



# Helping teachers implement culturally responsive practices during math instruction

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Culturally responsive math teaching is an emerging focus in instructional research that responds to the need to educate an increasingly ethnically, linguistically, and culturally diverse student population.<sup>1</sup> Culturally responsive teaching is an asset-based approach that incorporates students' identities and lived experiences into the classroom to make math more enjoyable, improve instructional effectiveness, and increase student learning. ***We describe several aspects of culturally responsive teaching and provide examples of specific practices that administrators can encourage teachers to implement.***

Students come to school with different cultural, socioeconomic, and linguistic backgrounds. Teachers, in turn, must find ways to tailor instruction to meet the needs, interests, and strengths of an increasingly diverse student body. One way is to use culturally responsive teaching practices. These include a variety of activities designed to incorporate students' cultural identities and lived experiences into the classroom to help students connect with the content. Implementing culturally responsive teaching practices is valuable because it can increase students' engagement with math content and make math a more joyful experience for both teachers and students.<sup>2</sup>

In math instruction, the content covered and teachers' instructional approach are heavily influenced by the curriculum used, particularly in elementary and middle school.<sup>3</sup> Given the influence of curriculum materials on classroom instruction, administrators can support culturally

responsive practices in math by selecting a math curriculum that includes explicit guidance about these teaching practices. However, a recent analysis shows that curricula currently provide little attention to culturally responsive teaching practices.<sup>4</sup> In the future, as publishers incorporate more guidance in this area, we encourage administrators to consider this aspect when choosing a new math curriculum to adopt.

Until then, administrators can help teachers implement culturally responsive teaching practices through professional learning or by adopting supplemental resources that support these instructional practices in math.

In this document, we describe nine aspects of culturally responsive math instruction and offer concrete examples of related practices that administrators can encourage teachers to use in their classrooms, include in professional learning, or look for when selecting resources.

## Culturally responsive math instruction should



**Build on students' cultural and community funds of knowledge.** Cultural and community funds of knowledge are the everyday knowledge and activities in students' homes and communities that they understand and relate to.<sup>5</sup> Culturally responsive teaching sees these as resources students bring to the classroom. Students bring ways of thinking about, reasoning with, and understanding math based on their backgrounds and the extent to which they engage in different mathematical activities. For example, students may know how to calculate fares when riding the bus or have experience measuring ingredients when cooking. Encourage teachers to make instruction more relatable and meaningful to students by supporting these instructional practices:

- Reference students' community and home knowledge, culture, or experiences to make math instruction more relatable and meaningful to them.
- Inquire about student backgrounds and experiences and draw on those during math lessons.
- Ask students to reflect on instances where they might have seen a math concept at work in their own life and adapt it into a problem for the class.



**Promote rehumanization.** Rehumanizing is a direct effort to honor diverse cultures. Rehumanizing makes clear that all students can be good at math by showing students that strong mathematicians are found in cultures around the world.<sup>6</sup> In addition, rehumanizing acknowledges that math is not just an abstract set of rules and procedures: it is a human activity involving both thinking and feeling. Help teachers rehumanize math by supporting the following actions:

- Affirm positive math identities for all races, genders, and ethnicities by using math problems that honor students' culture and avoid terms like "misconceptions," "abilities," and "achievement gaps" when talking about students.
- Expand students' views of what mathematics is by highlighting that math is more than abstract memorization. Math involves problem solving and reasoning and can draw upon students' empathy, senses, and feelings.
- Represent the diversity of mathematicians by introducing Black, Indigenous, Latinx and other mathematicians to students by using literature and websites such as [www.lathisms.org](http://www.lathisms.org) or [www.mathematicallygiftedandblack.com](http://www.mathematicallygiftedandblack.com).



**Promote and value diverse student thinking and ideas.** Research suggests that students attain deeper levels of conceptual understanding in math when they discuss their reasoning and compare different approaches to solving problems.<sup>7,8</sup> In culturally responsive math teaching, attending to student thinking is even more important given their diverse backgrounds and variety of ways they might approach problems. Encourage teachers to promote student thinking by encouraging the following practices:

- Embolden students to share their reasoning, ask questions of one another, discuss each other's ideas, and build shared understanding.
- Encourage and value multiple forms of communication, including hand gestures, pictures or drawings, and diverse verbal responses.

**Assign math problems that require high levels of cognitive demand.** Cognitive demand refers to the type of thinking that math problems require of students.<sup>9</sup> Engaging in challenging content is important for every student—and particularly for historically marginalized students who have not had equal access to demanding content in the past. Research shows that some teachers have lower expectations for historically marginalized students.<sup>10</sup> Help teachers set up students for success in math by encouraging the following:

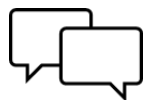


- Give all students opportunities to engage in high-demand math tasks that are conceptually challenging and that emphasize underlying concepts, patterns, and properties.



