CHAPTER 1

Leading High-Performing Collaborative Teams for Mathematics

> *The Common Core State Standards provide a consistent, clear understanding of what students are expected to learn, so that teachers and parents know what they need to do to help them learn. The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that our young people need for success in college and careers. With American students fully prepared for the future, our communities will be best positioned to compete successfully in the global economy.*
>
> —NGA & CCSSO

The mission of the K–12 CCSS for mathematics is ambitious yet attainable. Thus, it will require your strong leadership for the right kind of professional development—professional development that leads to effective and consistently implemented instructional and assessment practices. To successfully and equitably implement these expectations, the teachers you lead must be engaged in an ongoing *process* of professional development and learning. Among your primary leadership responsibilities are to monitor, pressure, and support the successful implementation of the CCSS for mathematics—at your level of leadership and influence within the school organization.

For this to happen, you will need to establish and lead a coherent and ongoing professional development *process* that supplies every teacher with the confidence and pedagogical knowledge capacity necessary to improve his or her mathematics teaching, assessment methods, and ability to take action and support students to take action on mathematics assessment results.

The Professional Development Paradigm Shift

One of the primary characteristics of high-performing and high-impact schools—schools that are successfully closing the mathematics achievement gap—is their laser-like focus on teacher collaboration as a key to improving instruction and reaching all students (Education Trust, 2005; Kersaint, 2007). Traditional professional development that relies on one-shot workshop models outside of teachers' work environment and nurtures an expectation of teacher isolation without support or pressure for implementation does not result in significant improvements in student achievement. The professional development of teachers and leaders can no longer rely on singular events or isolated trainings as is typical in the old paradigm.

For professional development and learning to become effective, an ongoing, continuous, sustainable, and collaborative activity inside the school is needed. Research on effective professional development programs—those that provide between thirty and one hundred hours of contact time with teachers over the course of six to twelve months—demonstrates a positive, significant, and sustained effect on student achievement (Wei, Darling-Hammond, Andree, Richardson, & Orphanos, 2009).

Strong effects for professional development on teacher practice occur when the professional development is focused on enhancing teachers' knowledge of how to engage in specific pedagogical skills and how to teach specific kinds of content in order to enhance student learning (Blank, de las Alas, & Smith, 2007). The most effective professional development immerses teachers in collaboratively studying, in a structured way, the very curriculum they will teach, as well as their students' acquisition of that curriculum—down to the lesson level. This approach ultimately leads more teachers to adopt the curricular and instructional innovations from the school district's instructional vision (Huggins, Scheurich, & Morgan, 2011; Penuel, Fishman, Yamaguchi, & Gallagher, 2007; Wayne, Kwang, Zhu, Cronen, & Garet, 2008).

Teacher participation in collaborative team discussions *removes several barriers* to the creation and implementation of a rigorous and coherent mathematics curriculum. Implementing the CCSS for mathematics means individual members of your collaborative teams can no longer afford to take weeks out of each school year to reteach content, crowd the curriculum with favorite projects, fail to challenge students to think mathematically, or deliver instruction that is ineffective. Working with colleagues, each teacher on a collaborative team begins to "balance personal goals with collective goals, acquire resources for his or her own work, and share those resources to support the work of others" (Garmston & Wellman, 2009, p. 33). As Kanold (2011a) explains:

> This is the wonderful paradox of the loose-tight or "defined autonomy" PLC culture. Adults can work within a defined set of behaviors [the CCSS expectations] and have an opportunity for freedom and choice. . . . Autonomy is different from independence. Autonomy in the loose-tight PLC world does not mean the individualistic going it alone, relying on nobody. Yet, rather as Daniel Pink (2009) points out, autonomy means "acting with choice—which means we can be both autonomous and happily interdependent with others." (p. 48)

The issue for you as a school leader is not about protecting individual teacher autonomy. Rather, the issue lies in your ability to teach and support collaborative team autonomy and transparency using the research-based tools necessary to collaboratively reflect and experiment in ways that are connected to the vision and mission of your school district to improve student learning.

As a school leader, you influence this subtle yet important shift toward using collaborative professional development time for rigorous thinking, execution, and capacity building of the faculty and staff. The paradigm shift: *professional development is no longer an event that occurs occasionally in a teacher's and leader's life*; professional development with other colleagues becomes the teacher's and leader's way of life. This new paradigm

for professional development envisions mathematics teachers and other specialists collaborating interdependently to deepen their knowledge of mathematics pedagogical content and competencies, and expects *action on that knowledge* with application to practice. Part of your role as a school leader is to ensure teacher action on that knowledge.

Given the high stakes of increased academic achievement for all students, teacher collaboration with peers must be *nondiscretionary.* Mathematics teachers in your school cannot opt out of working with peers when it comes to issues related to student learning. The act of becoming an effective teacher can no longer be about *my* students or *your* students. It is about *our* students and what each teacher and leader can do to benefit *all* students in a grade level or course. Teachers in your school or district who opt to work in isolation miss the chance to learn from others, and they fail to fully understand the benefits and the responsibility of being interdependent colleagues. When teachers collaborate on mathematics teaching and learning, they grow as effective mathematics teachers. That growth is a never-ending aspect of a teacher's professional journey, and it is your leadership challenge and responsibility to help that journey be an enjoyable and meaningful experience for each teacher in your school or district.

Collaborative grade-level or course-based learning teams become the engines for change in your school or district. Building the knowledge capacity of the collaborative learning team, and focusing that capacity on student learning, are primary responsibilities of your leadership work and influence. This is best done through well-designed communities of practice—*professional learning communities* (Schmoker, 2005).

