills they have learned. In the context of the beginning of this unusual school year, a team test at the beginning of the year could give students a shared goal and reason to explain to each other what they remember and know how to do, as well as to look up what they don’t remember or know how to do. Team assessments give the teacher time to listen to the students’ mathematical thinking as they discuss and work out complex problems with their teams. As with all CPM tests, the team assessments are cumulative in nature, so you can use a test from a later chapter in the previous course to get a snapshot of what students remember from the whole year. Sample team assessments for every CPM course can be accessed via the CPM Assessment tab in your teacher eBook (choose Download Sample Tests).

We sincerely hope you will have the opportunity to be with your students in the fall to experience the math with them in person. Suggestions for team assessments are included in the Assessment tab of the Teacher Resources in your eBook. If your classes are virtual, here are some ideas that may work to conduct a team assessment in that environment:

1. Synchronously: If you can host a virtual class meeting time (or perhaps a couple of different options from which students can choose), assign students randomly to breakout rooms (which are available in Zoom and Schoology virtual meeting spaces, as well as many others). You can monitor the discussions and give teams a shared whiteboard or Google doc on which to collaborate. Students can upload photos of their hand-written work at the end of the class time.

2. Asynchronously: Allow students to choose two or three other students to form teams they can work with remotely, or have them sign up to individual team time slots, which will fit their scheduling needs. We have created a Desmos template you can use, with or without your own edits and customization, to give students a place to list answers and submit their work, and to give you a place to collect all of the responses in one place. Please read more detailed suggestions for using the template in the Activity Details and Teacher Moves of the template. Another format option is to give the whole class these rich problems, instruct them to talk to each other as much as they want, and document their collaboration and sources as well as their solutions. If you are grading the assessment, be sure to include their collaboration documentation as part of the grade, so students attach a high value to that. Students could use a document such as this to share and discuss their thinking process during the test. Another option is to require that each student submit a video of themselves explaining the solutions to the problems (after they have discussed them with their team) using a screen recording on a laptop or FlipGrid, their phone camera, or any of the many video options available.

By giving a team assessment with rich, complex mathematical problems, you will be able to see the strengths your students are coming in with and work from there to develop a pathway to navigate through a year I am sure will be filled with many surprises.

As students work on the tests at home, you may or may not be able to monitor how much help they get from outside sources. Consider encouraging teams to find sources to help them with the content they do not remember or never learned. Tell them you know that each one of them missed out on a lot of instruction during the previous school year, and you will be working with them not only to accommodate those needs throughout the year as they arise, but also to help them learn to independently find and fill those needs.

By giving a team assessment with rich, complex mathematical problems, you will be able to see the strengths your students are coming in with and work from there to develop a pathway to navigate through a year I am sure will be filled with many surprises.

Please be considerate to all of our teachers and do not post solutions to CPM sample tests or test problems. Copying the problems and posting to any public site is a violation of US copyright law.
Who would have thought that the school year would wrap up with remote learning because of a pandemic? Even though the onset of it all was a bit overwhelming and intimidating, I must admit that I came out on the other side of this 4th quarter stronger in many aspects, as did our entire math department. We improved our ability to troubleshoot on the spot, communicate virtually in multiple ways, teach/reach students across platforms we had never explored before, and Google anything and everything we had no clue how to do. Throughout my 21 years in the classroom, I had never been so uncomfortable and unfamiliar with what was being asked of me. (Maybe you can relate?) But I figured if I was feeling like a fish out of water, so too, were many of my colleagues.

All the teachers in our math department joined forces more than ever to support each other and each other’s students through remote learning. We had regularly-scheduled meetings to go over the upcoming week’s lessons, discuss student engagement strategies, share formative data on student work, recognize what is working and what is not, and celebrate our successes, no matter how small. We devised a calendar of concepts for the quarter and divided up the workload in creating lesson resources that were housed in shared drives. We helped each other troubleshoot the many glitches that can occur with technology, and we knew who to reach out to within our department, depending on what kind of help was needed. We simply made each other stronger by sharing our individual talents when it came to delivering instruction online.

