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Are Teachers' Formative Assessment Practices Reliable Indicators of Students' Mastery of Standards?

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"I will lift up mine eyes unto the hills, from whence cometh my help. My help cometh from the Lord, which made heaven and earth."

Psalm 121:1 & 2

Dedication

I dedicate this dissertation to my family of educators – my grandmother, mother, sisters, aunts, and cousins who have used their gifts unselfishly to teach, inspire, and share the knowledge that God has given them to effect positive change with the youth in our world.

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Abstract

Some students, parents, and teachers are concerned over the apparent disparity between a student's classroom grades and his/her proficiency levels reported from criterion-referenced standardized assessments, such as the Georgia Milestones. The purpose of this research project was to determine if teachers' formative assessment practices were reliable indicators of students' mastery of grade-level standards. This study was a mixed-methods study with an explanatory research design. Qualitative data were collected through observations and interviews that analyzed teachers' perceptions of the meaning of formative assessments and how they are impacted by the summative assessment system. Also, samples of teacher-selected assessments were analyzed to determine if the formative assessment items were aligned to the standard at the appropriate level of complexity. Findings from this analysis showed that many of the formative assessments given by teachers were not fully aligned to the standard. Quantitative data analysis also found that students' grades on formative assessments were correlated to their proficiency levels on the Georgia Milestones assessment. Findings from this study have provided evidence for a need for assessment reform through improved professional learning provided by teacher leaders that calibrates an understanding of the standard and how to assess it, as well as the implementation of standards-based grading.

Keywords: Georgia Milestones, formative assessment, summative assessment, and grading

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Chapter 1: Introduction and Rationale for the Study

Each year parents receive regular reports of their student's progress in American schools. In the current standards-based educational environment, progress reports detail a student's progression towards mastery of grade-level standards. These reports are created by the students' teachers who formatively assess the students throughout the course of study to determine development towards meeting identified curriculum standards. However, parents also receive another report of how well their students have mastered these same curriculum standards at the end of the yearly instructional cycle. This report comes not from a compilation of evidence documented throughout the school year. This summative report reflects a student's performance on a single assessment, which generally carries with it high stakes that may affect grade-level promotion, school funding, and be "used to make decisions about students, teachers, schools and/or districts" (Blazer, 2011, p. 1). While based on the same standards, these two accounts may report different things (O'Malley, 2017).

This is a confusing reality in American schools today. Students in elementary schools can be exposed to a standards-based curriculum for 180 days. Their teachers may plan highly-engaging, standards-driven lessons and formatively assess student progress towards meeting those standards all along the way. Students may also receive regular feedback from teachers who share the results from quizzes, tests, and performance-based assessments with their parents, and parents may receive quarterly report cards and attend parent/teacher conferences in which they are presented with evidence of their child's learning over the course of the instructional period. Some of these students may even be celebrated with awards, medals, and trophies at Honors Day

Programs affirming them for their efforts in achieving above average mastery of grade level standards. All these things may take place in schools today based upon how students performed on teacher-made/selected formative assessments. Yet the score reports from the standardized assessment given at the end of the school year may indicate something very different from the portrait painted by the student's classroom teacher.

This is a wide-spread issue. Variability in students' performance on classroom assessments and norm-referenced assessments such as the SAT or the ACT is well documented for high school students because of its impact for admission into American colleges and universities (Berlinsky-Schine, 2020). The issue is pervasive throughout the country. One study of 123,000 students enrolled in 33 American colleges found that a student's high school grades is "a more reliable predictor of academic success" than the standardized assessment (Adams, 2014, p. 1).

However, what about elementary students who are tested using a criterion-referenced assessment? Are parents of elementary school students receiving conflicting reports, as well? Logical assumptions could be made that a student's standardized test performance and classroom grades would be similar because they are both assessments of a student's mastery of a given curriculum. O'Malley (2017) reports that standardized test scores do not always mirror grades that students have earned in the classroom. She also states that the students' performance in school generally reflects higher achievement than standardized test performance (O'Malley, 2017). Though not as well documented as it is with high school students, it appears that there is some concern about the discrepancy between classroom performance and standardized testing performance even in elementary and middle schools. This is evident through the numerous

published articles and reports giving parents "tips" to help students improve on standardized assessments (Liu, 2020).

End of Grade Assessments

The federal mandate covered in the 2015 Every Student Succeeds Act (ESSA) requires that public schools in our country adopt an academically challenging curriculum and are held accountable for student achievement through annual testing in third through eighth grade. Public school students in these grades take a state-mandated test once a year in reading and math and must also be tested in science once in elementary and middle school (The Understood Team, 2020).

Students all over the country are held to this mandate. However, this study will focus and gather data from a school district in Georgia. While the data for this study is collected in one state, the results can be applicable to states all over the country that adheres to the 2015 ESSA federal mandate of adopting state-mandated assessments for accountability purposes. State-mandated testing in elementary schools is a priority throughout our country. "High-quality assessments are a critical tool that can help educators, parents, and policymakers promote educational equity by highlighting achievement gaps, especially for our traditionally underserved students, and that can spur instructional improvements that benefit all our children" (Alexander, 2017, p. 4).

Previously in the state of Georgia, students in third through eighth grade were required to take stakes End of Grade (EOG) assessments on the state's criterion-referenced test, the Georgia Milestones. The Georgia Department of Education (2015) states that the purpose of the EOG assessments is to ascertain how well students have mastered the curriculum taught in state-funded schools throughout the year. Students' performance on these tests is also used to gauge

the quality of the schools, and this information is shared with stakeholders (i.e. parents, the public, policy makers, etc.). The administration of the Georgia Milestones was to meet the federal mandate of the Every Student Succeeds Act. This federal education law mandates that states must annually assess students in grades 3-8 for accountability purposes (U. S. Department of Education, 2015).

The Georgia Milestones was introduced to the educational community in 2014 with its first implementation in the 2014-2015 school year (Beaudette, 2014). With the state's adoption of new content standards – the Georgia Standards of Excellence (GSE) – the Georgia Milestones was created as a summative assessment to "measure how well students have learned the knowledge and skills outlined in these standards" (Beaudette, 2014, p. 2). The Georgia Milestones replaced the Criterion Referenced Competency Test (CRCT) that had been previously used as part of the state's accountability system.

However, there have been recent changes to the state's summative assessment cycle. On March 16, 2020, Governor Brian Kemp signed an Executive Order which suspended in-person learning for all Georgia schools due to the Covid-19 pandemic plaguing our county (Lane, 2020). In support of this mandate and similar mandates across the country, the United States Education Secretary, Betsy DeVos, provided a one-year waiver to "suspend federally mandated testing for the 2019-20 school year after schools around the country closed and learning was delivered remotely for several months" (Strauss, 2020, p. 3).

Since that time, Georgia's Governor Brian Kemp has sought to gain permission from the federal government to suspend the Georgia Milestones Assessment System (GMAS) testing for the second year in a row because of what he called "disruptions in learning" due to the coronavirus pandemic (Strauss, 2020, p. 1). Governor Kemp further stated that he would

continue to seek eliminating some assessments because, in his opinion the "current high-stakes testing regime is excessive" (Strauss, 2020, p. 1). The governor also stated that the schools should use the upcoming school year to "focus on remediation, growth and the safety of students" (Strauss, 2020, p. 6).

Problem Statement

In contemplating changes to the yearly assessment cycle, educators, policy makers and other stake-holders must consider what type of assessment system should be implemented to focus on remediation and growth while providing the data needed at the federal level to document student achievement and school effectiveness. Without the administration of the summative assessment, what could be used?

Because the EOG assessments are given at the end of the year, it would be beneficial for students, parents and teachers to be able to track students' mastery of curriculum standards throughout the year. One would think that this could be aptly done by examining the grades that students receive from classwork and tests that assess these same grade level standards. However, research of this issue in high school classes shows that there can be a great disparity between the grades that students achieve on their report cards and the performance level rating that they achieve on end-of-course/end-of-grade assessments (O'Malley, 2017). It can be very disheartening for a parent to see that his/her child performed poorly on this standardized test after receiving passing, if not exceptional, grades throughout the school year.

However, this does occur with End of Course (EOC) assessments. For example, it was reported in 2009 that over 200,000 students were enrolled in the Algebra I course in public schools in Texas. Eighty-eight percent of those students passed the Algebra I course. However, only 56% of the 10th graders passed the Texas Assessment of Knowledge and Skills (O'Malley,

2017). Furthermore, this is not a recent issue. A study conducted in 1999 reported that 79% of the students in Texas passed the Algebra I course, but only 45% of those students passed the Algebra I EOC test (Boykin, 2010).

The goal of this study is to determine if the results from teacher-created/selected formative assessments are reliable indicators of how students will perform on a summative assessment that measures the same curriculum.

Research Questions

This study was designed to answer the following research questions:

1. What is the relationship between a student's math grades and his/her standardized test score?
2. What are teachers' perceptions regarding the uses of standardized test scores in improving instructional decisions?
3. How well do teachers' formative assessments align with the rigor of the standardized assessment at the appropriate level of complexity?

Organization of the Study

The first chapter, Chapter 1, will serve as an introduction to the study as well as an overview of the background and imminent need for reform in testing practices in the state of Georgia, which can be applicable to other states with state-mandated testing. This chapter will also share the problem statement, research questions, and outline of the study.

In Chapter 2, the researcher will review relevant literature regarding the ever-changing cycle of assessment in American history. The strengths, challenges, and issues with each type of assessment will also be discussed. This chapter will also present working definitions of terms associated with assessment and the testing movement in the United States. Findings from

empirical studies that are currently available relationship between formative and summative assessments will be shared, and connections to the field of teacher leadership will be purported.

Chapter 3 describes the methodology used in this study to address the three research questions. Included in this chapter are details of the research design including a description of the research theories used. Details regarding the participant selections, instruments, and data collection/analysis will be shared.

Chapter 4 will include the analysis of all data collected for the study. The data analysis will be organized by research questions. In this chapter, discussion regarding any emerging themes will be highlighted, as well.

Finally, Chapter 5 will encompass a summary of the major findings of this study. Implications for the field of teacher leadership will also be addressed in this chapter along with recommendations for teachers, teacher leaders, and future research.

Chapter 2: Review of the Literature

Educational assessments have become a common fixture in our American schools since the beginning of the one-room schoolhouses of the colonial period (Brink, 2011). Along with its pervasive use, assessment has taken on many forms–from oral examinations, to paper-pencil tests, to standardized/multiple-choice assessments, and performance-based evaluations (Miller, Gronlund & Lin, 2013, p. 1). However, policymakers have attempted over the years to have assessments create a portrait of the learner that summarizes his/her knowledge level, abilities, readiness, and aptitude (Park, Ji, & Lin, 2015). This quest to use assessments to create the perfect profile of a learner has come under scrutiny and leaves people to ask several questions: What does this assessment tell about the learner? Is this assessment really measuring what it proposes? How can information from this assessment be used? Will other assessments yield similar findings? These questions and more should be addressed to determine the proper use of assessment in American schools.

History of Educational Assessments in U. S. Schools

Reform in educational measurement within the United States can be traced back to the mid-1850's (Miller, Gronlund, & Lin, 2013, p. 4). As the perceived needs of the nation have changed, so has the evaluation of its students. Politicians and policy makers have greatly influenced the educators' practice to help frame the concept of an ideal citizen needed to propel this nation to be a leading force in the world (Brock, 2018). Along with these ideals, assessments have been created to evaluate whether or not schools are producing students that will give America the edge that is needed, as well as, ensure that schools and teachers are held accountable to taxpayers for their significant investment (History of Standardized Tests, n.d.).

Because assessment has become a standard component of the educational cycle, educational examinations are commonplace in our schools (Neill, 2016). However, shifts over time in the way people think about education have caused the purposes of educational examinations to change and evolve (Chappuis, 2010). An examination is a detailed evaluation or test of one's knowledge and/or skills in an identified area (Examination, n.d.). However, examinations in the United States have taken on many forms and have changed over time based upon ever-evolving objectives.

Oral Examinations

Before 1845, the mission of schools in the United States was to serve the wealthy elite, and assessments were given to determine if students had mastered what had been taught. These examinations were called "recitations" and were administered orally in a whole group setting (Brink, 2011). However, educational reformers, such as Horace Mann of Massachusetts and Henry Barnard of Connecticut began a movement to provide a free, public education for the masses paid by tax dollars. These reformers believed that making a public education available for all people in the country would serve "as an effective instrument to achieve justice and equality of opportunity and to remove poverty" (Mishra, 2016, p. 84). Therefore, with this end in mind, it became necessary to create accountability systems so that the use of tax dollars could be justified. The laborious and time-consuming methods of oral examinations would not suffice.

Written Examinations

After visiting Europe in 1843, Mann was convinced that written exams were superior to oral recitations in that they could be administered to large groups at a time and served as a lasting record of knowledge obtained by the student (Hutchinson & Hadjioannou, 2017). Therefore, in 1845, the Massachusetts Board of Education under the leadership of Horace Mann began

instituting written examinations of students. The results of these tests were not received well because teachers were harshly criticized about the quality of education that students received. Teachers believed that the reason for unfavorable student outcomes was that the written exams were not well aligned to the content taught in the classrooms ("History of Standardized Testing," 2013).

Standardized Tests

These written exams were the first examples of "standardized tests". These tests were standardized in that they were easily-gradable, published assessments with directions given for administration and instructions for interpretation of the results (Congress of the U. S., 1992, p. 108). Also, teachers were not privy to the questions before the administration. With the administration of these early assessments, there was minimal thought for the idea of norming student results or comparing student scores against the performance of peers of the same age or grade level who had already completed the exam. However, information gathered from these early, standardized written assessments would soon be used as an educational equalizer to ensure that students in one-room country schoolhouses were receiving an education comparable to students in big metropolitan areas (Brookhart, 2013).

Achievement Tests

From 1850 to 1900, the residual effects of taxpayers funding public education became a dubious burden that required justification from policy makers. Not only were tax dollars being used to fund schooling for the masses, but income decreased significantly that would have been generated by students aged 10 to 15 if they were working instead of attending school. It was estimated that this loss of income from school-aged children increased from $25 million in 1860 to $215 million in 1900 (Congress of the U. S., 1992, p. 106). In order to justify the money spent

on public education, policy makers relied on principles of business practices and determined that achievement tests should be implemented to show the returns of investment in students' education. Thus, achievement tests were implemented for accountability measures. These first achievement tests had a two-fold purpose – to classify students based upon proficiency and to allow outside governing authorities to monitor the effectiveness of schools (Hutt & Schneider, 2018).

College Entrance Exams

During this time, achievement tests were not only used in grade schools, but were becoming increasingly popular with colleges. In 1890 Harvard President, Charles William Eliot, proposed that colleges create a standardized admissions test that would be a requirement for entry into colleges throughout the country. Therefore, in 1900, the College Entrance Examination Board was established, and the first college entry exams were administered in 1901 (Alcocer, n.d.).

Additionally, standardized assessments were becoming increasingly popular. In 1905, Alfred Binet created a standardized test that measured intelligence (i.e. Standford-Binet Intelligence Test). Also, in World War I, servicemen were given aptitude tests to assign them to appropriate jobs in the military, and throughout the first three decades of the 20th century, there were well over 100 standardized achievement tests created to assess students in elementary and secondary school subject areas (Alcocer, n.d.) including the first SAT tests administered in 1926.

Advancements in Scoring

Consequently, because of the popularity with standardized testing, developments were created to provide ease of use and faster reporting. In 1914 when completing his doctoral dissertation at Kansas State Teachers' College, Frederick Kelly introduced the concern of

subjectivity in grading assessments. Therefore, he proposed that examinations be created that had pre-established answers and eliminated any variation in scoring (Watters, 2015). Kelly's multiple-choice *Kansas Silent Reading Test* could be administered within a limited time frame without the student having to write anything and graded by scanning the page at a glance. This type of standardized assessment gained popularity, and the first multiple-choice assessments were introduced on a large scale in 1930 as a means of removing some of the subjectivity in grading/scoring (Alcocer, n.d.). Then in 1936, advancements in computing led to the creation of the automatic test scanner by IBM, which remained virtually unchanged up until 2005 (Automated Test Scoring, n.d.).

Norm-Referenced Tests

Next, governmental policies were introduced that required the use of standardized testing as a requisite for receiving federal funding. Federal legislation like the 1958 National Defense Education Act (NDEA) required secondary schools to establish testing programs in order to receive federal dollars. These tests were to be used "to identify students with outstanding aptitudes and abilities so they could prepare for college" (Brookhart, 2013). Also, after the Civil Rights Act of 1964 was passed to promote equality in schools, President Lyndon B. Johnson facilitated the establishment of the Elementary and Secondary Education Act (ESEA) in 1965. This government regulation, along with its subsequent reauthorizations, emphasized high standards and accountability in schools and used norm-referenced, standardized testing as a tool to evaluate educational programs and a requirement for Title I or low-income schools to receive funding (Paul, 2018). This yielded the consistent use of norm-referenced tests such as the Iowa Test of Basic Skills (ITBS) in elementary schools and the American College Testing Program (ACT) for entrance into college programs (History of Standardized Tests, n.d.). These norm-

referenced assessments were used to rank students and compare their performance to similar peers across the nation.

Basic Skills Tests

The next major advancement in education reform that impacted testing in schools was the "Back-to-Basics" movement beginning in the 1970s. This educational reform movement resulted from a decline in student test scores and concern from the private sector that schools were not producing graduates that were competent in the basic skills – reading, writing, and arithmetic. Therefore, minimum competency exams were established in some states to ensure students achieved a minimum level of competency before moving to the next grade or graduating from high school (Weiss, 2016).

Although the country now had educational assessments that required a focus on minimum competencies, in 1983, President Ronald Reagan released a report called, "A Nation at Risk." In this report, there were some startling findings about the assessment results in the nation—"23 million American adults were functionally illiterate; the average achievement for high school students on standardized tests was lower than before the launch of Sputnik in 1957; and only one-fifth of 17-year old students had the ability to write a persuasive essay" (Graham, 2015). These findings caused great alarm and launched the standards-based reform era in American testing.

Criterion-Referenced Competency Tests

During the standards-based era, reauthorizations of ESEA boosted federal allocations for education with the goal of increasing students' proficiency on state-wide exams (High, 2015). These criterion-referenced assessments were to be created based upon approved state-wide curriculum standards that were grade-level expectations of what students should learn in school.

Common Core State Standards were created in 2010 and released for adoption to support the idea of a national curriculum. The No Child Left Behind Act (NCLB) of 2001 and its updated version, Race to the Top (RTTT) forced accountability of schools through these criterion-referenced assessments and evaluated schools based upon their achieving Adequate Yearly Progress (AYP; Lee, 2014).

Reporting for Subgroups

Components of the reauthorizations of ESEA take into consideration the progress of each subgroup tested. Previously, the assessment performance of subgroups such as African-Americans, English-language learners, and students with disabilities was hidden from scrutiny among the total school population, virtually ignoring their growth and progress. However, with NCLB, RTTT, and the most recent Every Student Succeeds Act of 2015, there has been a focus for improving student outcomes of all learners in the nation's schools (Education Post, 2019).

Major Categories of Assessments

The nation's history is replete with examples of how educators and policy makers have used assessments to ascertain students' knowledge, skill, and aptitude, measure learner growth, compare and rank order students, identify qualified candidates, and evaluate schools. However, studies of assessments in schools have shown that assessments occur during three main periods of the instructional cycle: before, during and after instruction (Konen, 2017), and are classified into two categories – formative assessments and summative assessments (Proprofs, 2019). Formative assessment practices are considered part of the instructional cycle. They inform students and teachers of students' progress towards achieving identified goals, and are used to guide instructional decisions. On the other hand, summative assessment practices are used to determine what students have learned with regards to content standards. Summative assessments

can be standardized assessments or teacher-created assessments given at the end of an instructional cycle (Reese, 2009). The following is a description of the four main types of assessments that are used in American schools today.

Diagnostic Assessments

Diagnostic assessments are formative assessments used to gauge what students already know (Archuleta, 2019). They involve the collection and meticulous evaluation of data concerning students' knowledge in a particular area. Diagnostic assessments are administered before instruction begins to determine what students know and understand at the onset of a particular course, unit or lesson. They provide detailed information about learning barriers students may have and offer insight into skills that need to be attained (Saeed, Tahir, and Latif, 2018). Educators then use the information gathered from diagnostic assessments to individualize instruction to meet students' needs. Diagnostic assessments have aided teachers in identifying students' strengths and weakness, identifying students' misconceptions about a concept, and planning for instruction.

Both informal and formal measures may be used as diagnostic assessments ("Formal and Informal Assessments," 2015). Examples of diagnostic assessments created by teachers include pretests, self-assessments, inventories, interviews, initial writing prompts, etc. Other more formal diagnostic assessments used in education and created by psychometricians include assessments such as DIBELS (Dynamic Indicators of Basic Early Literacy Skills) and IKAN (Individual Knowledge Assessment of Number). Diagnostic assessments can take almost any form with the goal of gathering information about what the student knows about the content before the instruction begins (Abbey, 2017).

Strengths. Diagnostic assessments add value to the educational process in that they provide a realistic picture of a student's current understanding of knowledge and skills in a course before instruction begins. Having this knowledge helps educators plan for instruction and helps students know what skills/content should be focused upon during the course (Abbey, 2017). This type of information helps to individualize the instruction for students and make the learning experiences more meaningful for them (Wixson & Valencia, 2011). Learning pathways created through diagnostic assessments have been found to improve time on task and increase student engagement (Pagani, Fitzpatrick, & Parent, 2012).

Also, diagnostic assessments help teachers and students pace themselves. For example, if a diagnostic assessment shows that a student has sufficient knowledge in a particular area, time can be devoted to other areas of need. Using data from diagnostic assessments helps educators to shape their courses, reserving precious instructional time for content that has not yet been mastered (Nguyen, 2019).

Another benefit of the use of diagnostic assessments is that they can be used to measure the impact of an instructional program (Bhanji et al., 2012). Because diagnostic assessments are administered before the treatment/instruction begins, stakeholders are able to know exactly what level of understanding students possessed in a particular area before the course and then use another assessment to measure the student growth achieved (Thomas et al., 2019). Because of this benefit, data from diagnostic assessments is sometimes compared to student outcomes demonstrated in summative assessments to provide a picture of student achievement, program implementation, professional development needs of staff, and even teacher effectiveness.

Challenges. One real drawback to the use of diagnostic assessments is in the lack of flexibility in some courses. The purpose of using diagnostic assessments is to be able to use the information to tailor student learning. However, some schools/districts/programs require a strict adherence to a prescribed scope and sequence that limits flexibility (Keeling, 2009).

Another challenge for teachers is that even though diagnostic assessments are used, there is a lack of time and/or resources to fill in the gaps for some students and meet everyone's individualized needs while maintaining the requirements of a particular course. Often data from diagnostic assessments shows multiple pre-requisite skills and knowledge that must be attained before a student is able to be successful in a particular unit/course. This presents a challenge for educators to meet these individualized needs. One author writes, "We spend significant amounts of time teaching in reverse, and then ask why students are not catching up to their peers" (Rollins, 2014, p. 4).

Finally, as with many other types of assessments, a student's familiarity with the diagnostic assessment can skew data for better or for worse. There have been educators that have documented that becoming accustomed to prompts used in a particular test format reduces frustration and facilitates demonstration of mastery of a concept (Giavanna, 2017).

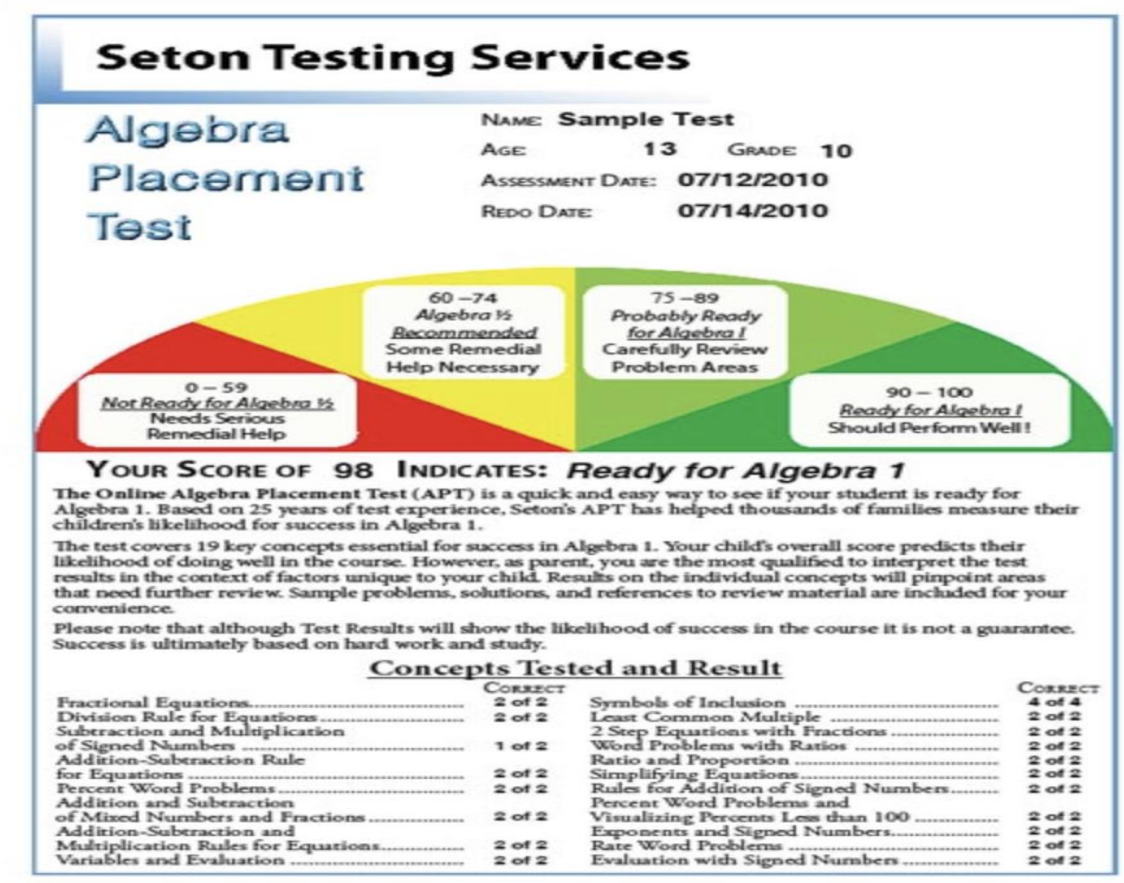
Interim/Benchmark Assessments

Interim/Benchmark assessments are administered periodically (every five to nine weeks) within the school year to determine students' progress towards demonstrating proficiency with identified curriculum/grade-level standards. (Garner, Thorne, & Horn, 2017). Educators use the data gathered from benchmark assessments in a variety of ways to inform instructional decisions. Classroom teachers use information from benchmark assessments to determine which standards have been mastered and adjust instruction accordingly. School-level and district administrators

use the data from interim assessments as an indication of the effectiveness of curricular resources to help students master grade-level standards. The information gained from benchmark assessments is also used to measure student growth over time and to predict students' performance on high-stakes assessments like end-of-grade or end-of-class summative assessments (Garner, Thorne, & Horn, 2017). Examples of some interim/benchmark assessments include Renaissance Star Reading and Math, Voyager Sopris Learning, and Aimsweb Plus.

Strengths. In his article, "Interim Assessments: Keys to Successful Implementation," Kim Marshall states the overarching benefit of interim assessments. "The basic argument for interim assessments is actually quite compelling: let's fix our students' learning problems during the year, rather than waiting for high-stakes tests to make summative judgments on us all at the end of the year" (Marshall, 2006, p. 6).

One of the features of the reports that typically come from popular interim/benchmark assessments is the at-a-glance interpretation guide concerning students at risk of academic failure. Many of the reports provided from the interim/benchmark assessments utilize a traffic-light style reporting process that gives the reader easy-to-interpret information at-a-glance about a student's mastery of grade level standards. See Figure 1 below which shows a sample report from an Algebra benchmark assessment.



Seton Testing Services

Algebra Placement Test

NAME: **Sample Test**
AGE: **13** GRADE: **10**
ASSESSMENT DATE: **07/12/2010**
REDO DATE: **07/14/2010**

60 – 74
Algebra ½ Recommended
Some Remedial Help Necessary

75 – 89
Probably Ready for Algebra I
Carefully Review Problem Areas

0 – 59
Not Ready for Algebra ½
Needs Serious Remedial Help

90 – 100
Ready for Algebra I
Should Perform Well!

YOUR SCORE OF 98 INDICATES: *Ready for Algebra 1*

The Online Algebra Placement Test (APT) is a quick and easy way to see if your student is ready for Algebra 1. Based on 25 years of test experience, Seton's APT has helped thousands of families measure their children's likelihood for success in Algebra 1.

The test covers 19 key concepts essential for success in Algebra 1. Your child's overall score predicts their likelihood of doing well in the course. However, as parent, you are the most qualified to interpret the test results in the context of factors unique to your child. Results on the individual concepts will pinpoint areas that need further review. Sample problems, solutions, and references to review material are included for your convenience.

Please note that although Test Results will show the likelihood of success in the course it is not a guarantee. Success is ultimately based on hard work and study.

Concepts Tested and Result

	Correct		Correct
Fractional Equations	2 of 2	Symbols of Inclusion	4 of 4
Division Rule for Equations	2 of 2	Least Common Multiple	2 of 2
Subtraction and Multiplication of Signed Numbers	1 of 2	2 Step Equations with Fractions	2 of 2
Addition-Subtraction Rule for Equations	2 of 2	Word Problems with Ratios	2 of 2
Percent Word Problems	2 of 2	Ratio and Proportion	2 of 2
Addition and Subtraction of Mixed Numbers and Fractions	2 of 2	Simplifying Equations	2 of 2
Addition-Subtraction and Multiplication Rules for Equations	2 of 2	Rules for Addition of Signed Numbers	2 of 2
Variables and Evaluation	2 of 2	Percent Word Problems and Visualizing Percents Less than 100	2 of 2
		Exponents and Signed Numbers	2 of 2
		Rate Word Problems	2 of 2
		Evaluation with Signed Numbers	2 of 2

Figure 1. Sample report from an interim-benchmark assessment. Reprinted from setontesting.com. (n.d.). Retrieved from https://www.setontesting.com/algebra-placement-test/. Copyright 2018 by Seton Testing Services. Reprinted for educational use only.

Challenges. One documented challenge of using interim/benchmark assessments is that some teachers have found that the benchmark assessment may not be well aligned to the pacing in the scope and sequence (Abrams, Mcmillan, & Wetzel, 2015). When this occurs, students' scores on benchmarks cannot be seen as reliable because the assessment truly did not measure the intended content of what should have been taught up to that point in time. One teacher expressed her frustration:

> "The other problem too is when you have your pacing guide and they tell you to hit this [content] the first nine weeks, a lot of times the questions on the benchmark aren't

> correlated with what you were teaching the first nine weeks, so they will have questions about things that they didn't tell you to go over" (Abrams, Mcmillan, & Wetzel, 2015, p. 365).

Alignment is also a problem with benchmarks created at the district level by curriculum specialists. In a 2017 study, Garner, Thorne, and Horn reported that "locally developed benchmark assessments lack the (costly) psychometric validation of published tests, while purchased benchmark assessments are often poorly aligned to local curricula" (p. 409).

Formative Assessments

Formative assessments are informal and formal measures of learning that are used throughout an instructional cycle to monitor students' progress towards identified goals or expectations. The main goal of formative assessments is to improve learning rather than just to assign a grade (Godbout & Richard, 2000). The information gained through the use of formative assessments assists educators in making sound instructional decisions that meet the needs of learners in their classes. W. J. Popham cites in his research that "if teachers employ (a) formative assessment's means-ends paradigm in their classrooms, their students will learn better" (Popham, 2013). Diagnostic assessments and benchmark assessments are formative in nature when the data gathered is used to improve student outcomes. Because formative assessments are used to drive instruction, it is imperative that they are given periodically throughout the unit/course to provide effective/timely feedback thereby maximizing student achievement.

Formative assessments can take on many different methods and can be formal or informal in nature. Some of the strategies used for formative assessments are discussed below:

- Analyzing Student Work – Teachers examine student work against an exemplar to identify gaps between their learning targets and the actual student's

performance. This information is used to determine students' mastery of standards, as well as, provided teachers with information to modify their practices (Brondyk, n.d.)

- Classroom Polls – This is a method to check for whole group understanding. The teacher poses a question and polls the room to determine how many students are answering the question (i.e. "How many chose letter A? B? C? D?"). Students then display their answers by holding them up on whiteboards or raising the number of fingers to show their responses. This strategy allows the teacher to assess learning at-a-glance (Bambrick-Santoyo, 2016)
- Conferencing – This assessment strategy involves the educator meeting one-on-one with the student to discuss a particular assignment. During the conference, the teacher is able to ascertain student mastery of concepts and provide the student with immediate feedback for improvement (Fluckiger et al., 2010).
- Essays/ Open-Ended Questioning – Students are given a question to respond to in order to demonstrate mastery or understanding of a concept. The prompt is "open-ended" in that it requires the student to construct an answer as opposed to selecting the correct answer choice ("close-ended"). Open-ended essay type assessments also require more depth of thought than close-ended questions. Norman Webb and Karin Hess suggest that open-ended questioning as a formative assessment not only assesses the "breadth of content but also the depth at which students are expected to understand concepts (Eddy & Kuehnert, 2018, p. 37).

- Exit Tickets – Also referred to as "Tickets Out the Door," these assessments allow students to respond to a question, solve a problem or summarize their understanding of the day's lesson in a short amount of time. This type of informal assessment is usually given on an index card or a "sticky note." (Dodge, 2009).
- Formative Paper-Pencil Assessments – This type of assessment employs the use of various assessment strategies such as multiple-choice assessment items, essay items (open- and closed-ended questions), performance tasks, etc. to allow students to demonstrate mastery of a concept. Formative paper-pencil assessments are graded and the results are shared with students as a check in student progress (Ketabi & Ketabi, 2014).
- Games – Educational games are often used in the classroom as an interactive way for teachers to assess students' knowledge. They can be used to assess the knowledge of an individual or a group of students and are widely used for assessment purposes because of the vast array of possibilities and their motivational appeal (Kumar, 2018).
- Graphic Organizers – Students use this type of assessment to make connections in their learning, show relationships between concepts and organize information from the content (Dodge, 2009).
- Journal Reflections – This ongoing assessment strategy requires the student to describe personal thoughts and record their ideas and experiences. The strength of reflective journals lies in that they show individual growth and changes within in the student over a period of time (Clark, 2012).

- Misconception Check – This type of formative assessment provides students with an incorrect answer in order to see if they can identify the error. To assess in this way, teachers give students a false fact about the lesson concept and students use some type of signal (i.e., colored cards, thumbs up/down, stand/sit) to agree or disagree. The teacher must record student answers so that the information can be used to clear up student misconceptions (Holbeck, Bergquist, & Lees, 2014).
- Multiple Choice Assessments – This type of formative assessment is popular because of its ease in grading and its objective nature. Students are given a prompt and are asked to select only the correct answer(s) from the listed choices (Barlow & Marolt, 2012).
- Observation – In this process, the teacher systematically views or records students while at work for the purpose of improving instruction. This process gives teachers insight into students' thought processes, learning styles, and misconceptions (Liu, 2013).
- Performance-Based Assessments – Students are asked to make a presentation, perform a task, create or produce a product with real-world connections. This type of assessment is used to gauge students' problem-solving and critical thinking skills (Harada, 2004). This type of assessment requires students to create something to serve as evidence of their learning.
- Portfolio – This is a type of authentic is a collection of a student's work samples within a course over a period of time. The student's work is collected and evaluated to show growth over time. The work selected in the portfolio should represent a variety of skills and knowledge obtained throughout the course. Also,

portfolio assessments can be used for self-reflection and exhibition of learning (Adeyemi, 2015).

- Quizzes – A quiz can be considered as a pre-test to determine how a student has achieved mastery of the instructional material before the summative exam. Quizzes should be aligned directly to content standards and lesson objectives. Several types of questions (i.e. multiple-choice, fill in the blank, constructed responses, etc.) can be used on a quiz with the intent of using the information to track student progress and improve learning (Turner, 2014).
- Self-assessments – This type of formative assessment improves the educational process by requiring students to monitor their own learning based upon identified success criteria. Students are empowered and taught to "regulate their own learning by requiring them to exercise metacognitive monitoring of their work and processes against standards, expectations, targets, or goals" (Panadero, Brown & Strijbos, 2016, p. 811).
- Summarization/Reflection – Students are provided opportunities to pause their learning, review, and make sense of what they have learned. Summarization is a beneficial formative assessment practice because it requires students to synthesize information, sorting through ideas and gleaning the most important information. It is considered one of the less stressful formative assessments methods, and researchers have found that reflective summarization also helps students better retain their knowledge, thereby improving learning (Mock et al., 2016).

Strengths. Formative assessment improves the educational process in several ways. It is used "to clarify what students are supposed to be learning, improve the instructional practices of individual teachers, and allow for reteaching of concepts to reach struggling students" (Bekula, 2010). Formative assessment also strengthens the educational process by providing "real-time" data needed to adjust teaching and learning (Phelps, 2010). It promotes the use of effective strategies in the classroom because teachers are able to gather information to modify teaching and learning as it is happening.

In addition to helping teachers make sound instructional decisions, formative assessments can help students become more self-reflective about their learning (Hollingworth, 2012). Formative assessments give students the opportunity to check their progress during the course of the instructional unit. One study found that formative assessments improve the relationship between parents and teachers by using the information about the student gained from the formative assessment to help parents and educators establish goals and have a common understanding about what is needed for the student (Curry et al., 2016).

Also, formative assessments tend to carry less risk that some other assessments. They are generally used in conjunction with other instructional measures to create a portrait of the student's performance. Other assessments like summative, standardized assessments have higher stakes and may be used as criteria for promotion to the next grade level or passing a class (Carnegie Mellon University, 2019).

Challenges. One significant challenge in the use of formative assessments is that "most current classroom teachers do not receive training in effective assessment practice in their preparation programs, and require significant and ongoing training to develop this practice (Dell

& Dell, 2016). If the assessment does not appropriately measure what it intends to assess, it is a waste of time.

Additionally, some educators feel that precious instructional time is sometimes sacrificed to administer common formative assessments within the school. Common formative assessments are assessments that are meant to guide instruction but are given to every child in a particular course within the grade to compare student and teacher performance. When teachers must adhere to rigid formative assessment schedules, they may feel the need to push through content before it is taught to mastery which, in turn, diminishes student outcomes on the assessment (Sasser, 2018).

Another thing to consider about formative assessments is that they are generally low-stakes assessments and lack the gravity associated with the higher-stakes of summative assessments. This may result in students not taking the assessments seriously and not attempting to perform as well on them. When this happens, teachers will not be able to get a true picture of a students' ability and use the information improperly (Sasser, 2018).

Summative Assessments

In contrast to formative assessments, summative assessments are used at the end of an instructional course to ascertain what students have learned during that period of instruction. Formative assessments are assessments for learning, while summative assessments are assessments of learning (Tomlinson et al., 2013). According to a leader in the field, Richard DuFour (2010), summative assessments should answer the following questions: "Did the student acquire the intended knowledge and skills by the deadline? Yes or no? Pass or fail? Proficient or non-proficient?" (p. 2). Summative assessments are viewed as the culminating assessments after an instructional cycle has been completed (e.g. a final project, comprehensive exam, senior

recital, research paper). Generally, the information used from summative assessments has more far-reaching effects than the other types of assessments which focus on the individual learner. Data gathered from some summative assessments carry high stakes in that the information is sometimes used to determine promotion of students, evaluate the educator's instruction and/or the effectiveness of the curriculum or accreditation of a program (Garrison & Erhinghaus, 2019).

Strengths. One of the strengths of summative assessments is that they are generally given at the end of a course and can be used to measure growth and attainment of skills and objectives. They are criterion-referenced assessments which means that they are based upon certain knowledge and skills that have been identified for course mastery (Klapp, 2018). Summative assessments are also used as a motivator for students (Klapp, 2018). Because of the gravity of the assessment, students will be more likely to take the summative exam seriously and be motivated to do their best (Concordia, 2017).

Challenges. Even though having high-stakes assigned to most summative assessments is a strength, there are negative aspects involved with the use of these assessments. Summative assessments are sometimes used as a singular variable for some high-stakes decisions. For example, promotion to the next grade for third, fifth, and eighth grade students in the state of Georgia is dependent upon the student's performance on one assessment—the Georgia Milestones Assessment. Students in grade 3 must pass the English/Language Arts assessment, and students in grades 5 and 8 must pass the English/Language Arts and Mathematics assessments in order to be promoted to the next grade level ("Promotion and Retention Guidance," 2019) virtually ignoring their performance on formative assessments the entire year.

Also, many summative assessments are standardized tests that were not created by classroom teachers who teach the content, but were created by psychometricians as an

accountability measure for school evaluation and state/federal funding. The issue with these standardized, formative assessments is that they have years of research questioning the reliability and validity of these accountability measures (Strauss, 2017).

Issues with Testing

Questions about the Veracity of Standardized Tests. Because standardized tests are typically used as accountability measures that determine promotion/retention, merit pay, teacher and principal evaluations, one would question the accuracy of these summative tests. The accountability reform movement of Race to the Top (RTTT) funded two different agencies to create criterion-referenced standardized assessments aligned to the Common Core Curriculum Standards (CCCS). These two consortiums—Smarter Balanced and Partners for Assessment of Readiness for College and Careers (PARCC)—develop annual standardized assessments to be used in multiple states across the country (Kubiszyn & Borich, 2016, p. 336). With access to federal funds, testing is a multi-million dollar industry. In 2017, the Huffington Post reported that the "standardized testing market was anywhere between $400 million and $700 million" (Stauffer, 2017, p. 2).

Additionally, these tests are constructed by psychometricians, curriculum experts, teachers and school administrators who use their expertise to ensure that they yield accurate results. In other words, students' performance on norm-referenced tests should be accurately compared to a normative sample, and students' performance on standardized criterion-referenced tests, such as the Georgia Milestones, should correctly indicate if students meet or exceed the state standards (Kubiszyn & Borich, 2016, p. 337).

With so much money being spent to develop them by experts in the field, it would seem that standardized tests could be trusted to provide an accurate picture of student performance.

However, there are multiple reports of issues with reports of standardized assessments due to test bias. There is an ongoing debate initially raised by Roy Freedle in 2003 about the SAT being culturally and statistically biased ("Bias in the SAT," 2010). Several researchers have produced counter claims (Dorans & Zeller, 2004), but the debate continues. Also, the veracity of the results of the Praxis I exam was called into question because a certain group of candidates for a teacher education program was found to "not know how to take" standardized assessments (Graham, 2013, p. 1). The researcher did not call this an example of test bias but did acknowledge that the scores of this ethnic group were impacted negatively.

Also, standardized assessments are limited in that they are just one "snapshot" of a student's achievement. Ricketts (2010) reports that a variety of assessments should be used to provide a clear picture of a student's achievement. She further states that the most ideal assessment situation is to have a variety of formative assessments to "monitor learning throughout the learning process and summative assessments that serve as checkpoints of learning at the end of a learning cycle" (Ricketts, 2010, p. 48).