Professional Learning Communities: Your Vehicle for Professional Development

Not surprisingly, many school leaders, teachers, and administrators equate professional learning communities with teacher collaboration. As such, *PLC* is a term that is fairly ubiquitous in education. At the same time, various definitions and understandings regarding a PLC *culture* abound. In this book, DuFour, DuFour, and Eaker's (2008) *Revisiting Professional Learning Communities at Work* and DuFour, DuFour, Eaker, and Many's (2010) *Learning by Doing* are used to define the conditions for collaborative mathematics learning teams in an authentic PLC culture. For our purposes, we refer to grade-level or course-based groups of teachers and leaders working together in a PLC as *collaborative teams*.

Just as students in groups need direction and support from the teacher to work well together, teachers and other educational stakeholders in collaborative teams need direction and support from you, as a school leader, to learn how to *collaborate* well and move beyond low-level team conversations.

The collective CCSS mathematics teamwork of PLCs focuses on designing practice around four fundamental agreements (DuFour et al., 2008). These four agreements are:

1. What students should learn—clarifying the essential student learning clusters and outcomes—including *how* students learn the *what* through engagement with the CCSS Mathematical Practices learning processes (chapters 2 and 3)

2. The development and use of common and coherent assessments to determine if students have learned the agreed-on curriculum—*how* will you know if students are learning? (chapters 2 and 4)
3. How to collectively respond in class and out of class when students don't learn the agreed-on curriculum of the CCSS (chapters 4 and 5)
4. How to collectively respond in class and out of class when students do learn the agreed-on curriculum of the CCSS (chapters 4 and 5)

In order for collaborative mathematics teams to respond to these four professional learning community agreements, you must provide the time, access, support, and accountability for the teams to do their work.

American educators often speak to a shared vision, but that vision is not usually fine-tuned to address the specific work needs of the collaborative teams in your school. Thus, teachers often work toward success for every student without a coordinated image of what that might look like in the classroom. Similar to providing students with a target to aim toward, collaborative teams need a shared vision of curriculum, instruction, assessment, and intervention that is specific to learning mathematics. As Danielson (2009) argues, "It's not sufficient for a school to be comprised of individual expertise; that expertise must be mobilized in the service of a common vision" (p. 17). For example, if you surveyed a random selection of ten teachers in your school, would they all be able to describe the same mathematics instructional vision for their grade level or course? Is the vision for instruction crystal clear and coherent for them?

Thus, a shared vision is a necessary cornerstone to the work of your collaborative teams. Your teams might already have a shared vision in place, which is a good start. Yet it is not sufficient. Teacher team inquiry, action orientation, experimentation, and reflection enable you to make progress toward the vision with fidelity of purpose. In many schools, teachers are working in teams and using data to set goals and monitor progress. Does this describe the work of collaborative teams at your school? If so, it is also an important and necessary action, but again, not sufficient.

Although given less attention, the difficult collaborative teamwork of collective inquiry, together with action orientation and experimentation, has a more direct impact on student learning than teachers working in isolation (Hattie, 2009). It is in the process of inquiry and experimentation that team members find meaning in collaborative work with others. It is through the respectful challenging of their peers about what does and does not work in the classroom that teachers take ownership of their own beliefs, learning, and professional development. In the collective creation, modification, and ongoing reflection of what is taught and how instruction impacts student learning, teachers begin to pursue personal growth as professionals.

Teacher collaboration is about *purposeful peer interaction* (Fullan, 2008). If PLC team collaboration is to influence and impact teacher learning, then teachers, teacher leaders, and administrators become intentional about the nature and content of the collaboration.

The collaboration of your teams must be purposeful and focused. According to Reeves (2010), high-impact professional development and learning in collaborative teams:

1. Focus on student learning
2. Focus on assessment of the decisions teacher team members make
3. Attend to people and practices rather than programs

In this sense, members of your collaborative teams collect and analyze data to determine if their instructional decisions (their behaviors and practices) had an impact on student learning. In this scenario, you attend to the needs of the teachers in your sphere of leadership by creating and supporting collaborative work that pushes teacher peers to critically examine student learning. As teachers collectively analyze student work, classroom practices, and dialogue about mathematical content, the impact on student achievement is far greater than discussions about predesigned lessons to teach. The PLC teaching-assessing-learning cycle described in chapter 4 is designed to support this type of meaningful collaborative team inquiry and work.

Collaboration is not necessarily efficient or easy. However, when teachers have the skills and knowledge to collaborate through professional conversations focused on student learning, the dialogue, reflection, and actions emerge as a form of ongoing professional learning and teacher development. As Fullan (2008) indicates, collaborative learning is your work. Leading others in collaborative learning begins by recognizing the different stages that lead to authentic teacher team collaboration and helping your teams move through those stages.

Teacher Collaboration Versus Cooperation or Coordination

There is a caution for you as you examine the level of actual or authentic collaboration of your various teacher teams. What is often considered teacher *collaboration* is actually cooperation or coordination. *Cooperation* is an informal process for sharing information with no goal or outcome in mind (Grover, 1996). Cooperation is about being a *team player*. One potential danger of cooperation is the exclusion of team members' diverse ideas. Consider a scenario in which your team members share ideas and lesson plans about how they each teach a learning target about triangles in a geometry unit. In this case, teachers cooperate by sharing resources, although each teacher retains his or her own authority to teach and assess the learning targets.

