Have you ever been in a meeting with colleagues or friends in which the air hummed with purpose, where you could hear laughter and stories, and where important problems were still solved? A meeting in which all the participants felt like they contributed and learned something? If you have been lucky enough to be part of a supportive problem-solving meeting or community, then you know something about what it is like to be in our kindergarten math learning community!

The math curriculum we use at CFS (Investigations in Numbers, Data, and Space developed by TERC) emphasizes using math concepts and skills through the exploration of materials, activities, and peer-to-peer discussions. In a TERC training class on implementing Investigations, we learned about how to create learning communities. Because of this, we have made creating and maintaining a supportive and invigorating math learning community a priority that undergirds all math activities.

What do we mean when we say we have a math learning community?

We intentionally and persistently work with students to develop community norms and expectations about how to approach and discuss math. Children do not arrive in pre-kindergarten knowing how to act in academic activities. They learn the rules and expectations for lessons and activities from the things we explicitly teach them; by observing, practicing, getting feedback, and practicing some more. With these types of support, children learn how to offer feedback and suggestions sensitively, how to approach problems with confidence, and how to accept feedback without feeling criticized. Some of the specific strategies we use to support this development are summarized below.

Difficulty is embraced. Often children will say, “That’s easy” after hearing about a math or literacy activity. It is a mantra, a sigh of relief, a declaration that they do not need to be worried about failure. Though it is understandable, it can be pernicious. As teachers, our goal is to teach children things they do not already know. Learning often requires effort and persistence, and we want children to embrace difficult things because they provide opportunities to learn. To this end, we remind children not to say, “It’s easy.” Instead, we encourage them to think about activities as fun, interesting, or exciting. In addition, we support their learning in ways that help develop resilience and confidence so that needing to think that a learning task is easy becomes less important over time.

Mistakes are celebrated. The learning process often requires making mistakes and learning from them. Trying things out, evaluating, getting feedback, and making revisions are important aspects of the learning process. Most children do these things comfortably while playing. They do not even perceive the adjustments they make as being revisions to mistakes. They are simply having fun playing and learning as they go.

However, when it comes to learning more academic subjects like math and literacy, many children become self-conscious in groups and worry about making
mistakes. Even when the groups they are in are comprised of the same friends they were building blocks with a few minutes ago, suddenly the fear of failure raises its ugly head. This can make it difficult for children to take risks, which can slow down learning and cause stress.

To mitigate this, we celebrate mistakes in our class in a number of ways. We explicitly discuss why mistakes are valuable. We role play scenes in which dolls and animals make mistakes. We model making mistakes pedagogically and in life. If we spell something wrong on the board, we say, “Oops, I made a mistake.” If we spill water on the floor, we point out our mistake and address it (often with the help of several student volunteers.) We also might say when a student has made a mistake, “This is an excellent learning opportunity!” We create an atmosphere in which being mistake-free is not a goal and making a mistake often presents valuable opportunities.

**Learning is fun and funny.** Laughter is a frequent sound during math and literacy in our classroom. Learning how to read and use mathematical concepts can be challenging and frustrating, but in our class, they are often also funny, enjoyable, and rewarding. For young children, being quiet and serious are not prerequisites for learning. Children can learn while playing, moving around, laughing, and having fun. Humor and fun can help soothe children if they are worried about making mistakes. If we can laugh at our own mistakes, it is easier to take risks and try out new ideas.

**Feedback is sensitive and genuine.** For students to be comfortable trying things and making mistakes, they need to be confident that if they do make a mistake, the feedback they receive will be supportive and respectful. For this approach to be effective, we need to know the children well in an ongoing and dynamic way. We watch what activities they choose, what materials they use, and how they work with peers. We watch how they work in literacy and math lessons and experiences. We see how much effort they put into learning many new skills and ideas at once. Through observations and interactions, we come to understand students’ strengths and challenges. This allows us to offer them specific, authentic, and sensitive feedback about what we observe.

**We give genuine praise.** A significant way to support students striving to do their best and to be open to feedback is by giving genuine praise. A pitfall of working with young children is that we can see how hard-earned many accomplishments can be. From writing a name...
legibly to climbing to the top of a structure, we see that hard work results in a sense of accomplishment and eventually mastery. We can be tempted to applaud every small accomplishment to express our faith in children’s abilities to succeed.

