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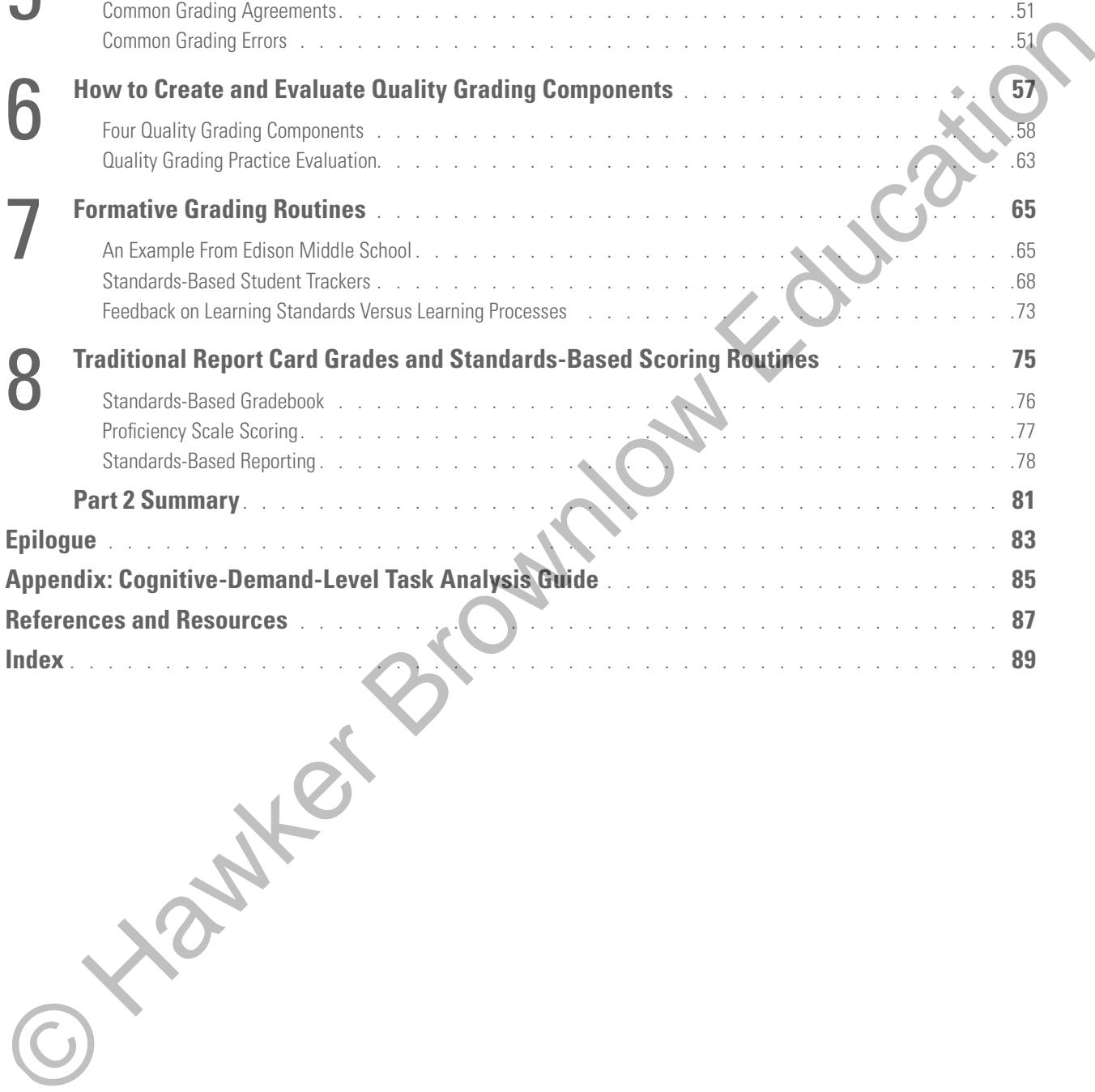
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Introduction

If you are a teacher of mathematics, then this book is for you! Whether you are a novice or a master teacher; an elementary, middle, or high school teacher; a rural, suburban, or urban teacher; this book is for you. It is for all teachers and support professionals who are part of the K–12 mathematics learning experience.