Coordination on the other hand requires more teacher team planning and communication than cooperation. Efficiency regarding the management aspects of a given unit of instruction tends to drive teachers to coordinate. For example, a Third-Grade Team or a High School Geometry Team may coordinate a schedule so all teachers have access to modeling materials for the unit, or they might divide up different standards from a CCSS content standard cluster in order to design lessons. Note that coordination can serve purposes of efficiency but does little to push *inquiry and discussion of the daily instruction and assessment in the classroom*—the true purpose and high-leverage work of PLC collaborative teams.

Whereas *cooperating* and *coordinating* are about *individuals* on the teacher team making decisions, *collaboration* is about creating interdependence with colleagues as they work beyond consensus building. When your teams are effectively collaborating, you will observe team members creating new structures and ways of working that are focused on academic success for all students, not just the students in their own classes. Your leadership role is to monitor the teacher team meeting and observe the type of work and discussions taking place and to provide formative guidance about how to deepen the quality of the team's work.

To support your team-monitoring effort, Graham and Ferriter (2008) offer a useful diagnostic tool framework that details seven stages of teacher collaboration. You can use this framework as a diagnostic check to determine the level of authentic collaboration currently taking place in the teams you lead. Table 1.1 highlights an adapted version of the seven stages.

Table 1.1: Seven Stages of Teacher Collaboration

Stage	Questions That Define This Stage
Stage one: Filling the time	What exactly are we supposed to do as a team?
Stage two: Sharing personal practice	What is everyone doing in his or her classroom for instruction, lesson planning, and assessment?
Stage three: Planning, planning, planning	What should we be teaching during this unit, and how do we lighten the load for each other?
Stage four: Developing common assessments	How will we know if students learned the standards? What does mastery look like for the standards in this unit?
Stage five: Analyzing student learning	Are students learning what they are supposed to be learning? Do we agree on student evidence of learning?
Stage six: Adapting instruction to student needs	How can we adjust instruction to help those students struggling and those exceeding expectations?
Stage seven: Reflecting on instruction	Which lesson-design practices are most effective with our students?

Visit **go.solution-tree.com/commoncore** for a reproducible version of this table.

Teams that are at the first three stages of collaborative team development are trying to understand what they are supposed to do and accomplish as a team. They may need your help in setting their agendas, bringing a focus to their work, and learning how to plan for the unit-by-unit work of the team—calendars, assignments, projects, timing of review days, and so on. Teams in stages four and five are coordinating common planning of instruction and assessment, developing common assessment instruments and

tasks, and analyzing student results. The teams may not take collective action on those results, but they are coordinating the generation and use of common learning targets, mathematical tasks, and assessments. It is in the final two stages that teams are actually *collaborating* as members take collective responsibility for the learning of all students, differentiating instruction based on their collective understanding of student progress and designing assessments based on student needs by reflecting on the question, "Which practices are most effective with our students?" (Graham & Ferriter, 2008, p. 42). If, after analyzing the data from the unit common assessment instrument (test), your teams develop a differentiated lesson design to either extend the knowledge and reasoning of students who have mastered the learning target or to provide targeted support for struggling learners (stage six), then a more authentic and interdependent collaboration is under way. Collaborative teams achieve stage seven when they regularly make adjustments to instruction based on learner needs and discuss and implement instructional and assessment strategies that have the greatest impact on student learning.

You can use table 1.1 to help your teams diagnose, monitor, and assess their collaborative teams' stages of development and supply crucial data to the professional development action required for their growth as collaborative teams. You should use this tool to measure the stage at which each team in your sphere of influence operates. Are they cooperating, coordinating, or collaborating? When the teams in your PLC work together, you can observe to determine: Are discussions focused on sharing lessons or activities without inquiry into assessing student learning? Are meetings centered on when the unit test will be given in class without questioning how teachers are connecting larger concepts throughout the unit? You can use the table 1.1 descriptors to determine the current stage of team development throughout your school and to help your teams become more aware of whether or not their weekly meetings and discussions are moving beyond cooperation and into the desired direction of stage six and stage seven collaboration. However, there are several barriers to effective collaboration that you can help remove to ensure your collaborative teams are maximizing their potential.

Leading Collaborative Practices

One of the goals of stage seven is to pursue high *within-school* teacher knowledge capacity and low *between-teacher* implementation variance in terms of mathematics content, pedagogical knowledge, and assessment knowledge. According to Barber and Mourshed (2007) in *How the World's Best Performing School Systems Come Out on Top*, the world's highest-performing school systems are able to "decrease the pedagogical variability between teachers and increase the quality of instruction. . . . They do this by establishing clear instructional priorities and investing in teacher preparation and professional development" (p. 12). Five critical collaborative team areas impact effectiveness and will need your support. They are:

1. Participation
2. Commitments
3. Leaders

4. Agendas and meeting minutes
5. Team time

In order to do the teamwork described in figure 1.1 and to move effectively and efficiently to the more advanced stages of team collaboration, it is important you provide guidance to your teams for each of these five collaboration factors.

Participation

The members of the various collaborative teams under your influence will vary according to the needs of your school or district. For larger schools, collaborative teams may be comprised of all teachers of a particular course, content level, or grade level. For example, a collaborative team may be all teachers of advanced algebra or mathematics 2, teachers of multiple grade levels (like seventh or eighth grade), teachers of a single grade level (like all third-grade teachers), or those who teach honors-level mathematics courses. Your collaborative teams also benefit from other faculty and staff members participating on the team. School support personnel such as counselors, special needs or English learner (EL) teachers, or paraprofessional tutors might also be considered to participate on various mathematics collaborative teams, as they can both receive and provide insight and support to a coherent collaborative team response to intervention in your school or district.

