

# When I Grow Up

Ear to the Ground features voices from several corners of the mathematics education world.

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**Watch a child play**, and you may observe the child try on an adult role. Children become cooks, contractors, presidents, teachers, scientists, doctors, athletes, and more. Ask children, “What do you want to be when you grow up?” and you may learn about their interests, their cares, their hopes, and their role models.

As a profession, mathematics education holds that mathematics is essential to all students. As NCTM’s slogan says, “Do math and you can do anything!” We want students to embrace mathematical thinking in all areas of their lives. We want all students to believe that they are “math people,” no matter what they become when they grow up.

How do our students try on the role of “math person”? An electronic search for “what good mathematicians do” or “how to think like a mathematician” will present you with advice. The Common Core State Standards (NGA Center and CCSSO 2010) include the

Standards for Mathematical Practice. The list of phrases on the “We Are Mathematicians” poster from *Teaching Children Mathematics* (2000) continues to resonate with teachers today (see figure 1).

A contemporary conception of what it means to “think like a mathematician” will include items that have long been part of mathematics: logical reasoning, precision, and abstraction, along with intuition and sense making. Today’s lists also emphasize asking questions, posing problems, making guesses, and problem solving. Mathematicians today engage in mathematical modeling and communication. They use different strategies and tools and work both individually and collaboratively.

As I was growing up, I enjoyed the orderliness of mathematics as well as its messy creativity. I enjoyed fanciful logic puzzles and answering real-life questions. I liked getting stuck on problems and being a fast computer. I looked

up to role models who were recognized by others as good mathematicians. I also wondered why some of my friends did not like mathematics. That curiosity led me to a career in mathematics education.

People told me I was “good at math,” perhaps on the basis of their own list of the behaviors they expected from mathematicians. My role models and friends welcomed my ideas and questions. I enjoyed learning mathematics, and I experienced success. I failed sometimes (one professor recommended that I end my mathematics career with his course), but I was allowed to continue. I grew up to be a mathematics person.

Mathematics, however, is known for its exclusivity. We determine who is allowed to continue in mathematics on the basis of our judgments about how the person thinks, acts, and performs. Mathematics is also known for exclusion: Our image of a “good mathematician” has been clouded

Fig. 1



The "We Are Mathematicians" poster (Fuys and Huinker 2000) highlights six characteristics of young mathematicians engaged in doing mathematics.

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by our prejudices. Although I have long embraced lists like the one I made for my students in 2002, I have begun to think about the impact of such lists. How do our lists contribute to students' decisions about what they want to become when they grow up?

Our lists set boundaries on the kinds of behaviors that are meant to go on in mathematics class. Have you ever said, "Let's get back to the math" in one of your classes? I know I have. What we value as "mathematical" tells students something about what it means to be a "math person." The question of how to "engage students with the subject matter as they grow in mathematical maturity and expertise" (NGA Center and CCSSO 2010, p. 8) is one that deserves much care.

As our students try on the role of "math person," they will ask, "Is this the kind of person I want to be when I grow up?" not just what math topics they will learn. The eight Standards for Mathematical Practice focus on varieties of individual expertise and

proficiency. I imagine a list of eight practices focused on students' relations with others (Gutiérrez 2018) within communities:

1. Talk about which problems are important to solve and who should be part of solving them.
2. Think about the benefits and drawbacks of using mathematical approaches.
3. Listen to the ideas of others and collaborate with them to solve problems.
4. Consider the biases we bring to our mathematical models.
5. Draw on approaches from a broad set of human cultures, interests, and concerns.
6. Establish shared understandings.
7. Examine how choices of structures affect our perceptions.
8. Seek out puzzlement and doubt.

No single list can capture all of what we may want to

communicate about a life in and with mathematics. As our students try on different adult roles, they will consider their own cares, interests, and hopes. Our students will remember the actions of their role models and the kinds of behaviors that were valued. Our students will decide if mathematics is a "fit" for them, not just the other way around. Our lists matter.

At midlife, I still ask myself, "What do I want to be when I grow up?" I think not only about new jobs and challenges but also the kind of person I want to be. I think about how I interact with others, particularly as a role model for aspiring mathematicians. Mathematics and mathematics education are still growing up too and always will be. What will they look like in the future? We can determine that together, in community. What does a "good mathematician" look like, feel like, and act like? The answers remain up to us. —

## REFERENCES

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