



SHELL
EDUCATION

Guided **MATH**

Conferences



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Guided **MATH** *Conferences*

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Conferring with Young Mathematicians

Just as students come in all shapes and sizes, with distinctive personalities, quirks, senses of humor, and sensitivities, they also come into our classrooms with unique background knowledge and instructional needs. Somehow we manage to adapt our instruction each year as these young learners enter our classrooms—not only adapt, but truly delight in the diversity that enriches the learning environment we so carefully construct.

Realistically, however, the vast differences in foundational knowledge and skills of students pose challenges—challenges that are intrinsic to the profession of teaching. How do we gain insights into the thinking of our students, discover what they know, what they can do, what misconceptions they have, what struggles they face, and what concerns they harbor? The intimate nature of small classes allows astute teachers to establish close relationships with their students in which they acquire something of a true measure of their students' learning strengths and needs through observation and discussions. Building on that measure, differentiation of instruction flows naturally.

With larger class sizes, the task of accurately assessing the complex and unique individual learning needs of our students is more difficult. Opportunities to closely observe their work are limited, as are in-depth student-teacher conversations during lessons, especially during whole-class lessons. In some ways, a classroom full of students is analogous to an orchestra. When twenty-five or thirty students are each playing their own scores, the blended sound of the whole orchestra makes it almost impossible to distinguish the sounds of individual instruments. Nuthall (2005, 919) found that unlike conductors who can sometimes pick out the sounds of individual musicians, teachers in such settings are “largely cut off from information about what individual students are learning” and “are forced to rely on secondary indicators such as the visible signs that students are motivated and interested.”

Diagnostic tests, benchmark tests, and other paper-and-pencil assessments may give us some guidance, but they frequently fail to expose students' thinking or provide deeper insights into their background knowledge. Too often, these methods of assessment let us know only whether students were able to find or choose the correct answers—not necessarily whether they really *know how* to find the answer or whether they have any misconceptions. Paper-and-pencil assessments do not often shed much light on the depth of students' understanding of mathematics.

A Tale of Four Students

To illustrate the limitations of these assessments, consider the mathematics assessment results of four hypothetical students on a written multiple-choice test. Two of these students chose the correct answer for a question, while two others chose an incorrect answer. Since the assessment was not an open-response test, what does their teacher *really*

know after grading this assessment? Did the students who chose the correct answer know how to solve the problem? In this case, one of these students chose the answer solely by chance. The other found the correct answer using incorrect reasoning. Based on the correct answers, one might assume that both students understood the concepts or skills being tested, while in fact, neither of them did.

On the other hand, consider the two students whose answers were incorrect. In this hypothetical, one of the two really understands the concepts involved and knows how to solve the problem, but made a simple error in computation. He may have been tired on the day of the test, or possibly lacked the motivation to fully work out the correct answer. Perhaps he was ill or troubled about something in his personal life. But the isolated assessment results give a false indication of his level of knowledge.

Finally, the last of these four students had absolutely no idea how to find the correct answer. But from the written test, how do we know that for certain? When a student's answer is incorrect, we need to know why. Where did the young learner go wrong? What gaps in knowledge or skills prevented the student from being able to find the answer? Meaningful, relevant instruction for students can only be planned and delivered when these questions are answered.

The confusion about the mathematical ability and learning needs of these four students is obvious even when considering their answers to just one question. The lack of precision in targeting instructional needs only increases when an assessment is composed of many questions. This kind of assessment may offer teachers a snapshot of the overall achievement of their students, but little specific guidance concerning the instructional needs of individual learners.

Open-response assessments yield a clearer picture of what students can and cannot do, as well as what they do and do not understand. Although the results from these assessments may inform our planning of instructional “next steps” for individual students based on their needs, our descriptive feedback to students is often delayed. And even with this assessment format, we are routinely in a position of having to guess exactly what our students' thoughts were as they worked—particularly with students whose ability to communicate mathematically is limited.

But what about assessing student understanding during class discussions? Won't students' oral responses provide us with more transparent evidence of their thinking? After all, most of us ask questions frequently during lessons to gauge student comprehension. Too often, however, even with the use of questioning, it is difficult to clearly discern what students are thinking. Marilyn Burns (2005, 27) shares her early experiences as a teacher:

...when students answered questions correctly I usually accepted their responses with a nod or comment of approval, rarely prodding them to explain their reasoning. When students were incorrect, however, I was more likely to probe further by asking, “Are you sure about that?” or “Why do you think that's right?” Follow-up prompts like these then became signals to the students that their response was not correct or acceptable.