For smaller schools, your teams might be too small. It can be difficult to collaborate when there are a limited number of teachers in your school or there is only one grade-level or course-based teacher. In that case, the collaborative team can expand to include all members of a grade band, like 3–5, or all members of a department. *Personal learning networks* (PLNs)—groups of colleagues and experts that communicate, usually in an online capacity, to learn and share information—also greatly enhance teachers' collaboration. Teachers can share information with colleagues (a *blog buddy* perhaps) outside of their school. Their work together might focus more on vertical articulation, sharing of expectations for learning targets, common unit-by-unit tasks, assessments, and the effective instruction and support needed for all students.

Team members need only have a common curricular, instructional, or assessment focus about which to collaborate. While there is no ideal or magic number of teachers on a collaborative team, experience seems to suggest that teams much larger than seven or eight can be challenging. When your teams are too large, discussions become unwieldy, and a few extroverted teachers can hijack participation, limiting the voices of other team members who may not be heard (Horn, 2010). It is possible for larger teams to engage in productive dialogue. However, a higher level of facilitation of the collaborative work will be required to ensure all voices are heard. Principals, mathematics department chairs, or K–12 instructional leaders and coaches should also consider teacher compatibility and social/emotional intelligence when determining teacher assignments each year (Goleman, 2007).

Commitments

You, as a school leader, need to explicitly communicate expectations for how collaboration looks and sounds. In *What Works in Schools*, Marzano (2003) identifies the necessity

for collegiality. *Collegiality* is defined as the way teachers interact with each other in a manner that is professional. Roland Barth (2006) provides a description of collegiality.

> When I visit a school and look for evidence of collegiality among teachers and administrators—signs that educators are "playing together"—the indicators I seek are:
>
> 1. Educators talking with one another about practice
> 2. Educators sharing their craft knowledge
> 3. Educators observing one another while they are engaged in practice
> 4. Educators rooting for one another's success (p. 10)

Michael Fullan and Andy Hargreaves (1996) explain that professional behaviors include respect for one another, a willingness to share mistakes, and an openness to critique practices and procedures (as cited in Marzano, 2003). Sharing mistakes and being open to criticism can be daunting. Thus, your teams will need to establish and enforce norms or collective commitments of conduct and behavior if teachers are to work in collaborative teams that promote a level of openness and vulnerability.

The purpose of designing collective team commitments is to create a respectful, open environment that encourages diversity of ideas and invites professional criticism combined with close inspection of practices and procedures. Various protocols are available to assist your teams in establishing actions to which team members agree to adhere. The process need not be arduous, complicated, or time consuming. The protocol in figure 1.1 is one model you can use to establish and then review your collaborative teams' collective commitments throughout the year.

Setting Team Collective Commitments

Because we need our best from one another when working as a team, it is essential that we set collective commitments for our work cultures. Collective commitments are values and beliefs that will describe how we choose to treat each other and how we can expect to be treated.

As we set three to four collective commitments for ourselves, please note that establishing these does not mean that we are not already good people who work together productively. Having collective commitments simply reminds us to be highly conscious about our actions and what we can expect from each other as we engage in conversations about our challenging work.

Step One

Write three or four "We will" statements that you think will have the most positive influence on our group as we collaborate on significant issues about teaching and learning. Perhaps reflect on past actions or behaviors that have made teams less than productive. These are only a jumpstart for your thinking.

Step Two

Partner with another colleague to talk about your choices and the reasons for your selection. Together decide on three or four commitments from your combined lists.

Figure 1.1: Setting teacher team collective commitments protocol. continued →

Step Three

Partner with two or four other colleagues to talk about your choices and the reasons for your selection. Together decide on three or four commitments from your combined lists.

Step Four

Make a group decision. Prepare to share your choices with the whole group.

Step Five

Adopt collective commitments by consensus. Invite clarification and advocacy for particular commitments. Give all participants four votes for norm selection. It is wise not to have more than five or six norms.

Source: Adapted from P. Luidens, personal communication, January 27 and April 9, 2010.

Visit **go.solution-tree.com/commoncore** for a reproducible version of this figure.

Your collaborative teams should keep collective commitments focused on behaviors and practices that will support your team's collaborative work. Some teams find it useful to post their norms in a conspicuous place as a reminder to each other. Other collaborative teams might choose a commitment to highlight at each meeting as a reminder of their commitments. (Visit www.allthingsplc.info under Tools & Resources for additional ideas.)

For one particular mathematics collaborative team, members decided to make their collective commitments to (1) listen to understand others, (2) challenge ideas respectfully, and (3) keep the agenda focused on teaching and learning. Although the team was relatively the same group as the previous year, members reflected on the previous year and felt that sometimes one or two individuals passionate about their ideas often hijacked the discussions without hearing others' ideas. The collective commitments reflect the collaborative team's dedication to hearing all ideas and respectfully challenging each other.

Your leadership can help each team member take responsibility to hold one another accountable for the agreed-on team commitments. This is a form of peer-to-peer, or *lateral*, accountability. It must become a permissible and expected aspect of the team culture for team members to address those members not adhering to the norms. If needed, you must help your collaborative teams establish a process that addresses what happens when team norms are not honored. The purpose of the collective commitments and norms is to raise the level of professionalism and liberate the team to openly, safely, and respectfully discuss the work at hand.