**Maintain rigor and high standards for all students.** Scaffolding is a common instructional practice to support students' access to math content when they may be struggling to understand it. Although scaffolding is a good instructional practice, sometimes it can result in lowering the rigor of math problems.<sup>11</sup> In a culturally responsive classroom, accessing students' everyday knowledge is one way to scaffold them into formal mathematics without lowering expectations. For example, children's understanding of how to share snacks with friends can be a scaffold for solving equal sharing problems in the math classroom. Encourage teachers to use the following strategies that give all students the opportunity to succeed with the rigorous content of each lesson:

- Use a variety of scaffolding techniques designed to help students achieve success with the math tasks in each lesson that have higher levels of cognitive demand.
- Bridge students' everyday experiences to the mathematics classroom context.



**Affirm multilingualism.** To attain deep understanding of math, students must engage in rigorous content and discuss their thinking with other students. Multilingual learners across the English-learning spectrum need meaningful opportunities to engage in mathematical reasoning such as describing patterns, using representations, and making generalizations.<sup>12</sup> Ensure teachers support multilingualism:

- Encourage students to develop their mathematics skills while working in their home language. Do not wait for them to have attained specific levels of English language proficiency to work on challenging and engaging mathematics.
- Immerse multilingual children in language-rich mathematics while using strategies to develop academic language, such as reframing everyday language explanations with math terms.
- Encourage students to use multiple forms of communication to show their thinking, including graphic organizers, manipulatives, equations, drawings, labels, and writing.



**Distribute intellectual authority.** Using approaches that center on the student paves the way for students to actively engage in meaningful math conversations and deeper math understanding.<sup>13</sup> Students can draw on their own experiences and knowledge to make sense of and connect with the math concepts they are learning. Using student-centered approaches helps students see that teachers are not the only source of knowledge and honors the various forms of knowledge students bring to the classroom.<sup>14</sup> Encourage teachers to distribute intellectual authority and do the following:

- Promote students as mathematical authorities and make space for students' ideas to drive mathematical conversations. For example, when students ask questions to validate their thinking, turn them back to the classroom to consider: "What do you think about Mateo's idea?"
- Encourage group or pair work activities to support students in teaching each other.



**Disrupt status and power.** Administrators can help teachers overcome typical power imbalances in the classroom to ensure all students are empowered participants, regardless of background.

This is particularly important when creating opportunities for students to work together and share intellectual authority. Popular or outgoing students may speak most often, or the top performers in class may get more attention from the teacher.<sup>15</sup> Therefore, it is important to intentionally attend to students' unique mathematical, cultural, and linguistic strengths, to ensure all students participate in meaningful ways.<sup>16</sup> Encourage teachers to empower all students with the following actions:

- Use strategies to address status imbalances, such as confronting stereotypes or using inclusive talk that builds up students and encourages multiple approaches to math.
- Implement classroom norms to ensure each student participates during a lesson. Students need to feel free to speak up without fear of making a mistake and getting criticized for solving problems differently.



**Provide opportunities for students to analyze and act.** Students learn math in the context of meaningful problems from their lives and communities.<sup>17</sup> An effective strategy to teach math is to frame the learning around an issue that students will strongly connect with. Ensure teachers provide opportunities for students to analyze and act:

- Frame problems around current or historical issues of injustice or social justice that may resonate with students in their school. For example, students could calculate the cost of buying bottled water when lead is discovered in the water system or discuss different ways to distribute donations among families at a local food bank.

These nine features of culturally responsive instruction do not necessarily cover every important aspect of culturally responsive instruction, nor does every lesson implemented need to attend to all nine. These features represent a starting point for how to better support teachers in implementing culturally responsive instructional practices during math instruction. As publishers incorporate more of these practices, administrators may wish to consider the features described above when selecting curricula.

**Background.** These nine aspects of culturally responsive math instruction are based on a tool developed by Maria del Rosario Zavala and Julia Maria Aguirre. They use this tool, called the CRMT2, to support professional learning for teachers.<sup>18</sup> Their research has shown these nine aspects to be important practices used during classroom instruction for effective implementation of culturally responsive mathematics teaching. As part of an evaluation Mathematica conducted, Mathematica researchers adapted Zavala's and Aguirre's tool to examine six different middle school curricula. We found that curricula paid little attention to the aspects of culturally responsive instruction described in this document.<sup>19</sup> ▲

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