Validity and Reliability of Formative Assessments. In order to guide teachers in creating assessments that are aligned to the standards, it is important to consider whether or not the teacher-made assessments are valid and reliable. Do the assessments created by teachers measure the skills and knowledge intended, and do they yield similar results each time they are administered? A case study involving 42 physics teachers in Kenya was conducted to examine validity and reliability of teacher-made assessments. The researchers interviewed the 42 educators, collected and analyzed sample assessments that they had given for validity and reliability. The findings of the case study showed that the experience of the teachers, education

level and training on test construction and analysis influenced the validity and reliability of the tests (Kinyua & Okunya, 2014).

Kastberg (2003) also found that teachers can use Bloom's taxonomy as a framework for assessment construction to align test items to the curriculum that is taught. Bloom's taxonomy considers the level of cognitive demand that is necessary for a student to complete a task ranging from the lower knowledge and comprehension levels that require simple recall, to being able to apply the knowledge learned, analyze its components, synthesize the information to create new ideas, and then evaluate the content to make judgments about what is learned. Additional research has shown that training teachers to carefully consider the depth of knowledge of assessment tasks and items greatly improves the validity and reliability of the tests that they make (McMillan, 2005).

Another framework for determining the level of cognition required to answer an assessment item or complete an assessment task is Norman Webb's Depth of Knowledge (DOK) Levels. Webb's framework model was created to increase the "cognitive complexity and demand of standardized assessments" (Francis, 2016, p. 10). There are four DOK levels that progressively increase in the amount of required cognitive demand. They include: DOK Level 1 – Recall and Reproduction (recall of facts or procedures), DOK Level 2 – Skills and Concepts (Use information or conceptual knowledge), DOK Level 3 – Short-term Strategic Thinking (requires reasoning or developing a plan), and DOK Level 4 – Extended Thinking (requires making connections and complex reasoning; Oregon State, n.d.). The assessments guides for the Georgia Milestones show the DOK Level that each standard is aligned to and provides sample items (GADOE, 2014).

Subjectivity in Teacher Grading. Another theme that must be addressed in this study is the impact that subjectivity plays in teacher grades. O'Malley (2017) states that the disparity in classroom grades and standardized tests may come from the fact that teachers use a plethora of formative assessment measures to contrive the final classroom grade. These measures could include quizzes, tests, homework, class participation, projects, group assignments and even behavior. Another factor to consider is that each teacher weighs these components differently which leads to even more variability. Cliffordson and Thorsen (2012) suggest that grades are multidimensional in nature and encapsulate criterion-based skills and knowledge, but they also reflect subjective measures that may distort their meaning.

However, with the introduction of Common Core standards, there has been a push by some educators to move to more objective measures of grading through a standards-based grading system/report card, but this has come with opposition. When a group of parents in a Chicago middle school was introduced to their new standards-based grading system, the school district received strong opposition. One parent called the standards-based grading system "an unmitigated disaster" (Krishnamurthy, 2014, p. 5). The reasons for opposition included the fact that even though ratings were based on students learning key concepts and skills, no one had a clear idea of what "mastery" entailed. Parents had very little understanding of the 1-4 rating system.

Therefore, other researchers have proposed that there should be a level of consistency and inter-rater reliability within standards-based grading (Munoz & Guskey, 2015). Professional learning should be provided to teachers and parents that help them to understand the indicators that show whether or not their student has mastered the standard at the appropriate level of complexity. This type of work should be required as part of any standards-based grading system.

Determining the Meaning of Proficiency. In order to compare the results of student's grades and standardized test performance levels, all stakeholders must have a clear understanding of the meaning of proficiency. The state of Georgia has provided Achievement Level Descriptors (ALD) that will aid in this process. The theory behind achievement level descriptors is that students may be able to show some knowledge of the content within a particular standard, but may not be able to perform at the level of complexity or the DOK level for which the standard is aligned. Therefore, Georgia and other states have created achievement level descriptors which provide more meaning to the scale score achievement levels.

Achievement level descriptors should provide stakeholders the ability to make credible inferences about a student's knowledge and mastery of the standards (Schneider et al., 2013). The Georgia Department of Education (2015) has four achievement level descriptors (i.e. Beginning, Developing, Proficient, and Distinguished). Furthermore, each achievement level descriptor is illuminated with a specific description of what students on a particular level should be able to know and do with regard to each standard tested. For example, in order to score at the Proficient level for the fifth grade numbers and base ten standards, the achievement level descriptors state that students should be able to "recognize the directional characteristics of place value; read, write, and compare decimals to thousandths; multiply and divide multi-digit numbers; add, subtract, multiply, and divide decimals; and use whole number exponents to denote powers of ten" (GADOE, 2015, p. 3). A distinct description for each of the other three achievement levels is written so that stakeholder can understand what the ratings say that students should know and be able to do.

Empirical Studies Regarding Formative Assessments vs. Summative Assessments

Predictors of Success

Research conducted by Warne et al. (2014) showed that high school grade point averages derived from formative assessments along with SAT scores were a good predictor of success for college freshman. Both the students' GPA and SAT score had a predictive power of ($R^2 = .43$) regarding a student's future success in college (Warne et al., 2014).

Weighted GPAs Leading to Grade Inflation

However, this same case study reported that subjective measures in formative assessments, like the various methods for weighting GPAs led to variation in predictions. The example given in the study showed that some students received more weight for Advanced Placement (AP) classes. Students receiving an A in an AP class would get 5 points instead of the normal 4 points (a 25% inflation), and students receiving a B in an AP class would get 4 points instead of 3 points (a 33% inflation). In other words, "students who do not do as well in the class get rewarded more than do students who earn As" in the non-AP class (Warne et al., 2014, p. 263).

Standards-Based Grading and Predictions of Mastery in Standardized Assessments

In 2015, Pollio and Hochbein, published a report comparing the results of standards-based grading and standardized test scores in high schools. In the report, the researchers made a concession that although grades and standardized scores play a critical role in assessing students, "grades have lacked a uniform or standard meaning" (Pollio & Hochbein, 2015, p. 2). The report states that part of the discrepancy is due to the fact that teachers assess students in a variety of ways that are not properly aligned with achievement in a particular content area.

Consequently, these same researchers conducted experimental research in which a group of Algebra 2 students received an intervention that involved standards-based grading to assess students' proficiency levels in the course. After the intervention, it was found that using standards-based grading doubled the number of students "earning an A or B in a course and passing the state test" (Pollio & Hochbein, 2015, p. 1). The conclusion drawn is that "standards-based grading practices identified more predictive and valid assessment of at-risk students' attainment of subject knowledge" (p. 1).

Sources of Grading Variability

Leaders in the field of assessment, including Susan Brookhart and Thomas R. Guskey, published research in 2016 called "A Century of Grading Research: Meaning and Value in the Most Common Educational Measure" (Brookhart et al., 2016). In this research, they conducted literature searches to identify sources of variability in grading. Some of the reasons for variability in grading include:

- Variation in the letter grades that teachers allocate to student work
- The teacher's inability to distinguish between "degrees of merit"
- Lack of consistency in values that various teachers placed upon elements in an assignment.
- Lack of consistency in standards on the school and district level (Brookhart et al., 2016).

Measures of Educational Outcomes

Brandy Ellison (2009) reported case study research that showed that grades were a suitable supplement to standardized assessment when measuring student outcomes. The researcher proposed that they be used in conjunction with one another because they measure

different things. Grades add to an understanding of students' behaviors and achievements—something that standardized assessments are unable to do. This study used qualitative and quantitative measures to try to show a predictive relationship between end-of-course grades and the state of Virginia's standardized assessment. Findings showed that none of the end-of-course grades were 100% predictors of students' performance on the state's exam (Ellison, 2011). Although some subgroups showed a stronger relationship between the two types of assessments. This researcher also concluded that there is a need for educators to be surveyed to establish what non-achievement variables are considered to determine students' end-of-course grades. This research will help form an understanding of the extent to which variables are used that are not contained within the gradebook but which do influence the assigned end-of-course grades (Ellison, 2011).

Synthesis

The review of the current literature regarding the disparity between classroom grades and standardized test score proficiency levels establishes several themes. Several studies have been conducted that emphasize the disparity between formative assessment grading and summative standardized tests. These studies have been limited to research of college and high school level students. This study will add to the body of research regarding alignment of end-of-grade standardized assessments and the grades assigned to students in elementary courses.

With regards to validity and reliability, the literature review also showed that educators must be coached and receive job-embedded professional learning opportunities in selecting assessment items that are aligned to the standards at the appropriate level of complexity. Standard #5 of the Georgia Teacher Leadership Standards is devoted to ensuring that teachers are guided in selecting appropriate assessment instruments to monitor student progress towards

mastery of grade-level standards (GACE, 2014). Also, there is a level of subjectivity that must be addressed with teacher-assigned classroom grades. Variables such as participation and effort cannot be consistently measured and are not related to the standards. Additionally, teachers must use tools provided by the state when constructing assessments to help provide meaning to the various proficiency levels so that clear inferences are made about what students are able to do when examining the student work.

Connection to Teacher Leadership/Recommended Actions

A great disparity between classroom grades and a student's standardized test proficiency level is a sure indicator of a lack of alignment in the formative assessment system practiced in the schools. Teachers must be guided in unpacking the standards to ensure that they understand the skills and knowledge that should be mastered by the students before instructing them. Unpacking the standards should not be done in isolation but should take place through collaborative conversations with educators to identify the depth of knowledge required from the standards, thus making planning for instruction more thoughtful, purposeful and accurate. When creating assessments, educators should be coached and work collaboratively with others to clarify assessment requirements and then create exemplars that show what students should be able to do to demonstrate mastery of the given standard (Alonzo, Mihirrahi, & Davison, 2018). Using assessment measures/items not appropriately aligned to the standard may produce a false perception of what students are able to do.

Impact on the Field of Teacher Leadership

It is this researcher's desire to use the information gained from this study to share with instructional coaches the need to create better assessments for students that are aligned at the appropriate level of complexity. Hopefully, this information will be the catalyst to guide the

work of professional learning communities and influence job-embedded professional learning. Teachers should be coached and guided in understanding the meaning of the standard, identifying the Depth of Knowledge that is required, determining the best way to measure mastery of the standard, and creating exemplars for students in order to provide the most appropriate feedback to improve teaching and learning.

Chapter 3: Research Methodology

The purpose of this study was to: (a) establish if there is a disparity between the results of formative and summative assessments that teachers administer to students in elementary schools and (b) identify potential causes for the difference in results of these two types of assessments. In elementary schools in Georgia, students participate in a comprehensive summative assessment program called the Georgia Milestones that measures how well students have mastered the knowledge and skills delineated in the state's adopted mathematics curriculum, the Georgia Standards of Excellence (GaDOE, 2015). The Georgia Milestones (GMAS) is a summative assessment that is administered at the end of the grade; however, students in grades 3–5 are assessed throughout the school year by individual classroom teachers that create formative assessments based upon this same curriculum—the Georgia Standards of Excellence (GSE)—and then assign grades on student report cards based upon the formative assessments that they have created. The goal of this study was to determine if the results from teacher-created and/or selected formative assessments are reliable indicators of how students will perform on a summative assessment that measures the same curriculum.

Research Questions

This study was designed to answer the following research questions:

1. What is the relationship between students' math grades and their standardized test score?
2. What are teachers' perceptions regarding the uses of standardized test scores in improving instructional decisions?
3. How well do teachers' formative assessments align with the rigor of the standardized assessment?

Justification of the Research Design Selected

A mixed-methods research design was conducted to explore the relationship between formative and summative assessments within a standards-based curriculum. In this case, quantitative and qualitative measures were used to provide a more comprehensive outlook than that of using qualitative or quantitative methods alone (Creswell, 2013). Although more time-consuming, Ahmed et al. (2016) assert that mixed-methods research (MMR) offers several benefits:

- MMR is used to answer a broader range of research questions.
- MMR generates a more thorough knowledge required to inform theory and practice.
- MMR produces strong evidence for conclusions.
- MMR increases the ability to generalize the results, and
- MMR counteracts the weaknesses of one method in order to strengthen both.

Additionally, the research questions proposed in this study required a mixed-methods approach because they could not be answered by quantitative or qualitative measures alone.

The type of mixed-methods study that was proposed for this research is an explanatory design method. The explanatory research design is a two-phase method in which numerical data is obtained and then narrative data is collected in an attempt to explain the numerical data (Creswell, 2009). In explanatory research, the study is conducted to try to explain, rather than describe, the phenomenon studied (Given, 2008). The review of the literature revealed that there is discrepancy between the scores that high school students achieve on standardized assessments and the grades that they receive on their report cards for the same content area (O'Malley, 2017). This researcher sought to shape an understanding of this phenomenon by extending the research to elementary school students using descriptive, numerical data, and then attempted to uncover

root causes through teacher perception data and a qualitative examination of how well teachers align their formative assessments to the summative assessment given.

Rationale for Implementing a Case Study

A case study was the research design used to explore this topic. Case studies are used to answer "how" and "why" questions within certain real-life parameters (Klein, 2012). A case study allows the researcher to examine a problem/phenomenon "in order to extrapolate key themes and results that help predict future trends, illuminate previously hidden issues that can be applied to practice, and/or provide a means for understanding an important research problem with greater clarity" (Monitoring and Evaluation Toolkit, 2019, p. 4).

Yin (2018) suggests three important features of case studies before determining if it is the most important method to use to conduct research. First, Yin asserts that case study research must require the researcher to explore the phenomenon by asking how and why questions. In this study, the researcher explored how well students' proficiency levels on the mathematics Georgia Milestones assessment were correlated to the grades that they received on their report cards for the same content and why there may have been a discrepancy between a student's grades and standardized test proficiency levels. Next, Yin states that case study research is appropriate when the researcher has very little or no control over the phenomenon being studied. This researcher is an employee in the school district being studied. However, she has had no impact on students' grades or performance on standardized assessments within the 41 schools included in the study. Finally, case study research is appropriate when the event being studied is an experience within a real-world context. Thousands of young people each year are engaged in formative and summative assessment systems as part of the instructional cycle and accountability systems. It would be helpful to determine if there is a relationship between these two types of

assessments within the same curricular parameters. If a relationship is found, this information could be used to make instructional decisions and contribute to the meaning of what being a "Proficient" or "Honor Roll" student means. Therefore, this study met the criteria of a case study as proposed by Yin by satisfying the three given qualifications.

Worldview of the Researcher

Additionally, this type of research design was chosen because of the ideals of this researcher. This researcher was interested in using a dual approach to this study combining principles of transformative inquiry and positivism. A dual approach was taken because of the researcher's desire to understand how things work as it relates to the relationship between formative and summative assessments (positivism), while seeking to become a change agent and improve the formative assessment practices of some educators (transformative).

First of all, the positivist approach to this research sought to understand how there may be a discrepancy between a student's performance on formative and summative assessments when they are aligned to the same content standards. Positivism relies on the use of scientific evidence through experimental action research and statistics to reveal how society truly operates (Positivism in Sociology: Definition, Theory & Examples, 2015). As a positivist researcher, the goal was to describe the phenomenon and to rely on what can be observed and measured in the evidence (Trochim, 2020). This positivist view of the world required a triangulation of data using multiple measures and observations to get a clear understanding of what is happening in the real world (Trochim, 2020). First the researcher used statistical methods to compare grades and test scores. Then this researcher interviewed teachers to find out their individual perspective on the value of the summative assessment system and its impact to their formative assessment practices in the classroom. Finally, the positivist approach required this researcher to gather data

by observing formative assessment practices of teachers and analyzing the formative assessments that they use in the classroom to see how well aligned they are to what is assessed in the summative assessment system.

Additionally, this research project was transformative in nature because the researcher pursued bringing to light the possible issue of the disparity between classroom grades derived from formative assessments and standardized test proficiency levels and worked with educators to make a change in their practice. Prior studies have concurred that there can be a disparity between the grades that students achieve in school and the performance level rating that they receive on standardized tests that supposedly assess the same content (Boykin, 2010). Therefore, this researcher worked with educators as "active collaborators" in this inquiry process to encourage participatory action and reform of grading practices (Creswell, 2013, p. 25).

Finally, the goal of this research project was to bring to light issues regarding the possible disparity between grading and standardized test scores while proposing practical changes that educators can take to decrease the disparity. Seeking reform in grading practices to become better aligned with the results of end-of-grade tests was what made this research transformative in nature. It is a call for radical change in educational practice (National Science Foundation, 2007).

Context of the Study

Phase One focused on Research Question 1: What is the relationship between students' math grades and their performance level on the Georgia Milestones mathematics assessment? The goal of the first phase was to determine if there is indeed a discrepancy between the students' performance on standardized summative assessments and their performance on formative assessments of the same curriculum. Phase One employed quantitative research

methods using a descriptive/inferential statistical design to identity whether or not a correlation exists between formative and summative assessments administered to elementary school students in Georgia.

Phase Two of this case study focused on answering two research questions: What are teachers' perceptions regarding the uses of standardized test scores in improving instructional decisions, and how well do teachers' formative assessments align to the rigor of the Georgia Milestones mathematics assessments at the appropriate level of complexity? The goal of this phase was to gather information to infer why there may have been a difference in how students perform on formative and summative assessments that measure the same curriculum standards. Information gathered in this phase of the study incorporated a mixed-methods design that included perception surveys from classroom teachers (quantitative analysis), observations of teachers' formative assessment practices (qualitative analysis) and an examination of the rigor and standards-based alignment of formative assessments created by classroom teachers (qualitative analysis).

Population and Sampling Procedures

This first phase of the case study was conducted within an urban school district in Georgia. This school district served a total of 31,494 students in its 59 elementary schools. Sixteen thousand, ninety (16,090) of those students attended its 35 traditional elementary schools (i.e. non-charter or partner schools). However, the data gathered for this study was limited to a sample size of 2,471 fifth grade students in its 35 traditional Title I elementary schools. These 35 Title I elementary schools received additional federal funds because their students come from low income families with at least 95% of their student population receiving free or reduced price lunch.

The rationale for this limitation included the need to focus on results of schools similar in demographics to that of the school selected for Phase Two of the study which is a Title I school. These 35 Title I schools are similar in that they receive additional government-allocated funds to aid them in their quest to meet state standards. These additional funds are used to keep the student/teacher ratio relatively low, provide school-wide intervention programs, and deliver additional educational resources. Title I funds can also be used for non-educational supports for students such as parental engagement, behavior initiatives and attendance support (Kajeet, 2020, p. 9). The funds provided to these 35 Title I schools are in response to a mandate provided in the Every Student Succeeds Act signed into law by President Barack Obama in 2015 (U. S. Department of Education, 2015). Because these additional provisions were not provided to every school in the district, it was determined to focus on the results of the schools that received these added supports to achieve academic gains. The demographic information for students in the district's traditional Title I Schools is found in Table 1. The rationale for including the demographics for the district's traditional Title I schools is to provide more context to the interpretation of this data and to show that these schools primarily serve minority, economically-disadvantaged students which mirrors the sample of students used in Phase 2 of this case study.

Table 1

Demographics for students in Traditional Title I Schools (Georgia Urban District)

Subgroup	N	Percentage
Asian/Pacific Islander	161	1.0%
American Indian/Alaskan	48	0.3%
Black	14,143	87.9%
Hispanic	1,191	7.4%
Multi-racial	225	1.4%
White	531	3.3%
Economically Disadvantaged	15,704	97.6%
English Language Learners	917	5.7%
Students with Disabilities	2,124	13.2%

Phase Two of the study was dependent upon data gathered from a mid-sized elementary school within this urban district that will be referred to as Oak Hill Elementary (a pseudonym). Oak Hill Elementary was a Title I school that served 425 students in grades Pre-Kindergarten to Fifth grade. All of Oak Hill's students received free or reduced priced lunch, but 72% of its students were directly certified as economically disadvantaged which satisfies at least one of the following criteria:

- The student came from a family that received Supplemental Nutrition Assistance Program (SNAP) food stamp benefits.
- The student came from a family that received Temporary Assistance for Needy Families (TANF) benefits, or
- The student came from a family that had been identified as homeless, foster, or migrant (Georgia School Reports, n.d.).

In addition to its poverty index, Oak Hill's student population was 99.7% non-white with African-Americans (almost 85%) as the most prevalent subgroup of the population and Hispanics (15%) as the second highest subgroup.

Additionally, Oak Hill's faculty and staff population was even less diverse with African-Americans as the most dominant subgroup. Phase Two of this study gathered information from members of this staff in grades 3-5 whose students were tested using the Georgia Milestones summative assessment system. All participants asked to participate in the perception survey for this study had varying years of experience (see Table 2). Also, formative assessments were gathered from seven of the participants for analysis within small discussion groups, and additional data regarding teachers' formative assessment practices were gathered through classroom observations.

Table 2

The Perception Survey Participant Information

Participant Pseudonym	Grade	Approximate Age	Race	Gender	Years of Experience	Subjects Taught
Dana	3rd Grade	Late 20s	African-American	Female	6	All Subjects
Vivian	3rd Grade	Mid 40s	African-American	Female	23	All Subjects
Saul	3rd Grade	Late 40s	African-American	Male	22	Math & Science
Rachael	4th Grade	Mid 50s	African-American	Female	25	Mathematics
Bethany	4th Grade	Early 30s	African-American	Female	10	Math (SWD)
Kelly	5th Grade	Late 40s	African-American	Female	15	Mathematics
Barbara	5th Grade	Early 50s	African-American	Female	24	Math (SWD)

Access and Permission

Access and permission were obtained from Oak Hill's school principal to survey members of the staff, observe and provide feedback to teachers regarding formative assessment practices, and work with teachers to analyze teacher-created/selected formative assessments for alignment to the standard at the appropriate level of complexity. Once permission for the study had been obtained by the principal and the school district, purposeful sampling was used to obtain teacher participants. Purposeful sampling and criterion sampling were desirable for this process because the participants should have had an understanding of the phenomenon and the research problem being investigated (Creswell, 2013). In this case, all of the third–fifth grade teachers at Oak Hill Elementary had students that participated in the state's summative assessment system and created formative assessments for grading purposes thereby meeting the criteria for participation.

Therefore, all prospective teacher participants were invited to a focus group meeting to give an explicit overview of the study including a statement of the problem, the research questions that were investigated, and the research design that was used. Prospective participants were assured of anonymity–no records of students' or teachers' names, identification numbers or

individual assessment data/grades will be divulged at any time. Pseudonyms were used to reference information gathered from individual teachers to ensure full confidentiality. Finally, teachers signed a consent form acknowledging agreement to participate in the study (see Appendix A).

Data Collection and Analysis

Phase One

Phase One of the study was conducted to answer the question: What is the relationship between a student's math grades and his/her performance level on the Georgia Milestones mathematics assessment? Analyses were first conducted in order to answer the research question. The responses were compared via statistical significance tests. When warranted by evidence of statistical significance, effect sizes were estimated.

In Phase One, archived Georgia Milestones fifth grade math averages were collected from the 2019 testing administration of the 35 Title I traditional schools in the chosen urban school district in Georgia. The data gathered included the percentage of fifth grade students scoring in each of the four proficiency levels (i.e. Beginning, Developing, Proficient and Distinguished). Additionally, fourth quarter math grades were retrieved via the district's student information database. The fourth quarter math grades were cumulative grades representing the average for the entire school year. This data set included the percentage of fifth graders from each of the 35 schools that received an A, B, C, or F as a fourth quarter report card grade. The percentage attained for each performance level was described as Level 1, 2, 3, or 4 using the coding system and criteria used to compare grades and test scores shown in Figure 2 below. Descriptive statistics were used to analyze this data by creating graphical/pictorial models of the distribution of GMAS scores and grades at each school (see Figure 3).

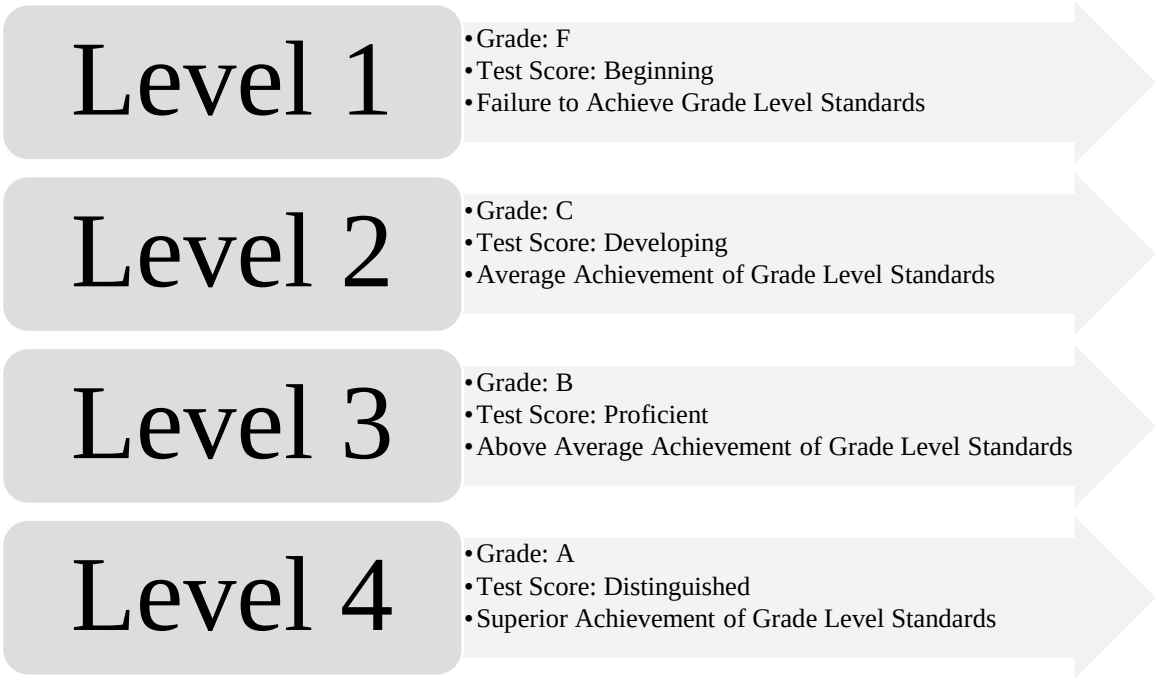


Figure 2. Comparison Criteria.

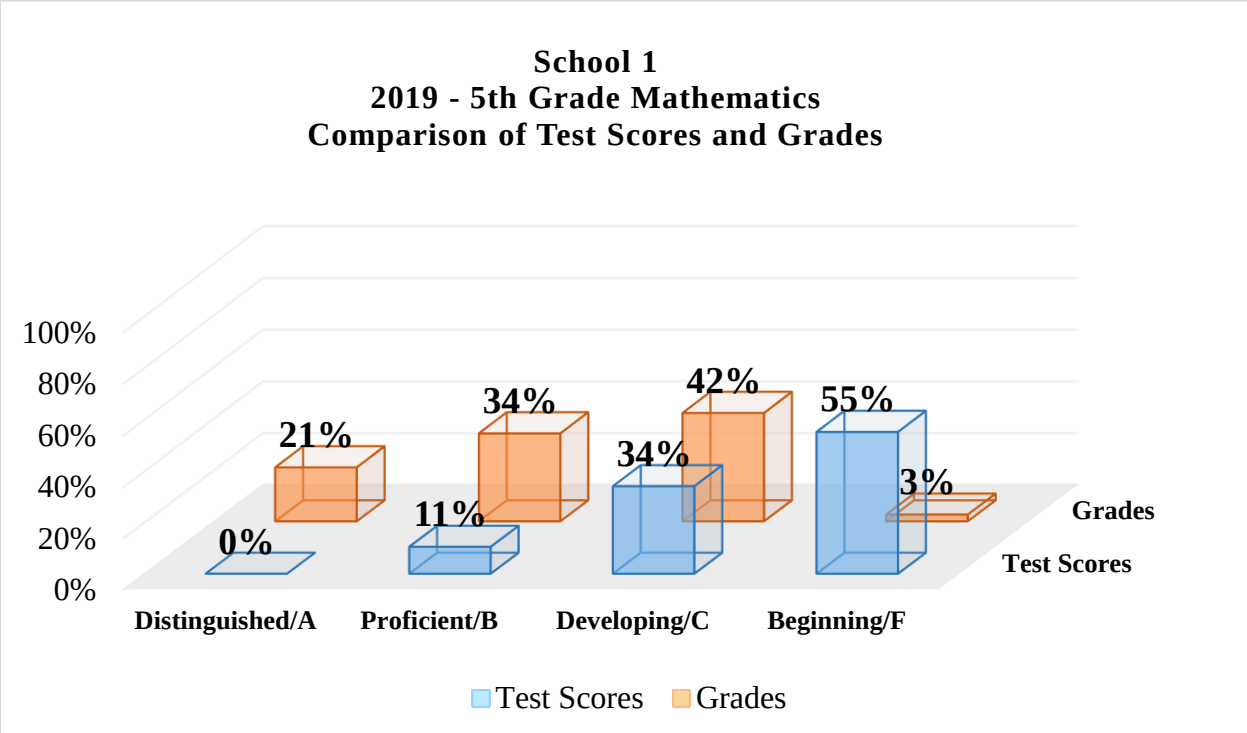


Figure 3. Sample School Graph.

Rationale for the Comparison Used in This Study. In the state of Georgia, the Georgia Promotion, Placement, and Retention law (O.C.G.A. §§ 20-2-282 through 20-2-285) and State Board of Education Rule (160-4-2-.11) of 2014 state that fifth graders must "achieve grade level on the state-adopted assessments in reading and mathematics and meet promotion standards and criteria established by the local board of education for the school that the student attends" (Georgia Department of Education, 2015, p. 2). Furthermore, the Frequently Asked Questions document on this rule states that if a fifth grade student does not achieve a level of Developing, Proficient or Distinguished on the mathematics section of GMAS then "the child is automatically retained" (Georgia Department of Education, 2015, p. 2). Hence, the comparison guidelines shown in Figure 4 were established for use in this research study. The GMAS Beginning achievement level and an F grade average both denote that a student has not attained grade level standards.

The Chi-Square Analysis. The next part of Phase One was to conduct further analysis from a sample of this population. Individual GMAS scores and fourth quarter math grades from third-fifth grade students at Oak Hill Elementary School were analyzed to see if an inference could be made regarding the relationship between GMAS scores and report card grades. The grades from fourth quarter were cumulative grades for the entire year. Therefore, the fourth quarter grades and GMAS scores both represented an evaluation of the entire curriculum. Analyses was first conducted in order to answer the research question. Due to the small sample size, the responses were compared via statistical significance tests. When warranted by evidence of statistical significance, effect sizes were estimated.

A Chi-Square goodness of fit test was conducted in order to determine how likely it is that the distribution of mean standardized math scores (achievement levels) and mean grades

from formative assessments was due to chance. In this case, the assumption that was made was that a student's grades and test scores were not related or independent of each other. Therefore, the null hypothesis of this statistical test proposed that a relationship did not exist between these two variables; they are independent on one another. The following null and alternative hypotheses will be used for this study:

H_0 – An elementary student's math proficiency level on the Georgia Milestones assessment is independent of the fourth quarter math report card grade.

H_1 – An elementary student's math proficiency level on the Georgia Milestones assessment is not independent of the fourth quarter math report card grade.

SPSS was used to conduct the Pearson Chi-Square Test of Independence. The $\alpha = 0.05$ with a 95% confidence interval. The two categorical variables were "GMAS Proficiency Level" and "Grade." Within each category, there were four groups as described in the contingency table below (see Table 3).

Table 3

Contingency Table between Proficiency Level and Grade

Level	Distinguished	Proficient	Developing	Beginning
Grade	A	B	C	F

Phase Two

Phase Two of the study was conducted to answer the remaining research questions: 2) What are teachers' perceptions regarding the uses of standardized test scores in improving instructional decisions, and 3) how well do teachers' formative assessments align to the rigor of the Georgia Milestones mathematics assessments at the appropriate level of complexity? In Phase Two, the researcher gathered data from a variety of sources (i.e. surveys, teacher-created/selected formative assessments, and classroom observations) for a period of eight weeks.

This period of data collection and the multiple sources used allowed the researcher to triangulate the data (Clancy, 2001) and add validity to the findings that emerged through recurrent behaviors and practices (Lundberg, 2003). The instruments and methods that were used to collect data for this phase are described below.

Initial Focus Group. As a precursor to collecting data through other methods, an initial focus group was convened with prospective study participants to make them aware of the goals of the study, the data that was collected, and the time/level of commitment involved. During this time, the researcher shared several topics that should always be addressed before initiating a research case study such as the researcher's motives/intentions, the care that was taken to protect the anonymity of all stakeholders involved through the use of pseudonyms, logistical concerns regarding time, artifacts used, the number of classroom observations/feedback sessions, and the option to be removed from the study at any time (Resnik, 2011).

Surveys. To gain information about the perceptions of teachers with regards to the impact of formative assessment practices on summative assessments, approximately 60 teachers from the participating urban school district were surveyed. Several questions from the "Teacher Survey on the Impact of State-Mandated Testing Programs" created by Boston College's National Board on Educational Testing and Public Policy were used (Pedulla, 2003).

The survey that was used was part of a two-year national study throughout 47 states of public school educators in grades 2–12. There was a sample size of about 12,000 teachers, and 35% (4,200 teachers) responded to the mail survey (Pedulla, 2003). The goal of this previous study was to examine how state-wide testing programs impact teachers and their instruction in classrooms. The survey has several dimensions that examine teacher perspectives on state-wide testing programs. However, the survey questions that were used in this study examined the

following areas: 1) teachers' perceived value of the state test, 2) the alignment of classroom practices with the state test, and 3) the impact on the content and mode of instruction/amount of instructional time. With regards to validity, these survey questions measured exactly what was intended in this study and were used to answer Research Question 2: What are teachers' perceptions regarding the uses of standardized test scores in improving instructional decisions? Also, with regards to reliability, the Cronbach's alpha measure of internal consistency for the survey dimension that was used is .73 (Pedulla et al., 2003) which implied good internal consistency.

The survey was uploaded to a Google Form and the data was analyzed to show trends in teachers' beliefs and practices regarding formative and summative assessments and were used to answer the second research question regarding teacher perceptions of how state-mandated testing impacts classroom practices. Additional questions from the survey that will be used to answer Research Question 2 can be found in Part 3 of Appendix C.

Analysis of the survey data included a descriptive report of aggregate responses to the questionnaire (Cresswell, 2013). The researcher placed participant responses in a table to show the distribution of responses for each question in the survey and created graphs to analyze the data. The researcher noted patterns in responses and variation in results in order to make data-driven inferences. Next, a summary of findings was constructed to include trends in teacher perceptions in order to answer the second research question.

Classroom Observations. Seven classroom teachers whose students were tested using the Georgia Milestones Assessment System were observed three times each over the 8-week period. The purpose of these classroom observations was to determine trends in formative assessment practices used by these teachers. This trend data helped answer questions about the

how well teacher-created/selected formative assessments were aligned to the summative assessment (GMAS) at the appropriate level of complexity.

All seven of these teachers were required to align their lessons and assessments with the Georgia Standards of Excellence–the same curriculum measured by the Georgia Milestones. The observation instrument that was used is the Formative Assessment Rubrics, Reflection and Observation Tools to Support Professional Reflection on Practice (Wylie & Lyon, 2013). This tool was created by an initiative of the Council of Chief State School Officers (CCSSO). This collaborative is called FAST (Formative Assessment for Students and Teachers) whose mission is to advance the implementation of formative assessments in each of its member states (CCSSO Collaborative, n.d.). A copy of the observation form is in Appendix B.

The FARROP (Wylie & Lyon, 2013) was used to gather data on six of the ten dimensions of formative assessment practices of teachers and has a rubric for each of the dimensions:

- Learning Goals – This dimension focuses on how well the teacher aligns learning goals to the Georgia Standards of Excellence (GSE) and communicates those goals to students.
- Criteria for Success – This dimension investigates how well students understand what quality work looks like in relationship to the GSE standard.
- Tasks and Activities to Elicit Evidence of Learning – This dimension focuses on evidence of student learning and mastery of GSE standards produced by students during the lesson.
- Feedback Loops During Questioning – This dimension focuses on how well the teacher provides ongoing feedback regarding student mastery of the standards during the lesson.

- Descriptive Feedback – This dimension focuses on the teacher's role in providing individualized feedback to students with regards to the success criteria established.
- Use of Evidence to Inform Instruction – This dimension focuses on how formative assessment is used to adjust instruction as needed to improve students' mastery of the standards.

Analysis of these classroom observations included quantitative and qualitative measures. First, a descriptive summary of each observation will be made. Each dimension of the observation instrument required scores from the FARROP rubric (i.e. 1 – Beginning; 2 – Developing; 3 – Progressing; 4 – Extending). This numerical information was analyzed and described. Next, the notes from the observation instruments were organized in a table and the data was coded, themes highlighted and patterns in teacher practices described (Merriam, 2009).

Post-Observation Discussions. As part of the protocol in using the FARROP, the researcher was required to conduct a post-observation discussion with the teachers. The goal of this discussion was to collect further evidence that supported inferences made about a particular teacher's formative assessment practices and their alignment with the Georgia Standards of Excellence and the Georgia Milestones. Post-observation questions included:

- What was the learning goal(s) for the lesson? Did students achieve that goal? How do you know?
- What evidence of student learning was collected? What is the next step?
- Using the Georgia Milestones Achievement Level Descriptors, how well-aligned is your lesson to the intent of the standard?

Information collected during the observation and post-observation discussion followed a similar pattern for analysis: 1) organizing the data in a table; 2) coding the data by key words, actions, and themes; and 3) interpreting the data coded to discover trends in teacher formative assessment practices in order to infer how well they align to the state's curriculum at the appropriate level of complexity. Table 4 provides the study's timeline.

Table 4

Case Study Timeline

Case Study Timeline	
Week of January 13, 2020	• Use Descriptive Statistics to Compare Fifth Grade Students' 2019 Standardized Test Performance and Fourth Quarter Mathematics Grades from the 35 Title I Schools
Week of January 20, 2020	• Use Statistical Tests to Compare Fifth Grade Students' 2019 Standardized Test Performance and Fourth Quarter Mathematics Grades from Oak Hill Elementary School
Week of January 27, 2020	• Conduct Initial Focus Group Meeting; Provide Overview of the Study; Secure Participant Consent
Week of February 3, 2020	• Conduct FAST Observation #1 for the 7 Participating Teachers • Debrief FAST Observation with the 7 Participating Teachers
Week of February 10, 2020	• Conduct PLC with Third grade participating teachers • Collect one CR quiz, exit ticket and homework assignment from each teacher and identify the standard for each • Work with the teachers to rate their formative assessment artifacts based upon the Achievement Level Descriptors for that Standard.
Week of February 17, 2020	• Conduct FAST Observation #2 for the 7 Participating Teachers and debrief
Week of February 24, 2020	• Conduct PLC with Fourth grade participating teachers • Collect one CR quiz, exit ticket and homework assignment from each teacher and identify the standard for each • Work with the teachers to rate their formative assessment artifacts based upon the Achievement Level Descriptors for that Standard.
Week of March 2, 2020	• Conduct FAST Observation #3 for the 7 Participating Teachers • Debrief FAST Observation with the 7 Participating Teachers
Week of March 9, 2020	• Conduct PLC with Fifth grade participating teachers • Collect one CR quiz, exit ticket and homework assignment from each teacher and identify the standard for each • Work with the teachers to rate their formative assessment artifacts based upon the Achievement Level Descriptors for that Standard.
Week of March 16, 2020	• Organize Data into a table • Code Data by Keywords, Actions, and Themes
Week of March 23, 2020	• Interpret Data Coded by Trends to Discover Trends in Teacher Formative Assessment Practices • Make Inferences and Draw Conclusions

Artifacts. In addition to observing teachers' formative assessment practices in the classroom, the researcher collected sample teacher-created/selected formative assessments for

analysis. Each teacher submitted one constructed response item from a quiz, one exit ticket, and one homework assignment aligned to a particular standard that had been used for grading purposes. The researcher then used the Georgia Milestones Achievement Level Descriptors matrix (GADOE, 2015) to determine how well the teacher-created/selected formative assessments align to the rigor of the Georgia Milestones mathematics assessments at the appropriate level of complexity. For each formative assessment, the researcher used the Achievement Level Descriptors matrix to analyze the assignment and rate it according to the four categories:

- Beginning – This work demonstrates that student has not yet demonstrated proficiency in the knowledge and skills necessary for the given standard and need substantial academic support.
- Developing – This work demonstrates that student has demonstrated partial proficiency in the knowledge and skills necessary for the given standard and need additional academic support.
- Proficient – This work demonstrates that the student has demonstrated proficiency in the knowledge and skills necessary for the given standard and are prepared for the next grade level's content.
- Distinguished – This work demonstrates that the student has advanced proficiency in the knowledge and skills necessary for the given standard and are well prepared for the next grade level's content (Georgia Department of Education, 2015).

By completing this analysis, the researcher was able to infer what percentage of the sample teachers' formative assessments align to the rigor of the Georgia Milestones mathematics

assessments at the appropriate level of complexity. Analysis of the sample teachers' formative assessments also gave evidence if there is any variation of alignment or rigor by the type of assignment given.

Validity of Interpretation

In order for this research to have a significant impact and effect change on teachers' formative assessment practices, several factors were considered regarding the trustworthiness of this research. Shenton (2004) reports several criteria that must be considered when exploring the trustworthiness of qualitative research. The research design used in this study addressed each of the four criteria for trustworthiness of research.

Credibility (Internal Validity)

The internal validity of a study references to what extent a study actually measures what is intended (Shenton, 2004). The internal validity of this research study has been addressed in several ways. First of all, the researcher collected several different types of information to triangulate the data and better inform the inferences made in the analysis. Data used to answer the research questions included information collected from teacher surveys, teacher-created/selected formative assessments, classroom observations and post-observation interviews/conferences. All of these research methods were well-established/recognized qualitative research strategies that provided evidence for the researcher to make an inference about how well teachers align formative assessments to match the rigor of the standards within the summative assessment.

Another strategy to ensure internal validity was to ensure the honesty of the informants (Shenton, 2004). All participants of the study were assured in the initial focus group meeting that their right to anonymity will be respected which protected them from the threat of adverse

consequences and promoted honesty. Additionally, the researcher had a good working rapport with each of the participants and had already established their trust.

Transferability (External Validity/Generalizability)

Transferability refers to the extent to which the research findings can be applied in other circumstances (Qualitative Designs, 2017). Background data was provided to establish a context for the study. Although the sample size used in the quantitative analysis was relatively small, generalizations can be made with regards to the larger population with similar characteristics experiencing the same phenomenon (Shenton, 2004).

Dependability (Reliability)

With regards to reliability, the research design was described in great detail so that if the processes used within the study were repeated, another researcher should be able to gain the same results and make similar inferences. Such attention to the description of the methods used helped to establish the research design as a "prototype model" (Shenton, 2004).

Confirmability (Objectivity)

Finally, the issue of objectivity within the research design is paramount. Inferences drawn from the research must be free of the researcher's biases and must be founded upon the information collected from the participants (Shenton, 2004). In this case, the researcher was strongly biased toward the belief that formative and summative assessment results should mirror each other if aligned to the same standards-based curriculum. However, conclusions drawn must be limited to only inferences made from the data collected. Objectivity was supported in this research design through the triangulation of the data to reduce researcher bias and the initial admission by this researcher was shared that teachers must be supported in creating formative

assessments for students at the appropriate level of complexity in order to mirror the rigor of their summative assessment.

Limitations and Delimitations

This research study used a case study within a mixed-methods design to try to explain a particular phenomenon. Because the nature of a case study had a limited number of participants, the results from this small sample had to be generalized over a large population. Access and permission for individual student results at all 35 Title I schools within the district would provide more data and give a clear, concise picture of the relationship between students' summative test scores and their formative assessment grades.