Your leadership role is to help each team develop a clear conflict-resolution plan, should members violate the norms. Kanold (2011a) provides one such process team members could follow—Care Enough to Confront, which requires team members to keep a short account of any issue. As he describes:

> Every team encounters some adversity as members debate and argue about important practices and methods for the teaching and learning. Once the *care enough to confront* discussion is completed, everyone on the team must let it go, move on, and keep a short mental account of the

> issue. Team members who harbor long-term resentments will be toxic to the team's growth. (p. 109)

As collaborative teams grow, develop, or change membership, collective commitments and ways to celebrate and be accountable to those commitments will likely change. Regardless of whether the collaborative team commitments do change, each year collective commitments should be revisited and reviewed. This will be more beneficial if done at the start of the year and at the end of each semester.

Leaders

Just as effective staff development needs planning and facilitation, collaborative team meetings also need intentional forethought and a team leader. The role of team leader or meeting facilitator might rotate or be delegated to one individual. On one hand, one person assigned team leader for the entire school year might bring continuity to team discussions and functions. (A team leader may have other responsibilities related to the team's work in addition to leading team meetings.) On the other hand, rotating the role of team leader or meeting facilitator gives more teachers the opportunity to take ownership and develop in their ability to facilitate discussions.

To make the most of the collaborative team meeting time, an effective collaborative team always knows who is *driving the meeting bus*. The team leader should be an intentional choice on your part, so as to maximize the team's ability to collaborate by inviting diversity of thought and challenging ideas and practices. An effective team leader will encourage all members to participate and ask questions to push for clarity and understanding. An effective team leader will also summarize team questions, understandings, decisions, and actionable items as he or she collaborates with you to help achieve the broader goals of the school. This person provides the follow-up work for team action.

One of your responsibilities is to provide ongoing training for your team leaders to make sure they are confident to manage the energy and the pacing of the meetings and ensure the meeting is effective for all participants, including members who do not process information as quickly as others.

Agendas and Meeting Minutes

Designing collaborative teams for mathematics is a considerable commitment of resources in people, money, and time. The payoff occurs when the teacher collaboration around teaching and learning mathematics results in professional growth and increased student achievement. Agendas and minutes of each meeting are tools that lend themselves to more efficient use of time. The designated team leader takes responsibility for seeking input from team members, determining the agenda, and making the agenda public to you and the team a few days prior to the meeting. Agendas acknowledge that time is valuable. They are essential to successful meetings (Garmston & Wellman, 2009). An agenda need not be complicated or long, but it needs to be purposeful. You should monitor the team agendas, and they should be posted electronically for review. Figure 1.2 (page 18) provides a sample mathematics agenda from a seventh-grade collaborative team.

Tuesday, October 16

- Share and analyze results from exponents unit assessment.
  - How did our students do overall?
  - Were the results what we expected?
  - Did anyone's students do better on each learning standard? What might those teachers have done differently than the rest of us?
- Review learning targets for the statistics unit.
  - Do our learning targets capture the key content concepts?
  - Do the learning targets together represent a balance of higher-level reasoning and procedural fluencies?
- Bring ideas for introducing statistics.
  - What have you tried in the past that seems to have worked?
  - Are there ideas, problems, and strategies that you tried that didn't work?
  - What task or problem might we use to help understand our students' prior knowledge about statistics?

Figure 1.2: Sample team meeting agenda.

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Notice that the agenda is composed of quick bullet points that communicate the focus of the meeting so your team members can come prepared with ideas, data, or other possible resources. Also note that the team leader provides guiding questions for team members to reflect on prior to the meeting. The team leader has primed the pump of the meeting expectations, so to speak. If the team leader does not know how to do this, you may need to give him or her guidance until he or she is confident in this peer leadership role. Team members who give prior thought and consideration to the agenda topics make the meeting more productive.

Meeting minutes, similar to the agenda, are beneficial, should be posted electronically, and do not need to be overly detailed. Minutes serve many useful purposes. First, minutes for each meeting capture the actions and decisions that the team has made. Teams have found it useful to go back to minutes from earlier in the year or even from the previous year to recall discussions related to the ordering of content or why they decided to use a particular instructional approach for a concept. Minutes also capture who is responsible for various action steps, such as creating a scoring rubric and key for a quiz or test or arranging artifact copies for all team members. The minutes provide you with quick insight into the activities of the team.

Second, the team meeting minutes are an efficient way to communicate to others what transpired at the meeting. If a teacher is unable to attend a meeting, you can use the minutes as a resource to let him or her know what the team discussed and decided. Much like students absent from class, teachers absent from a team meeting are still expected to know and carry out the team's decisions (and you must make this expectation clear

to them). Technology is an effective means by which to make minutes public to others. Minutes can be posted in email, or to a wiki, a blog, or a team website, to name a few.

Finally, the minutes provide you with targeted guidance, direction, or resources to support your collaborative team's work. Figure 1.3 provides an example of a High School Geometry Team's meeting minutes that were electronically posted.

- After today's meeting, we are thinking about doing a variation of Val's social-emotional learning activity after the first quiz, which we'll discuss at the next meeting.
- We discussed how to deal with the shortened first-term grading period. We are thinking we should stay with the plan of giving the cumulative exam on the Monday after the grading period ends.
- We discussed ways to deal with properties of quadrilaterals rather than doing the lab. We decided to eliminate the lab because it does not mirror the student problem-solving thought process we are trying to develop for this unit.
- We decided on partial credit for multiple-choice questions on tests and the formulas to use in chapter 12, as long as students show all work.

Figure 1.3: Sample Geometry Team meeting minutes.

Visit **go.solution-tree.com/commoncore** for a reproducible version of this figure.