Teaching mathematics so *each and every student* learns the K–12 college-preparatory mathematics curriculum, develops a positive mathematics identity, and becomes empowered by mathematics is a complex and challenging task. Trying to solve that task in isolation from your colleagues will not result in erasing inequities that exist in your schools. The pursuit and hope of developing into a collaborative community with your colleagues and moving away from isolated professional practice are necessary, hard, exhausting, and sometimes overwhelming.

Your professional life as a mathematics teacher is not easy. In this book, you and your colleagues will focus your time and energy on collaborative efforts that result in significant improvement in student learning.

Some educators may ask, “Why become engaged in collaborative mathematics teaching actions in your school or department?” The answer is simple: *equity*.

What is equity? To answer that, it is helpful to first examine inequity. In traditional schools in which teachers work in isolation, there is often a wide discrepancy in teacher practice. Teachers in the same grade level or course may teach, assess, assign homework, and grade students in mathematics quite differently—there may be a lack of consistency in what teachers expect students to know and be able to do, how they will know when students have learned, what they will do when

students have not learned, and how they will proceed when students have demonstrated learning. Such wide variance in potential teacher practice among grade-level and course-based teachers then causes inequities as students pass from course to course and grade to grade.

These types of equity issues require you and your colleagues to engage in team discussions around the development and use of homework and grading practices that provide evidence of and strategies for improving student learning.

Equity and PLCs

The PLC at Work process is one of the best and most promising models your school or district can use to build a more equitable response for student learning. The architects of the PLC process, Richard DuFour, Robert Eaker, and Rebecca DuFour, designed the process around three big ideas and four critical questions that placed learning, collaboration, and results at the forefront of our work (DuFour et al., 2016). Schools and districts that commit to the PLC transformation process rally around the following three big ideas (DuFour et al., 2016).

1. **A focus on learning:** Teachers focus on learning as the fundamental purpose of the school rather than on teaching as the fundamental purpose.
2. **A collaborative culture:** Teachers work together in teams interdependently to achieve a common goal or goals for which members are mutually accountable.

3. **A results orientation:** Team members are constantly seeking evidence of the results they desire—high levels of student learning.

Additionally, teacher teams within a PLC focus on four critical questions (DuFour et al., 2016) as part of their homework and grading routines used to inspire student learning.

1. What do we want all students to know and be able to do?
2. How will we know if students learn it?
3. How will we respond when some students do not learn?
4. How will we extend the learning for students who are already proficient?

The four critical PLC questions provide an equity lens for your professional work. Imagine the opportunity gaps that will exist if you and your colleagues do not agree on the level of rigor for PLC critical question 1 (DuFour et al., 2016): What do we want all students to know and be able to do?

Imagine the devastating effects on students if you do not reach complete team agreement on the high-quality criteria for the homework you assign (see PLC critical question 2) and your routines for how you score homework and use grades to inspire a formative student learning response. Imagine the lack of student agency (their voice in learning) if you do not work together to create a unified, robust formative mathematics grading process for helping students *own* their response when they are and are not learning.

To answer these four PLC critical questions well requires structure through the development of home-

work and grading *products* for your work together, and a formative culture *process* for how your students will embrace their errors on the practice you provide.

The concept of your *team reflecting together and then taking action* around the right work is an emphasis in the *Every Student Can Learn Mathematics* series. The potential actions you and your colleagues take together improve the likelihood of more equitable mathematics learning experiences for every K–12 student.

The Reflect, Refine, and Act Cycle

Figure I.1 illustrates the reflect, refine, and act cycle, our perspective about the process of lifelong learning—for us, for you, and for your students. The very nature of our profession—education—is about the development of skills toward learning. Those skills are part of an ongoing process we pursue together.

More important, the reflect, refine, and act cycle is a *formative* learning cycle we describe throughout all four books in the series. When you embrace mathematics learning as a *process*, you and your students:

- **Reflect:** Work the task, and then ask, “Is this the best solution strategy?”
- **Refine:** Receive FAST feedback and ask, “Do I embrace my errors?”
- **Act:** Persevere and ask, “Do I seek to understand my own learning?”

The intent of the *Every Student Can Learn Mathematics* series is to provide you with a systemic way to structure and facilitate deep team discussions necessary to lead an effective and ongoing adult and student learning process each and every school year.