An additional limitation of the study was that there has been some debate over the ability to compare formative assessments to summative assessments because of the varying purposes of each. However, the school district in which the study took place was a standards-based district which means that the curriculum was driven by the Georgia Standards of Excellence. Research has shown that both types of assessments are essential to the educational process and in this case are based upon the same learning goals (Ricketts, 2010). Zook (2017) also states, "Formative assessments let students show that they're learning, and summative assessments let them show what they've learned" (p. 8).

Another limitation of the study was that the Department of Education for the state of Georgia had not released a clear explanation of the cut scores for each proficiency level of the Georgia Milestones assessment. The Georgia Milestones End-of-Grade Interpretive Guide for Score Reports for Spring and Summer 2019 (EOG Interpretation Guide, 2019) described each achievement level as:

> A range of scores that defines a specific level of student performance, as articulated in the Achievement Level Descriptors (ALDs). . . The minimum and maximum scale scores for the different EOG assessments differ because the tests vary in length and their relative difficulty. (p. 8)

This means that the percentage for correct answers for each cut score had not been shared with the public which made it difficult to compare GMAS achievement level descriptors to the district's grading system that states that 90%–100% is an "A" and so forth.

Therefore, a delimitation for this study was to use the following comparisons in Table 5 as a standard for comparison in this study.

Table 5

Comparison of Standardized Scores to Grades

GMAS Achievement Level Descriptors	**Urban School District's Grading Scale**
Distinguished Learners demonstrate advanced proficiency in the knowledge and skills necessary at this grade level and content area of learning, as specified in Georgia's content standards. The students are well prepared for the next grade level and are well prepared for college and career readiness.	Weighted Average of Formative Assessments A = 90%-100% Shall Indicate Superior Achievement of Grade Level Standards
Proficient Learners demonstrate proficiency in the knowledge and skills necessary at this grade level and content area of learning, as specified in Georgia's content standards. The students are prepared for the next grade level and are on track for college and career readiness.	Weighted Average of Formative Assessments B = 80%-89% Shall Indicate Above Average Achievement of Grade Level Standards
Developing Learners demonstrate partial proficiency in the knowledge and skills necessary at this grade level and content area of learning, as specified in Georgia's content standards. The students need additional academic support to ensure success in the next grade level and to be on track for college and career readiness.	Weighted Average of Formative Assessments C = 70%-79% Shall Indicate Average Achievement of Grade Level Standards
Beginning Learners do not yet demonstrate proficiency in the knowledge and skills necessary at this grade level and content area of learning, as specified in Georgia's content standards. The students need substantial academic support to be prepared for the next grade level and to be on track for college and career readiness.	Weighted Average of Formative Assessments F = 0%-69% Shall Indicate Failure to Achieve Grade Level Standards

A final limitation noted regards the potential bias of the researcher because of her affiliation with the school district in which the case study was conducted. To counteract this potential bias, this researcher has presented this study through a positivist approach by triangulating data and using multiple measures before drawing conclusions. Much of the data used to draw conclusions is included within the study itself to allow for ease of replication.

Ethical Consideration

Additionally, to ensure that this research was respected and all participants were treated in an ethical manner, certain principles were adhered to throughout the study. First of all, the study was conducted in a manner to minimize the risk of harm to participants. Consent was obtained from every participant with the right to withdraw at any time. Everyone that engaged in the study did so of their own free will without the threat of coercion or lack of anonymity (Saunders, Kitzinger, & Kitzinger, 2015).

It was also important that participation in the study maximized the benefits for all stakeholders. Participants in the study saw it as something that is related to their work. This work was of interest to not only the individual teacher participants in the study but also linked to the values and principles espoused in the school district as a whole. It was anticipated that the school system will value the information gained through the study because the district already tracked each teacher's GMAS test scores and the distribution of grades for each course taught. This researcher took great care to avoid the mistreatment, mishandling and misinterpretation of data collected in order to show respect for all perspectives involved (i.e. student, teacher, school, and district).

Finally, results of the study were with Oak Hill's faculty and staff and other stakeholders to share light on the relationship between summative and formative assessments and teachers'

current formative assessment practices. After analysis of the data collected in the study, recommendations were made regarding professional learning for teachers in improving formative assessment practices. Figure 4 provides a complete overview of the research design.

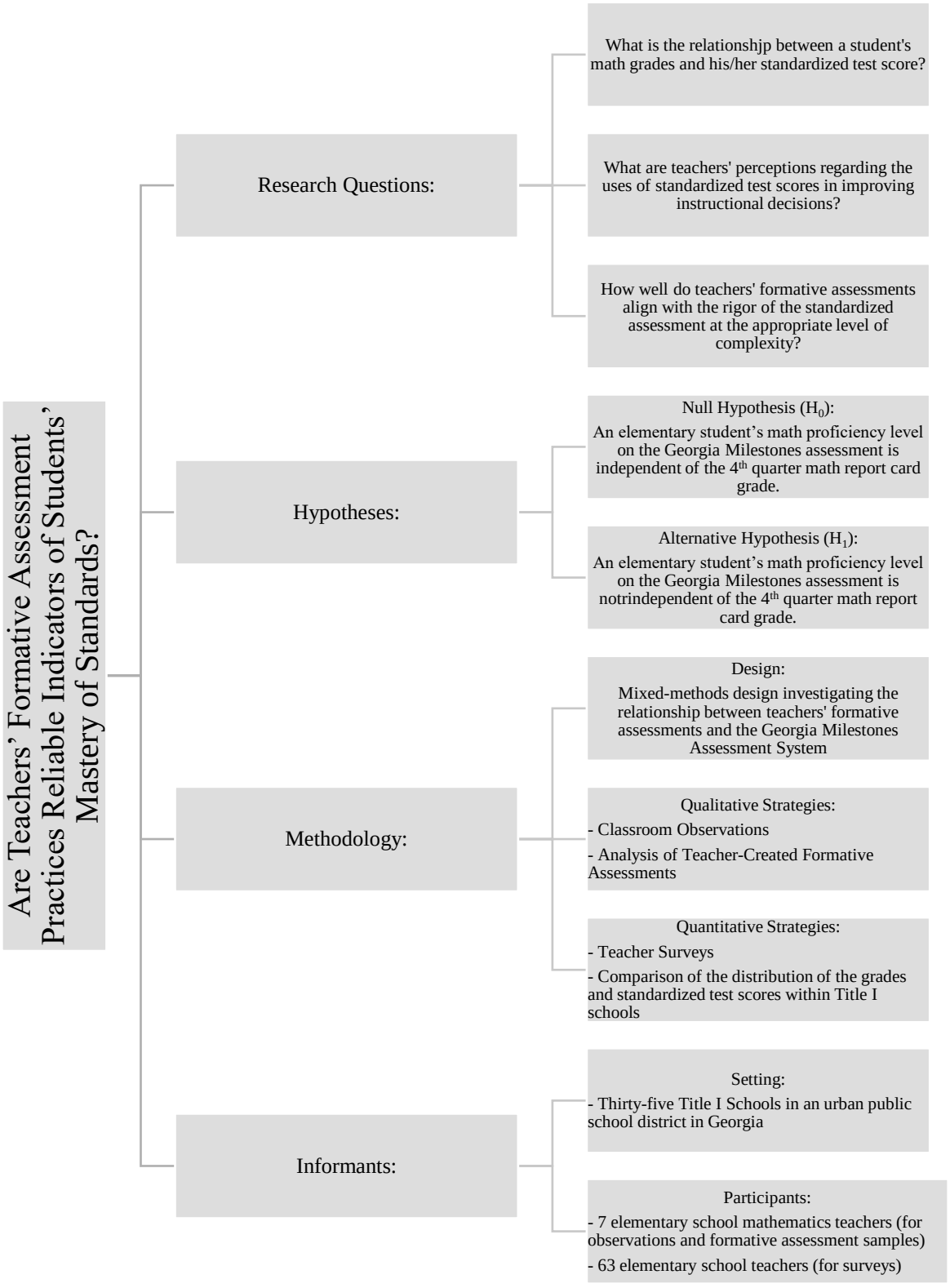


Figure 4. The Flowchart of the Research Design.

Chapter 4: Findings

This study investigated whether or not the results from teacher-created/selected formative assessments are reliable indicators of how students will perform on a summative assessment that measures the same curriculum. The purpose of this chapter is to exhibit the results of the mixed methods study that was conducted to answer the following research questions:

1. What is the relationship between a student's math grades and his/her standardized test score?
2. What are teachers' perceptions regarding the uses of standardized test scores in improving instructional decisions?
3. How well do teachers' formative assessments align with the rigor of the standardized assessment?

Data was obtained from 35 Title I schools to gain insight into the relationship between a student's math grade and the proficiency level score obtained on a standardized test. Further data from one Title I school within the district was analyzed to look at individual students' test scores and the math grades achieved to determine whether or not grades and test scores are independent of each other. Survey data was gathered to measure teachers' perceptions regarding the uses of standardized test scores in making instructional decisions. Teachers were also observed and structured interviews were conducted to ascertain the impact of standardized testing on their everyday classroom instruction. Finally, teacher created/selected formative assessments were analyzed to determine the level of alignment to the state's standardized assessment. This chapter will be organized by research question with the quantitative and qualitative measures used to inform analysis.

Research Question 1

The first research question was: What is the relationship between a student's math grades and his/her standardized test score? To answer this question, data was obtained from all 35 Title I schools within an urban school district in Georgia. For each of the 35 schools, the grade distribution and distribution of standardized test scores was examined for fifth grade mathematics. The percentage of fifth grade students in each school that received A's, B's, C's, and F's were reported along with the percentage of fifth grade math students in each proficiency level (i.e. Beginning, Developing, Proficient, and Distinguished) of the Georgia Milestones Assessment. Descriptive statistics were used to analyze this aggregate data.

Figure 5 below shows the criteria used to compare the grades and test scores.

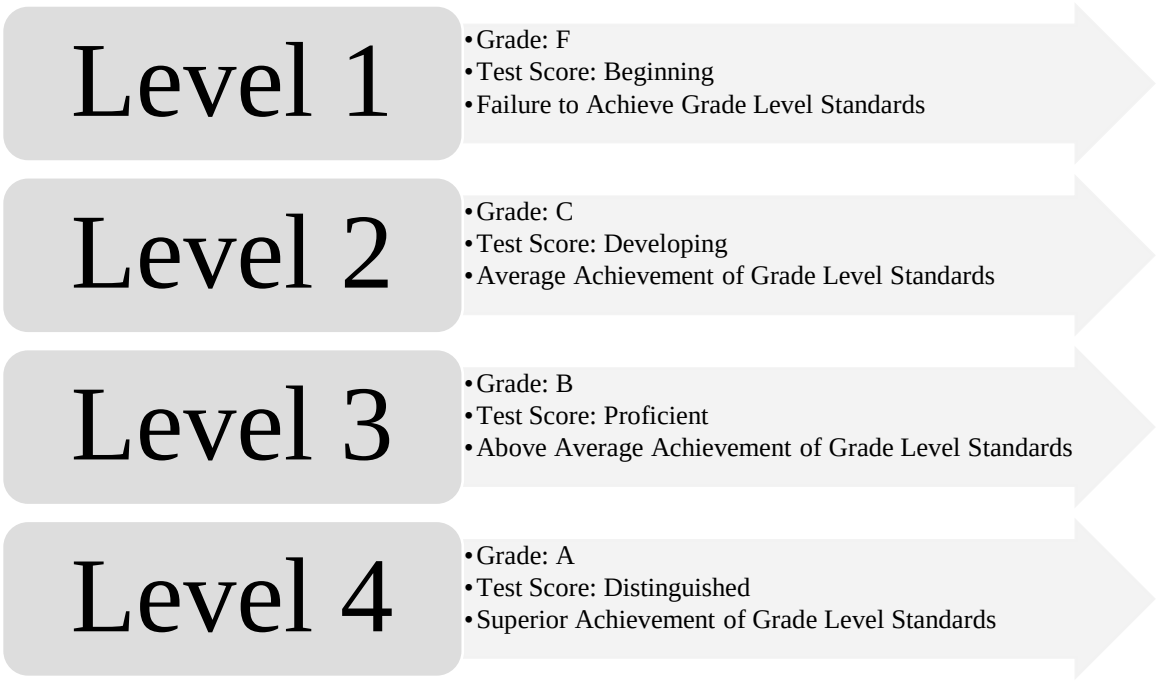


Figure 5. Comparison Criteria between Grades and Test Scores.

Initial examination of the data showed that distribution of grades and test scores among the 35 Title I schools was extremely dissimilar. Figure 6 shows an example of the difference in

distribution of grades and test scores. Out of the 66 fifth grade students tested at this particular school, 24% of those students received an A for the math course, but only 2% of those students received a Distinguished rating on the GMAS. Thirty-eight (38%) percent of the students received a B math grade, but only 19% received a Proficient rating. Thirty-eight (38%) percent of the students received a C math grade, but 24% of the students received a Developing rating on the GMAS. Finally, none of the fifth grade students in School 11 received a failing grade in math, but 56% of the students in School 11 scored on the Beginning Level of GMAS. The comparison charts for all 35 schools can be found in Appendix F.

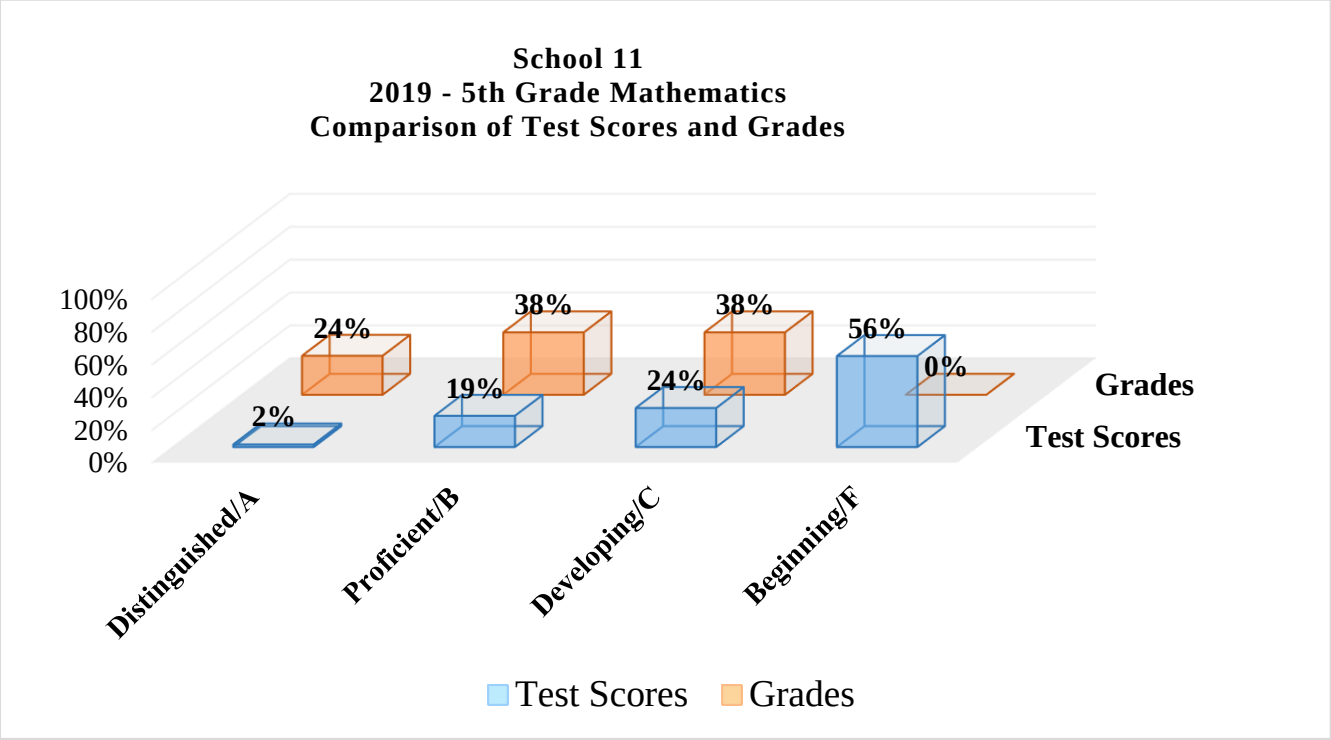


Figure 6. School 11 – Comparison of Math Grade and GMAS Score Distribution.

Further examination of the data showed that for the majority of Title I schools in the district, there was a great discrepancy between the percentage of students failing the fifth grade math course and the percentage of students failing the criterion-referenced standardized assessment of the same content (GMAS). The data showed that there were five schools that had

a 1% to 25% difference in the percentage of students with failing grades and failing the GMAS. There were 19 schools that had a 26% to 50% difference in the percentage of students with failing grades and failing the GMAS, and 10 schools with a 51% to 75% difference. Figure 6 is a histogram that shows the frequency of each group of differences. Twenty-nine of the 35 schools had differences of over 25% in the percentages of students with failing math grades and percentages of students that failed the standardized assessment. Appendix E provides a full report of the differences for all 35 Title I schools.

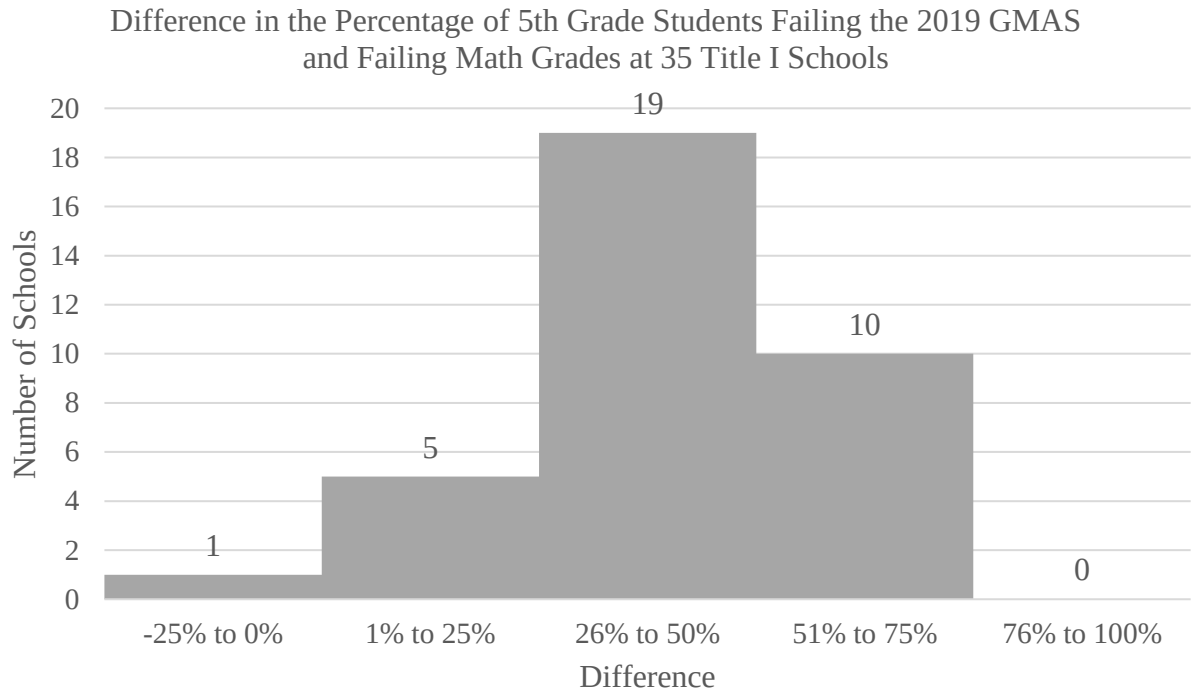


Figure 6. Differences in the Percentages of Failing Grades to Failing Test Scores.

In most cases there were more students to fail the standardized assessment (GMAS) than those that failed the math course. Only one school (i.e. School 22) had more students to receive a failing math grade (48%) than received a failing GMAS test score (41%). The eighty-one students in this particular school (i.e. School 22) had math grades that were very similar to that

of the GMAS test scores (i.e. 4% - Distinguished / 5% - A's; 18% - Proficient / 21% - B's; 37% - Developing / 26% C's; 41% - Beginning / 48% - F's).

However, to get a better picture of the relationship between an elementary student's math grade and his/her test score, individual student data was examined from Oak Hill Elementary, one of the Title I schools in this urban school district. Individual student test data from the 2019 GMAS administration along with each individual student's fourth quarter math grade was obtained to provide clarity to this issue. Students in grades 3, 4, and 5 were tested in mathematics for the 2019 GMAS administration. Table 6 provides a summary of the students tested during the 2019 GMAS administration at Oak Hill Elementary.

Table 6

Summary of Oak Hill Student Participants

Third Grade	Frequency	Percent
Male	57	65.5%
Female	30	34.5%
Third Grade Total	87	100.0%

Fourth Grade	Frequency	Percent
Male	48	60.0%
Female	32	40.0%
Fourth Grade Total	80	100.0%

Fifth Grade	Frequency	Percent
Male	38	57.6%
Female	28	42.4%
Fifth Grade Total	66	100.0%

Next, descriptive statistics were used to analyze the data for each grade level. The preliminary data shows the following frequencies for grades (Table 7) and test scores (Table 8). When examining the data for Oak Hill's students that received an above average grade in

mathematics, 56% of the third grade students received an A or B. There were 40% of the fourth graders that received above average grades in math, and 61% of the fifth graders receiving above average grades. Out of 233 students in third–fifth grade, only 28 students (12%) failed their mathematics class. Fifteen percent (15%) of the third grade students received a failing math grade, 19% of the fourth graders received a failing math grade, and 0% of the fifth graders received a failing math grade.

Table 7

2019 Oak Hill Students' Math Grades

Grades	A's		B's		C's		F's	
	N	%	N	%	N	%	N	%
Third	22	25%	27	31%	25	29%	13	15%
Fourth	7	9%	25	31%	33	41%	15	19%
Fifth	15	23%	25	38%	25	38%	1	2%

Additionally, preliminary findings from the GMAS test scores for Oak Hill's students show that only 21% of the 233 students in third-fifth grade scored at the Proficient and above rating on the state's standardized assessment. Twenty-one percent of the third graders scored Proficient or above, 23% of the fourth graders scored Proficient or above, and 20% of the fifth graders scored Proficient or above. Out of the 233 elementary students tested in third-fifth grade, 39% of the students failed the 2019 GMAS mathematics assessment scoring at the Beginning level.

Table 8

2019 Oak Hill Students' GMAS Test Proficiency Levels

Grade	Distinguished		Proficient		Developing		Beginning	
	N	%	N	%	N	%	N	%
Third	0	0%	19	22%	35	40%	33	38%
Fourth	0	0%	18	23%	38	47%	22	28%
Fifth	1	2%	12	18%	16	24%	37	56%

The following figures–Figure 8, Figure 9, and Figure 10–show the grade/test score distribution for third, fourth and fifth-grade at Oak Hill Elementary. The pictorial representations of the data show in each case that the distribution of grades is dissimilar to the distribution of standardized test scores.

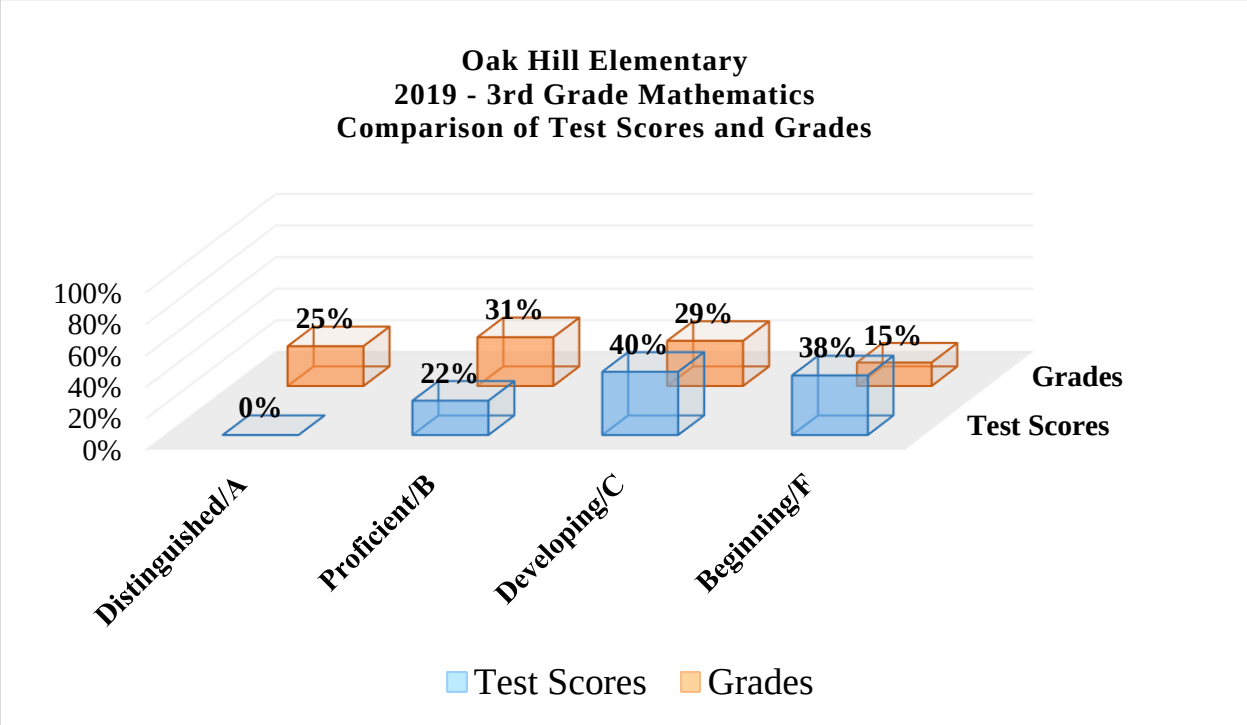


Figure 8. Oak Hill Elementary–Third Grade Distribution of Grades/Test Scores.

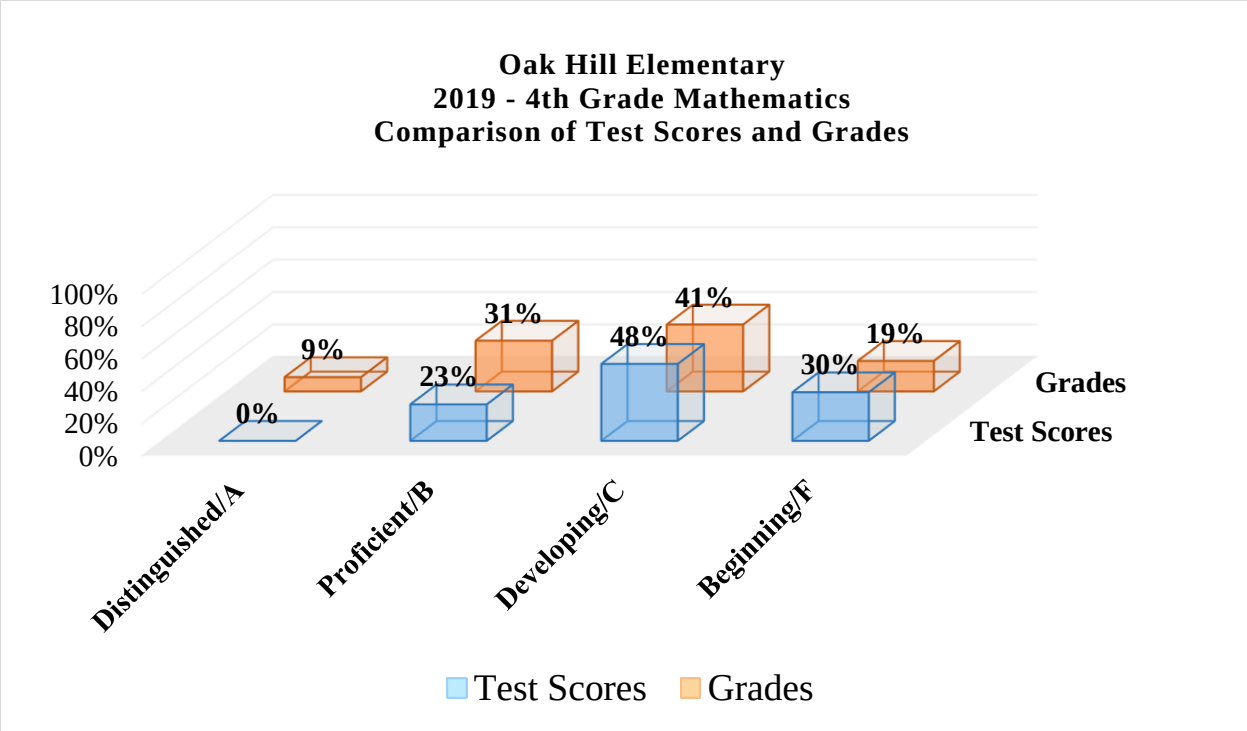


Figure 9. Oak Hill Elementary–Fourth Grade Distribution of Grades/Test Scores.

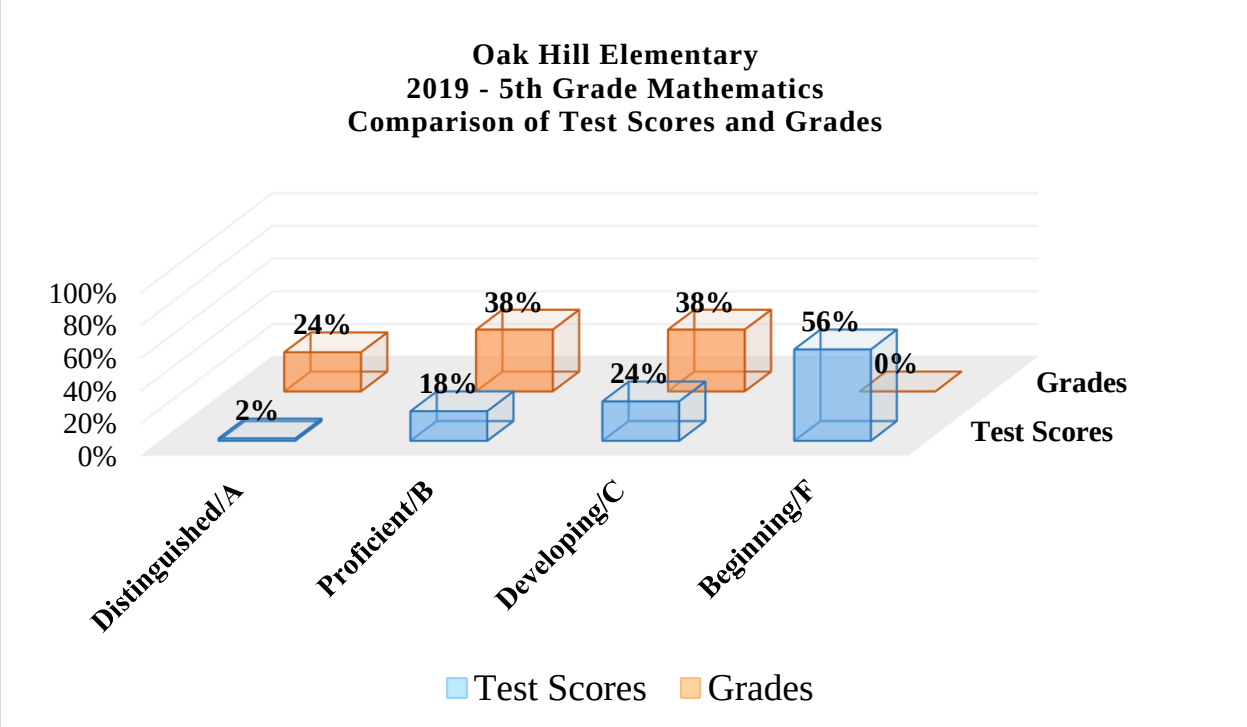


Figure 10. Oak Hill Elementary–Fifth Grade Distribution of Grades/Test Scores.

Finally, to determine if there is a relationship between an elementary student's math grades and his/her test score, a Chi-Square test was performed using SPSS software for each grade level's individual student data. In each case the following null and alternative hypotheses were tested.

H_0 – An elementary student's math proficiency level on the Georgia Milestones assessment is independent of the fourth quarter math report card grade.

H_1 – An elementary student's math proficiency level on the Georgia Milestones assessment is not independent of the fourth quarter math report card grade.

The $\alpha = 0.05$ with a 95% confidence interval.

Third Grade Chi-Square Results

Using SPSS software, a chi-square test of independence was performed to examine the relationship between math GMAS test scores and fourth quarter math grades. Since the p-value is small, the null hypothesis can be rejected because there is enough statistical evidence to conclude that the variables are associated. The relation between these variables was significant, X^2 (6, N = 87) = 46.914, p = .000, 95% CI [1.24, 14.45]. The effect size for this finding, Cramer's V, was relatively strong, .519 (Peter, 2016). A third grade elementary student's math proficiency level on the Georgia Milestones assessment is not independent of his fourth quarter math report card grade (see Table 9).

Table 9

Third Grade Contingency Table between GMAS Score and Math Grade

			GMAS Score			
			Beginning	Developing	Proficient	Total
Math Grade	F	Count	11 (13%)	1 (1%)	1 (1%)	13 (15%)
		Expected Count	4.9 (6%)	5.2 (6%)	2.8 (3%)	13 (15%)
	C	Count	13 (15%)	12 (14%)	0 (0%)	25 (29%)
		Expected Count	9.5 (11%)	10.1 (12%)	5.5 (6%)	25 (29%)
	B	Count	9 (10%)	14 (16%)	4 (5%)	27 (31%)
		Expected Count	10.2 (12%)	10.9 (13%)	5.9 (7%)	27 (31%)
	A	Count	0 (0%)	8 (9%)	14 (16%)	22 (25%)
		Expected Count	8.3 (10%)	8.9 (10%)	4.8 (6%)	22 (25%)
Total		Count	33 (38%)	35 (40%)	19 (22%)	87 (100%)
		Expected Count	33 (38%)	35 (40%)	19 (22%)	87 (100%)

A chi-square test was also performed manually using a 4 x 4 experimental design (see Appendix G). The contingency table generated using SPSS did not include cells for data that was unavailable. For example, there were no cases of third grade students scoring Distinguished on the GMAS and having a math grade of F. The manual results were similar showing that there was a significant relationship between the variables, X^2 (9, N = 87) = 47.34, 95% CI [2.70, 19.02]. The null hypothesis can be rejected. A third grade elementary student's math proficiency level on the Georgia Milestones assessment is not independent of his fourth quarter math report card grade.

Fourth Grade Chi-Square Results

A chi-square test of independence was performed to examine the relationship between math GMAS test scores and fourth quarter math grades. Since the p-value is small, the null hypothesis can be rejected because there is enough statistical evidence to conclude that the variables are associated. The relation between these variables was significant, X^2 (6, N = 80) = 25.779, p = .000, 95% CI [1.24, 14.45]. The effect size for this finding, Cramer's V, was moderate, .401 (Peter, 2016). A fourth grade elementary student's math proficiency level on the Georgia Milestones assessment is not independent of his fourth quarter math report card grade (see Table 10).

Table 10

Fourth Grade Contingency Table between GMAS Score and Math Grade

			GMAS Score			
			Beginning	Developing	Proficient	Total
Math Grade	F	Count	9 (11%)	6 (8%)	0 (0%)	15 (19%)
		Expected Count	4.5 (6%)	7.1 (9%)	3.4 (4%)	15 (19%)
	C	Count	13 (16%)	15 (19%)	5 (6%)	33 (41%)
		Expected Count	9.9 (12%)	15.7 (20%)	7.4 (9%)	33 (41%)
	B	Count	2 (3%)	15 (19%)	8 (10%)	25 (31%)
		Expected Count	7.5 (9%)	11.9 (15%)	5.6 (7%)	25 (31%)
	A	Count	0 (0%)	2 (3%)	5 (6%)	7 (9%)
		Expected Count	2.1 (3%)	3.3 (4%)	1.6 (2%)	7 (9%)
Total		Count	24 (30%)	38 (48%)	18 (23%)	80 (100%)
		Expected Count	24 (30%)	38 (48%)	18 (23%)	80 (100%)

A chi-square test was also performed manually using a 4 x 4 experimental design (see Appendix G). The contingency table generated using SPSS for the fourth grade results, as well, did not include cells for data that was unavailable. For example, there were no cases of fourth grade students scoring Distinguished on the GMAS and having a math grade of C. The manual chi-square results were similar showing that there was a significant relationship between the variables, X^2 (9, N = 80) = 25.56, 95% CI [2.70, 19.02]. The null hypothesis can be rejected. A fourth grade elementary student's math proficiency level on the Georgia Milestones assessment is not independent of his fourth quarter math report card grade.

Fifth Grade Chi-Square Results

A chi-square test of independence was performed to examine the relationship between math GMAS test scores and fourth quarter math grades. Since the p-value is small, the null hypothesis can be rejected because there is enough statistical evidence to conclude that the variables are associated. The relation between these variables was significant, X^2 (9, N = 66) = 43.652, p = .000, 95% CI [1.24, 14.45]. The effect size for this finding, Cramer's V, was relatively strong, .470 (Peter, 2016). A fifth grade elementary student's math proficiency level on the Georgia Milestones assessment is not independent of his fourth quarter math report card grade (see Table 11).

Table 11

Fifth Grade Contingency Table between GMAS Score and Math Grade

			GMAS Score				
			Beginning	Developing	Proficient	Distinguished	Total
Math Grade	F	Count	1 (2%)	0 (0%)	0 (0%)	0 (0%)	1 (2%)
		Expected Count	.6 (0.9%)	.2 (0.3%)	.2 (0.3%)	0 (0%)	1 (2%)
	C	Count	23 (36%)	1 (2%)	1 (2%)	0 (0%)	25 (39%)
		Expected Count	14.0 (22%)	6.1 (10%)	4.5 (7%)	.4 (0.6%)	25 (39%)
	B	Count	12 (18%)	11 (17%)	2 (3%)	0 (0%)	25 (38%)
		Expected Count	14 (21%)	6.1 (9%)	4.5 (7%)	.4 (0.6%)	25 (38%)
	A	Count	1 (2%)	4 (6%)	9 (14%)	1 (2%)	15 (23%)
		Expected Count	8.4 (13%)	3.6 (5%)	2.7 (4%)	.2 (0.3%)	15 (23%)
Total		Count	37 (56%)	16 (24%)	12 (18%)	1 (2%)	66 (100%)
		Expected Count	37 (56%)	16 (24%)	12 (18%)	1 (2%)	66 (100%)

Finally, a chi-square test was performed manually using a 4 x 4 experimental design (see Appendix G). As in the other two cases, the contingency table generated using SPSS for the fifth grade results did not include cells for data that was unavailable. For example, there were no cases of fifth grade students scoring Distinguished on the GMAS and having a math grade of B. The manual chi-square results were similar showing that there was a significant relationship between the variables, X^2 (9, N = 66) = 47.8, 95% CI [2.70, 19.02]. The null hypothesis can be

rejected. A fifth grade elementary student's math proficiency level on the Georgia Milestones assessment is not independent of his fourth quarter math report card grade.

Research Question 2

The second research question was: What are teachers' perceptions regarding the uses of standardized test scores in improving instructional decisions? To answer this question, a survey was created using several dimensions from Boston College's Teacher Survey on the Impact of State-Mandated Testing Programs (Pedulla, 2003). The survey questions and dimensions that were used in this study examined the following areas: 1) teachers' perceived value of the state test, 2) the alignment of classroom practices with the state test, and 3) the impact on the content and mode of instruction/amount of instructional time.

Demographics/ Survey Participants

Permission was obtained from an urban school district in Georgia to ask seven principals from the 35 Title I schools to share the online survey with their third–fifth grade teachers. These seven principals, including Oak Hill's principal, shared the link to the online survey with their teachers. A total of 63 teachers took part in the survey within the allotted time frame (five days).

Of the survey respondents, only 8% of them were novice teachers with five years or less experience. The majority of the teachers had over five years of experience, and 36% of the teachers surveyed had over 20 years of experience in education (see Figure 11).

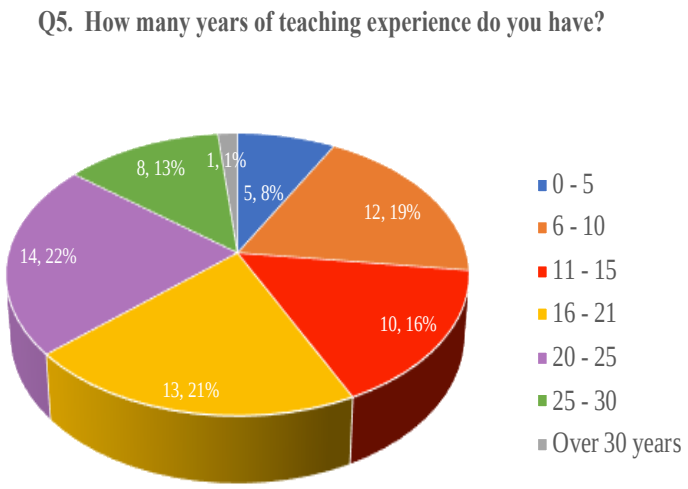


Figure 11. Years of Teaching Experience.

Additionally, the teachers surveyed represented a variety of classroom demographics. Of the district teachers surveyed, almost half of them (48%) taught classes in which the students were grouped or placed into their classes based upon their achievement (see Figure 12). This data is also supported through respondents' report of the ability level(s) of the students they teacher. About half (48%) of the respondents stated that their classes represented a mixed-ability group of students while the other 52% of the teachers reported teaching homogeneously-grouped classes – high ability (14%), average ability (14%), and low ability 24% (see Figure 13).

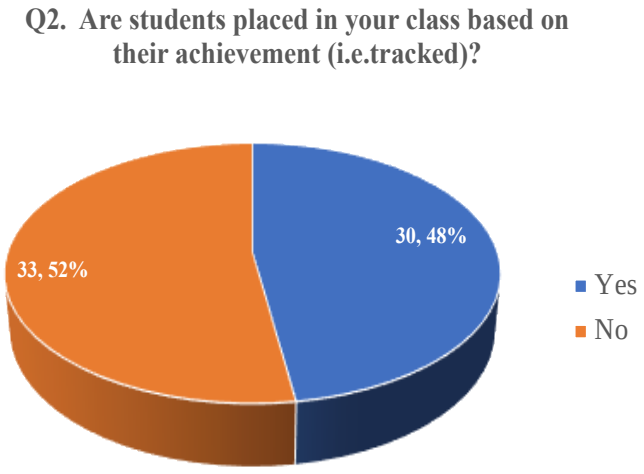


Figure 12. Student Achievement Used as Placement Criteria.

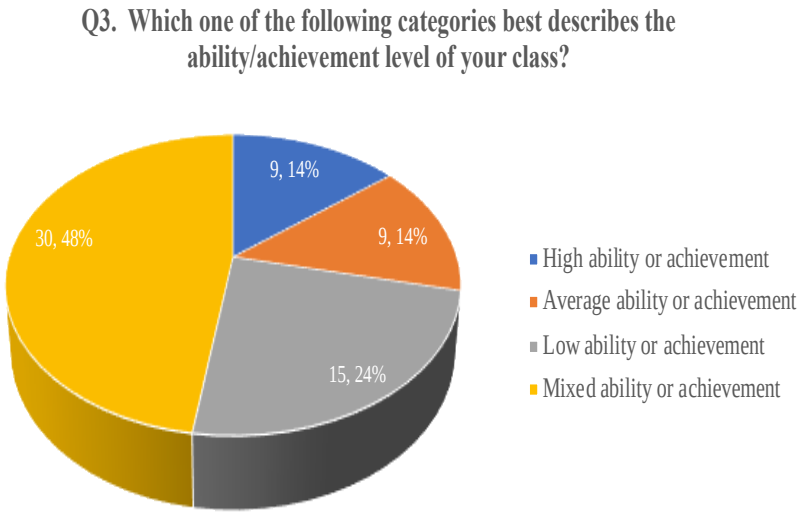


Figure 13. Achievement Level of Classes.