Laying the groundwork for collaboration by articulating expectations of how collaborative teams will work together (toward constructive discussions and decision making) and the logistics of announcing and capturing your team discussions is essential. Attention to these fundamental team-management issues supports deeper and more meaningful discussions that will impact student mathematics learning. Once you have established, articulated, and enforced expectations about collaboration, your teams can engage in meaningful discussions around teaching and learning mathematics.

Team Time

Other than providing the right type of monitoring and guidance for teamwork, you should ensure teams have the necessary time to meet, which is one of the important aspects of your leadership role. Significant student achievement gains result when collaborative learning teams are provided with sufficient and consistent time to collaborate (Saunders, Goldenberg, & Gallimore, 2009). The world's highest-performing countries in mathematics or sustained educational improvers—Singapore, Hong Kong SAR, South Korea, Chinese Taipei, and Japan—allow significant time for mathematics teachers to collaborate and learn from one another (Stigler & Hiebert, 1999; Barber & Mourshed, 2007). Meaningful CCSS implementation will require time—time to digest the CCSS domains and content standard clusters, time to design lessons and tasks that engage students in the Mathematical Practice, time to create a coherent unit-by-unit curriculum implementation plan, time to design instruction and assessments together, and time to plan and deliver interventions as determined by students' learning needs.

Finding ways to make more effective use of the time currently available and seeking ways to enhance time available—*as part of the teachers' contractual workday*—are

essential professional development issues for every school leader. Time is often the toughest challenge principals, school leaders, and teachers encounter. How can you find time for professional development activities in the already crowded school schedule?

Teaching children mathematics well is a complex activity that is learned through teacher knowledge sharing, coaching, professional development experiences, and field-based experience. Teachers as professionals need time to reflect on the success and failures of their daily lessons and weekly assessments with others who are working toward similar grade-level or course-based goals. By building time for professional development into the regular school day, you convey a message about the importance of continuous and ongoing learning. Although the grade-level books for the teachers and teacher teams in this series will provide more specific ideas for how to do so, insight into this process is available in "Making Time for Collaboration" at AllThingsPLC (n.d.; www.allthingsplc.info/pdf/articles/MakingTimeforCollaboration.pdf).

Figure 1.4 provides a few ideas for how to make collaborative team professional development time a priority in your school (Bowgren & Sever, 2010; Loucks-Horsley, Love, Stiles, Mundry, & Hewson, 2003).

1. Provide common time by scheduling most, if not all, team members to have the same period or time of day free from teaching.
2. Create an altered schedule for early-release or late-arrival students on an ongoing basis, if feasible to your community.
3. Use substitutes to roll through the day, releasing different collaborative teams for a few hours at a time.
4. Occasionally release teachers from teaching duties or other supervision duties in order to collaborate with colleagues.
5. Restructure time by permanently altering teacher responsibilities, the teaching schedule, the school day, or the school calendar.
6. Purchase teacher time by providing compensation for weekends and summer work.

Figure 1.4: Options for scheduling teacher collaboration time.

First and foremost, teachers need to be provided adequate time to achieve the expectations of ongoing weekly mathematics professional development. Reeves (2009) asserts it is a myth that people love to collaborate. He notes that real and meaningful collaboration requires time, practice, and accountability: "Schools that claim, for example, to be professional learning communities but fail to provide time for collaboration are engaging in self-delusion" (p. 46). School district leaders sincere in their efforts to create a PLC school culture will design creative ways to build time into the weekly schedule for collaboration around mathematics.

As teachers collaborate, their beliefs about teaching and learning are revealed. Through meaningful discourse, teams seek to reconcile inconsistency of ideas and practices in the quest to continuously improve student mathematics learning. This ongoing process of sharing, questioning, and reconciling ideas culminates in professional learning, which in

turn brings about more equity and access for all students. As the school leader, you must ensure that each collaborative team is efficiently and effectively focused on activities and actions that have a high-leverage payoff for improving student achievement.

High-Leverage Professional Development for the Common Core

You can use figure 1.5 to help your collaborative teams focus their collective energy on meaningful collaboration activities on a unit-by-unit basis. This top-ten list provides a coherent focus for movement toward erasing current inequities in teacher practice and places teacher time and talent on actions that more directly impact student learning. In order to justify the time provided, quality teacher team collaboration should take place around high-leverage issues. Figure 1.5 provides specific guidance to the most essential issues for your teams' work. Each team's specific, measurable, attainable, results-oriented and time-bound (SMART) student achievement goal plan for the year should contain some elements of these ten essential team actions—depending on the focus of the team for the school year. You must help your teams to answer the question, How will we know if our work mattered?

Teaching and Learning

1. The team designs and implements agreed-on prior knowledge skills to be assessed and taught during each lesson of the unit. The collaborative teacher team reaches agreement for teaching and learning in the lessons and unit.
2. The team designs and implements agreed-on lesson-design elements that ensure active student engagement with the mathematics. Students experience some aspect of the CCSS Mathematical Practices, such as Construct viable arguments and critique the reasoning of others or Attend to precision, within the daily lessons of every unit or chapter.
3. The team designs and implements agreed-on lesson-design elements that allow for student-led summaries and demonstrations of learning the daily lesson.
4. The team designs and implements agreed-on lesson-design elements that include the strategic use of tools—including technology—for developing student understanding.

Assessment Instruments and Tools

1. The team designs and implements agreed-on common assessment instruments based on high-quality exam designs. The collaborative team designs all unit exams, unit quizzes, final exams, writing assignments, and projects for the course.
2. The team designs and implements agreed-on common assessment instrument scoring rubrics for each assessment in advance of the exam.
3. The team designs and implements agreed-on common scoring and grading feedback (level of specificity to the feedback) of the assessment instruments to students.