Even when using discovery learning, Burns found that she failed to probe students'

levels of understanding when correct answers were given to her questions. She states, “I never really knew what students were thinking or whether their correct answers masked incorrect ideas. I only knew that they had given the answer I sought” (2005, 27).

When we ask probing questions of our students during class discussions, we may indeed learn what one or two, perhaps even three, students are thinking, but it is folly to assume that those thoughts accurately represent the thinking of the entire class. Yet without more in-depth knowledge, we are bound to fail in our mission of meeting the needs of all our students.

A Glimpse into Student Thinking

Literacy teachers have long been familiar with student-teacher conferences. Conferring with young learners is integral to both reading and writing workshop (Anderson 2000; Calkins 2000; Calkins, Hartman, and White 2005; Graves 2003; Serravallo and Goldberg 2007). Young learners share their thinking about their personal reading or writing in one-on-one conversations with their teachers. Not only do teachers discover much more about their students’ capabilities and next steps in learning, but close bonds between students and teachers are also formed.

The benefits of student-teacher conferences are not exclusive to literacy instruction. Sound instructional practices span the content areas. Serravallo and Goldberg (2007, 1) describe their beliefs about reading as follows:

- Reading is the act of constructing meaning.
- Reading is a process.
- Reading is deeply personal and, therefore, varies from reader to reader.

Indeed, mathematical work is very similar. Mathematicians engage in constructing meaning from their prior and current mathematical experiences to understand new concepts and solve problems. They participate in a process as they determine meaning, make connections to other areas of mathematics, and draw upon their background knowledge. They employ strategies they have acquired to deepen their knowledge and to find solutions to problems. And finally, understanding mathematics is deeply personal and varies from mathematician to mathematician. That is not to say that there are not constant mathematical principles, but an individual’s perspectives, modes of learning, and previous experiences combine to make his or her approach to comprehending mathematical concepts and problem solving entirely unique.

Furthermore, with these beliefs about reading in mind, Serravallo and Goldberg (2007, 7–8) conclude that effective reading instruction should:

- match the individual reader;
- teach toward independence;
- explicitly teach strategies;
- value time to experience reading; and
- follow predictable structures and routines.

These beliefs about reading instruction may be easily adapted to describe effective mathematics instruction. As mathematics teachers, we are most effective when our instruction matches our individual learners, we teach toward independence, we explicitly teach strategies, we value time for our students to explore challenging mathematical problems and concepts, and we establish and then maintain predictable structures and routines.

Because of their beliefs about reading and reading instruction, Serravallo and Goldberg (2007) understand the importance of one-on-one reading conferences, in which instruction is targeted specifically to student strengths, nudging young learners to the edge of what they are just beginning to be able to do, and supporting them as they begin to independently apply new strategies they have learned. The intimate nature of conferences allows teachers to know their students so well that their teaching points for each student are at an instructional level that is most appropriate to the student's immediate needs and current developmental phase.

Thus, in many ways, conferring with students is the heart and soul of teaching (Sammons 2010). According to Calkins, Hartman, and White (2005, 6), "It gives us an endless resource of teaching wisdom, an endless source of accountability, a system of checks and balances. And, it gives us laughter and human connection—the understanding of our children that gives spirit to our teaching." Conferring gives teachers true glimpses into the thinking of their students—whether it be thinking about reading, writing, or mathematics. With these glimpses, our instruction becomes more focused and powerful.

What Are Guided Math Conferences?

The Guided Math framework (Sammons 2010) is composed of seven components: establishing a classroom environment of numeracy, math warm-ups, whole-group instruction, small-group instruction, math workshop, math conferences, and assessment. (See [Appendix A](#) for a description of each component of the framework.) Together, these instructional tools offer teachers a manageable means of identifying and then meeting the mathematical needs of their students. One-on-one math conferences are valuable for accurate assessment of student strengths and needs, and for targeting individual needs through timely feedback and brief specific instruction—thus, they are an important support for the other six components. Even in classrooms where the Guided Math framework is not being used, conferring one-on-one with students gives teachers rich insights into their students' mathematical thinking as well as opportunities to provide effective, targeted instruction and offer constructive feedback.