Also, class size for the teachers differed greatly. Only 13% of the teachers reported having a small class size of at least 15 students. The majority range for class size was between 16 to 25 students (76%). However, there were seven teachers (11%) who reported teaching a class size greater than 25 students (see Figure 14).

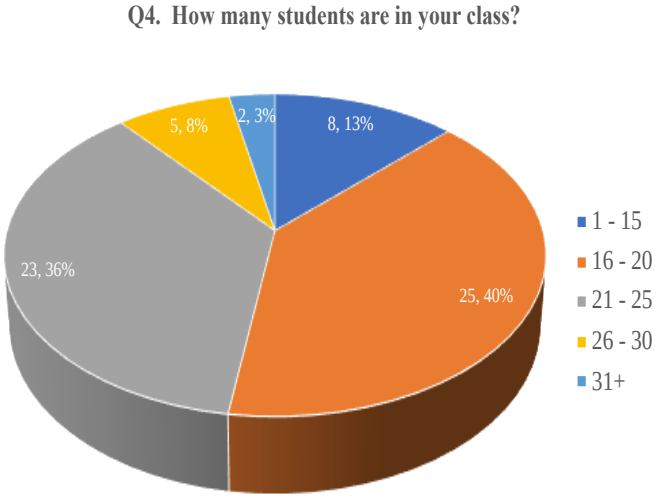


Figure 14. Class Size.

Teacher Perceptions

The questions in the survey examined teacher perceptions in several areas, and through careful quantitative analysis of these areas, several themes emerged. Figure 15 outlines the dimensions of the survey questions and sub-themes that emerged from survey respondents.

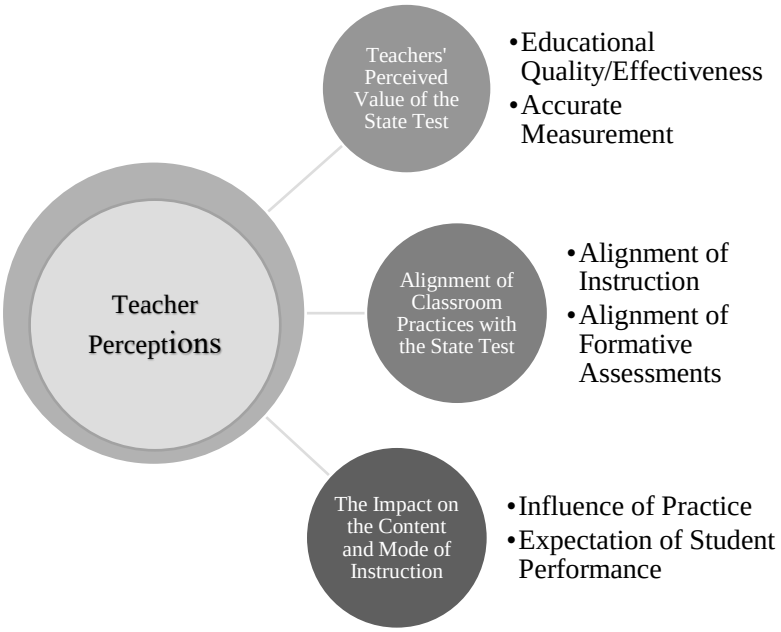


Figure 15. Teacher Perception Themes.

Teachers' Perceived Value of the State Test. Several survey questions were used to determine teachers' perceived value of the GMAS. Questions in this dimension covered issues regarding whether or not teachers believed the GMAS mathematics assessment was an accurate measure of the state's curriculum–the Georgia Standards of Excellence. Questions in this dimension also dealt with the issue of whether or not teachers believed that the results from the GMAS were an accurate indicator of the effectiveness of instruction that students had received. Teachers responded to each item in this domain using a 5-point Likert scale with a rating of 1 as "Strongly Disagree" and a rating of 5 as "Strongly Agree." Additionally, teachers were given the

opportunity to make comments regarding students' performance on the Georgia Milestones and the relationship to classroom grading.

Accurate Measurement. Teachers responded to several questions indicating whether or not they perceived that the state-mandated summative assessment (GMAS) was indeed an accurate measurement of student competencies. Table 12 provides a summary of the results in this area.

Table 12

Accurate Measurement of Student Achievement

		Survey Respondents	
Question	Response	*f*	%
Q7. The state-mandated test (Georgia Milestones) is as accurate a measure of student achievement as a teacher's judgment.	Strongly Disagree	5	8
	Disagree	20	32
	Neutral	25	40
	Agree	7	11
	Strongly Agree	6	10
Q8. The state-mandated test (Georgia Milestones) is as accurate a measure in rating student performance as the grades that they receive on their report cards.	Strongly Disagree	5	8
	Disagree	21	33
	Neutral	22	35
	Agree	8	13
	Strongly Agree	7	11
Q21. The state-mandated test (GMAS) measures high standards of achievement.	Strongly Disagree	1	2
	Disagree	6	10
	Neutral	22	35
	Agree	22	35
	Strongly Agree	12	19

When questioned about the accuracy of the Georgia Milestones assessment, most teachers (54%) agreed that the state assessment measured a high standard of achievement. Yet, forty percent (40%) of the teachers felt that the summative assessment was not as accurate a measure of student achievement as a teacher's judgment. Teacher respondents also had varying opinions when asked if the summative assessment (GMAS) was as accurate in rating student performance as report card grades. Forty-one percent did not agree, while 24% agreed that the GMAS was as accurate as report card grades.

Reasons for the variance of teacher opinions in this area became clear through the open-ended responses from respondents. One teacher reported, "Grades students receive in the classroom do not always reflect how they will score on the Georgia Milestones." Comments from other teachers revealed that report card grades may not match summative assessment results because of unwritten policies to pass students. A teacher stated, "The grades my students receive in the classroom do not match what is on the Milestones due to the fact that I am unable to fail them." Another teacher reported, "Some students receive grades that are not reflective of their performance in the classroom or on the GMAS. Some students will receive a grade of C to keep from failing."

Accurate Measurement of Subgroups. Table 13 below shows a summary of teacher perceptions regarding the performance of minority students and students acquiring English as a second language on the summative assessment.

Table 13

Accurate Measurement of Subgroups

		Survey Respondents	
Question	Response	*f*	%
Q16. Performance differences between minority and non-minority students are smaller on the state-mandated test (GMAS) than on the grades achieved in the classroom.	Strongly Disagree	14	22
	Disagree	15	24
	Neutral	15	24
	Agree	12	19
	Strongly Agree	7	11
Q17. The state-mandated test (GMAS) is NOT an accurate measure of what minority students know and can do.	Strongly Disagree	2	3
	Disagree	4	6
	Neutral	17	27
	Agree	21	33
	Strongly Agree	19	30
Q22. The state-mandated test (GMAS) is NOT an accurate measure of what students who are acquiring English as a second language know and can do.	Strongly Disagree	2	3
	Disagree	4	6
	Neutral	14	22
	Agree	19	30
	Strongly Agree	24	38

The results from survey respondents showed that 63% of the teachers believed that the results from the summative assessment were not an accurate measure of what minority students know and can do. Also 68% of the teachers felt that the state-mandated assessment is not an accurate measure of what ESOL students know and can do. These findings reveal perceptions of cultural bias that teachers may have with the summative assessment system.

When contemplating the results of minority and non-minority students, one respondent commented that "The GMAS is not culturally relevant to low-achieving, impoverished students" which indicates that socio-economic status may need to be considered as well. Another teacher responded,

> I have noticed a trend in education where communities of lower socio-economics score lower on the Georgia Milestones than the affluent communities. But each community's teachers teach the same standards. Thus, economic gaps heavily influence the achievement gap. Therefore, economic equity needs to turn into a policy.

Another sub-group of students that teachers referred to are our gifted kids or high-achieving students. Several respondents with differing opinions made comments about the performance of this subgroup of students. One teacher stated, "I have gifted students so they usually perform well on the GMAS." A second teacher agreed, "My students' daily grades usually align with the scores from the Georgia Milestones." Another teacher stated, "If they (students) are successful in class proficiency they will be successful on the GMAS, and if they are not successful in class they do not master the GMAS."

However, this is not the case with all high performing and/or gifted students. One teacher stated, "Some bright students are not good test takers and the grade reflects an "A" student, however, they may score below level on GMAS." Another teacher reported, "Students

who are high performing in the classroom can receive a low score on the GMAS because they have a fear of the test, which is not something that may be evident when taking an in-class assessment."

A second teacher agreed stating, "They are usually pretty close in terms of achievement, but students can have test anxiety or they could perform better than expected. You really never can tell." A third teacher added,

> From experience, I have had students who were on the Honor Roll and didn't pass a portion of the Georgia Milestones! In my opinion, the curriculum that my school adopted in the past wasn't adequate enough to prepare students to be proficient or higher but more so to prepare them to be Developing. My students were getting passing grades because the curriculum was too easy. The Georgia Milestones was challenging, so a lot of my high performing students didn't do as well. That was due to lack of exposure in the curriculum.

One final subgroup that may be considered are our transient students. One teacher stated, "In many instances a correlation cannot be made especially with transient students." Transient students are those who contribute to the high mobility rate in our school system because they move from school to school. This presents a difficulty because schools in our district do not follow the same pacing guide, nor use the same curricular resources to ensure that as students move from school to school, there is consistency in what is taught at a particular time.

At a minimum, these findings show that teachers believe that the student performance on the summative assessment (GMAS) and on classroom formative assessments is impacted by a variety of variables that may or may not be controlled. Variables such as student mobility rate, socio-economic status, previous experiences, and test anxiety all may impact a student's

performance on both the summative and formative assessment systems, thereby impacting the results.

Differences in Results/Educational Effectiveness. Respondents were also questioned about using the results of the summative assessment as a means of judging educational effectiveness. The results found in Table 14 showed that the majority of educators do not feel that the summative assessment system should be used to make decisions about educational effectiveness in the school, but 70% of the teachers also reported that their administrators do feel results from the state-mandated test reflect the quality of teachers' instruction.

Table 14

Educational Effectiveness/Differences in Results

		Survey Respondents	
Question	Response	*f*	%
Q19. Score differences from year to year on the state-mandated test reflect changes in the characteristics of students rather than changes in school effectiveness.	Strongly Disagree	5	8
	Disagree	4	6
	Neutral	18	29
	Agree	21	33
	Strongly Agree	15	24
Q24. Differences among schools on the state-mandated tests are more a reflection of students' background characteristics than of school effectiveness.	Strongly Disagree	0	0
	Disagree	0	0
	Neutral	10	16
	Agree	21	33
	Strongly Agree	32	51
Q27. Administrators in my school believe students' state-mandated test (GMAS) scores reflect the quality of teachers' instruction.	Strongly Disagree	1	2
	Disagree	3	5
	Neutral	15	24
	Agree	23	37
	Strongly Agree	21	33

When questioned about the fluctuation in standardized assessment test results from year to year, 57% of the district's teachers indicated that the score differences on the GMAS from year to year were due to changes in the characteristics of students rather than the changes in school effectiveness. Also, the majority of survey respondents (84%) stated that the differences

among schools on the state-mandated tests are more a reflection of students' background characteristics than of school effectiveness.

Respondents made several comments regarding possible reasons for differences in the way students perform on the GMAS. One respondent noted, "Some students just don't test well or have the home support needed to do well on the test." Another teacher commented that the previous year(s) instruction is also a factor,

> Because many students begin each year 1 to 2+ years behind grade level, teachers are at a disadvantage from day one. Teachers are unable to begin where they are supposed to start with the pacing guide. They must go back and try to fill in the gaps in learning to assist students with grasping new concepts. Students feel frustrated and defeated in certain subjects when there is a huge deficit in their learning (i.e. math & reading). Thanks for allowing me the opportunity to speak freely.

Another teacher made comments about the variety of variables that may influence differences in student performance on the GMAS. He/she stated,

> I believe that standardized testing doesn't really show what all students know and have learned. There are many variables (i.e. homelessness, food insecurity, domestic violence, child abuse, etc.) that can affect students before and during the GMAS. I believe there should be several testing measures to test student mastery of content. It is my belief that if a state assessment was given at the beginning of school and then at the end of the school year, it would show a clearer picture of student mastery.

Measure of Educational Effectiveness. Survey respondents expressed strong feelings when asked about the Georgia Milestones being used as a measure of educational effectiveness. One teacher commented,

> It's not about the Milestones, it's about the students we teach. The Milestones should be redesigned for students with learning disabilities and academic challenges. It should be different levels of the GMAS assessment. If we practice differentiation in the classroom, the assessment should be the same.

Another special education teacher added,

> I believe students in my classroom should have an alternative assessment since their learning looks different based on their IEP (Individualized Education Program). I believe that the Georgia Milestones puts a lot of stress on students. Why give 1,000,000 during the school year then make such a big deal about one? In my opinion, I believe students no longer take assessments seriously because all we do is test them.

Another teacher added to the idea of using the summative assessment as a measure of educational effectiveness. He/she stated, "Georgia Milestones doesn't consider having to remediate students. Sometimes, students grow but do not pass the assessment."

The survey data from respondents showed that 48% of the district's teachers disagreed or strongly disagreed that GMAS scores accurately reflect the quality of education students have received at schools (see Figure 16) even though 70% of them reported that their evaluators do believe that the summative results do reflect instruction in the classroom.

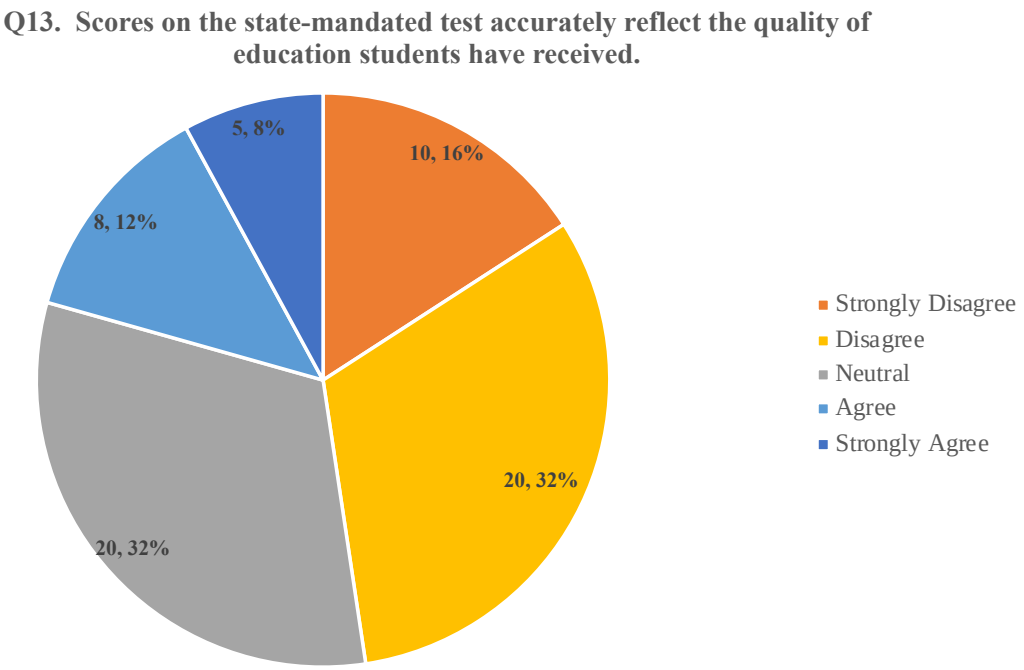


Figure 16. GMAS Scores–A Reflection of Educational Quality?

Alignment of Classroom Practices with the State Test. Another dimension of the survey considered the alignment of the summative assessment to formative assessment practices and daily instruction of teachers. Results from this area of the study shown in Table 15 showed that the majority of teachers (70%) believed that the state-mandated test is aligned to the curriculum that they are required to follow. Also 77% of the teachers believe that the district's curriculum is aligned to what is covered in the GMAS as well. Furthermore, 57% of survey respondents reported that their daily instruction is compatible with the Georgia Milestones assessment. All of this is evidence that the majority of teachers in the district do acknowledge the importance of teaching to the state's adopted curriculum that is assessed through the Georgia Milestones Assessment System.

Table 15

Alignment of Formative Assessment

Question	Response	Survey Respondents *f*	Survey Respondents %
Q6. The state-mandated test (Georgia Milestones) is compatible with my daily instruction.	Strongly Disagree	2	3
	Disagree	5	8
	Neutral	20	32
	Agree	22	35
	Strongly Agree	14	22
Q9. My district's curriculum is aligned with the state-mandated testing program (GMAS).	Strongly Disagree	0	0
	Disagree	3	5
	Neutral	11	17
	Agree	33	52
	Strongly Agree	16	25
Q10. The state-mandated test (Georgia Milestones) is based on a curriculum framework (Georgia Standards of Excellence) that ALL teachers in my state should follow.	Strongly Disagree	0	0
	Disagree	5	8
	Neutral	14	22
	Agree	24	38
	Strongly Agree	20	32
Q12. The instructional texts and materials that the district requires me to use are compatible with the state-mandated test (GMAS).	Strongly Disagree	2	3
	Disagree	15	24
	Neutral	15	24
	Agree	21	33
	Strongly Agree	10	16
Q18. Many low scoring students will do better on the state-mandated test (GMAS) if they receive specific preparation for it.	Strongly Disagree	1	2
	Disagree	10	16
	Neutral	17	27
	Agree	15	24
	Strongly Agree	20	32
Q20. If I teach to the state standards or frameworks, students will do well on the state-mandated test (GMAS).	Strongly Disagree	2	3
	Disagree	11	17
	Neutral	19	30
	Agree	14	22
	Strongly Agree	17	27
Q26. The state-mandated testing program (GMAS) leads some teachers in my school to teach in ways that contradict their own ideas of good educational practice.	Strongly Disagree	2	4
	Disagree	6	11
	Neutral	21	40
	Agree	7	13
	Strongly Agree	17	32

However, survey results also show varying opinions about how well adherence to the state's adopted curriculum impacts student outcomes on the GMAS. Comments provided by the teachers show that although students may perform well on classroom assignments aligned to the state's adopted curriculum, these results may not necessarily transfer to students' performance on the summative assessment. One teacher reported, "Generally, my students perform much better in the classroom compared to their performance on the Georgia Milestones." Another teacher stated,

> I believe that students' abilities are not a direct reflection of their scores on the GMAS. Students that have high grades and achieve and perform well in the classroom, could possibly score low on the GMAS (for a reason unknown). Therefore, the GMAS should be eliminated or revised. The efficacy of the GMAS should be a primary focus of educational leaders.

Additionally, there was some indication from survey respondents that the administration of the GMAS impacts their daily instruction with students. Teachers were asked specifically about preparation for the summative assessment. One teacher reported, "How students perform on standardized prep coursework is indicative of Georgia Milestone potential." In fact, 56% of the district's teachers agreed or strongly agreed that their students would do better on the state-mandated test (GMAS) if they receive specific preparation for it.

Alignment of Formative Assessments. With regards to content and format of teacher created/selected formative assessments, 71% of the district's teachers agreed or strongly agreed that their tests have the same content as the state-mandated assessment (see Figure 17). Also, 41% of district's teachers believed that their assessments are in the same format as the GMAS (see Figure 18). This data reveals that the majority of teachers do believe that their classroom

formative assessments measure the same content that students are assessed through the Georgia Milestones.

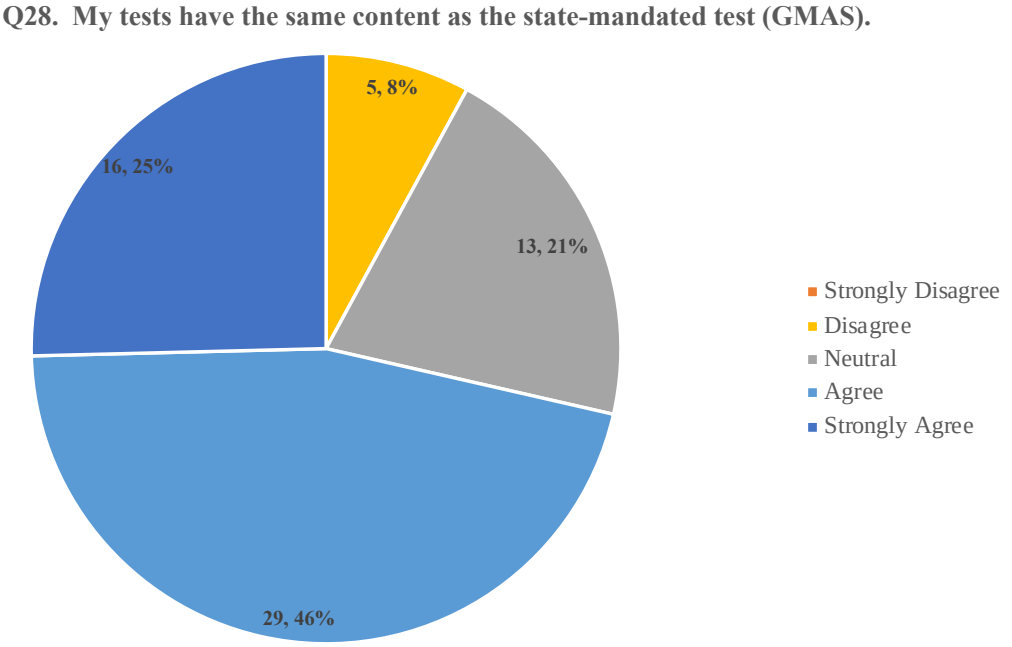


Figure 17. Formative Assessment vs. GMAS Content.

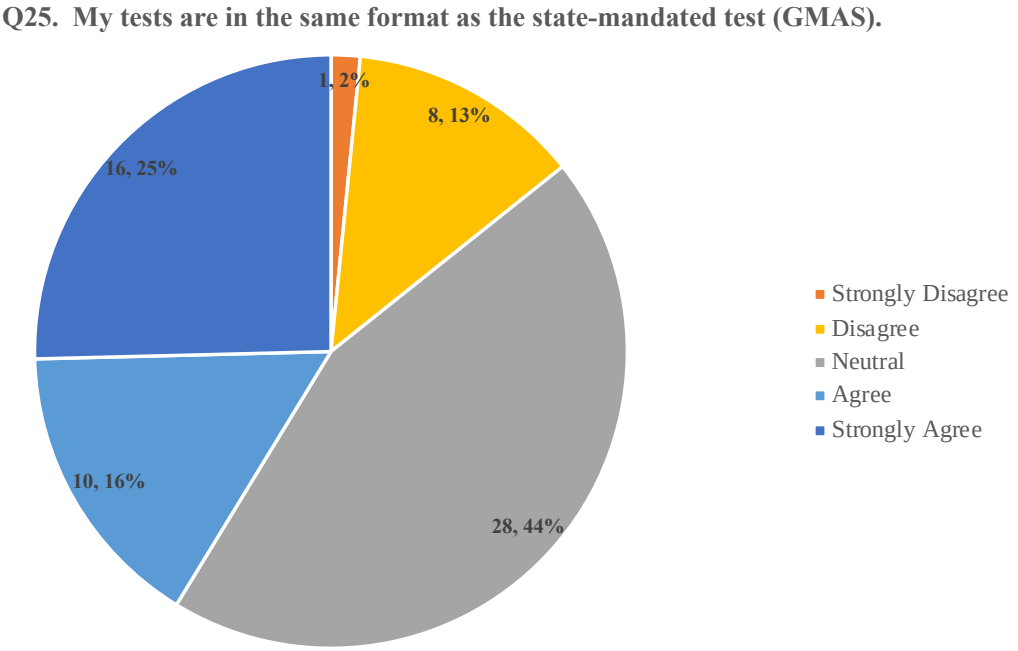


Figure 18. Formative Assessment vs. GMAS Format.

However, one teacher shared ideas about the difference in format for the summative assessment and classroom formative assessments. He/she stated, "The GMAS often contains questions at a DOK level of 2 or 3. Whereas in the classroom, the formative assessments may be at a DOK level of 1 or 2. Students who struggle in third grade, particularly in Reading, will be behind in upper grades, making it hard to pass future state tests at a high level."

Teacher Expectations. In the next dimension of the survey, respondents had to answer questions relating to expectations they have for student performance on summative and formative assessments. The responses to all three questions in this dimension in Table 16 showed that the majority of teachers have high expectations of student performance regardless the type of assessment. Whether the assessment was used in the classroom for formative assessment purposes or summative assessment purposes, this data shows that the majority of teachers have high expectations for students' academic performance.

Table 16

Survey Responses on Teacher Expectations

		Survey Respondents	
Question	Response	*f*	%
Q14. Teachers have high expectation s for the performance of all students on the state-mandated test (GMAS).	Strongly Disagree	0	0
	Disagree	2	3
	Neutral	11	17
	Agree	25	40
	Strongly Agree	25	40
Q15. Teachers have high expectations for the performance of all students on their graded formative assessments.	Strongly Disagree	1	2
	Disagree	2	3
	Neutral	7	11
	Agree	23	37
	Strongly Agree	30	48
Q23. Teachers have high expectations for the in-class academic performance of students in my school.	Strongly Disagree	0	0
	Disagree	2	3
	Neutral	8	13
	Agree	25	40
	Strongly Agree	28	44

However, even though many of the teachers indicated that they have high expectations for their students, open-ended responses from some respondents show a contrasting picture. All teachers surveyed do not expect that their students will perform well on both the summative and formative assessments. One teacher reported, "Many students achieve higher grades in the classroom compared to their scores on the Georgia Milestones test results." Also, some teachers' expectations of student performance on the GMAS and on classroom formative assessments vary for a plethora of reasons. One teacher stated,

> I feel the grades the students make on assessments taken weekly and daily do not add up to how they perform on the GMAS. There are a lot of variables associated with it. In a low socio-economic school, their (students) focus is merely dedicated to doing the best they can. Usually, the students give 100% percent to completing the GMAS and getting a score of "Developing" and some will prove to be "Proficient". It's the hard work and the teachers working ten times harder than the average teacher to attain the scores. A lot of times you witness students who have achieved all year long (Honor Roll) and end up not passing the GMAS, while others are barely in the Developing stages.

GMAS Influence on Teacher Practice. Next, several questions on the survey required respondents to consider how administering the GMAS may influence their practices in the classroom. Teachers were asked about how often their students' GMAS results impacted their teaching. Forty-eight percent (48%) of district teachers stated that their students' scores impacted their teaching daily. In contrast, none of the teachers stated that the GMAS results never influenced their teaching (see Figure 19).

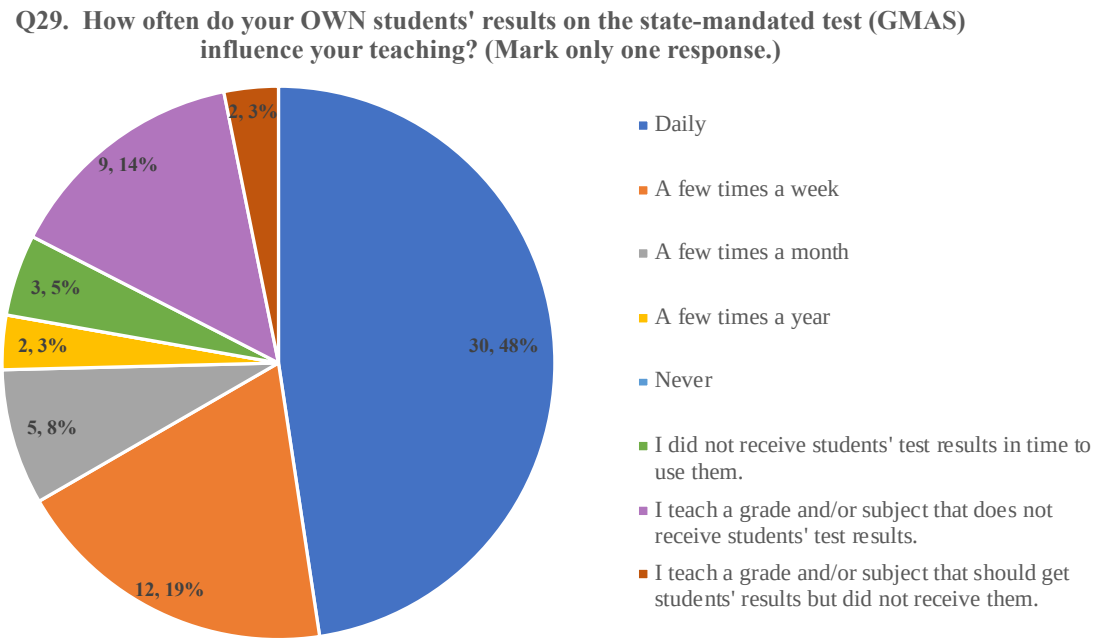


Figure 19. GMAS Impact on Teaching.

Next, teachers were asked about the type of instructional activities that are impacted by the results from the state-mandated test (GMAS). The top 3 activities (see Figure 20) that are impacted by GMAS for district teachers were: plan instruction (67%), give feedback to students (60%) and select instructional materials (59%). These findings may prove to be interesting to some readers because the results from the summative assessment are reported at the end of the school year. It could also be argued that using the summative assessment results to plan for instruction, select instructional materials, and give feedback to students are practices that could be associated more with formative assessment which shows an even greater impact that the summative assessment system has on the day-to-day formative assessment practices of educators.

Several teachers made comments about specific changes to instruction and formative assessment practices that need to happen to improve student achievement on the GMAS. One teacher proposed that, "We need to do more written responses in our testing strategies that

explain how we come to conclusions and not just looking for a quick answer." A second teacher stated, "I think that the high level questioning should be evident in instruction and classwork to prepare students for the rigor of the test, realizing that there are various levels of questioning." Another teacher recommended that we examine the rigor in our instructional practices and hold teachers in the lower grades more accountable for student performance. He/she stated,

> I do not believe some students have the same rigor in the classroom that they have on the GMAS. This is sometimes due to the makeup of the class or the teachers not differentiating for the students that can be pushed. Also, the students are not accustomed to the rigor when they get to the upper grades because they aren't used to the high expectations and the higher level of thinking that goes into reading and math. Teachers in the lower grades who are not tested need to be held to a greater accountability.

Also, there was one teacher that felt that in order for students to perform better on the GMAS, the content must be more relevant to their lives. He/she commented, "Students have to internalize the test and the effect it plays in their instruction and its relationship to their future goals and educational pursuit."

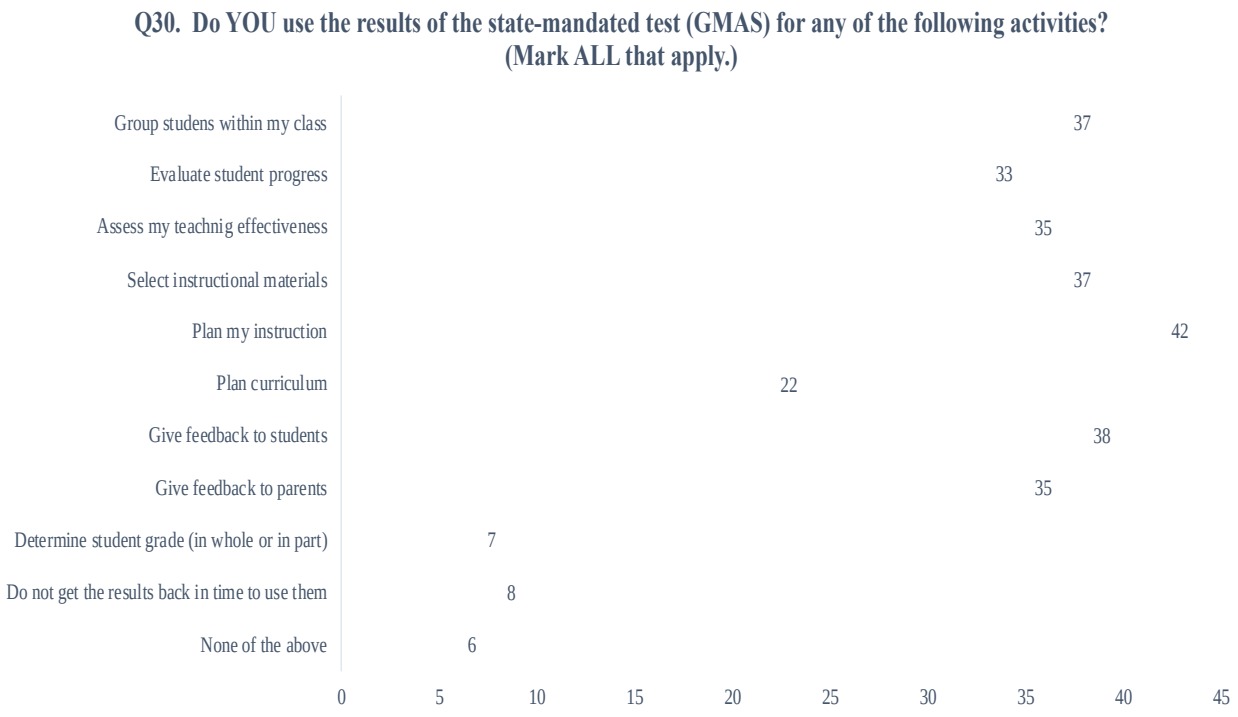


Figure 20. GMAS Impact on Instructional Activities.

Finally, with the survey results showing that some teachers allow the results of the GMAS to influence instructional practices and activities, 45% of district teachers reported that the state-mandated testing program (GMAS) leads some teachers in their schools to teach in ways that contradict their own ideas of good educational practice. Because this finding was not complemented with additional comments from teachers, further investigation may be warranted.

Research Question 3

The third research question was: How well do teachers' formative assessments align to the rigor of the standardized assessment at the appropriate level of complexity? To answer this question, this researcher observed and analyzed the formative assessment practices at Oak Hill Elementary, one of the 35 Title I schools in the Georgia urban school district studied. This researcher is considered a participant observer because she serves as the instructional coach for

the teachers participating in this study from Oak Hill. Demographic information for each participating teacher is presented in Table 17 below.

Table 17

Participant Demographics

Participant Pseudonym	Grade	Approximate Age	Race	Gender	Years of Experience	Subjects Taught
Dana	3rd Grade	Late 20s	African-American	Female	6	All Subjects
Vivian	3rd Grade	Mid 40s	African-American	Female	23	All Subjects
Saul	3rd Grade	Late 40s	African-American	Male	22	Math & Science
Rachael	4th Grade	Mid 50s	African-American	Female	25	Mathematics
Bethany	4th Grade	Early 30s	African-American	Female	10	Math (SWD)
Kelly	5th Grade	Late 40s	African-American	Female	15	Mathematics
Barbara	5th Grade	Early 50s	African-American	Female	24	Math (SWD)

Oak Hill Elementary School in which the case study was conducted has a student population of about 430 students in grades Pre-Kindergarten to fifth grade. All of Oak Hill's students receive free or reduced priced lunch, but 72% of its students are directly certified as economically disadvantaged. Oak Hill's student population is 99.7% non-white with African-Americans (almost 85%) as the most prevalent subgroup of the population and Hispanics (15%) as the second highest subgroup. Less than 1% of the school's population consists of multi-racial students. English language learners comprise 10.19% of Oak Hill's population, and Students with Disabilities (SWD) make up 13.5% of the school's population. Based on the College and Career Ready Performance Index (CCRPI), Oak Hill, as a school, received a C letter grade in 2019 for a CCRPI score of 76.4. The CCRPI score is calculated based upon standardized test scores, student growth on the test, graduation rates and other factors (GOSA, 2019).

After approval for the case study and teacher consent was obtained, data was collected for a period of four weeks to gain insight into teachers' formative assessment practices to see if the practices and the assessments, themselves, align appropriately to the Georgia Milestones

assessment. Each of the seven teachers' mathematics classes was observed three times using the Formative Assessment Rubrics, Reflection and Observation Tools to Support Professional Reflection on Practice (FARROP). The following dimensions of this observation instrument were utilized:

- Learning Goals – This dimension focuses on how well the teacher aligns learning goals to the Georgia Standards of Excellence (GSE) and communicates those goals to students.
- Criteria for Success – This dimension investigates how well students understand what quality work looks like in relationship to the GSE standard.
- Tasks and Activities to Elicit Evidence of Learning – This dimension focuses on evidence of student learning and mastery of GSE standards produced by students during the lesson.
- Feedback Loops During Questioning – This dimension focuses on how well the teacher provides ongoing feedback regarding student mastery of the standards during the lesson.
- Descriptive Feedback – This dimension focuses on the teacher's role in providing individualized feedback to students with regards to the success criteria established.
- Use of Evidence to Inform Instruction – This dimension focuses on how formative assessment is used to adjust instruction as needed to improve students' mastery of the standards.

Analysis of these classroom observations included quantitative and qualitative measures. First, a descriptive summary of each observation was made. Each dimension of the observation

instrument requires scores from the FARROP rubric (i.e. 1 – Beginning; 2 – Developing; 3 – Progressing; 4 – Extending). This numerical information was described in detail and analyzed. Next, the notes from the observation instruments were organized in a table and the data was coded, themes highlighted and patterns in teacher practices described (Merriam, 2009).

Following each observation, individual teachers were engaged in semi-structured interviews to gain more insight on their perspectives. The post-observation questions included:

- What was the learning goal(s) for the lesson? Did students achieve that goal? How do you know?
- What evidence of student learning was collected? What is the next step?
- Using the Georgia Milestones Achievement Level Descriptors, how well-aligned is your lesson to the intent of the standard?

Also, during these three post-observation interviews, teachers along with the researcher analyzed the formative assessments used noting whether or not the formative assessment that was used for grading purposes was aligned to the standard at the appropriate level of complexity. To determine this, the GMAS Achievement Level Descriptors and Hess's Cognitive Rigor Matrix for mathematics and science were used as guidelines (Hess, 2009). Hess's Cognitive Rigor Matrix is a tool that combines Benjamin Bloom's taxonomy (Anderson, 2014) and Norman Webb's Depth of Knowledge (Webb, 1997) and is often used by educators when designing assessment items and performance tasks to determine what cognitive rigor should look like (Hess, 2014). Hess's Cognitive Rigor Matrix was used in conjunction with the GMAS Achievement Level Descriptors to provide more information about the cognitive demand required by each formative assessment. A variety of formative assessments were collected and

analyzed from each teacher but had to include the following: (1) an exit ticket, (2) a homework assignment, and (3) a constructed response item from a quiz.

Formative Assessment Teacher Profiles

The following narratives will be used to report the findings of the classroom observations, post-observation conferences, and student work analysis to gain more insight into formative assessment practices and teacher perspectives and answer the following research question: How well do teachers' formative assessments align to the rigor of the standardized assessment at the appropriate level of complexity?

Dana. Dana is an African-American female in her late 20s who has been teaching for six years. She teaches a reduced-model EIP (Title I – Early Intervention Program) third grade class which means that she teaches a relatively small, mixed ability group of students. Out of Dana's sixteen third graders, there are four students that have been identified as EIP or "at-risk of not reaching or maintaining academic grade level" (Donald, 2018, p. 3). Dana's class has several English Language Learners (ELLs) that do receive services earlier in the school day but participate in Dana's entire math block. Also, during her math block, Dana serves two Students with Disabilities (SWD) children that return to her classroom for an extra dose of math after receiving pull-out services from a special education teacher.

Dana is returning to education after staying home with her child for about five years. Dana presents herself as a cooperative, caring educator that works well with her grade level team during the weekly collaborative planning sessions and tries to follow the scope and sequence documents provided by our district to the best of her ability. However, many times her pacing lags behind her peers on the grade level because she is concerned that her "students are not ready to move on yet." Dana has difficulty staying on the district's pacing because she stretches out one

math lesson over the course of several days to ensure that her students "have the concept." This means that activities may be repeated and additional instruction may take place before her students take the assessment that has been planned for that particular group of lessons.

Classroom Formative Assessment Practices. Analysis of Dana's formative assessment practices showed that she scored in the Progressing level throughout each of the dimensions of the FARROP observation instrument (see Appendix H). Dana consistently presented a clear focus for her math lessons by stating the learning goal aligned to the standard. However, this practice could have been enhanced by making connections to what had been previously learned. With regards to the student work/formative assessments given to students, Dana selected formative assessments and assigned grades to tasks that were aligned to learning targets within the standard. This provided information about how students were progressing towards mastery of skills within the standard, instead of the standard as a whole. During each observation, Dana made it a practice to post a teacher exemplar and then shared student exemplars as examples of what made a "good answer".

Additionally, there was evidence that Dana used the information from the formative assessments to inform her practice. During one of the debriefing sessions, she expressed the following concern:

> The Exit Ticket showed that most of my students just weren't ready. I just can't move on and allow them to fail. The concepts build on each other. If I move on too fast, the kids will have gaps in their knowledge and won't demonstrate mastery on the test.

Alignment of Dana's Formative Assessments. Dana's selection of formative assessments came from a variety of resources (i.e. textbook publisher, web-based and created by herself and/or team). Using the GMAS Achievement Level Descriptors, 2 of the 3 formative

assessments were constructed on the Developing Level which means that students who demonstrated mastery on these formative assessments should possess the skills needed for them to perform on the Developing Level of the GMAS. Dana's web-based homework assignment and teacher-created quiz would need to be adjusted in order to require her students to demonstrate skills necessary for performing at the Proficient Level and above on the GMAS (see Table 18).

Table 18

Formative Assessment Analysis–Dana

Assessment Type	Origin	Standard Alignment	Achievement Level Descriptors Rating	Hess's Cognitive Rigor Matrix Level	How Might the Task be Adjusted to Meet the Proficient Level and/or Beyond?
Exit Ticket	Textbook Publisher	3.NF.3	Distinguished	DOK 2/ Analyze	
Homework	Web-based Resource	3.NBT.2	Developing	DOK 1/ Apply	Use place value relationships to explain arithmetic patterns.
Quiz	Teacher Created	3.NF.2	Developing	DOK 2/ Understand	Understands fractions in terms of intervals on a number line.

Vivian. Vivian is an African-American female in her mid 40s who has been teaching for a total of 23 years. Vivian's third grade class is also comprised of a mixed-ability group of 16 students. Three of her students are in the EIP program, 3 students are ELL, and 3 students are SWD. Although her ELL and SWD students leave Vivian's classroom at various times during the day, all 16 students are present during her math block which gives the SWD students an extra dose in math.

Vivian is an experienced educator who feels very comfortable in math. She is also extremely comfortable with the math curriculum resources that the school has chosen to use because she piloted the program in our school for a year before the school's decision to use these

curricular resources on a school-wide basis. For this reason, Vivian is responsible for writing the math plans for her third grade team and leads out in sharing math resources during weekly collaborative planning sessions.

Classroom Formative Assessment Practices. Vivian's formative assessment practices ranged from the Beginning to the Developing Level using the FARROP observation instrument (see Appendix H). Observation of Vivian's math classes showed that she did not make it a practice to share a standards-driven learning goal with students. At the beginning of each lesson, students were told what the topic was for the day. Also, students were not provided with clear expectations of success for their work, and the feedback given to students regarding their work lacked specificity (see Appendix H). This lack of attention to the details of the standard was also reflected in the formative assessments that she selected for her students. The majority of the formative assessments she gave and used for grading purposes were aligned to the standard at the topic level, but did not encompass the full meaning of the standard. With regards to using the formative assessments to guide instruction, Vivian stated that she was more concerned with covering the content in time for the GMAS administration. In her words, she needed to "keep moving."