Figure 1.5: High-leverage unit-by-unit actions of mathematics collaborative teams.

continued →

Formative Assessment Feedback

1. The team designs and implements agreed-on adjustments to instruction and intentional student support based on both the results of daily formative classroom assessments and the results of student performance on unit or chapter assessment instruments such as quizzes and tests.
2. The team designs and implements agreed-on levels of rigor for daily in-class prompts and common high-cognitive-demand tasks used to assess student understanding of various mathematical concepts and skills. This also applies to variance in rigor and task selection for homework assignments and expectations for make-up work. This applies to depth, quality, and timeliness of teacher descriptive formative feedback on all student work.
3. The team designs and implements agreed-on methods to teach students to self-assess and set goals. Self-assessment includes students using teacher feedback, feedback from other students, or their own self-assessments to identify what they need to work on and to set goals for future learning.

Visit **go.solution-tree.com/commoncore** for a reproducible version of this figure.

Meaningful CCSS implementation will require time—time to digest the CCSS standards, content standard clusters, and Mathematical Practices; time to create a coherent curriculum; and time to design instruction and assessments around the high-leverage actions listed in figure 1.5. Use figure 1.5 as a monitoring tool as you examine the week-in, week-out work of your various collaborative teams.

Collaborative Protocols

Several protocols combine collaboration with a spotlight on the teaching and learning of mathematics. Five structured protocols can be especially beneficial in your work with diverse teacher teams. These protocols provide different settings in which you can collaborate and share reflections and beliefs about teaching and learning.

1. **Lesson study:** Lesson study differs from lesson planning. Lesson study focuses on what teachers want students to learn; lesson planning focuses on what teachers plan to teach. In lesson study, a teacher team develops a lesson together, and one teacher teaches the lesson while the others observe the student learning. (This part of the protocol will require your support with substitutes.) Each teacher collects observational data during the lesson to support the lesson's learning targets. The team then comes together to debrief the lesson and revise as needed to incorporate what students have learned.

   Lesson study may seem time and work intensive for a single lesson. Nonetheless, the benefit of lesson study is the teacher professional learning that results from the deep, collaborative discussions about mathematics content, instruction, and student learning. See the lesson-study references listed in the Extending My Understanding section (page 24) for more information about this powerful activity.

2. **Peer coaching:** Peer coaching is a kind of partnership in which two or three teachers engage in conversations focused on their reflections and thinking about their instructional practices. The discussions lead to a refinement and formative assessment response to classroom practice. The participants may rotate roles—discussion leader, mentor, or advocate. Teachers who engage in peer coaching are willing to reveal strengths and weaknesses to each other. Peer coaching creates an environment in which teachers can be secure, connected, and empowered through transparent discussions of each others' practice.
3. **Case study:** Case study can be used to address a wide range of topics or problems collaborative teams encounter. The case study presents a story—one involving issues or conflicts that need to be resolved through analysis of available resources leading to constructive plans to address the problem. Typically, case studies are used to examine complex problems—the school's culture, climate, attendance, achievement, teaching, and learning (Baccellieri, 2010). The best cases are based on team members' real classroom events. This is a great opportunity to expand the work of your coaches and instructional leaders to focus on the work of the team rather than individual teachers.
4. **Book study:** Book study is a familiar and popular activity for teachers to engage in conversations with colleagues about professional books. It may be a formalized activity for some collaborative teams; however, book study can emerge in any number of ways—from hearing an author speak at a conference, from a colleague's enthusiastic review of a book, or from the mutual interests of teachers who want to learn more about a topic. Book study promotes conversations among faculty and staff that can lead to the application of new ideas in the classroom and improvement of existing knowledge and skills. Book study is a great way to connect with a personal learning network as you blog, tweet, skype, or use other forms of communication to connect with colleagues outside of your school.
5. **Collaborative grading:** Collaborative grading occurs as your teams reach stages four and five (see table 1.1, page 12) of team collaboration. In this situation, you and your colleagues design a common unit test together and assign point values with scoring rubrics for each question on the exam. Teachers grade and discuss the quality of student responses on the assessment instrument together and develop an inter-rater reliability for scoring of the assessment tool. Achieving consistency in grading students' assignments and assessments is an important goal for collaborative teams.

From the point of view of instructional transparency and improvement, lesson study is a particularly powerful collaborative tool that merits close consideration. Lesson study has been shown to be very effective as a collaborative protocol with a high impact on teacher professional learning (Hiebert & Stigler, 1999).

Looking Ahead

Preparing to implement the CCSS provides a unique opportunity for your school or district to embrace the idea that schools should become learning institutions for the adults as well as the students. The CCSS in mathematics and in English language arts can serve as this catalyst. Effective professional development is not only a prerequisite for improved student achievement but also a commitment to the investment in the professionals who have the largest impact on students in schools.

The process of collaboration capitalizes on the fact that teachers come together to use diverse experiences and knowledge to create a whole that is larger than the sum of the parts. Teacher collaboration is *the* solution to sustained professional learning—an ongoing and never-ending process of teacher growth necessary to meet the demands of the CCSS expectations. The National Board for Professional Teaching Standards (2010) states the following with respect to professional teachers:

> Seeing themselves as partners with other teachers, they are dedicated to improving the profession. They care about the quality of teaching in their schools, and, to this end, their collaboration with colleagues is continuous and explicit. They recognize that collaborating in a professional learning community contributes to their own professional growth, as well as to the growth of their peers, for the benefit of student learning. Teachers promote the ideal that working collaboratively increases knowledge, reflection, and quality of practice and benefits the instructional program. (p. 75)

The new paradigm for the professional development of mathematics teachers requires an understanding that the knowledge capacity of every teacher matters. More importantly, however, is that every teacher *acts* on that knowledge and transfers the professional development he or she receives into daily classroom practice—truly closing the knowing-doing gap. Part of your leadership role is to ensure that every teacher grows professionally and subsequently acts on his or her new knowledge.