Math conferences are one-on-one *conversations* with students about their mathematics work, as one mathematician talking with another. Literacy educators have written much about successfully conferring with students. Murray (2004, 148) emphasizes the importance of maintaining a conversational tone during conferences. "They are not mini-lectures but the working talk of fellow writers sharing their experience with the writing process. At times, of course, they will be teacher and student, master and apprentice, if you want, but most of the time they will be remarkably close to peers...."

Like conversations, conferences between teachers and students include these characteristics (Anderson 2000):

- Conferences have a purpose.
- Conferences have a predictable structure.
- Lines of thinking are pursued with students.
- Teachers and students each have conversational roles.
- Students are shown that teachers care about them.

We show our genuine interest in the work of our students when we confer. Sitting side-by-side and shoulder-to-shoulder with our students, we dig deeper so we can meet their unique, individual needs. In doing so, we support them as they begin to apply what they are learning in both large-group and small-group lessons (Miller 2008). The thoughtful conversations we create get to the core of their thinking and then prompt them to consider what they are doing from other angles or with more depth.

Math conferences are a time for students to share their mathematical thinking with their teachers. In doing so, they learn not only to organize and express their mathematical ideas cogently, but also to continually reassess the validity of their reasoning. Moreover, these mathematical conversations support the learning of new concepts and strategies by requiring that students focus on representing their work, both verbally and with diagrams, models, or symbols so that it can be clearly understood by others. All of these are essential aspects of mathematical practice (Common Core State Standards Initiative 2010; National Council of Teachers of Mathematics 2000).

Math conferences are also a way of extending and deepening the numeracy of our students. Allington (2012) describes the ability to go beyond word calling, simple recall, and recitation when reading as *thoughtful literacy*. It requires a reader to engage with the ideas in a text, challenge them, and then reflect on them. When conferring with students, we foster that same kind of understanding of mathematics—*thoughtful numeracy*, the mathematical counterpart to thoughtful literacy. We help students develop the mathematical skills they need to cope with the practical demands of everyday life (Steen 1990). With that goal in mind, these conversations between students and teachers serve to increase the capacity of young mathematicians to effectively engage in mathematical thinking and problem solving, critically consider the mathematical data and the reasoning of others, and clearly communicate their own mathematical thinking, so that they will be able to successfully apply the knowledge, skills, and strategies they have acquired to new situations and problems they encounter throughout their lives (Saskatchewan Ministry of Education 2009).

Guided Math Conferences, Math Interviews, and Small-Group Instruction

Instructional strategies for teachers abound. As we focus on conferring with students about mathematics, it is important to distinguish between math conferences, math interviews, and small-group instruction. All three share important characteristics and have a place in the Guided Math framework, but each is unique in many ways. Although all of these instructional elements afford teachers opportunities to build relationships with their students, encourage mathematical communication, and assess student understanding, they

vary in the amount of time required, the participants involved, the focus of the conversations, and their primary functions. A summary of the comparisons that follow can be found in [Figure 1.1](#).

Guided Math Conferences vs. Math Interviews

Looking first at math conferences and math interviews, both are one-on-one conversations between a teacher and a student. They are valuable forms of assessment during which teachers learn more about the mathematical understanding and capability of their students. They both uncover students' misconceptions and gaps in understanding that may not be apparent when relying only on the written work of students. According to Burns (2010, 19), her experiences with student interviews were "revealing and sometimes astonishing," exposing "the fragile conceptual base of [students'] understanding that their teacher had no way of knowing from the context of the classroom lesson." Thus, the information from both conferences and interviews can serve to guide instructional decisions. In addition, both techniques are powerful ways in which teachers can connect more deeply with their students as students share their mathematical thinking with the teacher.

In spite of the similarities, however, there are some distinct differences between these two instructional practices. Although math interviews are not a part of the Guided Math framework, they can be used for diagnostic assessment in a Guided Math classroom. In math interviews, the main focus of conversation is a given task proposed by the teacher during the interview based on a "big idea," with specific questions to determine the degree of student understanding and to expose any existing misconceptions. The primary function of the interview is that of assessment to inform later instruction (Moon and Schulman 1995). No feedback is given to students during the interview. Instruction based on strengths and needs that are uncovered during the interview is delivered at a later time. The length of time required for an interview is usually about ten to fifteen minutes.

