

Promoting Mathematical Practices

Engaging students as practicing professionals within a field is a long-standing approach across content areas in gifted education pedagogy (Renzulli et al., 2000; Tomlinson et al., 2009). Through this approach, teachers design curricula and learning experiences where students ask questions, solve problems, and develop the skills of professionals within a given field or discipline. With the introduction of the National Council for Teachers of Mathematics Process Standards in 2000 and the release of the Common Core State Standards (CCSS) for Mathematical Practice by the National Governors Association Center for Best Practices (NGA) and Council of Chief State School Officers (CCSSO) in 2010, there also is an emphasis on engaging students developing these practices in mathematics.

By providing learning opportunities to do so, teachers can engage students in practices that mathematicians use and further promote mathematical thinking. Specifically, the CCSS for Mathematics identifies eight Standards for Mathematical Practice (SMP) for all students to develop:

1. Make sense of problems and persevere in solving them;
2. Reason abstractly and quantitatively;
3. Construct viable arguments and critique the reasoning of others;
4. Model with mathematics;
5. Use appropriate tools strategically;
6. Attend to precision;
7. Look for and make use of structure; and
8. Look for and express regularity in repeated reasoning (NGA & CCSSO, 2010).

Many teachers already are familiar with these mathematical practices and intentionally engage students in mathematics learning experiences to develop them. However, in the effort to “create the mathematical innovators of tomorrow, educators need to help students develop mathematical passion, perseverance, and creativity in the face of difficult problems, and not just mathematical competence in computation and problem solving” (Johnsen & Sheffield, 2013, p. 9). Therefore, Johnson and Sheffield proposed an additional 9th Standard for Mathematical Practice in relation to developing students’ mathematical talent.

The proposed 9th practice states that students should, “Solve problems in novel ways and pose new mathematical questions of interest to investigate” (Johnsen & Sheffield, 2013, p. 16). Engaging students in this practice would position them to use the other eight mathematical practices,

and requires that teachers establish an environment in which students can feel comfortable “taking risks, embracing challenge, solving problems in a variety of ways, posing new mathematical questions of interest to investigate, and being passionate about mathematical investigations” (Johnsen & Sheffield, p. 16). Additionally, when students are approaching problem posing and solving in new ways, they are also engaging in mathematical creativity.

As a new academic year approaches and teachers and students may be returning to physical classrooms with more consistency, teachers should be considering multiple ways to discover their students’ areas of mathematical talent and creativity and foster growth in students’ mathematical knowledge, skills, and understanding. Engaging students in high-interest mathematical tasks that involve the Standards of Mathematical Practice may be one way to approach this. For example, when students accurately model a problem context (SMP4), accurately explain their mathematical reasoning (SMP6), or develop a mathematical argument (SMP3), teachers can observe a number of mathematical concepts that students may be demonstrating. This type of informal assessment, while students are engaging in the Standards for Mathematical Practice, provides teachers with insight into their students’ mathematical reasoning and understanding.

While certainly not an exhaustive list, additional learning experiences that promote students’ engagement in all of the Standards for Mathematical Practice, as well as mathematical creativity, include problem solving, problem posing, mathematical discourse, using representations. Many of these topics have been explored throughout the last several iMathination columns, such as:

- Engaging students in problem posing and problem solving (May 2019 and August 2019 columns);
- Providing tools for students’ oral and written communication of mathematical ideas (May 2020, August 2020, and February 2021 columns); and
- Promoting mathematical creativity with number talks and students’ written mathematical communication (February 2020, and May 2021 columns). **THP**

References

- Johnsen, S. K., & Sheffield, L. J. (2013). *Using the common core state standards in mathematics with gifted and advanced learners*. Prufrock.
- National Governors Association Center for Best Practices (NGA), &

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A Really Smart Charlie Brown

I had an important conversation with one of my 3rd graders today. He's an eager learner, a happy soul, and a quirky odd duck. His brain grasps concepts quickly, but it also drifts off into imagineering, usually involving dragons and robots. He treats everyone kindly, but isn't always treated kindly in return. He lights up when presented with complexity, but misses the easy problems because he knew it three years ago and is rushing to be done. He fascinates me, but frustrates his regular classroom teacher. He can tell me in a logical fashion all the details of the latest topic he has been learning about, but in the physical world he leaves a trail of disorganization in his wake. He is precious, and he needs the services of gifted education.

A few months back, he spontaneously said to me at the end of our group time, "Miss Fisher I Mean Mrs. Alley,... Sometimes I feel like a really smart Charlie Brown." My heart just melted for him because his statement meant that he was now seeing in himself what I have seen since I started working with him in Kindergarten. It's probably a hard realization for a young mind to reach—that one is quirky and awkward and loved and amazing and doesn't quite fit in. "It's okay, Buddy," I told him. "Our world needs people like you. You have a purpose just the way you are, and I'm here to help you figure out how to find it."

In the meantime, his teacher has been stopping me in the hallway to quiz me on "what to do about" him. She's frustrated, and that's okay, too, because it stems from her desire for him to be successful. The same concerns are coming from mom, as well.

And this is my role, my purpose. The gifted education specialist's job is three-pronged. Of course we are here for the students, but we are equally here for the teachers and parents, too. Teaching and parenting these youngsters is not the cakewalk those on the outside-looking-in think it is. Often, everyone is hanging on by their fingernails.

So today he and I had a long chat about how his brain works and why he's different and how I knew when he was in Kindergarten that he would need me for this conversation someday. (He actually asked that!)

I asked him about what was going well and what he was struggling with. He's known me for four years and he knows I'm here to help with "the good parts and the not-so-good parts" of being gifted, so he opened up to me rather easily.

"Well, the not-so-good part is sometimes my mind just drifts away and then I'm thinking about dragons and robots and science and I don't hear what the teacher is saying. And she's upset with me."

He has a heart of gold and I definitely got the sense that

he feels badly that his teacher is frustrated when this happens. I told him that even though I was going to help him find ways to overcome this (including talking with his teacher about some in-classroom accommodations), I didn't want it to be at the cost of him losing that beautiful ability of his mind to imagine amazing things—because someday he might be able to use that ability to help or entertain other people, which would be a good thing. I told him this was a great time in his life to start figuring out how to be the one in charge of where his mind is each moment, instead of his mind being in charge of itself.

Really smart Charlie Browns sit in classrooms all over the world...engaged, daydreaming, struggling, and thriving. What messages does the really smart Charlie Brown in your class need to hear about his or her brain? What is going well and not-so-well for them, and what role do you play in shaping the classroom experience for children like this?

Earlier this year, he saved up *one hundred* purple tickets that he had earned to buy his class a root beer float party delivered by the lunch ladies. I marvel at his giant, golden heart and his beautiful, fascinating brain. May he come to know what treasures they both are, and may he someday find kindred spirits in the really smart Charlie Browns from your classrooms. **THP**

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