In the chapters that follow, the Standards for Mathematical Practice and the content standards of the CCSS will be unpacked, and the role collaborative teams play in implementing and supporting all students' successful acquisition of these new standards through highly effective instructional, assessment, and intervention practices will be explored in greater depth. We will provide tools to assist you in your work as you make the vision of the Common Core State Standards a reality in your school and for all students.

Chapter 1 Extending My Understanding

1. A critical tenet of a PLC's mathematics program is a shared vision for the teaching and learning mathematics in your school program.
    a. Do you have a shared vision of what teaching and learning mathematics looks like for your school or district? If not, how might you create one?
    b. Does this vision build on current research in mathematics education?
    c. Does your vision embrace collaboration as fundamental to the ongoing professional learning of faculty and staff?

2. Graham and Ferriter (2008) identify seven stages of collaborative team development. These stages characterize team development evolving from cooperating to coordinating, leading ultimately to a truly *collaborative* team.
    a. Using table 1.1 (page 12), at what stage are your various collaborative teams currently operating?
    b. What role might you play in helping your team transition toward stages six and seven?
3. Using figure 1.5 (page 21), identify the high-leverage actions your collaborative teams currently practice extremely well. Rate the current levels of implementation (0 percent low and 100 percent high). How might you use this information to identify which actions should be teams' priorities during this school year or the next school year?
4. Implementing the content and CCSS Mathematical Practices might seem daunting to some teachers, and as a result, there may be resistance to or half-hearted attempts at needed changes in content, instruction, or assessment. Consider leading your collaborative teams through a Best Hopes, Worst Fears activity. Give team members two index cards. On one, have them identify their best hopes for implementing the CCSS. On the other card, have team members record their worst fears. Depending on the level of trust and comfort of the team, you might collect the index cards and read the best hopes and worst fears anonymously, or individuals can read their hopes and fears aloud to the group. The purpose of this activity is to uncover concerns that if left undiscovered might undermine collaborative teamwork. Your teams should talk about how they can support one another to minimize fears and achieve best hopes.
5. Pages 22–23 list several collaborative protocols. Choose a protocol that you are either familiar with or would like to learn more about. How might you use that protocol to engage your various collaborative teams into a deeper discussion for implementing CCSS content or Mathematical Practices?

Online Resources

Visit **go.solution-tree.com/commoncore** for links to these resources. Visit **go.solution-tree.com/plcbooks** for additional resources about professional learning communities.

- ***The Five Disciplines of PLC Leaders*** **(Kanold, 2011a; go.solution-tree.com/plcbooks/Reproducibles_5DOPLCL.html):** Chapter 3 discusses the commitment to a shared mission and vision by all adults in a school for several tools targeted toward collaborative actions. These reproducibles engage teachers in professional learning and reflection.
- **Chicago Lesson Study Group (www.lessonstudygroup.net/index.php):** The Chicago Lesson Study Group provides a forum for teachers to learn about and practice lesson study as a way to steadily improve student learning. To

learn more about lesson study or other collaborative protocols, the following resources are suggested.

- *Lesson Study: A Handbook of Teacher-Led Instructional Change* (Lewis, 2002)
- *Powerful Designs for Professional Learning* (Easton, 2008)
- *Leading Lesson Study* (Stepanek, Appel, Leong, Managan, & Mitchell, 2007)
- *Data-Driven Dialogue: A Facilitator's Guide to Collaborative Inquiry* (Wellman & Lipton, 2004)

- **AllThingsPLC (www.allthingsplc.info):** Search the Tools & Resources for sample agendas and activities for collaborative work.
- **The Center for Comprehensive School Reform and Improvement (www.centerforcsri.org/plc/websites.html):** The website offers a collection of resources to support an in-depth examination of the work of staff in learning teams.
- **Inside Mathematics (2010; www.insidemathematics.org/index.php/tools-for-teachers/tools-for-principals-and-administrators):** This portion of the Inside Mathematics website is designed to support school-based administrators and district mathematics supervisors who have the responsibility for establishing the structure and vision for the work of grade-level and cross-grade-level learning teams.
- **Learning Forward (2011; www.learningforward.org/standards/standards.cfm):** Learning Forward is an international association of learning educators focused on increasing student achievement through more effective professional learning. This website provides a wealth of resources, including an online annotated bibliography of articles and websites to support the work of professional learning teams.
- **The National Commission on Teaching and America's Future (Fulton & Britton, 2011; www.nctaf.org/wp-content/uploads/NCTAFreportSTEMTeachersinPLCsFromGoodTeacherstoGreatTeaching.pdf):** With the support of the National Science Foundation and in collaboration with WestEd, NCTAF released *STEM Teachers in Professional Learning Communities: From Good Teachers to Great Teaching.* NCTAF and WestEd conducted a two-year analysis of research studies that document what happens when science, technology, engineering, and math teachers work together in professional learning communities to improve teaching and increase student achievement. This report summarizes that work and provides examples of projects building on that model.
- **The Mathematics Common Core Toolbox (www.ccsstoolbox.org):** This website provides coherent and research-affirmed protocols and tools to help you in your CCSS collaborative teamwork. The website also provides sample scope and sequence documents and advice for how to prepare for CCSS for mathematics implementation.