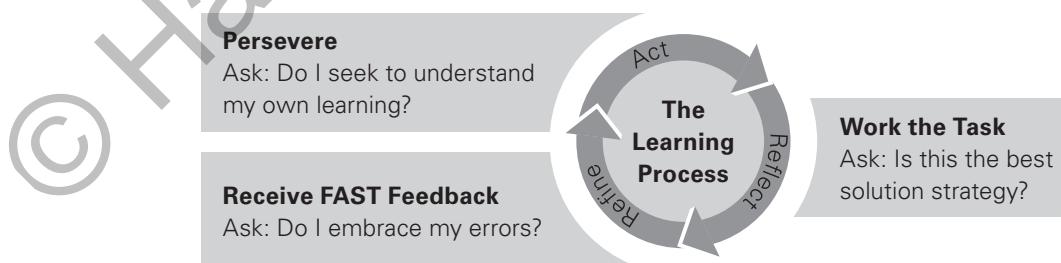


Figure I.1: Reflect, refine, and act cycle for formative student learning.

Mathematics in a PLC at Work Framework

The *Every Student Can Learn Mathematics* series includes four books that focus on a total of six teacher team actions and two coaching actions within four larger categories.

1. *Mathematics Assessment and Intervention in a PLC at Work*
2. *Mathematics Instruction and Tasks in a PLC at Work*

3. *Mathematics Homework and Grading in a PLC at Work*
4. *Mathematics Coaching and Collaboration in a PLC at Work*

Figure I.2 shows each of these four categories and the two actions within each. These eight actions focus on the nature of the ongoing, unit-by-unit professional work of your teacher teams and how you should respond to the four critical questions of a PLC (DuFour et al., 2016).

<i>Every Student Can Learn Mathematics</i> series' Team and Coaching Actions Serving the Four Critical Questions of a PLC at Work	1. What do we want all students to know and be able to do?	2. How will we know if students learn it?	3. How will we respond when some students do not learn?	4. How will we extend the learning for students who are already proficient?
Mathematics Assessment and Intervention in a PLC at Work				
Team action 1: Develop high-quality common assessments for the agreed-on essential learning standards.	■	■		
Team action 2: Use common assessments for formative student learning and intervention.			■	■
Mathematics Instruction and Tasks in a PLC at Work				
Team action 3: Develop high-quality mathematics lessons for daily instruction.	■	■		
Team action 4: Use effective lesson designs to provide formative feedback and student perseverance.			■	■
Mathematics Homework and Grading in a PLC at Work				
Team action 5: Develop and use high-quality common independent practice assignments for formative student learning.	■	■		
Team action 6: Develop and use high-quality common grading components and formative grading routines.			■	■
Mathematics Coaching and Collaboration in a PLC at Work				
Coaching action 1: Develop PLC structures for effective teacher team engagement, transparency, and action.	■	■		
Coaching action 2: Use common assessments and lesson-design elements for teacher team reflection, data analysis, and subsequent action.			■	■

Figure I.2: Mathematics in a PLC at Work framework.

Most commonly, a collaborative team consists of two or more teachers who teach the same grade level or course. Through your focused work addressing the four critical questions of a PLC, you provide every student in your grade level or course with equitable learning experiences and expectations, opportunities for sustained perseverance, and robust formative feedback, regardless of the teacher he or she receives.

If, however, you are a singleton (a lone teacher who does not have a colleague who teaches the same grade level or course), you will have to determine who it makes the most sense for you to work with as you strengthen your lesson design and student feedback skills. Leadership consultant and author Aaron Hansen (2015) suggests the following possibilities for creating teams for singletons.

- Vertical teams (for example, a primary school team of grades K–2 teachers or a middle school mathematics department team for grades 6–8)
- Virtual teams (for example, a team comprising teachers from different sites who teach the same grade level or course and collaborate virtually with one another across geographical regions)
- Grade-level or course-based teams (for example, a team of grade-level or course-based teachers in which each teacher teaches all sections of grade 6, grade 7, or grade 8; the teachers might expand to teach and share two or three grade levels instead of only one to create grade-level or course-based teams)

About This Book

Every grade-level or course-based collaborative team of mathematics teachers in a PLC is expected to meet on an ongoing basis to discuss how its mathematics lessons ask and answer the four critical questions as students are learning (DuFour et al., 2016). In this third book in the series, we explore two specific team actions for your professional work.