In contrast, math conferences are usually about five minutes in length. The focus of the discussion between the student and teacher is the mathematics with which the student is currently working. With this conversation, the teacher is conducting research to discover both student strengths and needs. The teacher uses this information to provide immediate, specific feedback and to decide on an appropriate instructional "next step" for the student. Then, within the conference itself, the next step is taught. As such, the major functions of the conference—assessment, feedback, and instruction—are entwined.

Both math conferences and math interviews offer teachers excellent ways to probe student thinking—going deeper than is possible in large-group or even small-group instruction. Because of the brief nature of math conferences, however, teachers are able to conduct them more frequently and more spontaneously throughout the school day. This flexibility is a considerable advantage to teachers whose instructional time is already strained by ever-increasing demands.

Math Conferences vs. Small-Group Instruction

Both math conferences and small-group instruction are essential components of the

Guided Math framework (Sammons 2010, Sammons 2012). Although they are both powerful tools for teachers, the differences between the two are many—in the participants involved, the durations, the focuses, and the functions.

The small-group instructional format involves the teacher meeting with groups of two to six students with similar instructional needs for fifteen to twenty minutes (Fountas and Pinnell 1996 and 2001; Sammons 2010). Working in their “zone of proximal development,” learners supported by the teacher expand and extend their mathematical understanding and capabilities (Vygotsky 1978). Teachers present brief mini-lessons about concepts or strategies to be learned and then actively engage students in practice requiring the young mathematicians to stretch just beyond what they can do successfully on their own.

Throughout the small-group lesson, teachers provide just enough support to move their students to a higher level of independent mathematical competence. The primary focus of the small-group format is the lesson itself, planned to meet the needs of the members of the group. As the lesson is presented, teachers are also able to informally assess student learning and to offer feedback based on the student work observed and the conversations that arise. In addition, small-group lessons “nurture joy, rigor, and empowerment” and inform other components of mathematics instruction (Wedekind 2011, 26), all of which are essential to effective implementation of the Guided Math framework.

While the worth of small-group instruction cannot be overstated, the intimacy of a one-on-one conference is absent in this setting. When conferring with students, teachers meet with just *one* student at a time. They ask students to tell them about the mathematics with which they are currently working, informally assessing student understanding and skills to identify both strengths and needs. As individual needs are discovered, teachers try to determine the best immediate instructional “next step” for these students. Which of the student needs noticed by the teacher can be most effectively targeted in the brief conference? And then, how can that teaching point best be conveyed to the student?

An integral part of conferences is immediate and specific feedback for students. Teachers share with them both something they have done well, in the form of an authentic compliment, and what they can do to make their work better or to increase their understanding. A learning goal, usually an incremental one given the brief nature of a conference, may be suggested. Along with the timely feedback, teachers might share a new strategy, correct a misconception, model mathematical communication, or demonstrate a process to address the specific teaching points for the young learners with whom they are conferring. Thus, within the Guided Math conference structure, teachers assess, give feedback, and teach a logical “next step.”

The opportunities to give individual students both specific feedback on their mathematical work *and* instruction that targets the unique teaching points of individual students during a small-group meeting are rare. So in addition to the differences in the number of students involved, the time required, and the focus of small-group instruction and math conferences, a major advantage of the conference format is the ability to promote specific individual learning. A challenge, however, is creatively finding the time to engage in these mathematical conversations with students on a regular basis.

Figure 1.1 Comparisons of Math Conferences, Math Interviews, and Small-Group Instruction

Format	Time	Participants	Focus	Function
Math Conference	About 5 minutes	Teacher and 1 student	Student's current work	<ul style="list-style-type: none"> • Assessment • Feedback • Individual Instruction (Teaching Point)
Math Interview	About 10–15 minutes	Teacher and 1 student	Instructional task introduced by teacher	Assessment
Small-group Instruction	About 15–20 minutes	Teacher and 2–6 students	Group lesson (based on identified needs of the group)	<ul style="list-style-type: none"> • Group instruction (Focus lesson) • Assessment • Feedback

Snapshot of a Math Interview

Terrence has recently enrolled in a second-grade class. Although his teacher received Terrence's grades from his previous school, she hopes to gain a little more insight into her new student's understanding of place value by conducting a math interview. As her other students are engaged in independent work, she sits down one-on-one with Terrence.