Alignment of Vivian's Formative Assessments. Vivian's selection of formative assessments also come from a variety of resources (i.e. textbook publisher, web-based and created by herself and/or team). However, 2 of the 3 formative assessments analyzed were constructed at the Beginning Level. Although her students may demonstrate mastery on these assessments, it is implied that they were not rigorous enough to allow students to demonstrate mastery of grade level standards according to the GMAS Achievement Level Descriptors (see Table 19).

Table 19

Formative Assessment Analysis –Vivian

Assessment Type	Origin	Standard Alignment	Achievement Level Descriptors Rating	Hess's Cognitive Rigor Matrix Level	How Might the Task be Adjusted to Meet the Proficient Level and/or Beyond?
Exit Ticket	Web-based Resource	3.NF.3	Beginning	DOK 1/ Remember	Compare fractions with the same numerator or same denominator.
Homework	Textbook Publisher	3.NF.1	Beginning	DOK 1/ Understand	Vary the kind of model used (i.e. area model or number line).
Quiz	Teacher Created	3.NF.3	Proficient	DOK 1/ Understand	Require an explanation of equal partitions of one or more wholes or intervals on a number line.

Saul. Saul is an African-American male in his late 40s with 22 years of experience in education. Saul team-teaches a group of nineteen third graders with another teacher. However, Saul is responsible for the math and science instruction in that classroom. Because our number of third grade at-risk EIP students was so great, Saul's class was created before the first quarter of school ended to provide services for these students. Saul's class is considered a Title I Augmented class with 14 of his 19 students classified as EIP. This class is in the Augmented EIP model because another teacher is provided to reduce the teacher/pupil ratio.

Saul is an experienced educator and is confident in his math instruction because before this assignment, he served the past five years as an EIP pull-out teacher that removed EIP students from the classroom and provided math instruction to students that needed this type of small group intervention. However, this year is different for Saul because he has to teach a full classroom of students and is encouraged to plan his instruction with the third grade team. Saul has proven to be a team player and is extremely cooperative.

Classroom Formative Assessment Practices. Saul's formative assessment practices ranged from the Developing to the Progressing Level using the FARROP observation instrument (see Appendix H). Saul did consistently communicate learning goals to students and did model expectations for student success. Also, the analysis of the formative assessments that he selected did show that they were properly aligned to the standard at the appropriate level of complexity. However, Saul could have improved his formative assessment practices by providing descriptive feedback to students regarding their performance on formative assessments. Feedback given to students in Saul's math classes was generally brief and non-descript, such as "Good" or "You Got it!" Students were not provided detailed evidence that explained their progress towards mastery of the standard.

Alignment of Saul's Formative Assessments. All three of Saul's formative assessments were analyzed and were found to be constructed at the Proficient Level or above using the GMAS Achievement Level Descriptors rating. This would imply that demonstrating mastery on these formative assessments would show that students possessed the skills needed to demonstrate proficiency or above in these areas on the GMAS (see Table 20).

Table 20

Formative Assessment Analysis–Saul

Assessment Type	Origin	Standard Alignment	Achievement Level Descriptors Rating	Hess's Cognitive Rigor Matrix Level	How Might the Task be Adjusted to Meet the Proficient Level and/or Beyond?
Exit Ticket	Teacher Created	3.NF.2	Distinguished	DOK 2/ Analyze	
Homework	Teacher Created	3.NF.3	Proficient	DOK 2/ Analyze	Compare fractions with the same numerator or same denominator.
Quiz	Teacher Created	3.NF.3	Proficient	DOK 1/ Apply	Explain understanding of fractional equivalence and comparisons.

Rachael. Rachael is an African-American female in her mid 50s with 25 years of experience in education. Rachael is the mathematics teacher for all of our fourth grade students. Our school is departmentalized on the fourth grade level with 3 different teachers (i.e. one Math; one Reading/ELA; one Science/Social Studies). Each mixed-ability group of homeroom students rotates with their entire class from teacher to teacher throughout the day. Within each class, there is a variety of EIP, ELL, and SWD students. However, during one math block, Rachael team-teaches with another EIP teacher to augment that class setting. During another math block, a special education teacher pushes in to team-teach and provide services for a large number of SWD students.

Rachael is extremely confident in teaching mathematics. For most of her career, she has taught either fourth or fifth grade mathematics and chooses to work in schools where math is departmentalized on the elementary school level. Rachael is responsible for the fourth grade mathematics plans. However, she does use weekly math collaborative planning time to plan with the fourth grade EIP teacher and the fourth grade special education teacher.

Classroom Formative Assessment Practices. Observation of Rachael's math classes often showed that her formative assessment practices ranged from the Progressing to the Extending levels using the FARROP instrument (see Appendix H). Rachael consistently communicated the daily learning target to students and made it a practice to model several examples for students to provide them with an exemplar. She also frequently provided students with a checklist to ensure that they were familiar with the success criteria and required that they use the checklist to self-assess their work. When examining, the formative assessments that Rachael used, it was found that they were often aligned to specific learning targets for each class period. While indeed aligned to learning targets, these formative assessments did not meet the

full intentionality of the standard. In debriefing sessions, Rachael made it clear that it was important for her to use these formative assessments to track student progress and provide evidence for the weekly grade/progress reports given to students and their parents.

Alignment of Rachael's Formative Assessments. Rachael also used formative assessments from a variety of sources. However, two of the three formative assessments we analyzed for Rachael were constructed at the Developing Level. Students scoring at the Developing Level are approaching but have not reached standards mastery. These formative assessments are not in total alignment with the standards according to the GMAS Achievement Level Descriptors (see Table 21).

Table 21

Formative Assessment Analysis–Rachael

Assessment Type	Origin	Standard Alignment	Achievement Level Descriptors Rating	Hess's Cognitive Rigor Matrix Level	How Might the Task be Adjusted to Meet the Proficient Level and/or Beyond?
Exit Ticket	Textbook Publisher	4.NBT.4	Developing	DOK 2/ Apply	Recognize/Explain whole number patterns in base ten.
Homework	Web-based Resource	4.NBT.2	Developing	DOK 2/ Analyze	Uses place value to symbolically order and compare numbers.
Quiz	Teacher Created	4.NF.2	Proficient	DOK 2/ Analyze	Create common denominators to compare.

Bethany. Bethany is an African-American female in her early 30s who is a special education educator of ten years. Bethany's case load consists of fourth grade SWD students with a variety of exceptionalities. Bethany serves these students in several capacities. She team-teaches with Rachael for one block of the school day. During this time, she pushes into the classroom and utilizes one of three different co-teaching models. During some classes, the One Teach-One Assist model is used, in which Rachael teaches the class while Bethany assists

individual students as needed and helps to manage behavior. Other times, Bethany and Rachael parallel teach in which they divide the students and both teach the same content using different resources and/or strategies. The third co-teaching model that they use is the alternative teaching model in which they split up the group and teach different content. This model is used mainly after an assessment, and there is a group of students that need to be re-taught the content before moving on.

Bethany is also responsible for teaching a small group of SWD fourth graders during an additional math block. During this block, Bethany is able to use the student's IEP (Individualized Education Plan) to teach grade level standards by deconstructing the standard and working on individual skills that each student needs.

Classroom Formative Assessment Practices. Using the FARROP observation instrument in Bethany's math classes showed that Bethany consistently performed at the Extending level with regards to formative assessment practices (see Appendix H). Bethany consistently communicated learning goals to students and deconstructed the standards to identify specific skills that students should be able to do in order to demonstrate mastery of the standard. Bethany used the deconstructed standard to create a matrix of skills and then created formative assessments for each of the skills/learning targets within the matrix.

In Bethany's math class, it was observed that each of her special education students may have been working on a different task/skill within the matrix. Bethany made it a practice to move throughout the classroom, giving each student individualized feedback on their work which helped them to know how to improve. After a student demonstrated mastery of a skill within the matrix, the student was then taught and formatively assessed on the next skill within the standard's matrix.

Although Bethany had an ongoing process for using formative assessments in her classroom, these assessments based on learning targets were not used for grading purposes. When asked to explain, she stated,

> It's not time to give grades yet. I have to use this information to let me know what skills within the standard that my students can show mastery. These tasks just help me to know what they can do and whether or not they are ready to move to the next skill. I have to do all of this before I create an assessment for grading that is totally aligned to the standard.

Alignment of Bethany's Formative Assessments. Bethany's formative assessments were created by her. After deconstructing the standard into distinct skills, she created tasks for her students that encompassed multiple skills and showed the full intent of the standard. All of the assessments that she shared and we analyzed together were constructed at the Proficient Level or above using the GMAS Achievement Level Descriptors (see Table 22).

Table 22

Formative Assessment Analysis–Bethany

Assessment Type	Origin	Standard Alignment	Achievement Level Descriptors Rating	Hess's Cognitive Rigor Matrix Level	How Might the Task be Adjusted to Meet the Proficient Level and/or Beyond?
Exit Ticket	Teacher Created	4.NF.4	Proficient	DOK 2/ Apply	Solves word problems with multiplication of fractions.
Homework	Teacher Created	4.NF.4	Proficient	DOK 2/ Apply	Explains multiplication of fractions by whole numbers.
Quiz	Teacher Created	4.NF.4	Distinguished	DOK 3/ Analyze	

Kelly. Kelly is an African-American female in her late 40s with 15 years of experience. She is responsible for teaching math to all of our fifth grade students. Our fifth grade is also departmentalized with 1 teacher for Mathematics, 1 teacher for Reading/ELA, and 1 teacher for Science/Social Studies. However, our fifth grade students have been homogeneously grouped at

the beginning of the school year using summative assessment data from the previous year's Georgia Milestones assessment and the STAR Math assessment given at the beginning of the school year. We have three homogeneous instructional groups–Lions (Low-Achieving), Mastiffs (Mid-Achieving), and Hyenas (High-Achieving). These instructional groups are fluid and changes are made throughout the year based upon formative assessment data and teacher observations.

Kelly is responsible for the mathematics plans for fifth grade but works collaboratively with the fifth grade special education teacher to plan instruction weekly and analyze student data. Kelly has been teaching only fifth grade mathematics for the past five years and each year is growing her capacity and confidence in the content. Kelly is a firm but caring teacher and welcomes any support that is given.

Classroom Formative Assessment Practices. Observation of Kelly's math classes showed that her formative assessment practices ranged from the Progressing to the Extending levels using the FARROP observation instrument (see Appendix H). It was Kelly's practice to begin each lesson communicating the learning target to students. Kelly also repeatedly modeled expectations for students and created formative assessments that were appropriately aligned to the standard.

However, Kelly's formative assessment practices could have been improved with regards to providing descriptive feedback to students. As students worked independently, Kelly's practice was to make laps around the room, marking up students' papers with a rating code:

- Smiley face – Student has mastered the concept.
- Check – Student is moving in the right direction and needs more "at-bats".
- Question Mark – Student is unsure, still has questions, and needs re-teaching.

When asked about her rating code, Kelly stated that the symbols were for her use, not necessarily for the students. The code was used for instructional grouping. She used the code to determine who would be called back to her table during the small group time to receive additional instruction.

Alignment of Kelly's Formative Assessments. Kelly selected formative assessments from a variety of sources. Using the GMAS Achievement Level Descriptors, all three of the assessments that were analyzed were constructed at the Proficient Level of the GMAS. In other words, the tasks required students to demonstrate mastery of skills that were needed to be considered Proficient in that particular standard (see Table 23).

Table 23

Formative Assessment Analysis–Kelly

Assessment Type	Origin	Standard Alignment	Achievement Level Descriptors Rating	Hess's Cognitive Rigor Matrix Level	How Might the Task be Adjusted to Meet the Proficient Level and/or Beyond?
Exit Ticket	Textbook Publisher	5.NF.3	Proficient	DOK 1/ Apply	Solves multistep problems in division of fractions.
Homework	Web-based Resource	5.NF.3	Proficient	DOK 1/ Apply	Solves multistep problems in division of fractions.
Quiz	Teacher Created	5.NF.3	Proficient	DOK 3/ Apply	Solves multi-step problems in multiplication of fractions and mixed numbers.

Barbara. Barbara is an African-American female in her early 50s with 24 years of experience with special education students. Barbara's case load consists mainly of fifth graders which means that she co-teaches with Kelly for one period of the day. The co-teaching model that Barbara and Kelly mainly use is the Tag Team model in which they both deliver instruction. This Tag Team model is not generally planned but is spontaneous and is usually characterized with Kelly beginning the instruction that she has planned and Barbara jumping in to demonstrate

a different strategy or add to the lesson in some way. Barbara and Kelly have an excellent rapport with each other that makes this co-teaching model possible.

Barbara is also responsible for pulling out five SWD fifth graders for more individualized math instruction related to their IEPs. During this math block, the instruction parallels the lessons that the fifth graders get in Kelly's math class but gives the students time for additional practice and support.

Classroom Formative Assessment Practices. Observation of Barbara's formative assessment practices showed that she ranged from the Beginning to the Developing level using the FARROP observation instrument (see Appendix H). Barbara did not take the time to communicate learning goals to students and made it a practice to model only one example for students before asking them to try the task on their own. Therefore, students were frequently confused about the concept and were unclear about expectations. When asked about this process, Barbara stated that it was important for her students to learn to work independently. After trying on their own, she would then go back and model problems that presented the most difficulty for students. Barbara stated:

> I walk around while students are working independently to see what they can do by themselves. I don't want to hold their hands like most people do with special education students. It does no good for them. After I see what the majority of them are having difficulty with, I then guide them slowly through the steps so they can get it.

In addition to scoring low in formative assessment practices, analysis of Barbara's formative assessments used for grades showed their lack of alignment to grade level standards. It was found that Barbara placed an emphasis on giving her special education students assignments that she felt could be completed independently instead of scaffolding instruction,

modeling expectations and requiring them to complete assignments based upon grade level standards (i.e., the standards that are tested on the GMAS).

Alignment of Barbara's Formative Assessments. Barbara selected formative assessments from a variety of sources. Two of her assessments were rated at the Proficient Level using the GMAS Achievement Level Descriptors. However, one assignment that was used for grading purposes was not even rated at the Beginning Level because it was based on a concept that should be taught and assessed at the previous grade level (see Table 24).

Table 24

Formative Assessment Analysis–Barbara

Assessment Type	Origin	Standard Alignment	Achievement Level Descriptors Rating	Hess's Cognitive Rigor Matrix Level	How Might the Task be Adjusted to Meet the Proficient Level and/or Beyond?
Exit Ticket	Textbook Publisher	5.NF.6	Proficient	DOK 1/ Apply	Solves multistep problems with areas of rectangles.
Homework	Web-based Resource	4.NBT.4 (Below Grade Level)	Below Grade Level	DOK 1/ Apply	Combine with a 5th grade measurement standard to make connections to the current grade level.
Quiz	Teacher Created	5.NF.6	Proficient	DOK 1/ Apply	Fluently multiplies fractions by whole numbers.

Cross-Analysis of Participants' Findings

After examining the formative assessment practices of each of the participating teachers and working with them to analyze their formative assessments for alignment to the Georgia Milestones, several findings emerged. The following provides an analysis of the classroom observations that examined teachers' formative assessment practices along with an analysis of trends discovered through an analysis of teacher formative assessments used for grading purposes.

FARROP Findings. Each teacher was observed three times and then received a rating in each of the dimensions regarding their formative assessment practices using the Formative Assessment Rubrics, Reflection and Observation Tools to Support Professional Reflection on Practice (FARROP) rubrics. The rubrics for each dimension help to describe the combined role of the teacher and students in a particular formative assessment dimension. It should be noted that the ratings represent the teacher's level of implementation of formative assessment practices, not their level of expertise (Wylie & Lyon, 2013). There are 4 levels of implementation in the FARROP rubric: (1) Beginning, (2) Developing, (3) Progressing, and (4) Extending.

With regards to Learning Goals, the average rating for the teachers was 2.86 (SD = 1.345) with most of the teachers scoring a rating of 4. It was found that most of the teachers did present standards-driven learning goals for the lesson but may or may not have presented the goals in language that students could understand or use to make connections to previous learning.

In the next dimension, Criteria for Success, teachers were expected to communicate to students what quality work looks like. The mean rating in this area was 2.71 (SD = 1.254) with a mode of 3. It was found that some teachers may have modeled expectations for students but did not allow an opportunity for students to internalize the success criteria in a way that they effectively understood what was required. Teachers that were rated on the Extending Level of this dimension provided a teacher exemplar, shared student exemplars and had discussions to clarify expectations.

With regards to Tasks & Activities to Elicit Evidence of Student Learning, the average teacher rating was 2.86 (SD = 1.069) with a mode of 3. The evidence showed that most teachers chose tasks that were related to the learning goal. However, some of the teachers neglected to

choose a variety of tasks and activities to provide evidence for student mastery of standards and may not have appropriately used the evidence for the tasks to evaluate learning.

When examining feedback, the average teacher rating in the dimension, Feedback Loops During Questioning was a 3 (SD = 1.0) with a bimodal rating of 4 and 2. This showed that teachers varied greatly in the practice of engaging students in discussion to discern understanding of the content. Also, it was found that most of the teachers needed improvement in the practice of using student work to provide evidence-based feedback to individual students regarding clear targets for improvement. The mean rating for this dimension was 2.71 (SD = 1.113).

Finally, in the dimension of Use of Evidence to Inform Instruction, teachers received a mean rating of 2.71 (SD = .756) with a bimodal rating of 2 and 3. The observation data showed that even though teachers collected evidence of student learning, in most cases this evidence was not used to adjust instruction across a series of lessons as a whole. It was found that the majority of teachers were more concerned with documenting student performance and moving on to the lesson/concept. Figure 21 and Table 25 provide a summary of the FARROP observation data.

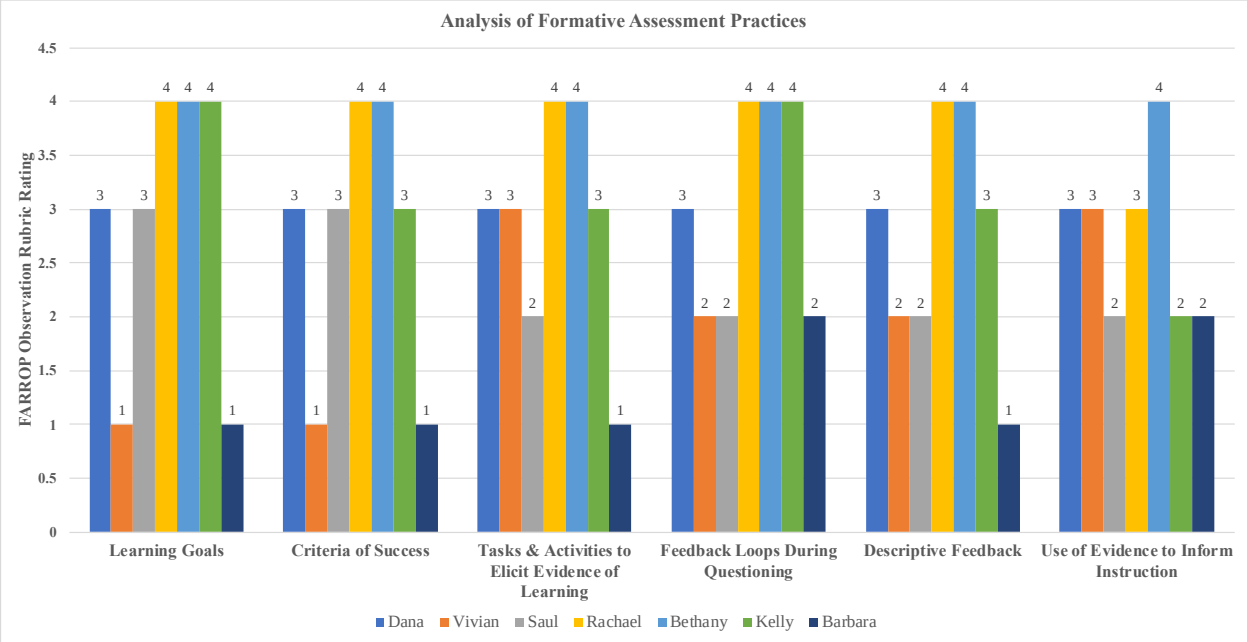


Figure 21. Teacher Ratings Using the FARROP Instrument.

Table 25

Mean Ratings for FARROP Dimensions (N=7)

Descriptive Summary	Learning Goals	Criteria of Success	Tasks and Activities to Elicit Evidence of Learning	Feedback Loops During Questioning	Descriptive Feedback	Use of Evidence to Inform Instruction
Mean	2.86	2.71	2.86	3.00	2.71	2.71
Median	3.00	3.00	3.00	3.00	3.00	3.00
Mode	4	3	3	2[a]	2[a]	2[a]
Std. Deviation	1.345	1.254	1.069	1.000	1.113	.756

Note. [a] Multiple modes exist. The smallest value is shown.

Analysis of FARROP Findings. Analysis of the formative assessment practices of teachers in this Title I school showed a variety of levels of implementation of formative assessment practices in standards-driven classrooms. The data shows that providing descriptive feedback to students tied to specific learning goals and success criteria is an area of improvement

for this group of teachers. Additionally, the teacher's use of evidence gathered from formative assessments to inform instruction is an area that should be improved.

Analysis of Formative Assessments. Teachers were asked to bring to debriefing sessions, three formative assessments that were used for grading purposes: one Exit Ticket, one Homework, and one Constructed-Response Item from a Quiz. The formative assessments were analyzed using the Georgia Milestones Achievement Descriptors and Hess's Cognitive Rigor Matrix. Below is a summary of the findings (see also Figure 22 and Table 26).

Homework. It was found that out of the three types of assessments, homework assignments were the least aligned to the Georgia Milestones at the appropriate level of complexity with a mean rating of 2.14. Homework is a requirement for students in this school district and comprises 10% of the total mathematics grade. It is considered additional practice on concepts that have been introduced in the classroom. Because the majority of the homework assignments analyzed were rated at the Developing Level, this would imply that teachers send assignments home that may be easier than what is required for students to perform at the Proficiency Level on the Georgia Milestones Assessment. This may present conflicting messages to parents and students about the level of rigor required for the GMAS.

Exit Tickets. Exit Tickets were the next highest rated assessment in alignment using the GMAS Achievement Level Descriptors. At Oak Hill, Exit Tickets are considered part of classwork and are used to formatively assess to what degree the students mastered the concepts taught in math class for that day. Exit Tickets and other classwork comprise 40% of the total math grade for students. The Exit Tickets analyzed from Oak Hill's teachers showed that the mean rating was 2.86. The mode for Exit Tickets was 3. In other words, most of Oak Hill's teachers selected or designed Exit Tickets that were aligned to at least the Proficient Level of the

GMAS. However, there were teachers who still used Exit Tickets that asked students to demonstrate mastery on skills less than what would be required on the GMAS.

Quizzes. Finally, the formative assessment type most aligned to the GMAS was found to be the constructed response items from quizzes. The mean and mode rating for Quizzes was a 3 implying that the average teacher at Oak Hill selected or created Quiz assessment items that required students to demonstrate mastery at least at the Proficiency Level required on the GMAS. Quizzes and test comprise 40% of a student's mathematics grade.

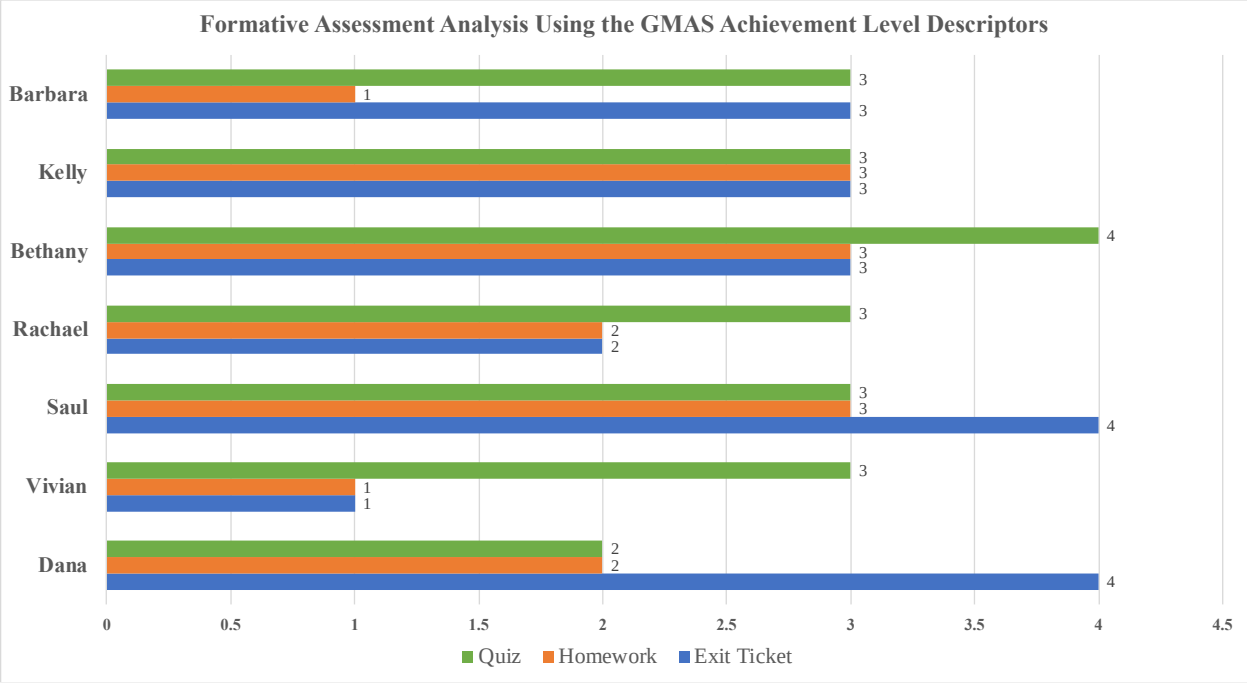


Figure 22. Formative Assessment Ratings.

Table 26

Mean Ratings for Formative Assessments (N=7)

Descriptive Summary	Exit Ticket	Homework	Quiz
Mean	2.86	2.14	3.00
Median	3.00	2.00	3.00
Mode	3	3	3
Std. Deviation	1.069	.900	.577

Selected vs. Created Assessments. Also, the case study showed that the teachers from Oak Hill used formative assessments from a variety of sources. Of the 21 formative assessments, five (24%) of the formative assessments were web-based resources pulled from educational websites. Only 20% of these web-based resources were aligned to the GMAS standard at the appropriate level of complexity. According to the rubric from the GMAS Achievement Level Descriptors, 80% of these web-based resources would not allow students to "demonstrate proficiency in the knowledge and skills necessary at the identified grade level as specified in Georgia's content standards" (GaDOE, 2015). When asked about why a particular assessment was chosen from a web-based resource, Dana said, "I like to choose assessments from ____ and ____ because they have already been created and they align to the standard, and if it aligns to the standard, then it will align to the Georgia Milestones."

There were five formative assessments analyzed from the textbook publisher adopted for use at Oak Hill Elementary. Out of these five textbook formative assessments, 60% were constructed at the Proficiency Level or above. The remaining eleven formative assessments (52%) were teacher-created. Of these teacher-created formative assessments, 91% were constructed at the proficient level or above (see Figure 23).

It was noted that many of the formative assessments that were not appropriately aligned to grade level standards lacked skills and/or competencies needed to demonstrate proficiency. For example, a formative assessment may have required students to divide fractions (i.e. Beginning Level). However, requiring students to divide fractions in multi-step word problems would increase the rigor to rate it on the Distinguished Level. In other words, although the formative assessments may have skills connected to the standards, the assessment was rated

below the Proficient Level if it did not encompass all the skills and knowledge needed at the appropriate level of complexity.

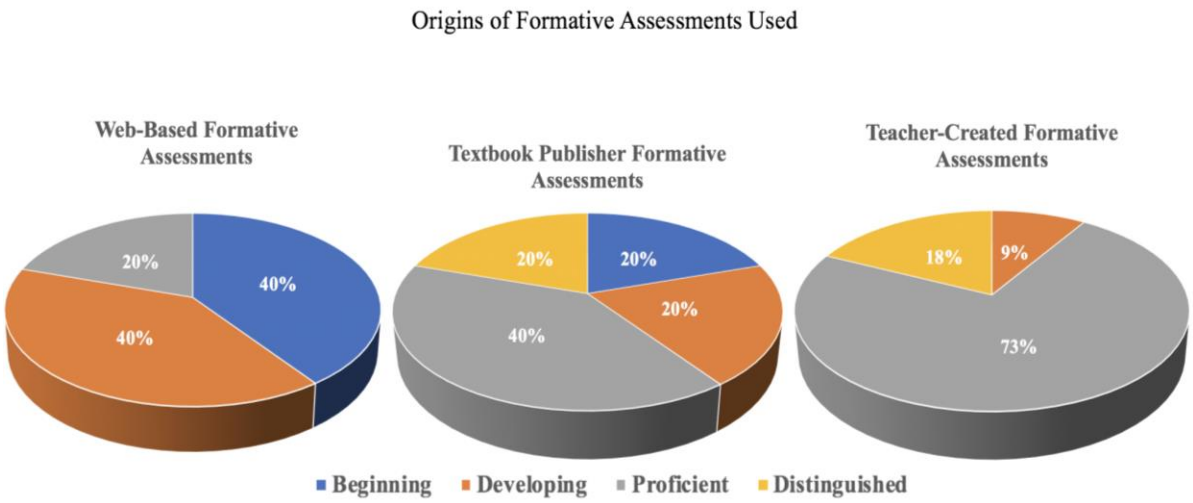


Figure 23. Origins of Oak Hill's Formative Assessments.

Chapter 4 Summary

Question 1 asked: What is the relationship between a student's math grades and his/her standardized test score? The distribution of fifth grade test scores and math grades at most of the Title I schools was extremely dissimilar based upon the comparison criteria used. When comparing the two assessment measures, 29 of the 35 schools had differences of over 25% in the percentage of students failing the assessment measure. However, statistical non-parametrical test results using the individual test scores and grades from Oak Hill's students relayed very different results. The chi-square test conducted for each tested grade level at Oak Hill showed that the null hypothesis could be rejected, and the alternative hypothesis accepted. On each grade level, a student's standardized test scores are related to his/her mathematics grades. Furthermore, in each case it was found that the relationship between the two variables – GMAS Performance Level and Fourth Quarter Math Grades was significant. Scatterplots generated from each set of data show a linear relationship between the two variables (see Figures 24, 25, and 26).

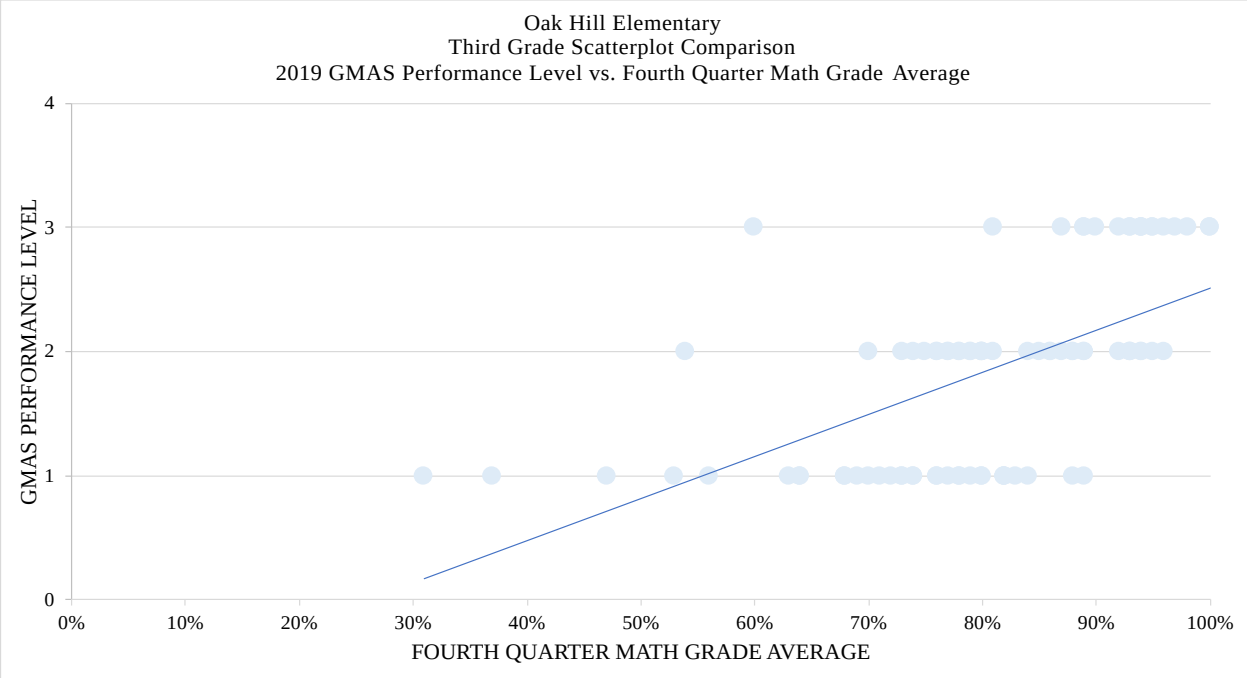


Figure 24. Third Grade Scatterplot Comparison.

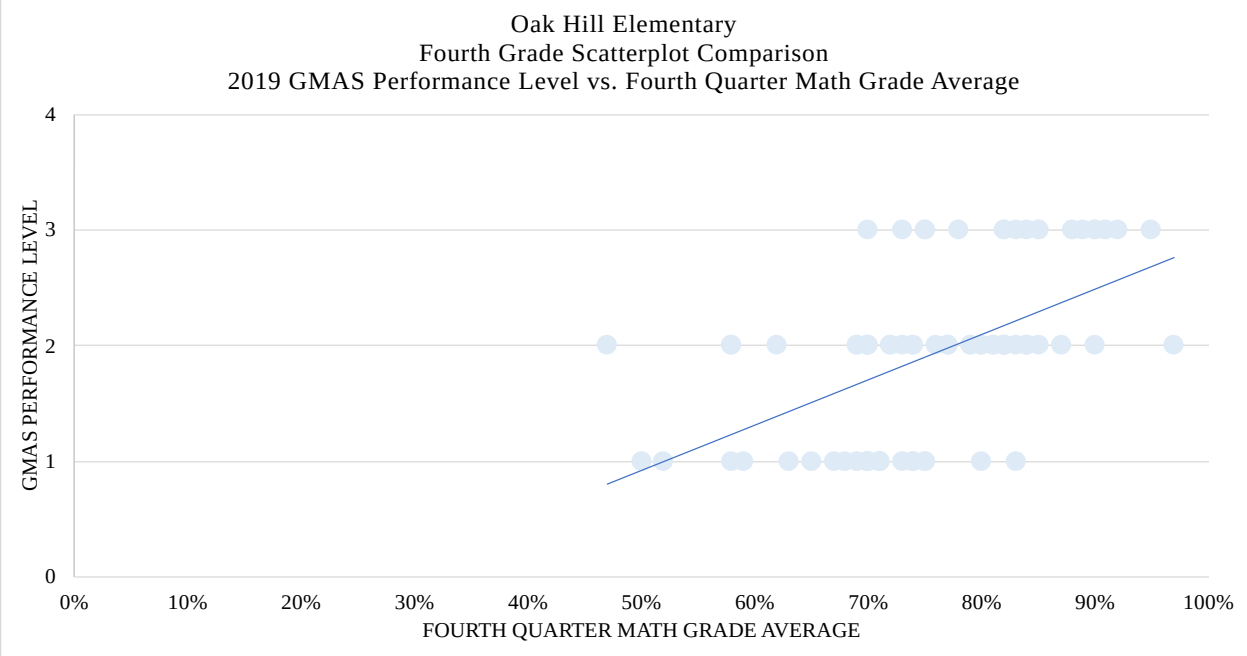


Figure 25. Fourth Grade Scatterplot Comparison.

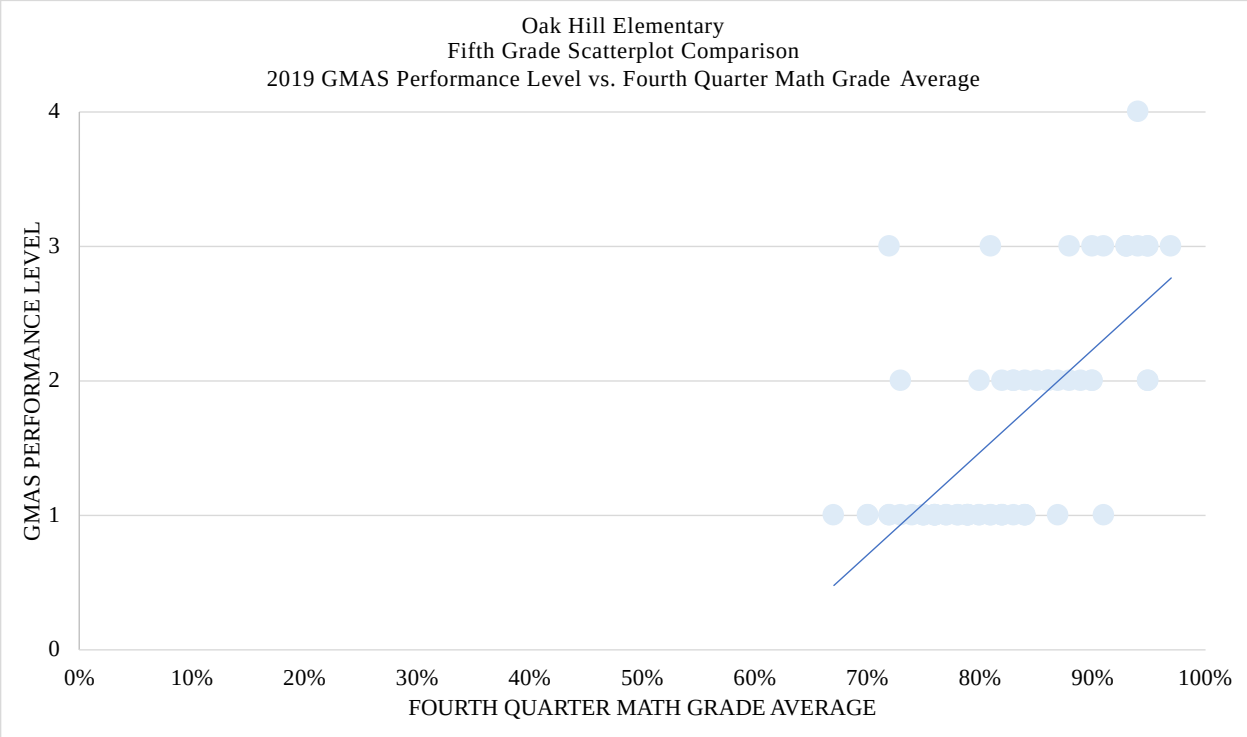


Figure 26. Fifth Grade Scatterplot Comparison.

Question 2 asked: What are teachers' perceptions regarding the uses of standardized test scores in improving instructional decisions*?* Survey results from teachers in an urban school district in Georgia showed that while many teachers respected the rigor and alignment of the summative assessment to grade level standards, they believed information gained through classroom formative assessments provides a clearer portrait of what students can do.

It was found that the majority of teachers (n = 49, 78%) do believe that the district's curriculum is aligned with the GMAS, and many of teachers surveyed (n = 31, 49%) also believed that the summative assessment measured about the same as what their formative assessments measure. However, many of teachers surveyed (n = 25, 40%) did not believe that the GMAS was as accurate as a teacher's judgment in measuring student achievement. Also, the

many of respondents (n = 26, 41%) did not believe that the GMAS was as accurate a measure in rating student performance as report card grades.

Additionally, teacher responses showed that they questioned the accuracy of results for minority students and other subgroups using the state-mandated test. The majority of respondents (n = 40, 63%) felt that GMAS was not an accurate measure of what minority students know and can do, nor did they feel like GMAS was an accurate representation of what English Language Learners know and can do (n = 43, 68%).

Although the majority of teachers showed that they believed classroom formative assessments provided a more accurate assessment of student achievement than the state-mandated GMAS test, it was found that the state-mandated test did have some influence over teachers' daily formative assessment practices. Many of the teachers (n = 30, 48%) reported that GMAS results influenced their formative assessment practices on a daily basis. It was also found that the use of a state-mandated summative assessment impacted formative assessment practices in various ways (i.e. grouping students for instruction; selection of educational materials, selection/construction of formative assessments, etc.). However, even acknowledging that the summative assessment did impact formative assessment practices in the classroom, many survey respondents (n = 30, 48%) reported that they did not believe that the state-mandated summative assessment should be used as a measure of educational effectiveness.

Finally Question 3 asked: How well do teachers' formative assessments align to the rigor of the standardized assessment at the appropriate level of complexity? After analyzing the classroom formative assessments, it was found that 33.3% of the formative assessments that teachers used for grading purposes did not require students to demonstrate proficiency in the knowledge and skills necessary at their identified grade level. The mean rating for the formative

assessments was 2.67 with a standard deviation of .913. It was found that the majority (91%) of the constructed response items that teachers created for quizzes encompassed the skills that students needed to demonstrate mastery for a particular standard. However, formative assessments selected from web-based resources (80%) and even the textbook publisher (40%) may not have been fully aligned to the standard as identified by the GMAS Achievement Level Descriptors due to a focus on discrete/isolated skills instead of applying a set of skills within the context of an application problem.

Through an analysis of the way in which classroom formative assessments were put into practice and utilized in schools, it was found that the teachers participating in this study needed to improve their use of formative assessments by using them more effectively to provide feedback to students informing them of what is needed to achieve the standard and make instructional decisions regarding planning for students.

Chapter 5: Conclusions and Recommendations

Introduction and Summary of Key Findings

The purpose of this research project was to determine if teachers' formative assessment practices are reliable indicators of students' mastery of grade level standards. This topic has become even more relevant with proposed changes in the state's assessment cycle due to a shift in the delivery models of instruction. Because of the Covid-19 pandemic, many schools within the state have opted to serve students virtually or have moved to hybrid models which combine face-to-face instruction with online learning (Buckle, 2020). Logical assumptions could be made that a student's standardized test performance and classroom grades would be similar because they are both assessments of a student's mastery of a given curriculum. However, careful examination of the two measures of student performance must be considered in order to make quality decisions about what the next round of state-mandated testing should look like.

This mixed-methods explanatory research study employed a two-phase design. In this explanatory research design, the numerical data was obtained, and then narrative data was collected in an attempt to explain the numerical data (Creswell, 2009). The researcher sought to use the data to explain, rather than describe, the phenomenon studied (Given, 2008). As a participant observer, this aspect of the research was extremely important to this researcher. It was crucial to set aside bias and rely on the views of the participants in the study to construct meaning around these issues that may be commonly known in a school setting but whose explanations are not well established within the literature.

The initial review of the literature revealed that there is discrepancy between the scores that high school students achieve on standardized assessments and the grades that they receive on their report cards for the same content area (O'Malley, 2017). This researcher sought to enhance

the body of research in this area by extending the research to elementary school students using descriptive, numerical data, and then attempted to uncover root causes through teacher perception data and a qualitative examination of how well teachers align their formative assessments to the summative assessment given. With underlying causes unveiled, practical solutions may be proposed to remedy the situation and effect change within our school culture.