If there is one key tip or strategy I would pass along to the next wave of teachers who might possibly embark on remote learning, it is this—COLLABORATE. You are not alone, even though it may feel that way as you sit down to teach from your home office. Know there is a slew of support out there for you on the other side of the laptop screen. Reach out to your regional contact at CPM. Reach out to your colleagues from your campus and district. Suggest a plan of action that could bring all those wheels in motion together on the same path. Then brainstorm how to move forward. A shared vision is an incredible thing in math education. You will become stronger for it and learn from it, both as an educator and as a person. The culminating beauty of it all is that your students will benefit the most from this empowered collaboration with others.

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### ADDITIONAL SUPPORT FROM CPM

CPM is creating several things to help support teachers in the fall. These items range from over-arching documents to lesson-specific templates. It is unlikely that every teacher will find every piece helpful or useful, so peruse the material with your classroom in mind. These materials will be posted at cpm.org, linked at your eBook landing page, and posted at professionallearning.cpm.org. We will send out an email blast and share via social media as well.

Later this summer, CPM will provide,

1. An overarching document describing considerations for the pre-start of the school year, as well as the HOW and the WHAT for different scenarios next year. This document will also have links to other sites and documents that might be helpful.

2. Templates for online collaboration for all levels. You will be able to copy these and adapt them to your class.

3. New high school Desmos activities to allow for online engagement.

4. A new eBook supplement, available for free for anyone who has purchased a CPM textbook. This supplement will include the Checkpoint problems from all the courses, the Math Notes Boxes from all the courses, the mid-year and end-of-year course reflections (for courses that have them), STTS that work well virtually, and more. When you sign into your CPM eBook account, this supplement will show up as another book, along with any existing eBooks that have been issued to you.

5. Sheets with guidance for synchronous and asynchronous lessons for middle school and high school courses (both traditional and integrated pathways; non fourth year courses only.)

6. Virtual learning events, hosted by CPM teachers, introducing some of the new resources, and exploring ways to run a CPM classroom remotely.
CPM EDUCATIONAL PROGRAM CONTACTS
Contact us via email by using FirstnameLastname@cpm.org. We look forward to hearing from you.

PROGRAM COORDINATORS
Curriculum & Assessment
Karen Wootton

Professional Learning
Sharon Rendon

Technology
Carol Cho
Curtis Fuhriman
support@cpm.org

Pilots & Adoptions
Carmel Draper, pilots@cpm.org

Research
Lara Jasien, Ph.D.

Business Administration
Debbie Jacobs

Executive Director
Elizabeth Coyner

WORKSHOP REGISTRATION
CPM.org/workshops
Anna Poehlmann, cpmworkshops@cpm.org

PROFESSIONAL LEARNING PORTAL
professionallearning.cpm.org

BUSINESS CONTACTS
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request quote: quotes@cpm.org
eBook license questions: ebooks@cpm.org
phone: 209.745.2055
fax: 209.251.7529

REGIONAL PROFESSIONAL LEARNING COORDINATORS

1 California: Micheál Marsh
   Karen Arth
   Pat King
   Jim Nugent
   Heather Penk
   Jim Nugent
   Gail Standiford
   Candice Tyloch

2 Northwest: Jenni White
   Chris Haley-Hughes
   Lisa Jasumback
   Laura Lethe
   Darrell Trussell

3 Southwest: Sara Thompson
   Lonnie Bellman
   Scott Blatnick
   Lisa Jasumback

4 Great Plains: Lisa Comfort
   Cheryl Krafka
   Julie Jackson

5 Great Lakes: Bruce Brusoe
   Lonnie Bellman
   Pam Lindemer
   Amy Rybaczuk
   Erin Schneider

6 Southeast: Gerry Long
   Lois McCarty

7 Northeast: Jocelyn Dunnack
   Mark Jones
   Tim Scripko

International Teacher Mentor:
Susan Hoffmier