Teacher: *Terrence, I am so happy you have joined our class. As a teacher, I really try to discover what my students think when they work as mathematicians, so that I will know how to best help them learn math. Thank you for being willing to talk with me for a few minutes.*

Terrence: *That's okay. I'm not great at math though.*

Teacher: *Well, don't worry about what we are doing today. Just answer the questions I ask as best you can.*

Terrence: *Okay.*

The teacher places two sticks of ten linking cubes each and 4 individual cubes on the table. On

a white board, she writes 24.

Teacher: *Please read this number.*

Terrence: *Twenty-four.*

The teacher points to the 4.

Teacher: *Please show me what this part of the number represents using the cubes.*

Terrence gathers together the four individual cubes.

Teacher: *Tell me why you chose those cubes.*

Terrence: *It's a four. So I got the four cubes. One, two, three, four.*

The teacher then points to the two.

Teacher: *Now, show me what this part of the number represents.*

Terrence chooses the two sticks of ten linking cubes.

Terrence: *That's easy! Twenty is two tens.*

The teacher removes the cubes and replaces them with three sticks of ten linking cubes and fifteen individual cubes. She writes the number 45.

Teacher: *Please read this number.*

Terrence: *Forty-five.*

The teacher points to the 5.

Teacher: *Please show me what this part of the number represents using the cubes.*

Terrence chooses five individual cubes.

Terrence: *Five! Five cubes—One, two, three, four, five.*

The teacher points to the 4.

Teacher: *Please show me what this part of the number represents using the cubes.*

Terrence looks confused and stares at the cubes.

Terrence: *Is this a trick question?*

Teacher: *Why do you think that?*

Terrence: *Because you only put out three tens! I can't show you four tens when there are only three of them.*

Teacher: *I see. Let's talk about this idea on another day because it's time to stop our interview for today. Thank you for working with me on these numbers.*

The teacher discovered that Terrence can correctly read the double-digit number she wrote. He has a beginning knowledge of place value, but needs more work with ones and

tens to understand that ten ones has the same value as a ten.

Because the interview was intended as an assessment of Terrence's understanding of place value to inform future instruction, the teacher gave Terrence no feedback on his responses, nor did she correct his misconceptions. The information the teacher obtained will be used to place Terrence in a small group of students with similar instructional needs. During those lessons, his misconceptions will be addressed and he will receive more focused feedback on his work.

Snapshot of a Small-Group Lesson

The following lesson is for a fourth-grade class working on a unit on measurement and geometry.

Connection:

We have been working with angles—identifying types and finding their measures. We have also been examining two-dimensional shapes and their attributes.

Teaching Point:

Today we are going to explore the sum of the interior angles of convex polygons.

Active Engagement:

Students work in pairs to measure the interior angles of triangles and quadrilaterals, then share their results.

What is the relationship between the sum of the interior angles of a triangle and a quadrilateral? Is there any way you could have figured that out without measuring each angle of the quadrilateral? (Dividing the quadrilateral into two triangles)

Let's try a pentagon. Divide it into the fewest possible triangles and compute the angle sum. Measure to confirm. What pattern do you see? Do you think that pattern will always occur?

Link:

You have been thinking like mathematicians—looking for patterns in your work and making conjectures. Remember to use what you know about the sums of the interior angles of convex polygons when you are trying to solve problems. Share with the group something mathematical you have learned or thought about in this lesson.

The focus of the lesson is leading students to discover the relationships between the interior angles of polygons. The teacher observes the work of the students closely and listens to their talk as they work. At times, the teacher questions students to focus their attention, have them justify their reasoning, prompt them to think more deeply, or encourage their mathematical communication. During these interactions, the teacher provides appropriate feedback to students based on their work and discussions.

Snapshot of a Math Conference

Josephina is a seventh-grade English language learner student who struggles with problem solving, particularly with determining which operation should be used to find a solution. With this math conference, the teacher hopes to gain some ideas about how to help her become more proficient.

Josephina is working to solve the problem shown below. The teacher notices that she has underlined the word *all*.

Task:

A dress was on sale for 50% off its original price of \$40. Later, the store took another 25% off that price. How much does the dress cost now after all the discounts?

