MATHEMATICAL FLOURISHING 4ALL

North Carolina Collaborative for Mathematics Learning | www.nc2ml.org

A Guide For Instructional Coaches

Affirming Learners' Mathematical Identities

When students feel their identities are valued and their experiences are relevant to the learning process, they become more engaged and motivated (ladson-billings, 1995). By encouraging students to share their unique problem-solving strategies and connect mathematics to their own cultures not only increases participation but also deepens understanding as students build on each other's strengths.

The 5 Equity-Based Practices

1. Going Deep With Mathematics
2. Leveraging Multiple Mathematical Competencies
3. **Affirming Learner's Mathematical Identities**
4. Challenging Spaces of Marginality
5. Drawing on Multiple Resources of Knowledge

Aguirre, et all, 2013

The "How!"

The concept of affirming learners' mathematical identities is crucial for fostering an inclusive and supportive mathematics classroom. This practice is about recognizing and nurturing the individual identity each student brings to their mathematical learning. It involves acknowledging students' unique cultural, linguistic, and personal backgrounds and integrating these into the learning experience to enhance engagement and achievement. It also involves examining stereotypes we might hold about particular groups of students and their ability to do mathematics. In other words, if a teacher believes women are not as good at mathematics as men, this bias can negatively impact how a teacher interacts with female students and, in turn, affirm their inferior mathematical identity.

What Does This Look Like?

- Highlight the mathematics in students' cultures and communities: Explore examples of math used in everyday life, traditional crafts, or cultural stories.
- Invite students to share their mathematical experiences: Encourage students to discuss their prior knowledge and how they've used math outside of school.
- Recognize and celebrate multiple ways of knowing and problem-solving: Value different approaches to solving problems and acknowledge the validity of diverse solutions.
- Ensure classroom materials reflect the diversity of students and avoid language that reinforces stereotypes: Post pictures of diverse mathematicians on the wall.
- Elevate the thinking of students from under-represented populations
- Post students' work around the room to acknowledge their mathematical authority and ownership.
- Affirming Learners Mathematical Identities Quick Look

Planning with Your PLC

Questions to Consider:

- What assumptions might we be making about students' abilities in mathematics based on their backgrounds?
- Do our curriculum materials represent students from diverse backgrounds and abilities?
- Do we regularly ask questions that encourage students to explain their mathematical thinking? To offer different solution strategies?
- What language do we use to praise students' thinking in ways that affirm them as "math people"?

Outdated curricula and pedagogies prevent many students from experiencing math as a fascinating area of exploration, culturally relevant and important in all spheres of life.

–Francis Su

Every being cries out silently to be read differently.

–Simone Weil

Affirming Learners' Mathematical Identities

When teachers deliver effective mathematics instruction, they can reduce the performance gap between students who are at risk for mathematics difficulty and their peers.

–Clarke, Smollkowski, Baker, Fien, Doabler, & Chard, 2011

How positively affirming learners' mathematical identities is connected to equity

Traditionally, math classrooms have been dominated by a singular perspective, often excluding the diverse ways students from different backgrounds experience and understand mathematics. **Positively affirming** each and every students' math identity disrupts this by valuing students' cultural connections to math and celebrating their unique problem-solving approaches. This fosters a **sense of belonging** and dismantles **negative stereotypes,** creating a more level playing field where all students feel empowered to see themselves as mathematicians and reach their full potential in the subject.

This practice acknowledges that every student has the potential to succeed in mathematics, challenging the traditional norms and biases that often define mathematical ability by race, gender, socioeconomic status or sexual identity. By fostering an environment where all students are encouraged to see themselves as capable mathematicians, educators can dismantle barriers that have historically marginalized certain groups from succeeding in math. This not only promotes a **more inclusive classroom** but also empowers students to engage deeply with the subject matter, enhancing their confidence and fostering a sense of belonging that is critical for academic persistence and success.

Moreover, affirming mathematical identities supports equity by ensuring that every student's voice is heard and valued in the learning process. This approach requires educators to adapt their teaching strategies to meet the unique needs of each student, thereby providing a more personalized learning experience that **considers cultural and individual differences.** Such tailored instruction helps to level the playing field by providing all students with the resources and support they need to excel, regardless of their starting point. This commitment to equity in mathematics education not only enhances learning outcomes for all students but also builds a stronger, **more diverse STEM workforce.**

Tasks that Can Be Used to Affirm Learners' Mathematical Identities

- Middle School Mathematics Lessons to Explore, Understand, and Respond to Social Injustice (Conway, et al., 2023)
- NCTM Social Justice and Equity Resources @ https://www.nctm.org/socialjustice/
- Conduct interviews with students and have students write their math autobiography https://mathequalslove.net/mathematical-autobiography-foldable/
- Get to know your students and family's community by conducting a community walk https://www.middleschoolmathman.com/middleschoolmathmanblog/math-is-everywhere-tiles-a-math-project-for-upper-grades
- Champion a student for the year (nc2ml.org 6-8 resources)

Want to Learn More?

The Impact of Identity in K-8 Mathematics: Rethinking Equity-Based Practices (Aguirre et al., 2013).

Ladson-Billings, G. (1995). Toward a theory of culturally relevant pedagogy. A*merican Educational Research Journal, 32*(3), 465-491.

NCSM Essential Actions: Culturally relevant leadership in mathematics education. mathleadership.org

Ong, M., Smith, J. M., & Ko, L. T. (2018). Counterspaces for women of color in STEM higher education: marginal and central spaces for persistence and success. *Journal of Research in Science Teaching, 55*(2), 206 –245.

Compared with women, men make up the greater share of the STEM workforce. In 2021, about two-thirds (65%) of those employed in STEM occupations were men and about one-third (35%) were women.

Consistent with women's faster growth than men's in the STEM workforce, the proportion of the STEM workforce that were women increased by 3 percentage points from 2011 to 2021.

Collectively, underrepresented minorities—Hispanics, Blacks, and American Indians or Alaska Natives—represented nearly a quarter (24%) of the STEM workforce in 2021, up from 18% in 2011.

Diversity and STEM