However, the habit of frequently saying, “That’s great” or “How beautiful” risks having children see adults as cheerleaders rather than genuine resources with skills and discernment. Our feedback can seem more like cheering rather than information children can count on to measure their own progress. If a picture that was quickly completed with little effort or thought receives great praise, the feedback may accomplish the opposite of the intention. Rather than bolster a student’s confidence as intended, the easy praise could unintentionally communicate that working quickly with little effort is the goal. This could suggest over time that when things take real effort and are difficult, something is wrong.

This is not that we withhold praise for student work. Rather, we use praise thoughtfully and we try to be specific and measured. For example, a child might ask us to take a photo of a block structure that several children worked hard to build. We would take photos, asks questions about what the children did and why they did it. We would point out specific things we noticed about the structure, comment on how well the students worked together, and ask questions about how they accomplished specific aspects of the building. Instead of just saying, “Great job,” we would try to draw students into talking about their accomplishments themselves. As a result, students gain more than praise; they gain self-reflection and specific information about their accomplishments.

What does a mathematical learning community look like in the classroom?

The fruits of our focus on classroom norms and processes can be seen in the way that students work together during math lessons. Most math lessons include group and individual activities. Once they are comfortable with our class norms, students can effectively work together in these activities. Usually accompanied by gales of laughter, students talk about their own work, each other’s work, and the teachers’ work freely, offering and accepting observations or feedback. As teachers, we remain close by, supporting students as needed. We make sure that as students learn how to provide and accept suggestions and feedback, everyone feels safe and valued. Because we have observed the students in diverse learning settings, we know what to expect and can anticipate the types of support each student might need.
Here is a wonderful example of a group activity math lesson from TERC. It demonstrates how kindergarteners can work together in groups, accomplishing math tasks. We gave the students the goal of finding all the ways that a few small shapes like triangles, trapezoids, and rhombi could be arranged to exactly fill in the outline of a hexagon. We split the group into pairs and small groups and the students took up their glue sticks with energy and purpose. As they worked, we moved around the groups, listening and watching. In some groups, students were quiet and focused. In other groups, students alternated between focusing on the task and rolling the glue sticks on the floor or pretending to be animals. Some children took leadership roles and others waited for peers to make suggestions. Sometimes, these roles shifted over the course of the activity. There was an array of skills, personalities, and learning styles, yet the air buzzed with purpose and learning was a current. Students offered ways of arranging shapes to make a hexagon and peers easily made suggestions and corrections. One student arranged the shapes in such a way that a triangle went past the outline of the hexagon. Another student pointed that out and shifted the triangle so it conformed to the outline. The feedback was simple and the resulting revision was easily accepted. It was just like watching children play; they adjusted their ideas fluidly and interactively.

After a period of group work, students were asked to walk around and view each other’s posters. Then they returned to their work and revised it if they were inspired by something seen on another group’s poster. That turned out to be a challenging task. It demanded attention, memory, and analysis as children made comparisons across multiple posters to see what was similar and different. They shouted back and forth, pointing out new finds to group members, running back and forth to better hold things in their memory. It was uproarious, but it was also focused and effective. Finally, we met as a large group and took turns sharing and creating a single collective poster illustrating all of the ways we had found to make a hexagon.

We could have asked each child to make their own set of hexagons or we could have drilled students to recognize the shapes and names. Either would have been quicker and more orderly. Neither would have provided the depth of learning the collective activity provided. The approach we used had the students using mathematical thinking in active ways. In addition, they had fun.

Through activities such as this, students have the potential to view academic learning as purposeful and fun. We tend to equate focus and concentration with silence and stillness. However, in the hexagon activity, students were highly active and very loud. Their focus was not exclusively on making hexagons. They made jokes, played, talked about other things. However, they also got the task done and had a deeper experience using mathematical concepts, vocabulary, and skills. Finally, the activity encouraged practice using group problem-solving skills. These skills will be useful for the rest of their education, as well as later in life, when they may find themselves in problem-solving meetings with colleagues and friends.

By creating a learning community, students can see themselves the way teachers do: as dynamic, competent, resilient, creative, and humorous learners and community members.