Teacher: *Josephina, what are you working on?*

Josephina: *I'm trying to find the answer to this problem. It's kind-of hard. I keep reading it—I know you are supposed to do that. That's the first thing you should do.*

Teacher: *So as you read this problem, what are you thinking?*

Josephina: *I'm really thinking about the words in the problem. They can help me know what to do. I'm trying to remember what my teacher last year told me. She said there were certain words that tell you what to do to find the answer. I found a word that I think she talked about—"all"—and underlined it. I think that means I have to add things up to find the answer.*

Teacher: *Why do you think that means you should add to find the answer?*

Josephina: *Because there are certain words that tell you what to do. I think "in all" means add. But I'm not really sure how to add this up.*

The teacher realizes that an earlier teacher of Josephina's was probably aware of her difficulties understanding English and had encouraged her to turn to "key words" rather than teaching her to work to truly understand problems she was attempting to solve.

Teacher: *Josephina, as a mathematician, you know how important it is to first read and understand the problem you are trying to solve. You are working on the first step in problem solving! Let me share something with you that I have learned. When I am faced with solving a problem, I have to do more than just look for certain words. I have to really try to see in my mind what is happening, so I can figure out a way to solve it. Just because this problem has the word "all" in it, it doesn't necessarily mean that we add to solve it. Let me tell you what I do sometimes when I read a problem. I try to think about and "see" in my mind what is happening. So when I read that there is a sale, I know that I can buy something for less than what it used to cost. The store takes something off the price—it costs less to buy it when it is on sale. Then, I think about what mathematical operation I should use to show that something is taken off or away from the price. What do you think?*

Josephina: *I think you subtract. Don't you?*

Teacher: *That's right, Josephina. When we read carefully and really tried to think about what happened in the problem instead of looking for certain words, we were able to figure out what to do to solve the problem. Do you remember how to find a percent?*

Josephina: *Yes. I just couldn't figure out what to do with it.*

Teacher: *Josephina, can you tell me in your own words what we did to figure that out?*

Josephina: *Well, for one thing, I didn't just look for those words like from last year.*

Teacher: *Well, what did we do?*

Josephina: *I put it in my head. I mean, when I read it, I made sort of a movie to see what was happening. Then, when I thought I knew what was happening, I knew I had to subtract. That dress wasn't going to cost so much.*

Teacher: *Now you are thinking just like a mathematician! Whenever you are trying to solve a word problem, do just what we did with this one. Try to see what is happening—just like making a movie in your head.*

Through questioning and listening to Josephina's responses during this conference, the teacher discovered that Josephina was trying to use key words to determine which operation to use when problem solving. Since Josephina knew it was important to read the problem carefully before deciding on a strategy for solving the problem, the teacher was able to give her an authentic compliment letting her know what she was doing well. The teaching point of the conference was the use of visualization of the problem rather than searching for a "key word" to decide which operation was required. Josephina was able to explain the teaching point in her own words. The teacher then reminded Josephina that this was something she should always do when solving problems. The teacher will closely observe Josephina's future work to be sure that she is making use of this strategy and reinforce it, if necessary.

The Structure of a Guided Math Conference

Most conversations we have with others have predictable structures. We are comfortable following patterns of verbal give-and-take that we experience day in and day out in our formal and informal relationships with those around us. We know how they begin, the various parts, the transitions from speaker to speaker or topic to topic, and then we know how they are brought to a close (Anderson 2000). Consider the most basic of greetings: *Hi, how are you doing?* The typical response follows: *I'm doing fine, thanks. And you?* The greeter responds, *I'm fine, thanks.* Who does not know this pattern? We all know how to initiate it, to respond, and where it leads. Whenever we engage in a conversation, we draw upon an unconscious knowledge about how to talk with others that we have been absorbing since birth. The predictable structure we know so well allows us to effortlessly begin our conversations and enables conversation to flow smoothly.

As with everyday banter, when math conferences have an established structure, the predictability allays anxiety, allows for the easy exchange of ideas, and leads to more productive discussions. The traditional teacher-student pattern of discourse in the classroom is question-response-evaluation. In *Choice Words: How Our Language Affects Children's Learning*, Peter Johnston (2004, 6) warns, "There is always an implicit invitation to participate in a particular kind of activity or conversation. We cannot persistently ask questions of children without becoming one-who-asks-questions and placing children in the position of the one-who-answers-questions." In contrast, the

structure of a math conference is one that is more common to interactions between individuals sharing a similar interest. The teacher is simply someone who has genuine interest in the work of the student with whom he or she is talking and who is willing to share strategies for making that work even better.

