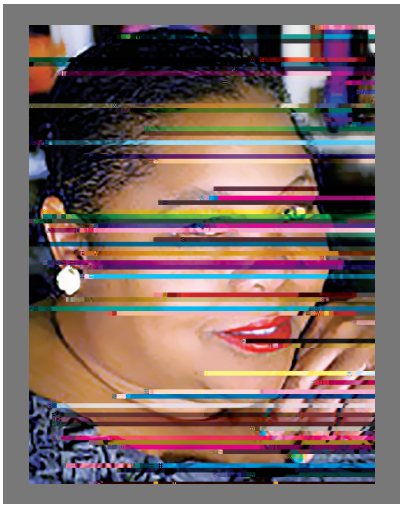
Introduction



Today's 21st-century classroom is filled with so many types of different learners and more possibilities than ever to reach and teach all those learners. We have students who are working below grade level, on grade level, and above grade level. Tomlinson asked the question over 20 years ago, "How do I divide time, resources, and myself so that I am an effective catalyst for maximizing talent in all my students?" (2014, p. 2) Math workstation is one of the ways to address the varied needs of students and curricular demands of classrooms. They take up the task of being able to engage students with the curriculum through "different approaches to learning, by appealing to a range of interests and by using varied rates of instruction along with varied degrees of complexity and differing support systems" (Tomlinson, 2014, p. 3).

Burns (2016) argues that giving students the opportunities to practice the math through a variety of choice activities is important and productive. National Council of Teachers of Mathematics (NCTM) (2004) pointed out that "Small groups provide a forum in which students can ask questions, discuss ideas, make mistakes, learn to listen to others' ideas, and offer constructive criticism." Protheroe (2007) notes that students who work together in pairs and groups on math activities showed increased achieveme3-8 (e)- (p.e3-8 (e0 [(TJ ET EMC /Span <</Lang (en-US)/MCID 34>>BDC BT 0

school, and graduate school. Having spent several years as a bilingual teacher and staff developer, she has an extensive background in Sheltered Instruction and English Language Learner Strategies. She has an EdM and an EdD from the Department of Curriculum and Teaching at Teachers College, Columbia University, specializing in teacher education and curriculum development.

Why Do Workstations?

Workstations allow students to practice the concepts they are learning. Mastery is achieved over time by distributing the practice across the year. Fosnot notes,

> "Teaching mathematics is about facilitating mathematical development. This means that you cannot get all learners to the same landmarks at the same time, in the same way, any more tha you can get all toddlers to walk at the same time, in the same way! All you can do is provide a rich environment, turn your classroom into a mathematical community, and support the development of each child in the journey toward the horizon."

Workstations are often leveled. This allows students to work in their zone of proximal development, gaining mastery throughout the year. Researchers warn us that because of "the enormous variability in young children's development," we mustn't set up arbitrary "fixed timeline[s] for children to reach each specific learning objective" but rather give students the time to learn the concepts well and develop deep understandings of the math" (National Association for the Education of Young Children and NCTM, 2002). Workstations offer structures for students to "learn as deeply as possible and as quickly as possible, without assuming one student's road m for learning is identical to anyone else's" (Tomlinson, 2014, p. 11). Hilberg, Chang, and Epaloose (2003) found that the goal of workstations "is to allow the teacher to provide the highest quality instruction to a small group of students, while other students work productively, independently, and cooperatively in a variety of interconnected tasks at other activity centers" (p. 14). Workstations allow practice to be distributed across time, at varied levels, so that students can actually gain mastery of the concepts.

their thinking, justify their explanations, and prove that they are correct. Oftentimes, it is small tweak that makes a big difference in the rigor level in a station. We also are always thinking about the intersection between Bloom's (1956) and Webb's (2002). Hess (2004) gives a framework to look at how these intersect. Pellegrino (2007) notes that math workstations should be "challenging critical thinking activities and important reinforcement for classroom instruction." Good workstations don't just happen, they are planned for and then evaluated and adjusted. A good workstation is a working curriculum space subject to change whenever needed.

Student Accountability

One of the big questions about math workstations is "How do we know that the students are doing what they are supposed to do?" Math workstations have recording sheets, so that students are accountable for the activities and games that they are doing. There are different types of recording sheets. Some sheets only require students to write down a few of the problems that they solved while playing a board game. Other sheets require that students record all of the work that they did in those stations. For example, if students are playing a comparison game, they write down each of their turns and record the comparison with a symbol. Students can also record their work in a math journal or even take pictures of their work with their electronic devices.

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Accountable Language

Math is a language. If students don't know the words and aren't required to speak it, they never learn it. So, we have to hold students accountable to using the math vocabulary during their work in stations (Coleman, n.d.; Jordan, 2013). One way to do this is to have language frames that scaffold the language and the phraseology for the students at the workstations. For example, at a workstation where students are comparing numbers, there might be a language strip that says:

I can use my math words!
_____ is greater than _____.
_____ is less than _____.
_____is equal to _____.

(Newton, in press).

Anecdotals

Math workstation work is another form of ongoing assessment. Teachers should keep anecdotals of what they see students doing in the workstation. This is done as the teacher walks around and sometimes even joins in to observe what is happening in the workstation.

Who is working well together?

Are they able to express their mathematical thinking?

Do they understand the concept?

Who is having di culty?

What is the nature of the di culty?

What are the error patterns or misunderstandings?
(Newton, in press)

Teachers should use these observations as they confer with students about their math achievement. Notes should be taken on individual students, partner work, small group work, and overall class reflections.

Scaffolded to Unscaffolded Activities

Scaffolding workstation activities is important. Scaffolding in math help students to access the big ideas, enduring understanding and specific skills that they are working on in a unit of study (Anghileri, 2006). In workstations, students use a variety of visuals, graphic organizers, templates, tools, and intentional grouping structures (alone, partner, and small group) to scaffold the math. Many of the workstations have the tools and templates built into the actual activity. For example, there are number paths, decimal grids, and fraction circles on the actual gameboards, so that students can reference them when needed. Also, students are encouraged to use various types of manipulatives such as counters, place value blocks, and geoboards to make sense of the math they are doing.

Scaffolding is temporary but often necessary. As students learn the concepts and understand the math they are doing and become proficient with the skills, the scaffolding is phased out. Not all students need the same level of scaffolding. For example, during a board game on elapsed time, one student might need an elapsed time ruler and the other student might be able just to draw a number line diagram. Another example is the use of hint cards. In some games, there are two levels of cards. The first level has cards with hints, and the second level has the cards without hints.

<table>
<tr><td colspan="2">In this game, students pick a card and move around the gameboard trying to be the first to reach finish.</td></tr>
<tr><td>Scaffolded</td><td>Unscaffolded</td></tr>
<tr><td>Estimate 19 x 18.
Hint: Round 19 and 18 to 20, then multiply.
If correct, move forward 2 spaces.</td><td>Estimate 19 x 18.
If correct, move forward 2 spaces.</td></tr>
</table>

Getting Started—The First 20 Days

The first 20 days are essential. If you don't take time to teach how of workstations during the first 20 days, you will end up teaching it all year long. During the first 20 days, students learn all the routines, rituals, and protocols of math workshop. They learn how to move to and from the workstations, how to get out the workstations, how to start games, how to stop games, and how to rotate around the room. They also learn to win with grace and lose with dignity. They learn how to play well together, discuss their thinking, listen to the thinking of others, and communicate in respectful ways. They also learn to collaborate and compete in friendly ways. The first 20 days of workshop rollout is the bedrock for the entire year, never skip them. See here for more information http://www.drnickinewton.com/downloads/

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