- **Team action 5:** Develop and use high-quality common independent practice assignments for formative student learning.
- **Team action 6:** Develop and use high-quality common grading components and formative grading routines.

Why is homework and grading so important to your work as a mathematics teacher—so important that we would dedicate an entire book just to this aspect of your teaching and learning process? More often than not, the best teacher teams continue to treat homework and grading as an isolated, inaccurate, private teacher routine for action. Rarely does a fourth-grade teacher, a seventh-grade middle school mathematics teacher, or a high school geometry teacher know the homework assigned or the grading processes used by other teachers of the same course or grade level.

Simply stated, for a grade-level or course-based collaborative team, the lack of common mathematics homework and mathematics grading practices that reflect a *formative feedback* process for student learning is one of the greatest inequity and opportunity gap creators that exist for students today. And the good news is, as part of a collaborative team in a PLC culture, you can do something about it! But get ready, because the discussions can get intense.

In part 1 of this book, you will focus on the purpose of mathematics homework, the criteria necessary for high-quality and common homework assignments, and formative routines as you use the high-quality components for common homework. You will compare the components of your current routines for independent practice with your team, find common ground, and validate those components against research-affirmed recommendations. You will also examine the importance of establishing an independent practice routine and how to communicate expectations for these routines with stakeholders, such as students and parents.

In part 2, you will reflect on high-quality common grading components and practices, and the most common errors made in your grading processes and routines. You will also focus on collaborative team processes for formatively using these components. You will consider how your students and your team can begin using homework and grading processes not as a summative event or moment, but rather as a formative learning process or opportunity.

Finally, you will examine specific strategies for evaluating the quality of your current mathematics grading components and routines, and how to compare traditional report card grades to standards-based proficiency scores.

In this book, you will discover a wide range of voices and personal advice and find your own voice, as a team, for designing homework and grading around these seven central questions.

1. How do we create high-quality common mathematics homework assignments that are meaningful and age appropriate?
2. How do we create high-quality common homework scoring routines for all students?
3. How do we use common homework assignments as part of a formative feedback process for improved student learning?
4. How do we evaluate the quality of current mathematics homework assignment processes and routines as a collaborative team?
5. How are our team's grading practices contributing to improved student learning?
6. How do we create high-quality grading practice components?
7. How do we evaluate the quality of our current mathematics grading practices?

Think of mathematics homework as *student practice when you are not around*. Think: "What are the factors that would help my students want to practice mathematics?"

Think of the act of grading students as a back-burner issue. That is, it lingers in the background, but it is not the primary reason why students are doing mathematics in your class. In a PLC culture, the primary reason students are enrolled in your grade level or course is to learn the mathematics standards as you answer the four PLC critical questions.

To become effective at grading and erase the inequities your students might experience due to ineffective routines requires you to work collaboratively with your colleagues to develop common practices that diminish grading as an external motivator for students. Yes, you will assign grades, but you will be more passionate in the pursuit of *learning*. This book provides guidance for

reshaping this most important aspect of helping *each and every student* learn mathematics.

In this book, you will find discussion tools that offer questions for reflection, discussion, and action. We invite you to write your personal homework and grading story in the *teacher reflection* boxes as well. You will also find some personal stories from this series' talented authors. These stories provide a glimpse into their personal insights, experiences, and practical advice connected to some of the strategies and ideas in this book.

The *Every Student Can Learn Mathematics* series is steeped in the belief that as classroom teachers of mathematics, your decisions and your daily actions matter. You have the power to decide and choose the mathematical tasks students are required to complete during lessons, homework, unit assessments such as quizzes and tests, and the projects and other high-performance tasks you design. You have the power to determine the rigor for those mathematical tasks, the nature of student communication and discourse to learn those tasks, and whether or not learning mathematics should be a formative process for you and your students.

Most important, you have the power to decide if you will do all of this challenging mathematics work of your profession alone or with others.

As you embrace the belief that together, the work of your professional learning community can overcome the complexities of your work and obstacles to learning you face each day, then *every student can learn mathematics* just may become a reality in your school.