This explanatory research study was driven by three questions:

1. What is the relationship between a student's math grades and his/her standardized test score?
2. What are teachers' perceptions regarding the uses of standardized test scores in improving instructional decisions?
3. How well do teachers' formative assessments align to the rigor of the standardized assessment at the appropriate level of complexity?

Discussion of Findings

Research Question One

Major Finding: Test Scores Are Correlated to Student Grades. While descriptive statistics conducted within the study showed that test scores and student grades do not mirror each other, the non-parametrical ANOVA tests conducted showed that even with this disparity, there is a moderate to relatively strong relationship between these two variables. An initial analysis showed that the averages of the distribution of fourth quarter cumulative math grades and the end-of-grade math summative assessment were extremely dissimilar in most cases. The data also showed great differences (i.e. 25% and higher) in the percentage of elementary students that failed the summative assessment and the percentage of students that failed the math course.

In the majority of cases there were more students to fail the summative assessment than those that failed the math course.

However, the chi-square test of independence showed that there is indeed a moderate to relatively strong relationship between a student's GMAS test score and fourth quarter math grade. The data provided showed that the difference in distribution of GMAS scores and grades was not significant enough to state that it was due to chance. Yet, this data also shows that there should be no expectation of causality. In other words, a student's fourth quarter math grade cannot and should not be used to presume that the student performed comparably on the standardized assessment.

Furthermore, there were limitations to this research design due to the relatively small sample size and the fact that there were chi-square cells in each contingency table containing less than five observations. For example, there were no observed occurrences of a student who attained a distinguished rating on the GMAS but failed the math course. These findings could be used as further documentation to support the differences between formative and summative assessments.

Although both formative and summative assessments are essential components to teaching and learning in the classroom, several researchers have highlighted their differences. Godbout and Richard (2000) state that the main goal of formative assessments is to improve learning. The information from these informal assessments should be used to help teachers make instructional decisions for students. Formative assessments are to be used throughout the instructional cycle to monitor student progress towards identified goals or expectations (Popham, 2013). Popham (2013) also states that formative assessments should be used to provide effective/timely feedback to maximize student achievement. In this way, formative assessments

can be viewed as "assessments for learning" because they inform the educational process. It is data used to revise planned instruction (Heick, 2019).

On the other hand, students are engaged in summative assessments at the end of an instructional cycle to determine what they have learned during that instructional period. Summative assessments should be viewed as the culmination of an instructional cycle and should provide information regarding whether or not students achieved the standard by a certain deadline (DuFour, 2009). As seen in this light, summative assessments are assessments of learning (Tomlinson, et al., 2013).

Research Question Two

Major Finding: Varying Criteria for Student Performance Leads to Ambiguity about What Students Can Do. In addition to the aforementioned research, findings from this study presented multiple reasons for the disparity between grades obtained through formative assessments and the EOG summative assessment scores. Teachers' perceptions about the value of the state-mandated test and its use, its alignment to their formative assessment systems, and various "unwritten policies" about grading practices are evidence of a lack of standardization of practices contributing to an ambiguous picture of what students know and are able to do.

First of all, teacher perception data gathered through the survey and the observation debriefing interviews showed that the majority of teachers did not believe that state-mandated summative assessments should be used as a measure of educational effectiveness. In their open-ended responses, teachers cited a variety of reasons including the fact that the standardized assessment is a singular event within the course of an entire school year. Other teachers stated that even with the reporting of GMAS student growth percentiles, the results of the standardized assessment do not emphasize all of the gains that students have made within a school year. This

preference of differentiated assessments for students was expressed by several educators. One teacher stated, "I believe students in my classroom should have an alternative assessment since their learning looks different based on their IEP (Individualized Education Program)." A few teachers even expressed the desire for a pre-/post-assessment system as part of state-mandated testing.

Also, most of the survey respondents felt that classroom formative assessments presented more accurate information about students' mastery of grade level standards. Teachers also stated that the achievement of subgroups such as minority students, students with disabilities and English Language Learners would be more accurately reported through the use of classroom formative assessments rather than state-mandated test results. One teacher stated,

> It's not about the Milestones. It's about the students we teach. The Milestones should be redesigned for students with learning disabilities and academic challenges. There should be different levels of the GMAS assessment. If we teach using differentiation, the assessment should be the same.

Responses to the open-ended survey question and teacher interviews also provided more insight into how the summative assessment system impacts classroom formative assessment practices. Teachers agreed that the summative assessment impacted daily formative assessment practices within the classroom and reported that summative assessment results from the previous year were used to homogeneously group students for instruction and make long-range plans for the start of a school year. Some survey respondents even reported that they used summative assessment results to impact the grades that students receive. Also, as part of the preparation to take the summative assessment, some teachers reported constructing their formative assessments

in the same format as the GMAS and using test preparation materials to acquaint students with the language and format of the summative assessment.

However, a major finding of the study provided insight into why there are differences in the percentage of students failing the GMAS and the percentage of students with failing grades. Several teachers reported in their survey responses that they are not "allowed" to give failing grades. In follow-up interviews with teachers at Oak Hill, it was reported that teachers were instructed not to give students in certain subgroups failing grades and to use different criteria when assigning grades to these students. For students with disabilities (SWD) and English Language Learners (ESOL), teachers in the study stated that they were instructed to collaborate with SWD or ESOL teachers to determine at what grade level those students performed and then grade their performance based upon how a student at that lower grade level would have performed on the assignment. For example, if a third grade SWD student was assessed and found to perform on a first grade level, the teacher would have to examine that SWD student's performance based upon how a first grader could perform on the same assignment. Teachers also reported modifying assignments for students in these subgroups.

> To explain the rationale for this practice as it was explained to her Dana stated,
>
> It's a given that they are behind grade level. It's really difficult because they're going to be tested on the grade that they're in even though they're functioning one or more grade levels behind. I grade them based upon the level that they are on and the level that I can push them to. We're pushing them there, but they may not make it there. And by the time that the Georgia Milestones comes around, we want to have pushed them as far as possible to be closer to grade level.

This type of behavior raises concerns due to the subjectivity in formative grading practices. When looking at a student's report card grades, what do those grades really mean? How does that student compare with others in the class? Should there be footnotes on the report cards to state that "grades were attained using alternate criteria"? Also, how reliable are those grades? What level of consistency is there in the grades assigned using the alternate criteria? Tameshia Grimes (2010) states, "Using various types of criteria increases the chances of subjectivity and bias, invalidating the grade issued as a measure of achievement" (p. 24).

In her study of interpreting the meaning of middle school students' grades, Tameshia Grimes (2010) also stated that removing the objectivity in grading practices leads to doubts in the validity and reliability of the grades and causes teachers to lose credibility. She stated,

> When grades are "unidimensional" in nature, their meaning is clear and the message communicated is more likely to be the message received; however, when grades become a reflection of a "hodgepodge" of factors, not only does the message communicated become distorted, but the reliability and validity associated with grades and grading also get questioned and lose their credibility. (p. 41)

Therefore, when considering the variety of factors involved in grading and formative assessment practices, it gives credence to the argument that assessing student academic achievement requires a variety of measures including those that may exclude input from the classroom teacher in order to obtain a true picture of a student's mastery of standards.

Research Question Three

Major Finding: Formative Assessments Are Fully Aligned to the Standards When They Encompass All Skills and Knowledge Outlined in the Standard. The third research question required a closer look into the formative assessment practices of classroom teachers.

The findings showed that teachers gathered resources for formative assessments from a variety of sources. These resources included formative assessments from the adopted textbook publisher, subscription/non-subscription required web-based resources, and teacher-created assessments. While there were about 67% of Oak Hill's analyzed formative assessments constructed at the appropriate level of complexity, many of them lacked some of the skills and knowledge for students to demonstrate that they could perform at the Proficiency Level or higher on the GMAS.

Debriefing sessions with Oak Hill's teachers showed that they perceived an assessment was aligned to the standard as long as it contained the same topic of the standard. For example, a fifth grade geometry standard (5.G.2) states: "Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation" (GADOE, 2016, p. 5). If a teacher selected a formative assessment for grading purposes that only required students to identify ordered pairs on the coordinate plane that would represent only what a Developing Learner could do according to the GMAS Achievement Level Descriptors. In order to demonstrate proficiency or above the student must also "create and use the x-/y- coordinate systems by graphing and interpreting real world contexts/problems in the first quadrant" (GADOE, 2015, p. 5).

In addition to selecting tasks aligned by topic only, it was found that some teachers also misused deconstructed standards to assess students without adhering to the full intent of the standard. Deconstructing standards has been defined as "the process of taking a broad standard and analyzing its components, then breaking the standard into smaller, more explicit instructional learning targets for use in daily teaching and classroom-level assessment" (CCCSS, 2018, p. 1).

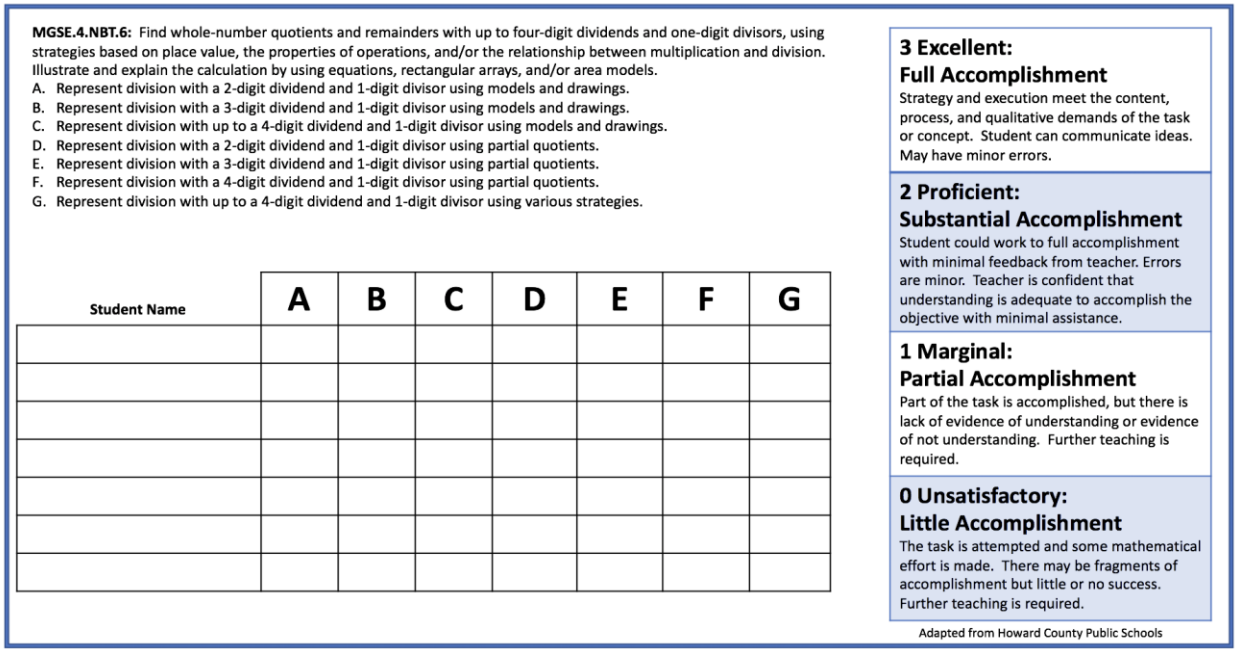
When deconstructing standards, teachers are tasked with identifying the individual skills and knowledge needed to demonstrate mastery of the standard and create learning targets.

While deconstructing standards is a useful exercise that breaks up the learning into bite-size chunks, creating a formative assessment for grading purposes that encompasses only one of the learning targets associated with the standard presents a false picture of students' progress towards mastery. It could be falsely interpreted that a student who has performed well on the assessment of a particular learning target possesses all the skills and knowledge needed to perform well on a GMAS test item that encompasses the full intent of the standard when this may not be so.

Instead of using the assessments of individual learning targets for grades, this information can be used as evidence of how close a student is to mastering individual targets within the standard. Bethany, a special education teacher that has mastered this understanding described the process she used,

> For each standard, I create a formative assessment rubric. I divide a standard by learning targets and assess students to see how well they perform on each individual learning target. Learning targets are given a score from the rubric and then the scores are averaged to create a grade for that particular standard. Using this strategy, I get to see two things. I am able to see what part of the standard kids are having difficulty accomplishing, and I also have a systematic way of achieving a grade for that standard. Also, the grades for my students are curved because at the end of the day, I can't give them below a 60% or 70% anyway.

Figure 27 below provides an example of one of Brittany's formative assessment rubrics.



MGSE.4.NBT.6: Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

A. Represent division with a 2-digit dividend and 1-digit divisor using models and drawings.
B. Represent division with a 3-digit dividend and 1-digit divisor using models and drawings.
C. Represent division with up to a 4-digit dividend and 1-digit divisor using models and drawings.
D. Represent division with a 2-digit dividend and 1-digit divisor using partial quotients.
E. Represent division with a 3-digit dividend and 1-digit divisor using partial quotients.
F. Represent division with a 4-digit dividend and 1-digit divisor using partial quotients.
G. Represent division with up to a 4-digit dividend and 1-digit divisor using various strategies.

Student Name	A	B	C	D	E	F	G

3 Excellent:
Full Accomplishment
Strategy and execution meet the content, process, and qualitative demands of the task or concept. Student can communicate ideas. May have minor errors.

2 Proficient:
Substantial Accomplishment
Student could work to full accomplishment with minimal feedback from teacher. Errors are minor. Teacher is confident that understanding is adequate to accomplish the objective with minimal assistance.

1 Marginal:
Partial Accomplishment
Part of the task is accomplished, but there is lack of evidence of understanding or evidence of not understanding. Further teaching is required.

0 Unsatisfactory:
Little Accomplishment
The task is attempted and some mathematical effort is made. There may be fragments of accomplishment but little or no success. Further teaching is required.

Adapted from Howard County Public Schools

Figure 27. Sample Learning Target Rubric.

In summary, it was found that there was a great difference in the communication of the criteria of success for a particular standard and the feedback provided to students for improvement. Superficial assessment of the standards by selecting tasks that did not embody the full intention of the standard left teachers, students, and their parents with information that may not have accurately reflected what students know and are able to do in relation to the state's adopted curriculum.

Implications of the Findings

The purpose of this explanatory research study was to determine whether or not teachers' formative assessment practices were reliable indicators of students' mastery of standards, and if not, find evidence that might explain why. This study aimed to help teachers reflect upon their formative assessment practices and develop a deeper understanding of how formative assessments should be used to provide realistic feedback to stakeholders regarding what students

know and are able to do. The results of this study proposed to expand the literature on the relationship between formative and summative assessments in the elementary school setting.

While the intent of this study was to construct meaning around the phenomenon of comparisons of formative and summative assessment results, it is the hope of this researcher that this understanding yields a transformation in the practice of educators, thereby yielding improved outcomes for students. Transformative educators promote evidence-based education which uses research to effect change in our schools. Dylan Wiliam et al. (2020) further advocates, "Evidence is important, of course, but what is more important is that we need to build teacher expertise and professionalism so that teachers can make better judgments about when, and how, to use research" (p. 11).

Recommendations for Further Action Research

Although this body of research determined that student test scores are related to the formative assessment grades received in elementary classrooms, it is the belief of this researcher that gains can be accomplished on the part of teachers, school leaders, and policy makers to create better alignment of these two assessment systems thereby yielding improved student outcomes. Better alignment of formative and summative assessments could provide "clear criteria for what defines good performance, detailed/actionable feedback, and information to make better instructional decisions" (Poorvu Center for Teaching and Learning, 2017, p.5).

Recommendations for Teachers

Based on the findings of this study, teachers need to improve formative assessment practices. If the goal of classroom formative assessments is to improve learning during the instructional cycle, then teachers must first be clear on the learning goals that students must master. Teachers must take the time to clearly examine the standards and deconstruct them to

determine the specific skills and knowledge that is required to demonstrate mastery. Clear expectations must be established and then communicated to students (Wylie & Lyon, 2013).

One major finding of this study was that teachers need to create formative assessments that are aligned to the full intention of the standard. This can only be done if teachers have a clear understanding of what the standard requires. The work of examining the curriculum and deconstructing standards is work that is essential to the assessment cycle. Peter DeWitt (2015) states,

> If teachers aren't crystal clear about the full and precise intent of a given standard, how can they accurately teach it? How can they accurately assess student understanding of it? How can they clearly communicate to students the specific learning intentions for a unit of study? (p. 3)

Throughout our history in American education, the process of deconstructing standards has taken on a variety of guises each supported through a specific protocol. The Five-step Protocol created by Jan Chappuis (2015), Educational Impact's Mastering Curriculum Mapping Guide (2012), and the Deconstruct Standards Protocol by Doug Reeves and Larry Ainsworth (2003) are just a few of the protocols in use today. Although each of these protocols has specific steps in examining the standards, the common thread is that they require teachers to do 3 things: (1) identify what students should be able to know and understand; (2) identify what students should be able to do; and (3) establish learning goals that can be communicated to students in language that they will understand. In order to effectively teach and assess the curriculum, teachers must incorporate these into their practice.

Furthermore, teachers should use deconstructed standards to communicate success criteria to students. Success criteria should "describe in specific terms what successful

attainment of the learning goals looks like." (Ontario Ministry of Education, 2010, p. 39). When establishing criteria for success, teachers must determine what does quality work look like. They need to thoughtfully consider what students can do to demonstrate mastery and success in learning. Caroline Wylie of EL Education suggests that learning targets be used to establish success criteria (Wylie, 2014). Learning targets describe what students will learn and be able to do by the end of a lesson. They are concrete goals written in student-friendly terms and begin with an "I can" statement. Wylie (2014) recommends that learning targets be created from national/state standards and use language that is specific to a particular context with verbs that are measurable suggesting how the target will be assessed.

After learning targets are established, teachers should design instructional activities that would require students to attain skills needed to demonstrate mastery with regard to the success criteria. These tasks to elicit evidence of student learning should encompass a range of activities for the teacher to collect "relevant and sufficient evidence of student understanding and/or progress toward the learning goals" (Wylie & Lyon, 2013, p. 46).

Wylie and Lyon (2013) also suggest that the criteria for success and carefully constructed tasks be accompanied by exemplars that "illustrate aspects of quality" and a "rubric that students can use to check their work" (p. 43). It is essential that students truly understand and internalize the criteria for success with a particular standard so that when they are engaged in a task, they can use the criteria to guide them and enable them to reflect upon the work.

Also, having clear, concise criteria for success equips teachers with specific "look-fors" to provide descriptive feedback to students. Providing descriptive feedback to students during the lesson cycle presents several benefits for teachers and students. It provides the evidence that students need to improve the quality of their work as long as it is presented in a timely manner

for students to be able to act on the feedback. For teachers, clear success criteria take away the subjectivity in grading making the process of describing student performance easier. When students are provided with clear criteria for success, tasks that are appropriately aligned to this criteria, and descriptive feedback for improvement, the goals of formative assessment can be realized (Stenger, 2014).

The aforementioned process of deconstructing the standards to identify what students should know and be able to do, coupled with determining specific criteria for success is all pre-work that should be done before teachers begin the process of teaching and creating formative assessments. This pre-work helps teachers develop a clear understanding of what the content standards require and better equips them for knowing how they should be assessed. If this is accomplished, then formative assessments selected and/or created by teachers will be more appropriately aligned to the standard and represent the full intention of the standard.

Recommendations for Teacher Leaders

The findings in this study present several implications for teacher leaders in the school. Teacher leaders are charged with mentoring educators and providing professional learning opportunities that would support teachers in improving their practice. The first implication of practice for teacher leaders would be to guide their mentees through the aforementioned process of deconstructing standards to identify clear learning targets, creating tasks appropriately aligned to the targets, and providing descriptive feedback for improvement.

As the content-area leads or pedagogical experts in the schools, teacher leaders should work to make collaborative planning sessions more productive and meaningful for educators. Teacher leaders must facilitate collaborative planning sessions to allow teachers to plan formative assessments and engage in the work of deconstructing standards while answering the

following questions: How will we as teachers and our students know when the learning target has been met? What are our look-fors during the lesson that will help guide our instruction?

Also, teacher leaders should facilitate the process of peer review of formative assessments. Protocols should be established and used when evaluating a formative assessment to ensure its alignment to the standard and to determine if the formative assessment encompasses the full intention of the standard or just one of the skills embedded within. This peer review process will help teachers not only evaluate their formative assessments but also calibrate the evaluation/scoring process among a group of teachers. The calibration process helps to ensure consistency and reliability in the formative assessment data. As part of its assessment toolkit, the Rhode Island Department of Education (2019) reported that,

> Calibration is necessary because rubrics alone do not ensure consistent scoring of student work.... Through the calibration process, educators agree on how the rubric applies to particular examples of student work. Not only does this bring about greater accuracy and reliability in scoring, it also helps to deepen educators' understanding of expectations for student work expressed in the rubric. (p. 4)

However, teacher leaders must also focus on the need to guide teachers in establishing effective formative assessment practices for grading. Professional learning should emphasize grading practices that would support a common understanding of what grades really mean. This common understanding should be grounded in the learning targets established for the curriculum and their accompanying criteria for success. Issues with ambiguity in grading must be addressed. An "A" earned by one student should represent attainment of the same skills and knowledge of another student receiving an "A" for that same assignment.

The first step in this process would be to support teachers in appropriately aligning formative assessments to grade level standards. Formative assessments for grading purposes should reflect all the skills and knowledge necessary for students to demonstrate mastery of that standard, not just discrete skills within the standard. This is not to suggest that teachers should refrain from assessing individual learning targets. Information gained from assessment of individual learning targets is essential to diagnosing students' needs and planning instruction. However, when assigning a grade, the formative assessment used should encompass the full intent of the standard. According to Student Achievement Partners, an organization founded by the authors of the Common Core State Standards, "Aligned instructional practice can be observed when the content and teacher's instructional choices allow students to get to the full intent of the standard" (Student Achievement Partners, 2011, para 3). This organization also provides resources to support professional learning opportunities in alignment of instructional practice. Educators should work collaboratively to use this and other resources such as *The Common Core Companion* (Burke, 2014). This book and others in its series help users to promote alignment by providing a detailed explanation of the standard, its relationship to other grades/content in the curriculum and suggestions for how to teach them.

Next, teacher leaders should provide professional learning in calibrating grading practices. Job-embedded training should be provided in the construction/use of rubrics and calibration of scoring. Educators should be given opportunities to examine a piece of student work and rate it based upon the success criteria embedded in the dimensions of the rubric. These trainings should also involve the creation of teacher exemplars as a model of what quality work looks like. As teacher leaders place more emphasis on alignment, formative assessment practices

should yield more valid results. "Valid and meaningful data-based decision-making depends on the degree of alignment between standards and assessments" (LaMarca & Redfield, 2000, p. 7).

Recommendations for Administrators and School Policy-Makers

Finally, the task of assessment reform in schools requires careful consideration from school administrators and policy-makers. The first recommendation for administrators and school policy-makers is to determine whether or not it is even appropriate to use formative assessments for grading purposes. Formative assessment occurs throughout the course of instruction to help inform practice and improve student learning. However, summative assessment is used to evaluate student learning at the end of an instructional cycle. This study verified that teachers use how students perform on formative assessments to establish a grade for a course which in theory changes the use of the assessment. Should this practice be allowed, or should all formative assessments only be used to assess learning gaps and close those gaps? School policy-makers need to first establish this understanding of practice.

Tom Schimmer (2019) argues that the answer to this question is no. Formative assessments should not be used for grading purposes. He cites the research of several scholars that agree that feedback from formative assessments is most effective when it is not accompanied by a grade or a score. He asserts that a student who receives a low score may not receive the feedback well making the process unproductive. According to the researchers, the distinction is clear.

> Formative grades are an oxymoron since the formative and summative uses serve different priorities. We assess to gather information about student learning and either use that information formatively to advance learning or use it summatively to verify that it has occurred (Schimmer, 2019, p. 2).

While Schimmer (2019) acknowledges that teachers are urged to provide parents with periodic updates about their student's progress, he advocates for a policy in which formative assessment grades do not count and are assigned a weight of zero in the teacher's gradebook. This would help ensure that the formative assessment process remains pure and allows students and parents to focus not so much on whether or not a grade was achieved but keep focused on what indicates that the student has or has not met the standard.

The second suggestion for this group of stake-holders is to reform grading practices by implementing standards-based report cards in schools. Standards-based grading is "described as a grading system in which students are evaluated based on their proficiency in meeting a clearly-articulated set of course objectives" (Iamarino, 2014, p. 1). Scriffiny (2008) proposes several benefits of standards-based grading. Standards-based grading provides meaning to vague letter grades. It provides a focus for rating student performance and evidence to help teachers adjust instruction. Students are provided feedback regarding specific standards that have or have not been mastered. Standards-based grading teaches what quality looks like.

Townsley and Buckmiller (2016) assert that the implementation of the more rigorous Common Core State Standards warrants standards-based grading because the number of standards has been reduced requiring students to "think deeper and work towards more meaningful applications" (p. 2). They also argue that recent educational laws such as the Every Student Succeeds Act state that educational systems "may no longer fail students who don't learn, and move on" (p. 2). Instead policy makers are mandating that all students become proficient (Townsley & Buckmiller, 2016).

Finally, requiring schools to use standards-based grading as part of their formative assessment systems would be a great complement to the proposed upcoming changes in state-

wide testing. In the state of Georgia, schools are now provided the option to use an interim formative assessment system called the DRC BEACON which would be administered periodically to measure student progress throughout the school year. The Georgia Department of Education reports that the DRC BEACON is aligned to the Georgia Milestones in several ways, "including the standards assessed, item types administered, delivery platform used, and tools and accommodations available" (GADOE, 2020, p. 2). BEACON will not take the place of the Georgia Milestones, but the goal of this assessment tool is to provide educators with immediate and detailed results on students' mastery of standards and attainment of goals.

Because schools are given the autonomy to determine how they will use the data generated through the BEACON assessment, the student results from BEACON and other interim assessments like it can be used as one piece of data along with classroom formative assessments to provide a clear picture of a students' performance. Pairing BEACON or other interim assessment results with classroom formative assessments would simplify the work of standards-based grading and reduce the subjectivity of some teachers' grading practices. However, further research should be conducted to determine which types of formative assessment practices support the results from the state-mandated assessment to provide students, parents, and other stake-holders an accurate picture of what students are able to do.

Final Thoughts and Conclusion

The history of assessment in American education is replete with periodic changes due to a variety of reasons. Political debates, cultural issues, the need for technological advancements, economic changes in our country, a push for accountability systems, and now even a global pandemic are just a few of the reasons that have warranted shifts in the way students in our

country have been assessed. It appears that we are now at another crossroads and must determine an alternate way of assessing our students and measuring educational effectiveness.

The purpose of this study was to explore the relationship between formative assessment grades and summative assessment results and gain insight into teacher perspectives on the topic. Evidence gained through this study and others (O'Malley, 2017) show that currently classroom formative assessments at a glance may appear unrelated to the summative assessment ratings that students receive on state-mandated test such as the Georgia Milestones, but there is indeed some correlation. In the wake of changing educational environments due to the impact of Covid-19, this finding may prove encouraging. The correlation between these two types of assessments may justify shifting away from high-stakes standardized testing and relying more on formative assessment results and teacher judgments to make educational decisions. Because a waiver has been requested to suspend summative assessments for the another year (Strauss, 2020), teachers, school leaders and other stakeholders need to be able to rely on other testing measures as assessments of student learning and educational accountability.

Furthermore, the impacts of the Covid-19 pandemic have led to other questions regarding the equity of education received by students throughout the country and how teachers are able to respond. How should formative assessment strategies differ in a virtual learning environment? How can school administrators ensure an equitable standards-based education for all students when access to technology resources for virtual instruction are not available to all? How can school policy-makers evaluate student results from summative assessments when they are administered with the distractions of students' home environments and without proper monitoring? These and other questions all signal a need to re-evaluate expectations of assessments for schools and warrant the need for further research.

On the other hand, evidence from this case study shows that the current use of grades as a formative assessment practice may not be the most reliable and valid measure to use. Reform is needed in schools to change classroom formative assessments to make them better aligned to the yearly summative assessments that students would have received. The recommendations put forth in this study are not new. However, they also have not been mastered by many of the educators providing instruction to students in American schools. Assessment reform in America is needed. Until this is done, the information gained through the grades from formative assessments is, at best, left to varying and wide-spread interpretation.

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Appendix A

Informed Consent Form

INFORMED CONSENT FORM

Thank you for agreeing to participate in this study, which will take place during the 2019 – 2020 school year. This form details the purpose of this study, a description of the involvement required and your rights as a participant.

The purpose of this study is:

- to determine if teachers' formative assessment practices are reliable indicators of students' mastery of grade level standards.

The benefits of the research will be:

- To better understand teachers' perceptions regarding the use of formative and summative assessments.
- To help teachers analyze formative assessments with regards to rigor and alignment to the Georgia Standards of Excellence.
- To help teachers improve formative assessment practices.

The methods that will be used to meet this purpose include:

- Survey
- Mini discussion groups of two or three participants to analyze teacher-created/selected formative assessments.
- Observations of formative assessment practices

You are encouraged to ask questions or raise concerns at any time about the nature of the study or the methods I am using. Please contact me at any time at the e-mail address or telephone number listed below.

Our discussion will be audio taped to help me accurately capture your insights in your own words. The tapes will only be heard by me for the purpose of this study. If you feel uncomfortable with the recorder, you may ask that it be turned off at any time.

You also have the right to withdraw from the study at any time. In the event you choose to withdraw from the study, all information you provide (including tapes) will be destroyed and omitted from the final paper.

Insights gathered by you and other participants will be used in writing a research report, which will be read and presented to my dissertation committee at Kennesaw State University. Though direct quotes from you may be used in the paper, your name and other identifying information will be kept anonymous.

By signing this consent form I certify that I _____ agree to
(Print full name here)
the terms of this agreement.

_____ _____
(Signature) (Date)

Researcher: owaller1@students.kennesaw.edu

Appendix B

Classroom Observation Form

Peer Observation Summary Form - FARROP

Name: _____ Date: _____ Class Period: _____

Nature of Observation: □ Targeted set of dimensions. If so, which: _____

□ All 10 dimensions of formative assessment

Dimensions of Formative Assessment	Rubric Level
Learning Goals: Learning goals were clearly identified and communicated to students.	
Evidence from today's lesson specific to Learning Goals dimension: _____	
Criteria for Success: Criteria for success were clearly identified and communicated to students.	
Evidence from today's lesson specific to Learning Goals dimension: _____	
Tasks & Activities to Elicit Evidence of Learning: Tasks and activities during the lesson provided opportunities for the teacher to collect evidence of student understanding.	
Evidence from today's lesson specific to Learning Goals dimension: _____	
Questioning Strategies that Elicit Evidence of Learning: Questioning strategies were used to collect evidence of student thinking, from more students, more systematically.	
Evidence from today's lesson specific to Learning Goals dimension: _____	
Feedback Loops During Questioning: Feedback loops during questioning were used to deepen student thinking.	
Evidence from today's lesson specific to Learning Goals dimension: _____	
Descriptive Feedback: Students were provided with evidence-based feedback that is linked to the intended instructional outcomes and criteria for success.	
Evidence from today's lesson specific to Learning Goals dimension: _____	
Peer Assessment: Peer Assessment provided students an opportunity to think meta-cognitively about the work of their peers.	
Evidence from today's lesson specific to Learning Goals dimension: _____	
Self-Assessment: Self-Assessment provided students an opportunity to thinking meta-cognitively about their learning.	
Evidence from today's lesson specific to Learning Goals dimension: _____	
Collaboration: A classroom culture was established in which teachers and students are partners in learning.	
Evidence from today's lesson specific to Learning Goals dimension: _____	
Use of Evidence to Inform Instruction: Formative assessment was used to provide feedback to adjust ongoing teaching and learning.	
Evidence from today's lesson specific to Learning Goals dimension: _____	

Appendix C

Teacher Survey on the Impact of State-Mandated Testing Programs

Are Teachers' Formative Assessment Practices Reliable Indicators of Students' Mastery of Standards?

Researcher's Contact Information: Olivia Waller-Hall;

owaller1@students.kennesaw.edu

Faculty Advisor: Dr. Jihye Kim

Introduction:
You are being invited to take part in a research study conducted by Olivia Waller-Hall of Kennesaw State University. Before you decide to participate in this study, you should read this form and ask questions about anything that you do not understand.

Description of Project:
The purpose of this study is to determine if teachers' formative assessment practices are reliable indicators of students' mastery of grade-level standards as reported by the state-mandated testing program.

Explanation of Procedures:
You will answer a series of questions to give information about teachers' perceptions regarding the uses of standardized test scores in improving instructional decisions.

Time Required:
It will take approximately 15 minutes to complete the survey.

Risks or Discomforts:
There are no known risks or anticipated discomforts in this survey.

Benefits:
The information gathered from this survey will add to the body of research regarding the relationship between formative and summative assessments and help teachers improve formative assessment practices.

Compensation:
There will be no compensation for participation in this study.

Confidentiality:
The results of this participation will be anonymous. No identifiable information or IP addresses will be collected.

Criteria for Participation:
You must be 18 years of age or older to participate in this study.

Research at Kennesaw State University that involves human participants is carried out under the oversight of an Institutional Review Board. Questions or problems regarding these activities should be addressed to the Institutional Review Board, Kennesaw State University, 585 Cobb Avenue, KH3417, Kennesaw, GA 30144-5591, (470) 578-6407.

PLEASE PRINT A COPY OF THIS CONSENT DOCUMENT FOR YOUR RECORDS, OR IF YOU DO NOT HAVE PRINT CAPABILITIES, YOU MAY CONTACT THE RESEARCHER TO OBTAIN A COPY

* Required

1. **Consent/Authorization Form** *
Mark only one oval.

I agree and give my consent to participate in this research project. I understand that participation is voluntary and that I may withdraw my consent at any time without penalty.

I do not agree to participate and will be excluded from the remainder of the questions.

Section 2

2. **Are students placed in your class based on their achievement (i.e. tracked)?** *
Mark only one oval.

Yes

No

3. **Which one of the following categories best describes the ability/achievement level of your class?** *
Mark only one oval.

High ability or achievement

Average ability or achievement

Low ability or achievement

Mixed ability or achievement

4. **How many students are in your class?** *
Mark only one oval.

1 - 15

16 - 20

21 - 25

26 - 30

31+

5. **How many years of teaching experience do you have?** *
Mark only one oval.

0 - 5

6 - 10

11 - 15

16 - 20

20 - 25

25 - 30

Over 30 years

Section 3

Please indicate the extent to which you agree with each of the following statements by filling in the circle that corresponds with your response.

6. **The state-mandated test (Georgia Milestones) is compatible with my daily instruction.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

7. **The state-mandated test (Georgia Milestones) is as accurate a measure of student achievement as a teacher's judgment.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

8. **The state-mandated test (Georgia Milestones) is as accurate a measure in rating student performance as the grades that they receive on their report cards.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

9. **My district's curriculum is aligned with the state-mandated testing program (GMAS).** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

10. **The state-mandated test (Georgia Milestones) is based on a curriculum framework (Georgia Standards of Excellence) that ALL teachers in my state should follow.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

11. **What the state-mandated test measures is about the same as what I measure in the formative assessments given to my students.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

12. **The instructional texts and materials that the district requires me to use are compatible with the state-mandated test (GMAS).** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

13. **Scores on the state-mandated test accurately reflect the quality of education students have received.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

14. **Teachers have high expectations for the performance of all students on the state-mandated test (GMAS).** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

15. **Teachers have high expectations for the performance of all students on their graded formative assessments.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

16. **Performance differences between minority and non-minority students are smaller on the state-mandated test (GMAS) than on the grades achieved in the classroom.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

17. **The state-mandated Test (GMAS) is NOT an accurate measure of what minority students know and can do.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

18. **Many low scoring students will do better on the state-mandated test (GMAS) if they receive specific preparation for it.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

19. **Score differences from year to year on the state-mandated test reflect changes in the characteristics of students rather than changes in school effectiveness.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

20. **If I teach to the state standards or frameworks, students will do well on the state-mandated test (GMAS).** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

21. **The state-mandated test (GMAS) measures high standards of achievement.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

22. **The state-mandated test (GMAS) is NOT an accurate measure of what students who are acquiring English as a second language know and can do.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

23. **Teachers have high expectations for the in-class academic performance of students in my school.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

24. **Differences among schools on the state-mandated tests are more a reflection of students' background characteristics than of school effectiveness.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

25. **My tests are in the same format as the state-mandated test (GMAS).** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

26. **The state-mandated testing program (GMAS) leads some teachers in my school to teach in ways that contradict their own ideas of good educational practice.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

27. **Administrators in my school believe students' state-mandated test (GMAS) scores reflect the quality of teachers' instruction.** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

28. **My tests have the same content as the state-mandated test (GMAS).** *
Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

Section 4

29. **How often do your OWN students' results on the state-mandated test (GMAS) influence your teaching? Mark only one response.** *

Mark only one oval.

- ◯ Daily
- ◯ A few times a week
- ◯ A few times a month
- ◯ A few times a year
- ◯ Never
- ◯ I did not receive students' test results in time to use them.
- ◯ I teach a grade and/or subject that does not receive students' test results.
- ◯ I teach a grade and/or subject that should get students results but did not receive them.

30. **Do YOU use the results of the state-mandated test (GMAS) for any of the following activities? (Mark ALL that apply.)** *

Check all that apply.

- ☐ Group students within my class
- ☐ Evaluate student progress
- ☐ Assess my teaching effectiveness
- ☐ Select instructional materials
- ☐ Plan my instruction
- ☐ Plan curriculum
- ☐ Give feedback to students
- ☐ Give feedback to parents
- ☐ Determine student grades (in whole or in part)
- ☐ Do not get the results back in time to use them
- ☐ None of the above

31. **How adequate has professional development in the following areas been in preparing teachers in your district to implement the state-mandated testing program?** *

Mark only one oval per row.

	No Professional Development	Very Inadequate	Inadequate	Adequate	Very Adequate
Knowledge of state curriculum standards or frameworks	◯	◯	◯	◯	◯
Alginment of the classroom curriculum to the state curriculum standards/frameworks	◯	◯	◯	◯	◯
Alignment of the classroom curriculum to the state-mandated test	◯	◯	◯	◯	◯
Test preparation strategies	◯	◯	◯	◯	◯
Interpretation of the test results	◯	◯	◯	◯	◯
Use of test results	◯	◯	◯	◯	◯

32. **Your state-mandated testing program (GMAS) influences the amount of time you spend on . . .** *

Mark only one oval per row.