Calkins, Hartman, and White (2005) describe a consistent and predictable architecture for writing conferences that can be adapted effectively for Guided Math conferences. The specific steps for these conferences are *research*, *decide*, *teach*, and *link*. The conference framework guides teachers as they confer, so they can discover what their students are thinking mathematically and then identify what to do to help them progress in both their understanding and skill. Following a structure gives purpose to what otherwise may be chatting without focus (Sammons 2010). The structure of a Guided Math conference will be elaborated upon in [Chapter Three](#). [Figure 1.2](#) provides an overview of this structure.

Figure 1.2 The Structure of a Guided Math Conference

The Structure of a Guided Math Conference

Research Student Understanding and Skills

- Observe the work of the student.
- Listen carefully as the student responds to questions about his or her work to understand what he or she is trying to do as a mathematician.
- Probe to glean more about the student's intentions, comprehension of relevant concepts, and mathematical capability.
- The student does most of the talking during this part of the conference.

Decide What Is Needed

- Weigh the validity of the student's current strategies and processes. Determine what should be the student's next step in learning. Decide on a specific teaching point and how you will teach it.
- Name specifically what the student has done well as a mathematician with an authentic compliment, linking it directly to the language of the standards, and remind him or her to continue to do this in future work.

Teach to Student Needs

- Use demonstration, guided practice, or explicit telling and showing to correct or extend a student's understanding and ability to successfully complete the task.
- Have the student briefly practice what was taught and explain what she or he has learned to ensure initial understanding.

Link to the Future

- Name what the student has done as a mathematician and remind him or her to do this often in the future.
- Have the student share a reflection on the mathematics learned.

(Adapted from Calkins, Hartman, and White 2005)

Kinds of Guided Math Conferences

While the conference content and teaching point will be largely determined during the research phase of the math conference, teachers often enter into conferences with preconceived areas of focus based on students' prior mathematical work. Experienced teachers know that even in these situations, much is to be gained by encouraging students to share their thinking and by listening carefully before selecting a teaching point. Nevertheless, Guided Math conferences typically fall into these categories. Each of these kinds of math conferences will be discussed in [Chapter Four](#).

- **Compliment Conferences:** Teachers use these conferences to motivate young mathematicians or to lift the spirits of discouraged learners.

- **Comprehension Conferences:** The focus of these conferences is on assessing and then extending the degree of student comprehension of mathematical concepts.
- **Skill Conferences:** The aim of these conferences is assessing and then extending the skills of students, including both process and computation skills.
- **Problem-Solving Conferences:** These conferences are used to explore the problem-solving strategies being applied by students and then to strengthen their toolbox of strategies, if needed.
- **Self-Assessment and Goal-Setting Conferences:** Together, students and teachers review progress toward meeting learning targets and establish learning goals.
- **Recheck Conferences:** Teachers use these conferences when they want to see if students are using what they learned during earlier conferences.

Chapter Summary

Of utmost importance to the teaching of mathematics is having an awareness of precisely what students know and can do. One-on-one Guided Math conferences allow teachers not only to acquire specific information about the mathematical proficiency of individual students, but also to teach these students their “next steps” in learning within a highly supportive setting. Students receive immediate and very specific feedback about their work as a part of these discussions. As such, the Guided Math conference format is a way of assessing, teaching, and providing feedback.

Additionally, one of the most positive consequences of conferring is the nurturing of the student-teacher relationship. Students find they can talk freely about their work, sharing questions or confusions, in a nonthreatening setting. The structured nature of the conference ensures that the conversation is focused on math, holding students accountable and teaching them how to communicate their mathematical thinking.

REVIEW AND REFLECT

1. How often are you able to engage your students in one-on-one conversations about their mathematical thinking?
2. What do you think is the most important benefit of math conferences? What are the greatest hurdles to implementing math conferences in your classroom? How could you overcome these hurdles?
3. Think of a student in your class who is struggling with a mathematical concept or skill. What would you like to know about his or her mathematical thinking? What questions would you ask if you decide to confer with this student?

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