	Strongly Disagree	Disagree	Agree	Strongly agree
Whole group instruction				
Critical thinking skills				
Individual seat work				
Basic skills				
Students working together in small groups (cooperative learning)				
Concept development using manipulatives or experiments				
Problems that are likely to appear on the state-mandated test				

33. **If you would like to offer any comments about the relationship between how students perform on the Georgia Milestones and the grades that they achieve in the classroom, please write them in the space provided.** *

Appendix D

Survey Reliability Data

Dimension: Alignment

Reliability Statistics

Cronbach's Alpha	N of Items
.855	7

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q6. GMAS Compatible with Instruction	23.31	19.487	.624	.834
Q9. District Curriculum Aligned with GMAS	23.00	21.659	.584	.843
Q10. GMAS Based on GSE Framework	23.07	19.287	.684	.826
Q12. Instructional Material Aligned to GMAS	23.74	17.857	.660	.831
Q20. Teach State Standards-Students Do Well	23.43	18.202	.665	.829
Q25. My tests same format as GMAS	23.31	19.341	.643	.831
Q28. My tests have same content as GMAS	23.00	21.512	.517	.849

Dimension: Accurate Measurement

Reliability Statistics

Cronbach's Alpha	N of Items
.767	10

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q7. GMAS-Accurate Measurement of Achievement as Teacher's Judgment	32.64	31.357	.548	.730
Q8. GMAS-Accurate Measure as Grades	32.52	30.402	.630	.717
Q11. GMAS Measures Same as Formative Assessments	31.95	33.461	.477	.742
Q16. Performance Diff. Smaller on GMAS (Minority vs. Non)	32.57	31.178	.519	.734
Q17. GMAS Not Accurate Measurement of Minorities	31.83	35.069	.323	.761
Q18. Low Students Do Better on GMAS if Prepared	31.86	30.808	.659	.715
Q19. Score Diff. Student Change Not School Effectiveness	31.79	36.270	.202	.777
Q21. GMAS Measures High Standards of Achievement	31.76	32.576	.658	.722
Q22. GMAS Not Accurate for ESOL	31.67	37.496	.113	.789
Q24. Diff. in Schools Reflect Student Backgrounds	31.12	37.522	.234	.768

Dimension: Measure of Educational Effectiveness

Reliability Statistics

Cronbach's Alpha	N of Items
.517	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q13. GMAS Scores Accurately Reflect Educational Quality	7.83	2.337	.398	.294
Q19. Score Diff. Student Change Not School Effectiveness	6.95	3.022	.226	.600
Q27. Admin Test Scores Reflect Quality of Instruction	6.60	3.320	.418	.336

Dimension: Teacher Expectations

Reliability Statistics

Cronbach's Alpha	N of Items
.804	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q14. Teacher High Expectations on GMAS	8.45	2.400	.780	.604
Q15. Teachers High Expectations on Formative Assessments	8.50	2.451	.582	.811
Q23. Teachers High Expectations in Class Performance	8.48	2.597	.607	.775

Dimension: Influence Practice / Professional Development

Reliability Statistics

Cronbach's Alpha	N of Items
.946	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q31a. Knowledge of State Curriculum	18.02	28.365	.815	.938
Q31b. Alignment Class Curriculum to State Standards	18.10	27.113	.909	.927
Q31c. Alignment Class Curriculum to GMAS	17.98	28.512	.897	.930
Q31d. Test Prep Strategies	18.05	27.656	.790	.941
Q31e. Interpretation of Test Results	18.21	27.294	.797	.941
Q31f. Use of Test Results	18.21	27.538	.825	.937

Appendix E

Test Score / Grade Distribution for 35 Title I Schools

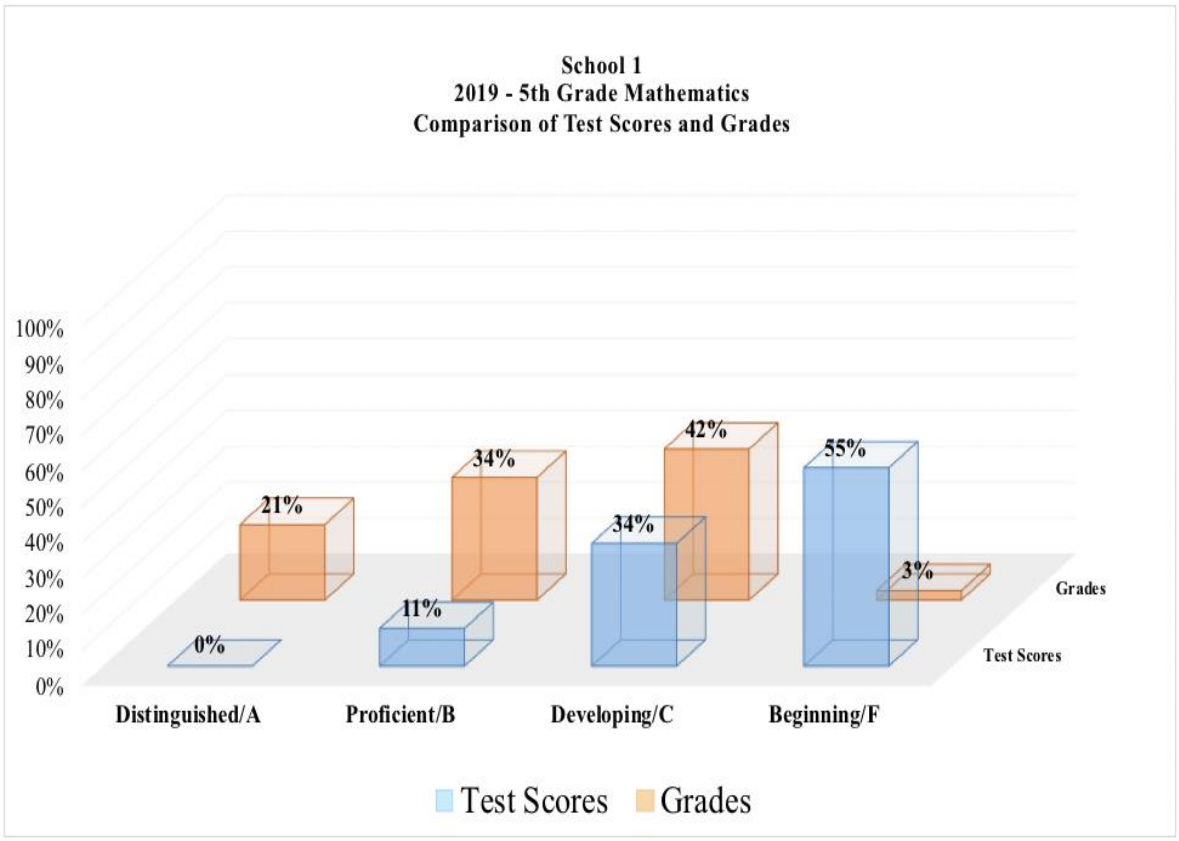
Test Score / Grade Distribution for the 35 Title I Schools

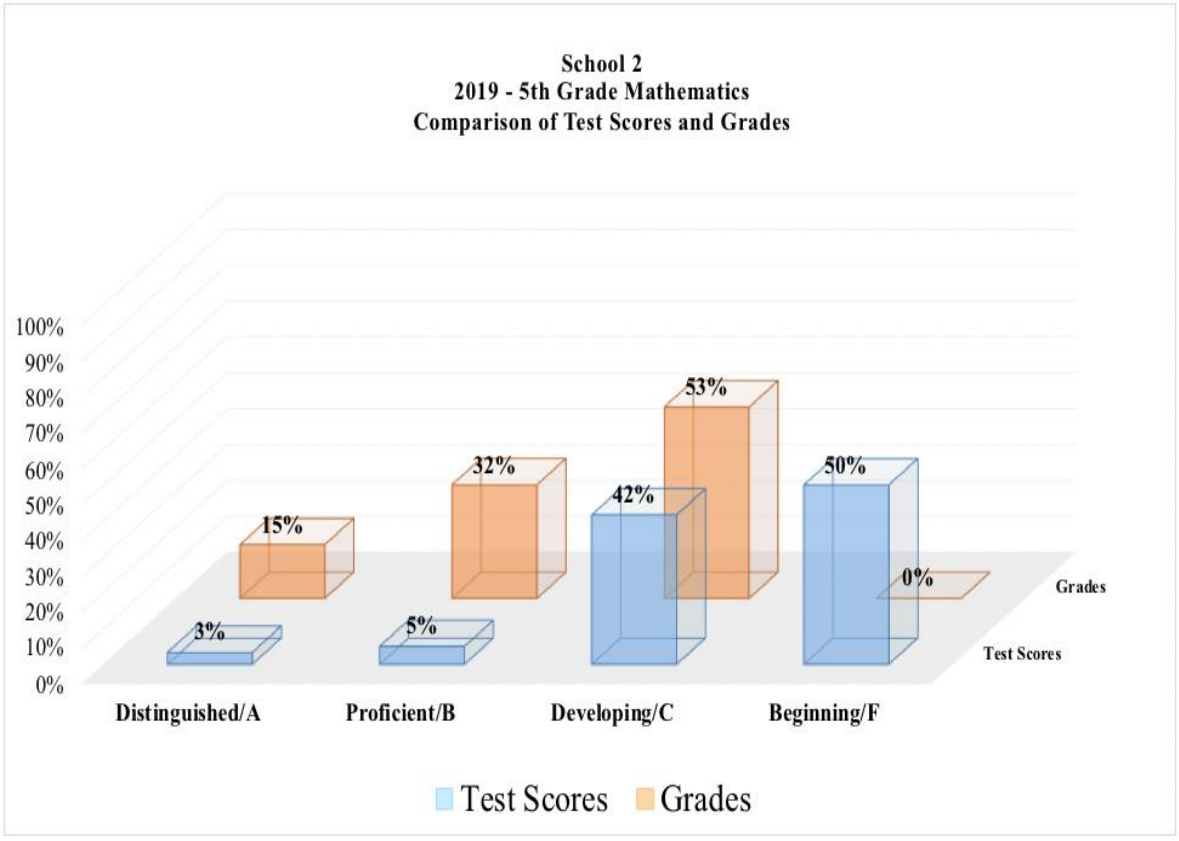
School	Number of Fifth Grade Students	% Distinguished / % A's	% Proficient/ %B's	% Developing / % C's	% Beginning/ %F's	Difference in % Beginning and % F's
School 1	38	0%	11%	34%	55%	52%
		21%	34%	42%	3%	
School 2	60	3%	5%	42%	50%	50%
		15%	32%	53%	0%	
School 3	51	8%	22%	37%	33%	14%
		6%	25%	49%	20%	
School 4	42	7%	10%	26%	57%	55%
		19%	47%	33%	2%	
School 5	83	16%	30%	28%	27%	27%
		32%	30%	38%	0%	
School 6	61	13%	23%	28%	36%	34%
		48%	36%	15%	2%	
School 7	62	0%	8%	37%	55%	53%
		10%	32%	56%	2%	
School 8	51	4%	20%	43%	33%	24%
		16%	31%	43%	10%	
School 9	66	8%	17%	33%	42%	30%
		9%	39%	39%	12%	
School 10	91	2%	24%	33%	41%	41%
		23%	40%	37%	0%	
School 11	66	2%	19%	24%	56%	56%
		24%	38%	38%	0%	
School 12	36	0%	3%	58%	39%	39%
		19%	39%	42%	0%	
School 13	57	0%	9%	33%	58%	55%
		10%	55%	32%	3%	
School 14	83	7%	23%	37%	33%	3%
		17%	28%	25%	30%	
School 15	75	0%	4%	40%	56%	53%
		21%	55%	21%	3%	
School 16	59	5%	20%	39%	36%	22%
		0%	25%	61%	14%	
School 17	88	1%	11%	42%	45%	27%
		2%	26%	53%	18%	
School 18	42	0%	5%	40%	55%	48%

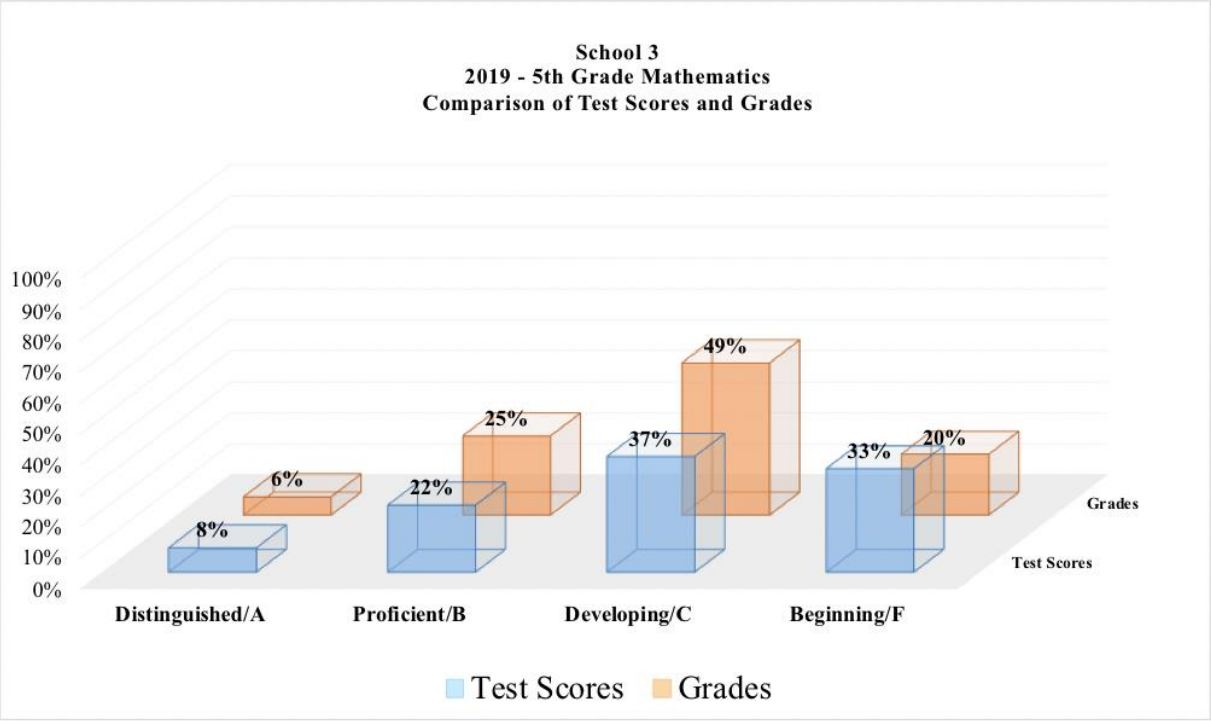
		10%	45%	38%	7%	
School 19	87	0%	17%	26%	56%	55%
		17%	24%	57%	1%	
School 20	65	2%	11%	37%	51%	28%
		12%	29%	35%	23%	
School 21	66	0%	5%	32%	64%	11%
		3%	21%	23%	53%	
School 22	81	4%	18%	37%	41%	-7%
		5%	21%	26%	48%	
School 23	105	6%	12%	35%	47%	43%
		11%	24%	61%	4%	
School 24	80	9%	14%	36%	41%	33%
		31%	30%	31%	8%	
School 25	65	0%	3%	37%	60%	57%
		27%	39%	31%	3%	
School 26	85	1%	20%	31%	48%	36%
		35%	26%	27%	12%	
School 27	93	6%	22%	25%	47%	38%
		17%	37%	38%	9%	
School 28	57	0%	5%	37%	58%	51%
		7%	42%	44%	7%	
School 29	87	4%	14%	41%	40%	37%
		25%	23%	48%	3%	
School 30	47	6%	17%	40%	36%	28%
		38%	29%	25%	8%	
School 31	86	1%	7%	27%	65%	50%
		13%	31%	41%	15%	
School 32	54	0%	15%	20%	65%	37%
		19%	19%	35%	28%	
School 33	70	0%	1%	31%	67%	66%
		9%	27%	63%	1%	
School 34	93	3%	12%	37%	48%	48%
		5%	33%	62%	0%	
School 35	51	4%	18%	31%	47%	45%
		13%	52%	33%	2%	

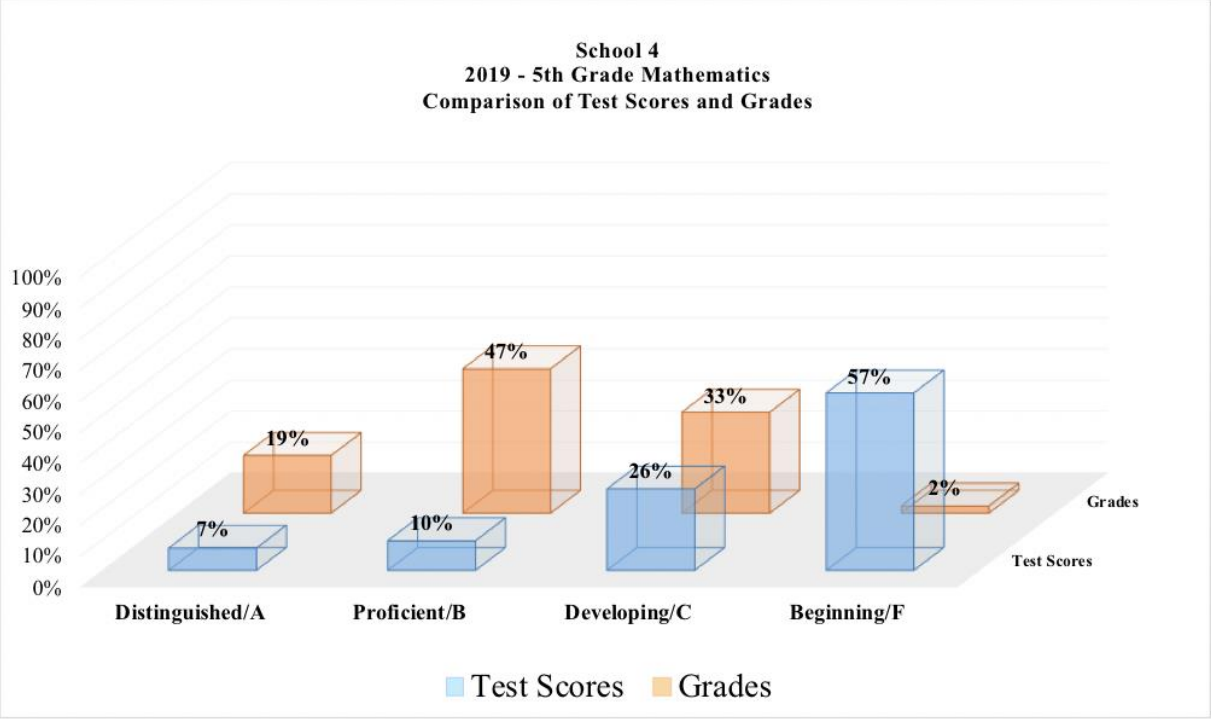
Appendix F

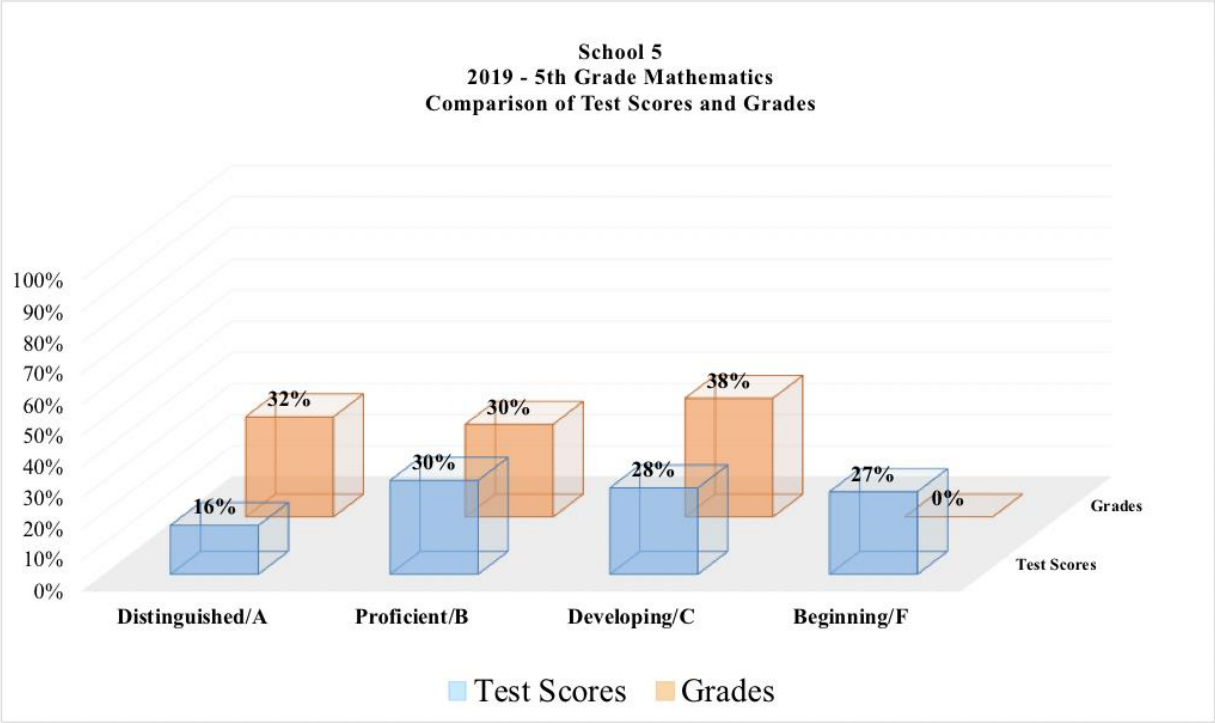
Individual School Graphs

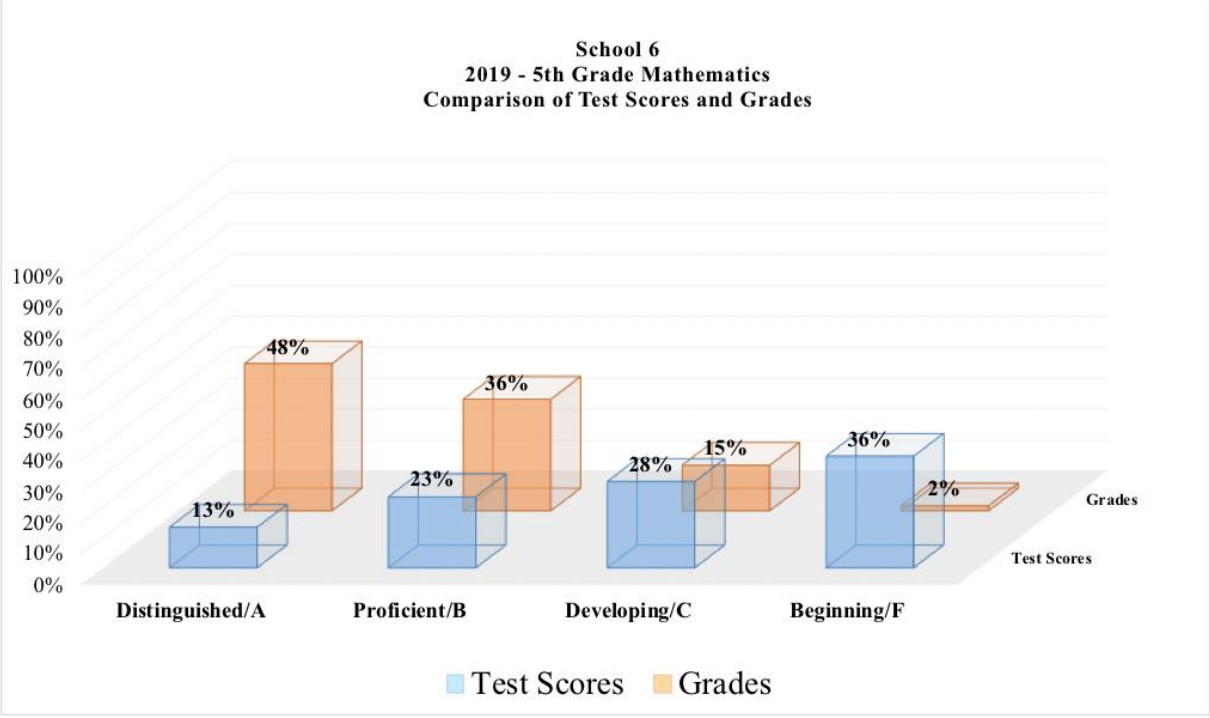

School 1
2019 - 5th Grade Mathematics
Comparison of Test Scores and Grades
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
21%
0%
34%
11%
42%
34%
55%
3%
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades

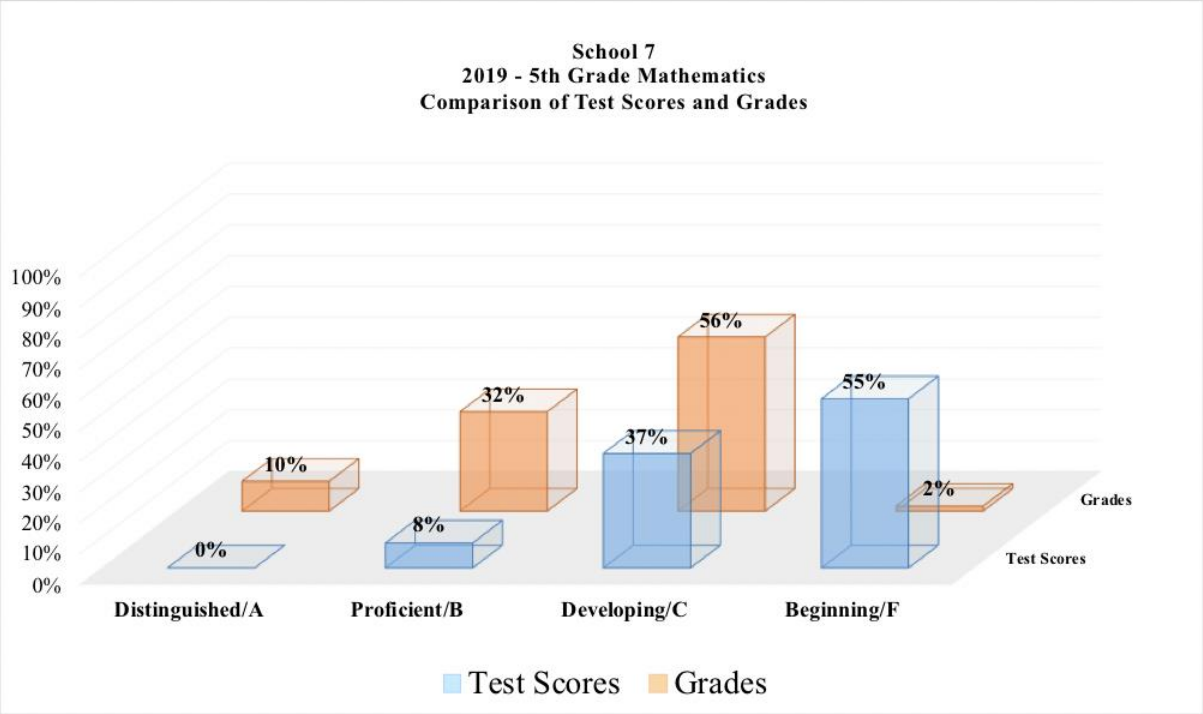

School 2
2019 - 5th Grade Mathematics
Comparison of Test Scores and Grades
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
15%
3%
32%
5%
53%
42%
50%
0%
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades


School 3
2019 - 5th Grade Mathematics
Comparison of Test Scores and Grades
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
8%
6%
22%
25%
37%
49%
33%
20%
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades


School 4
2019 - 5th Grade Mathematics
Comparison of Test Scores and Grades
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
7%
19%
10%
47%
26%
33%
57%
2%
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades


School 5
2019 - 5th Grade Mathematics
Comparison of Test Scores and Grades
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
16%
32%
30%
30%
28%
38%
27%
0%
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades


School 6
2019 - 5th Grade Mathematics
Comparison of Test Scores and Grades
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
13%
48%
23%
36%
28%
15%
36%
2%
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades


School 7
2019 - 5th Grade Mathematics
Comparison of Test Scores and Grades
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
10%
0%
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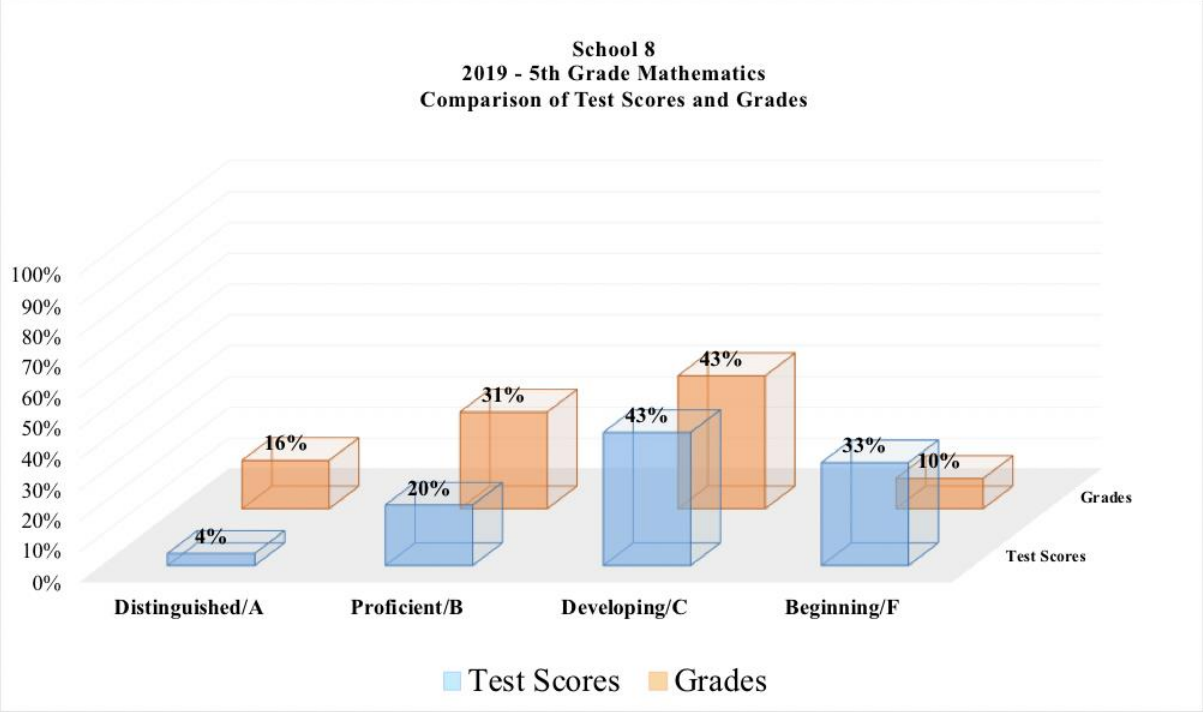
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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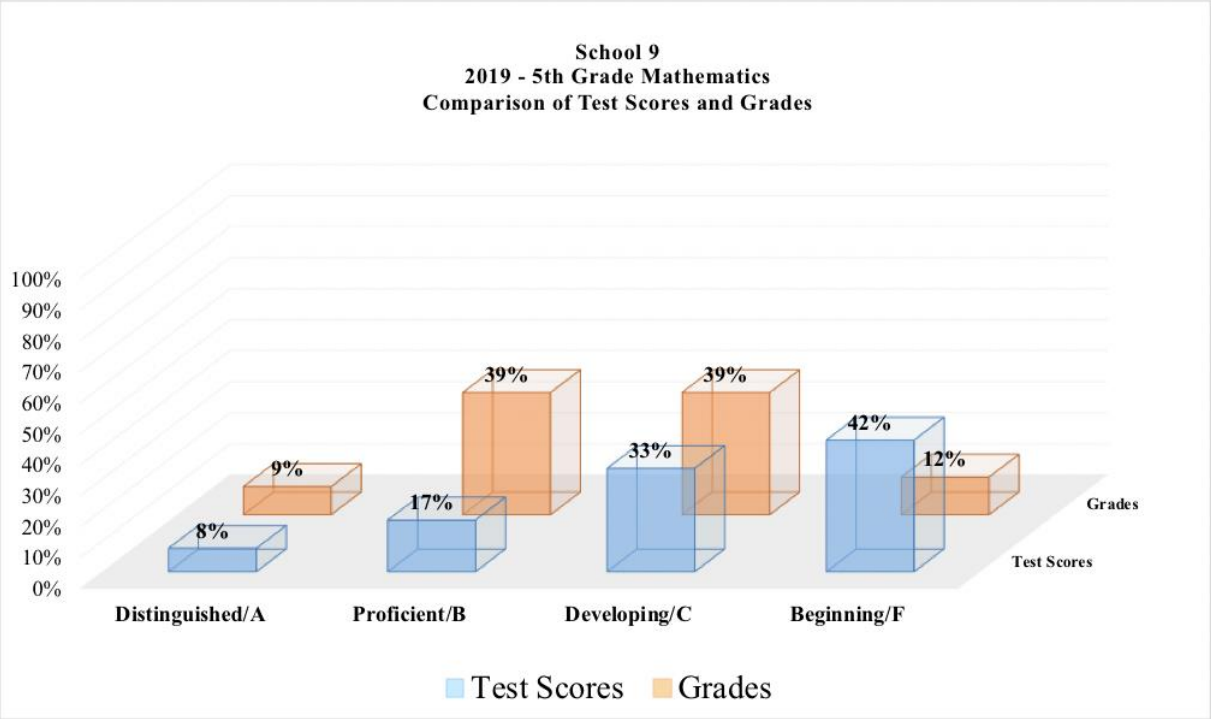
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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9%
8%
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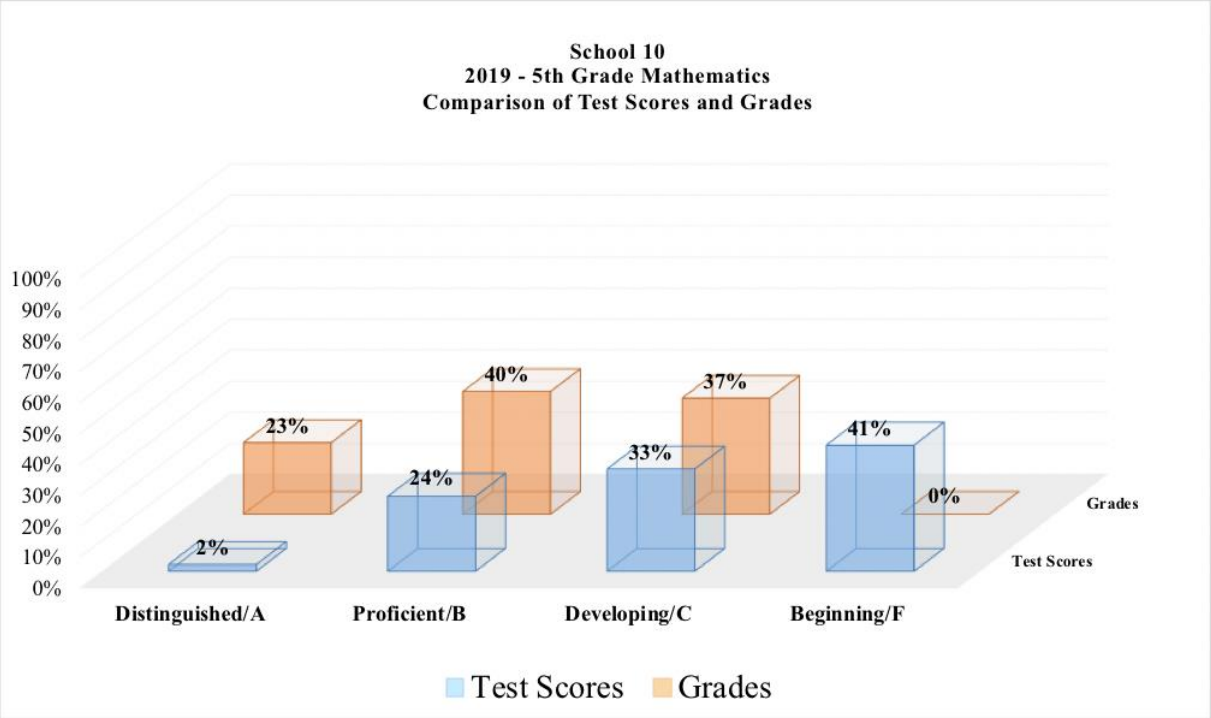
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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23%
2%
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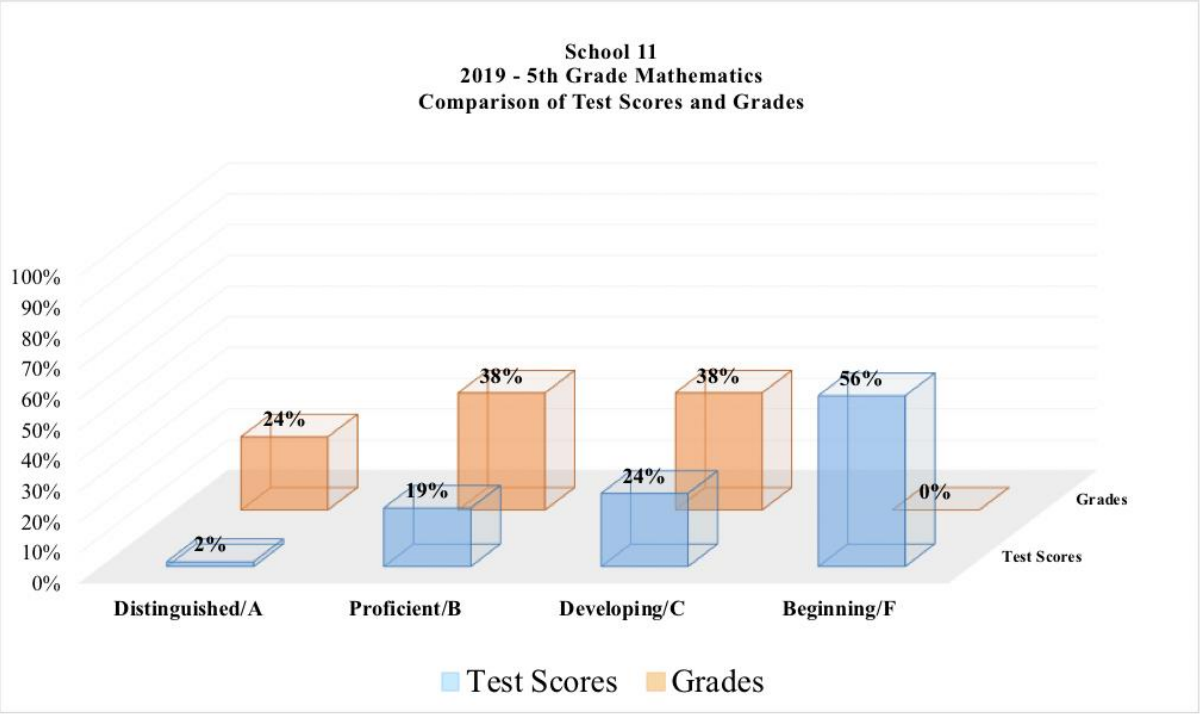
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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24%
2%
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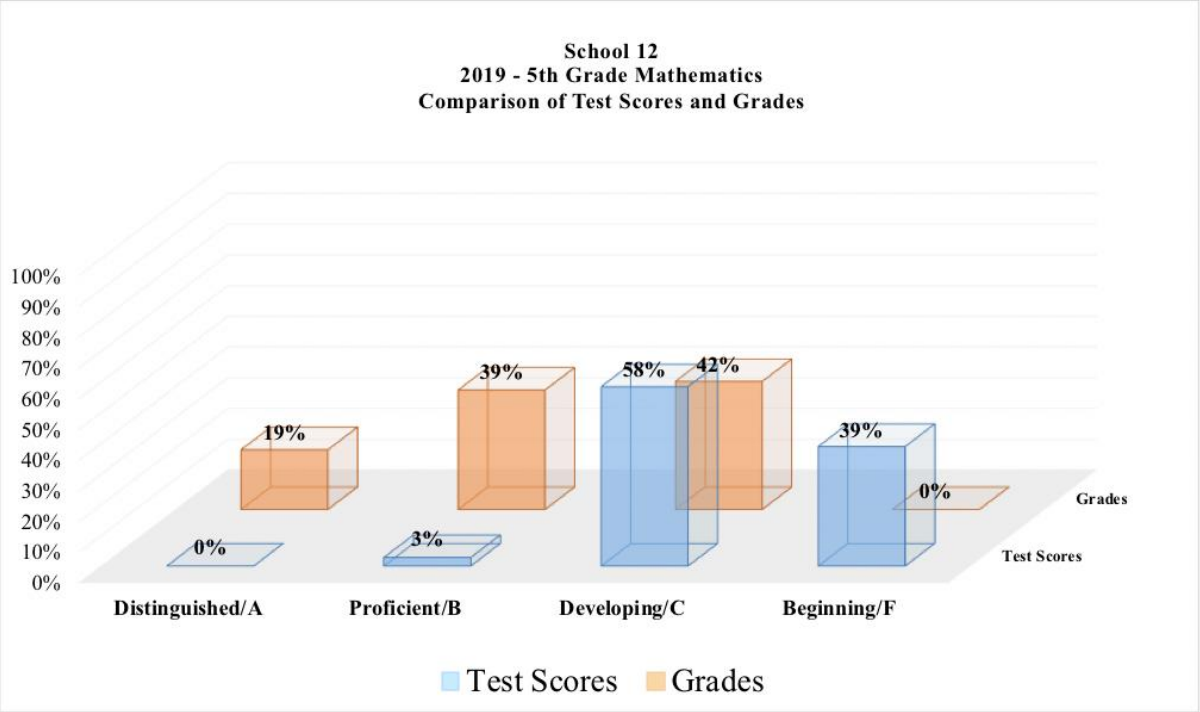
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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19%
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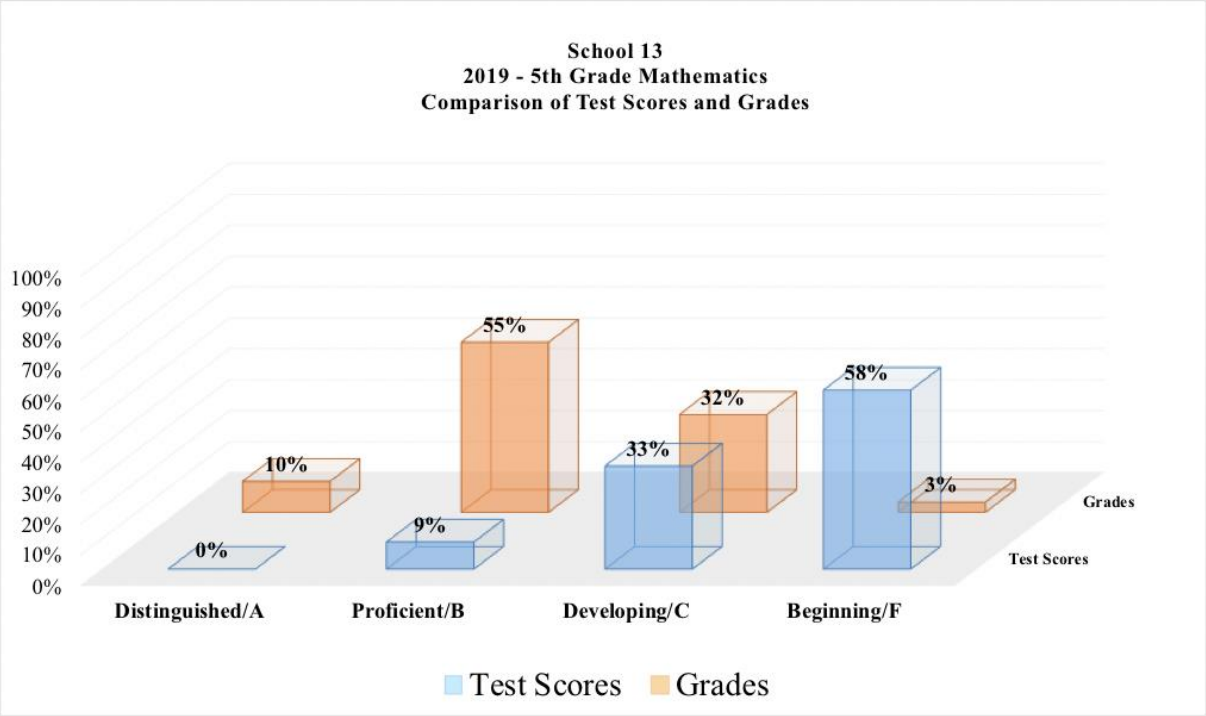
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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10%
0%
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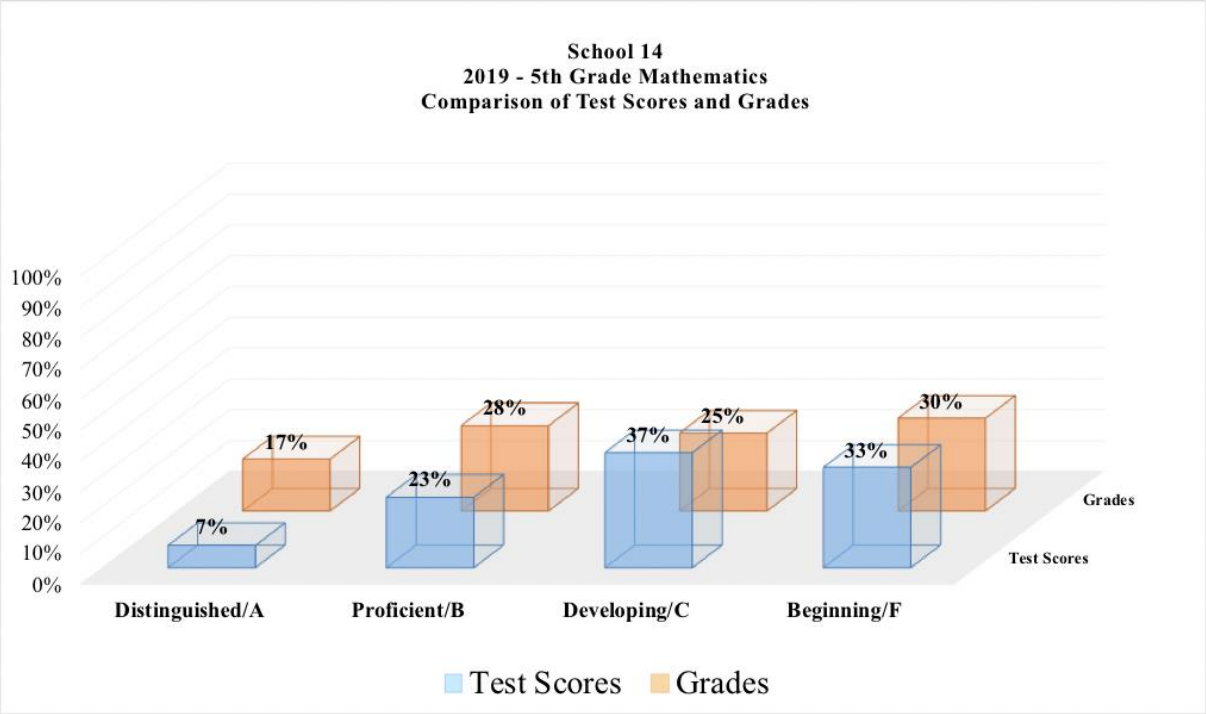
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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17%
7%
28%
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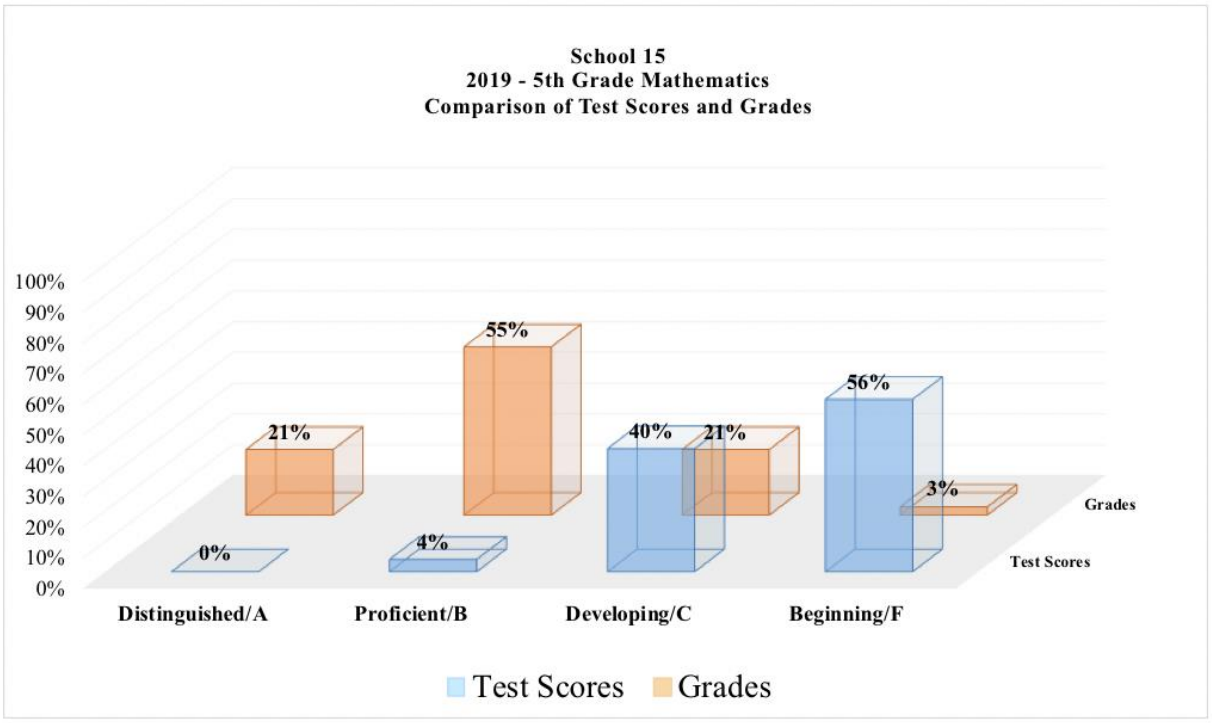
33%
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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21%
55%
40%
21%
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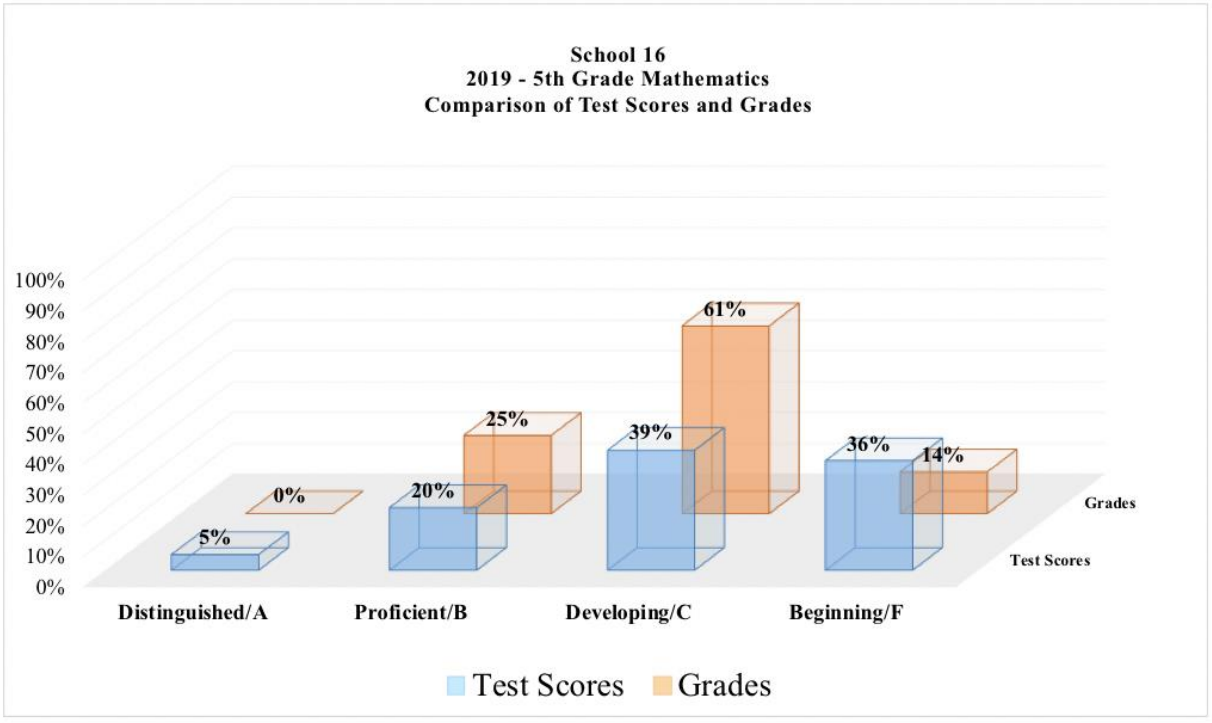
4%
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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61%
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39%
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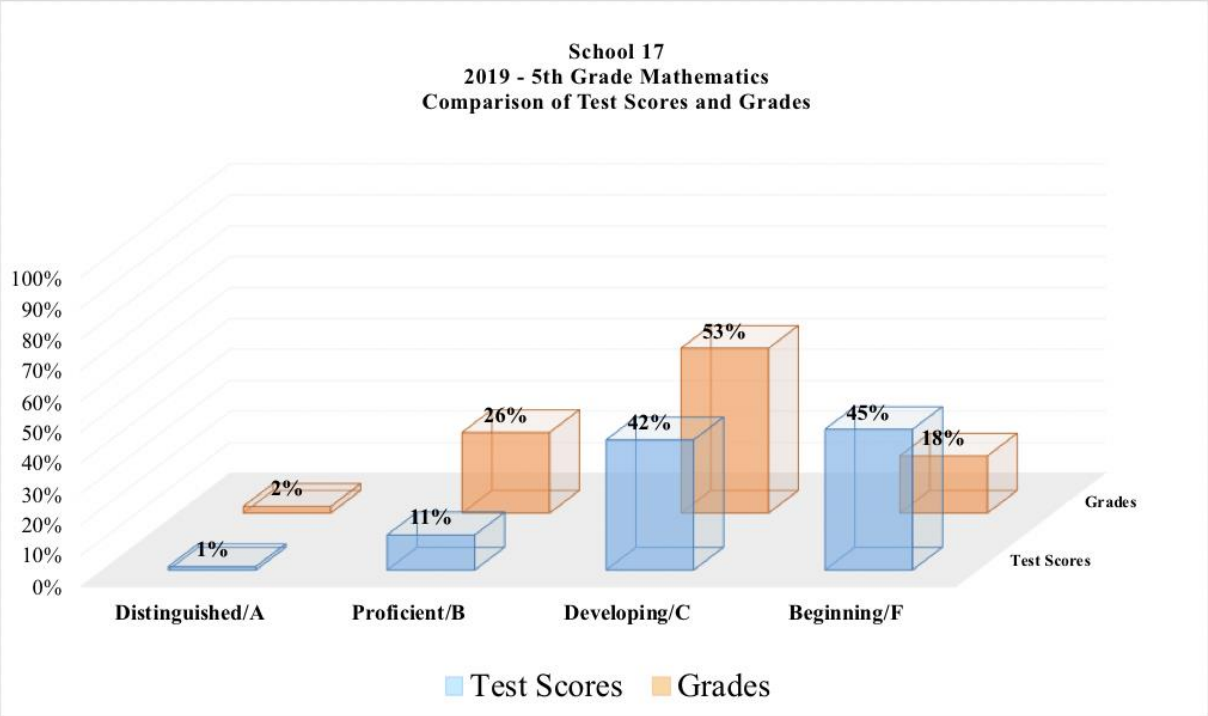
20%
5%
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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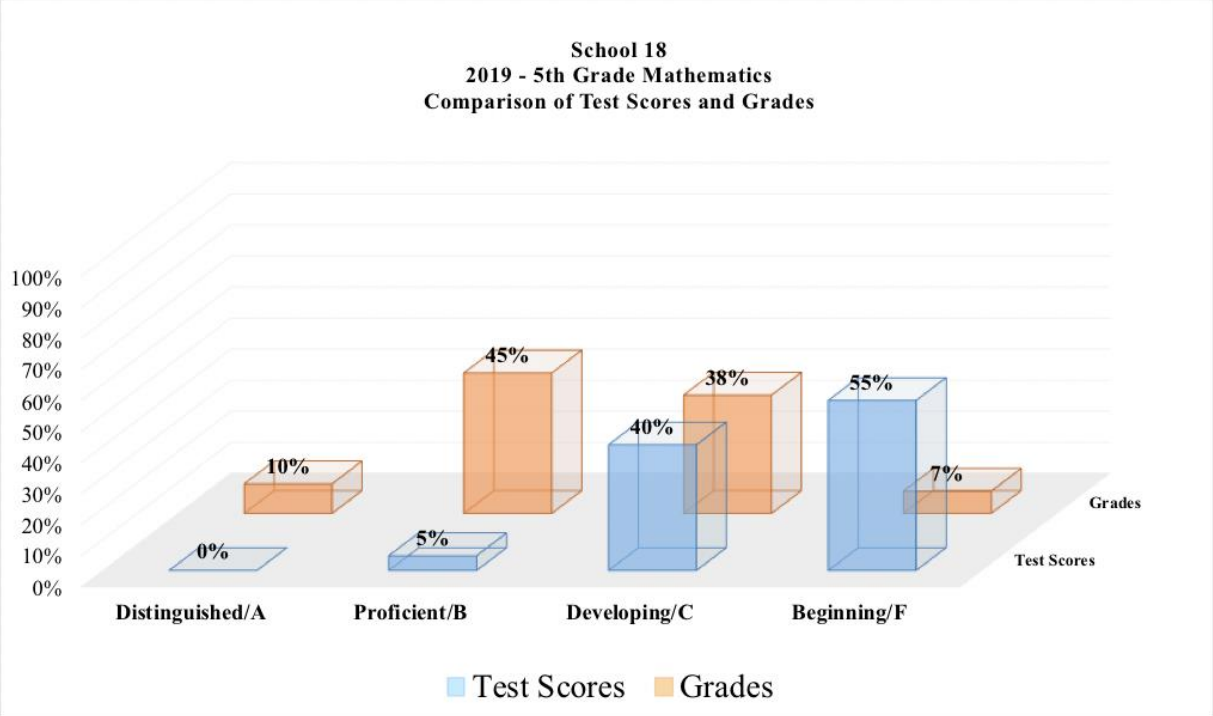
2%
1%
26%
11%
53%
42%
45%
18%
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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10%
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45%
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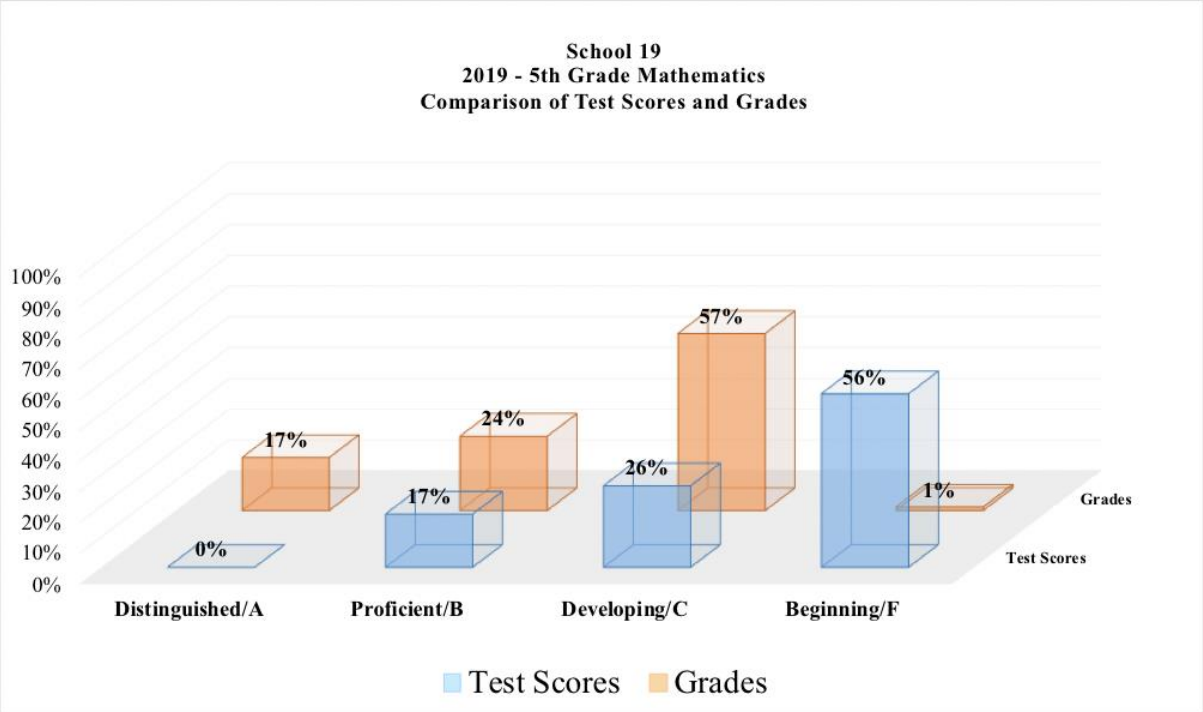
7%
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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17%
0%
24%
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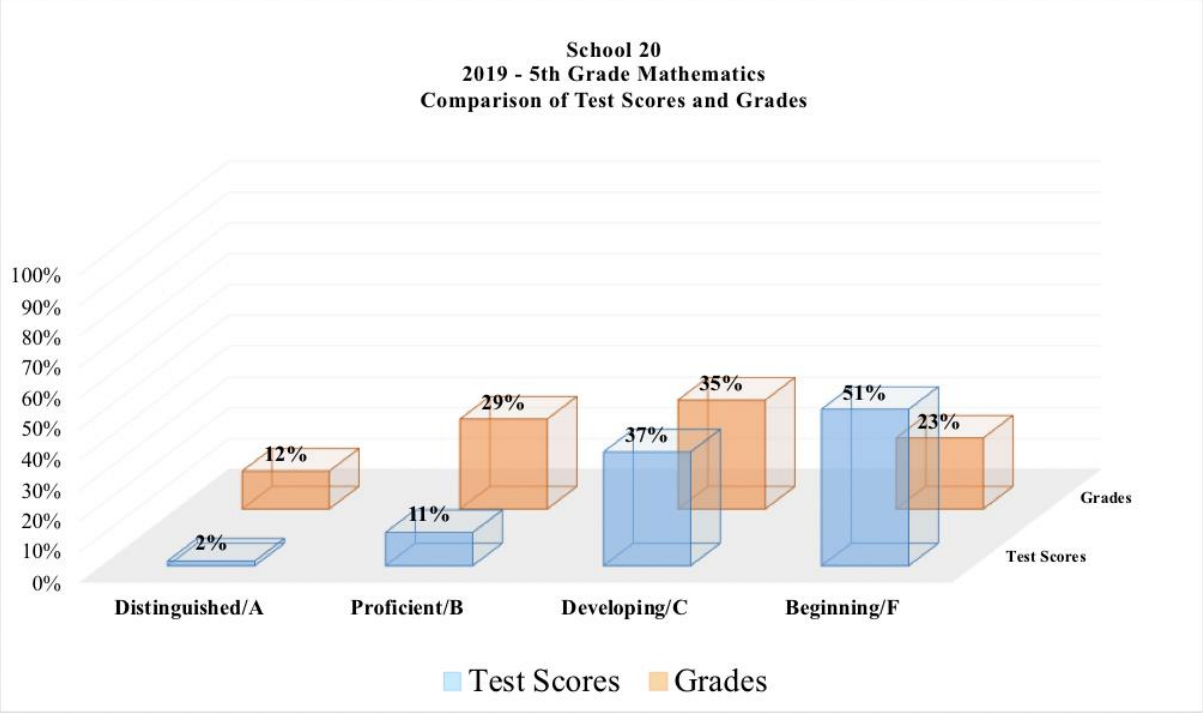
1%
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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2019 - 5th Grade Mathematics
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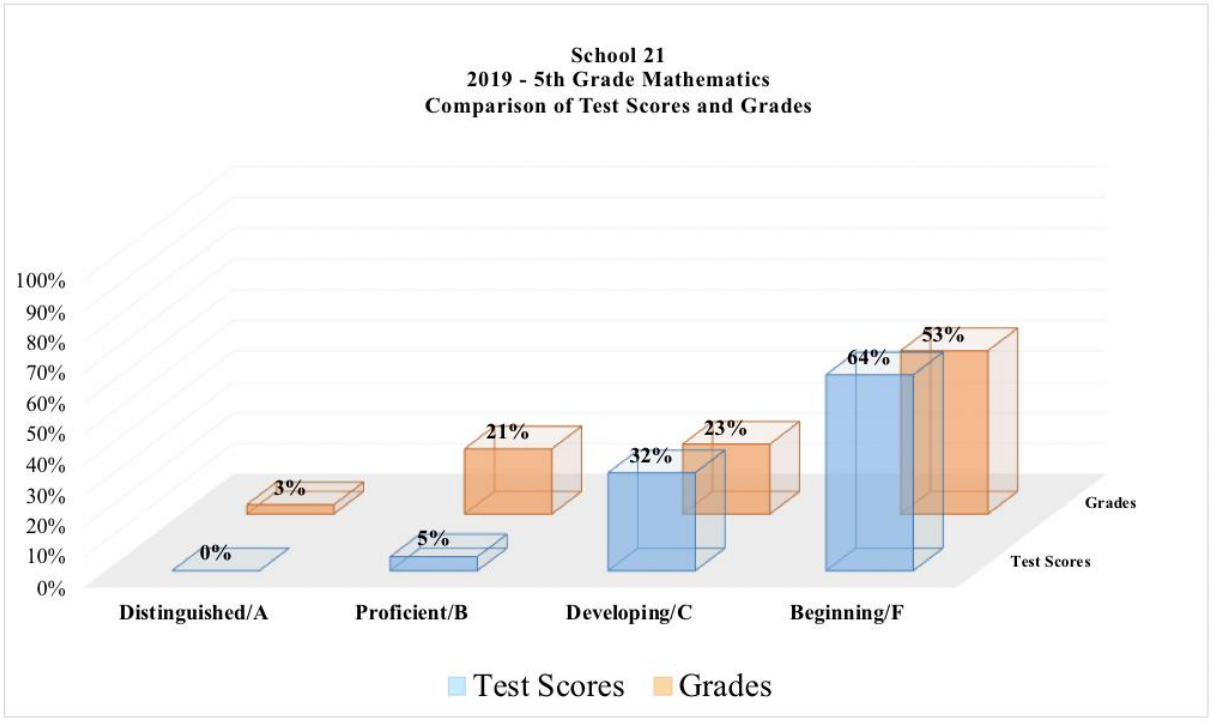
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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Grades
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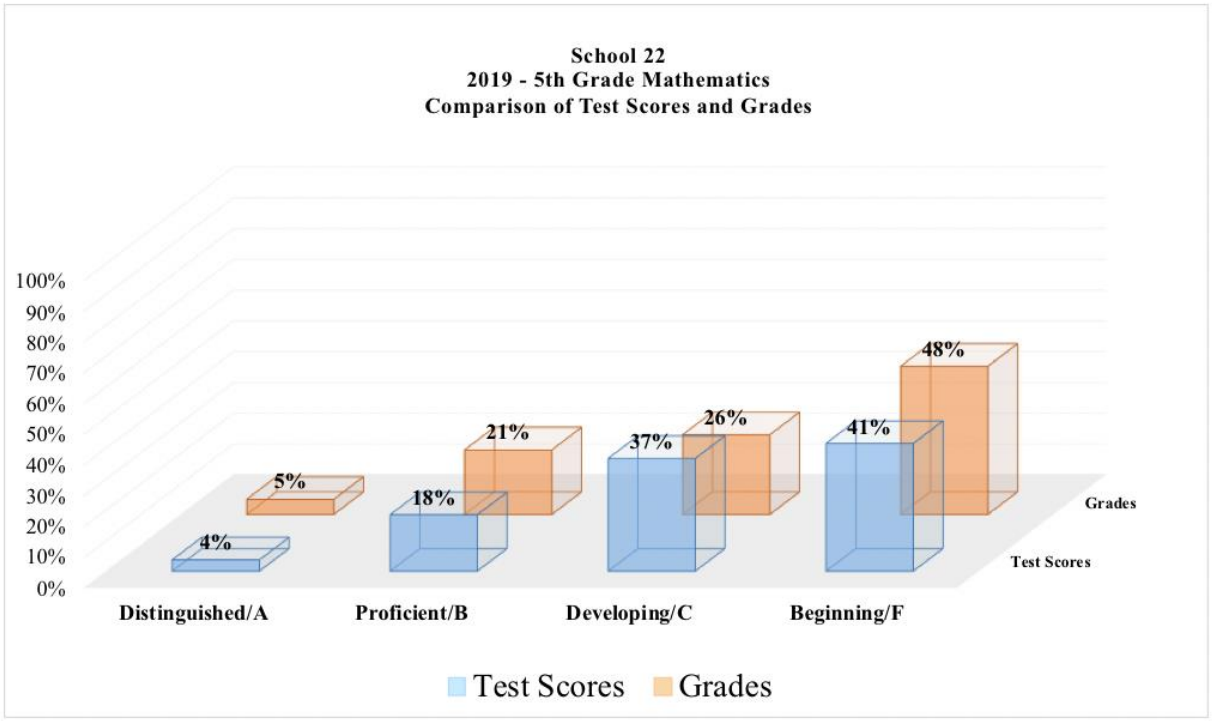
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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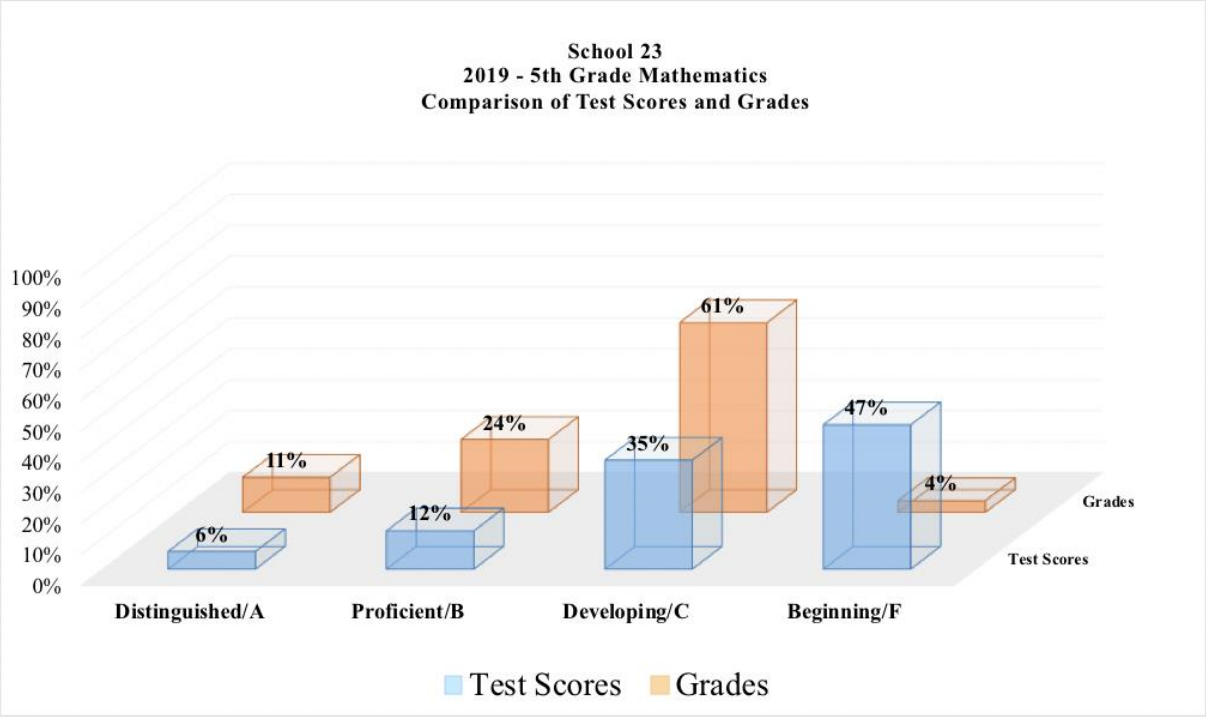
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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2019 - 5th Grade Mathematics
Comparison of Test Scores and Grades
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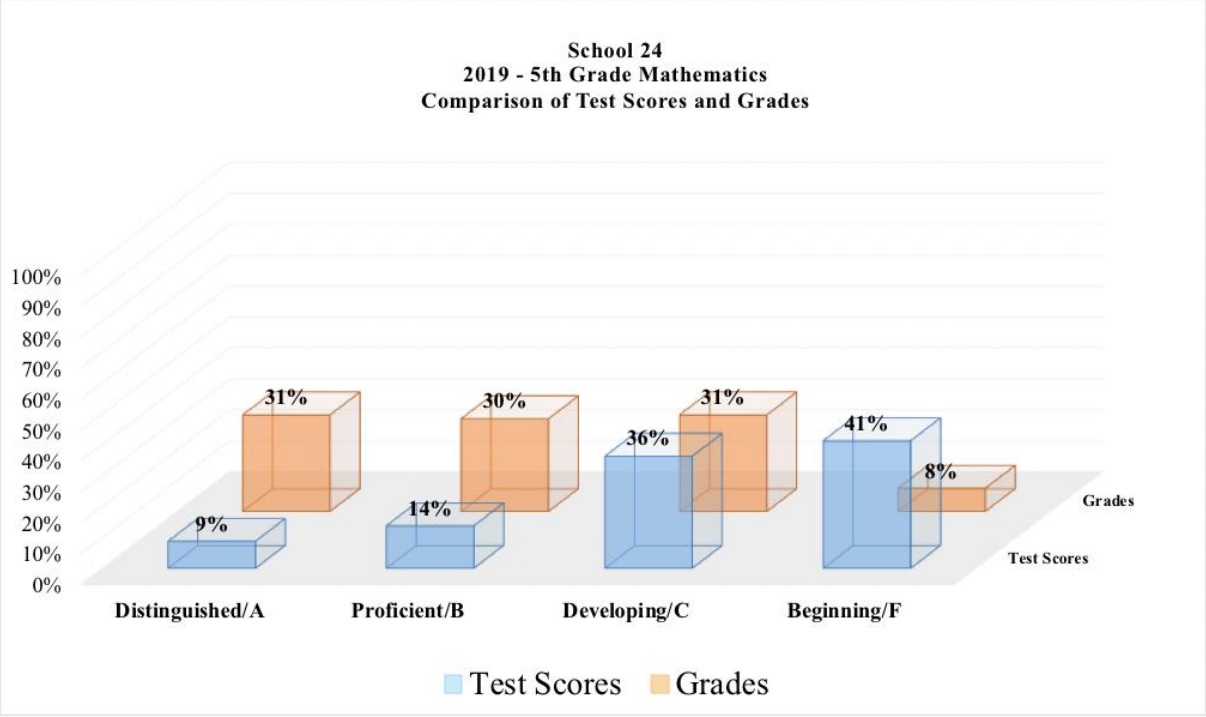
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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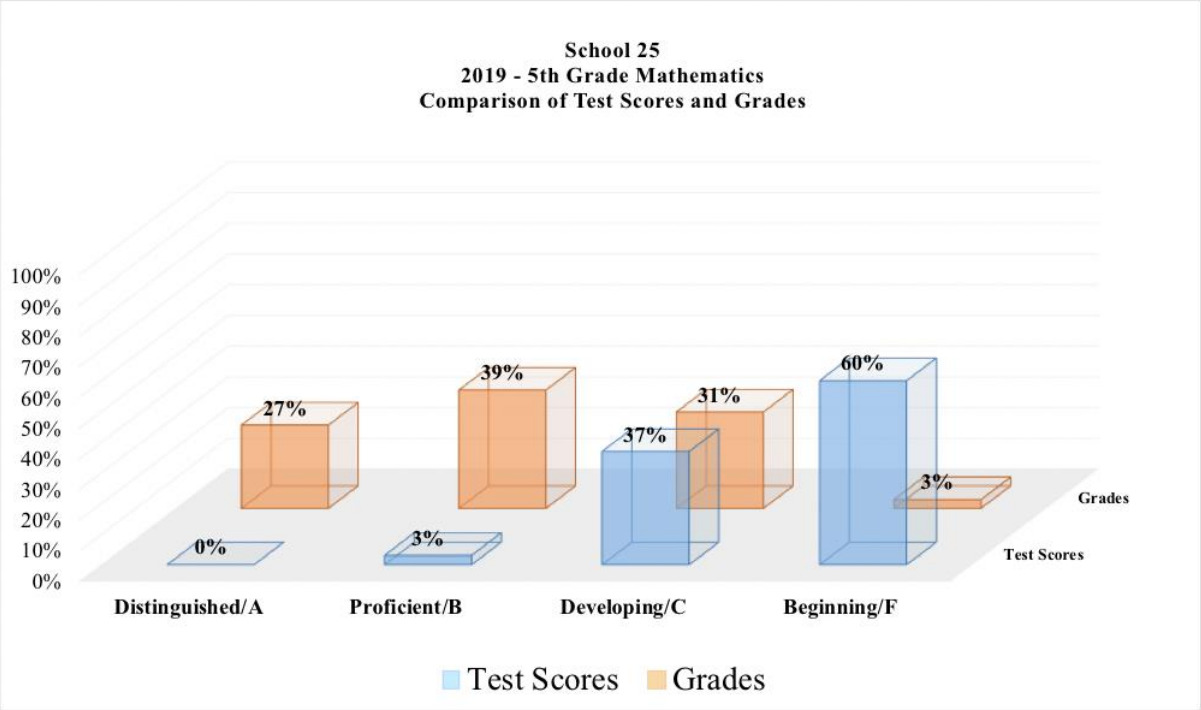
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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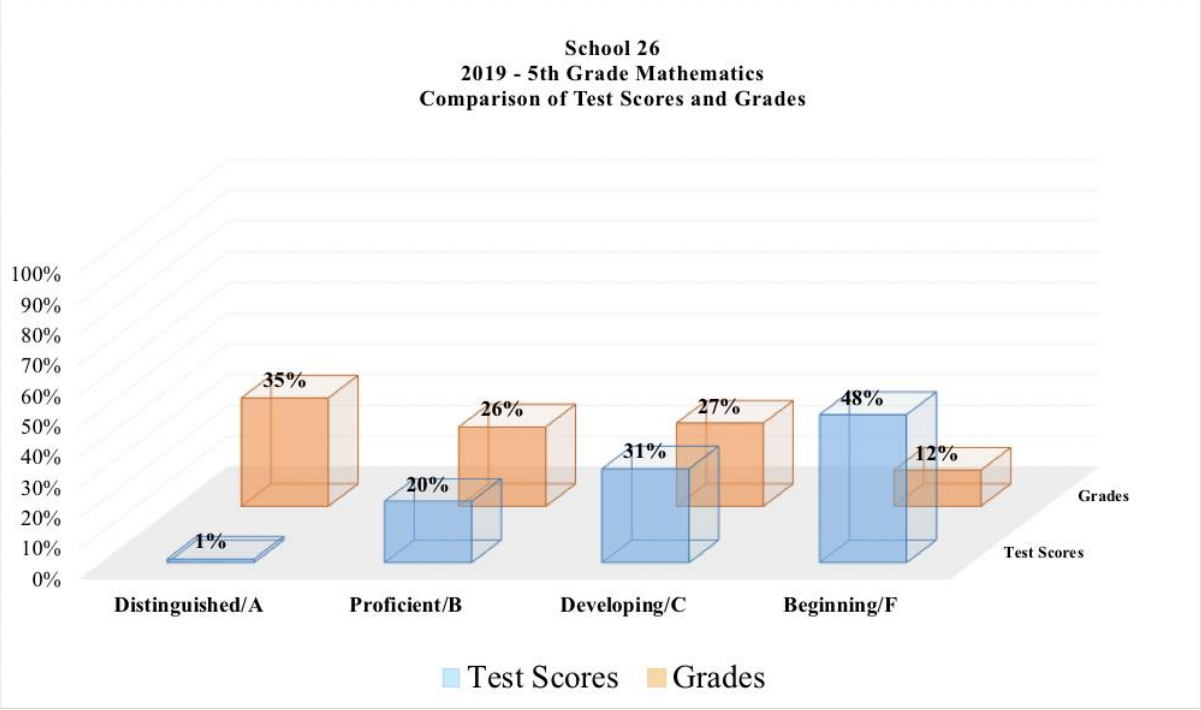
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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Distinguished/A
Proficient/B
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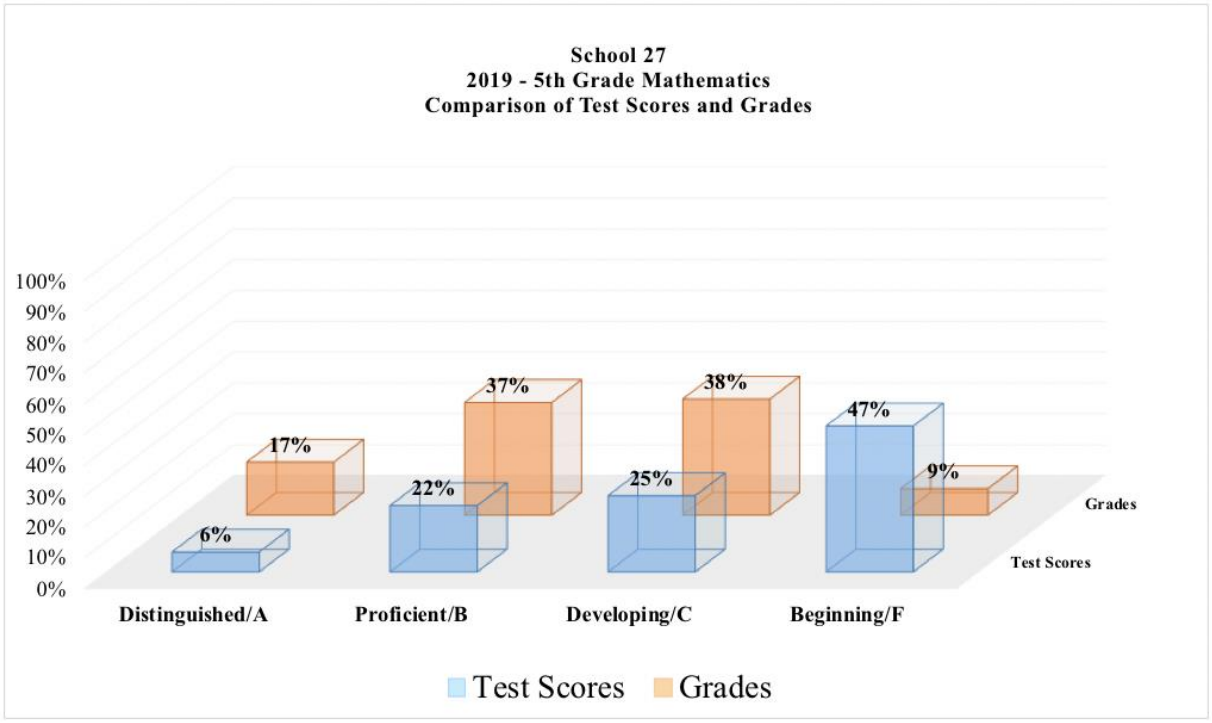
Beginning/F
Test Scores
Grades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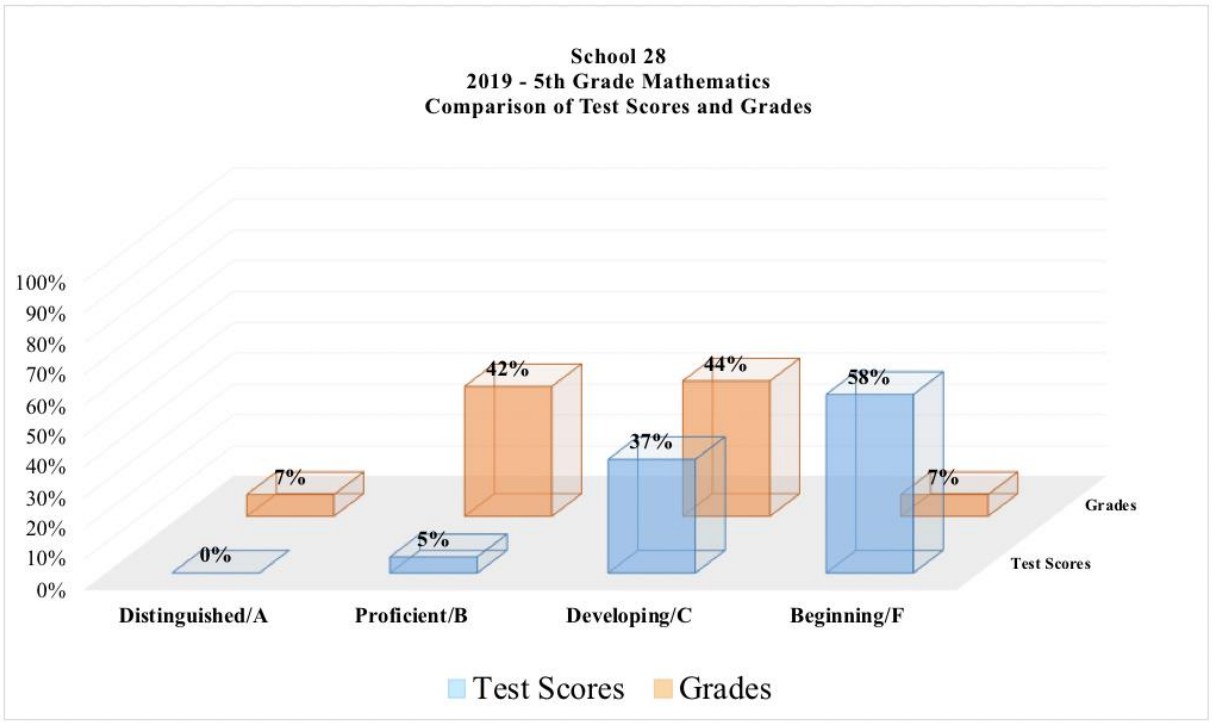
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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Comparison of Test Scores and Grades
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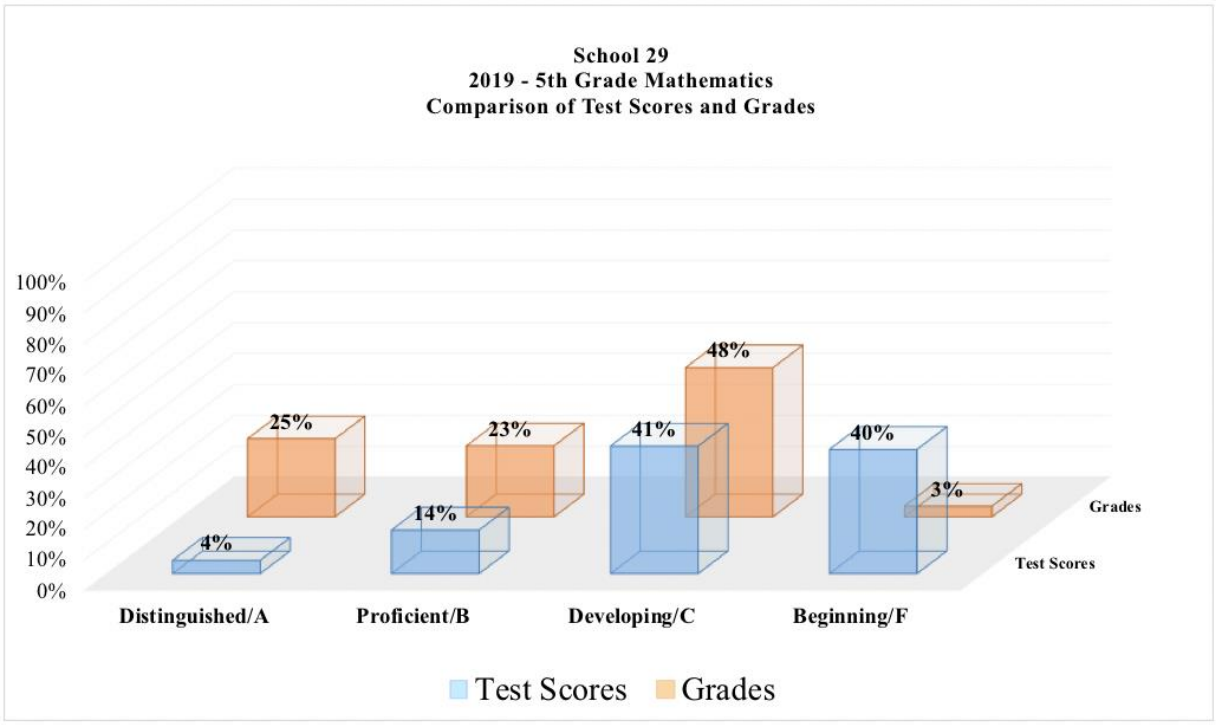
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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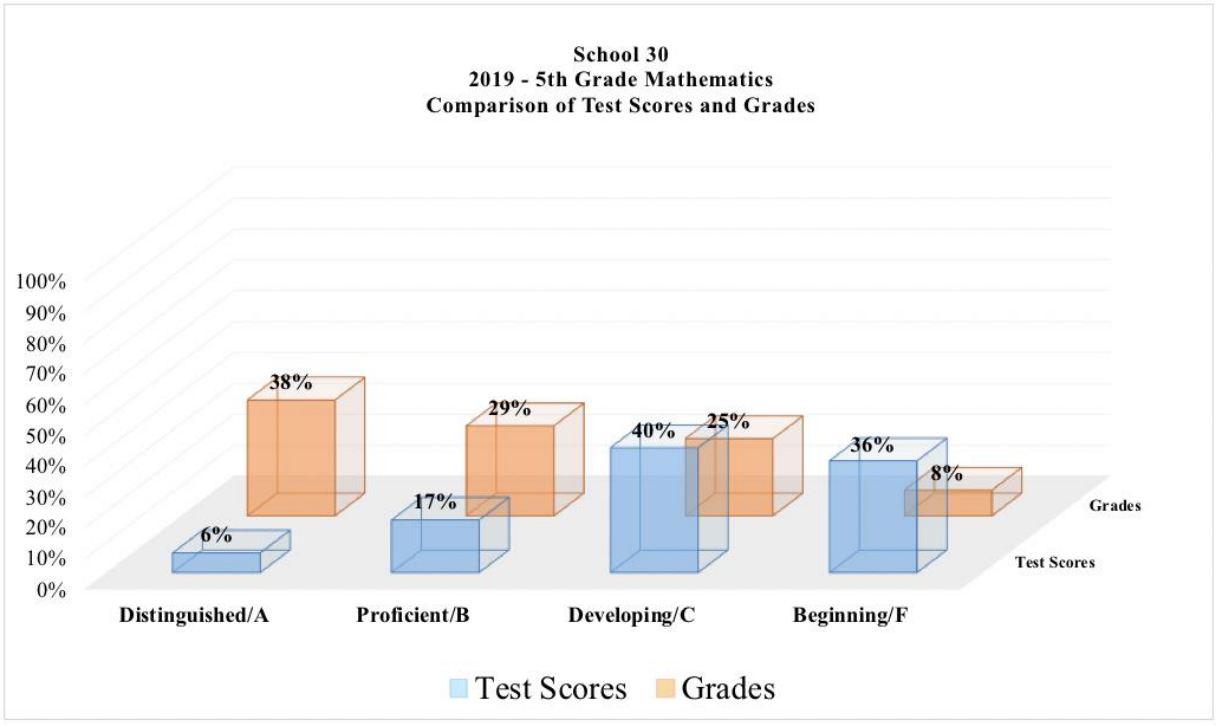
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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38%
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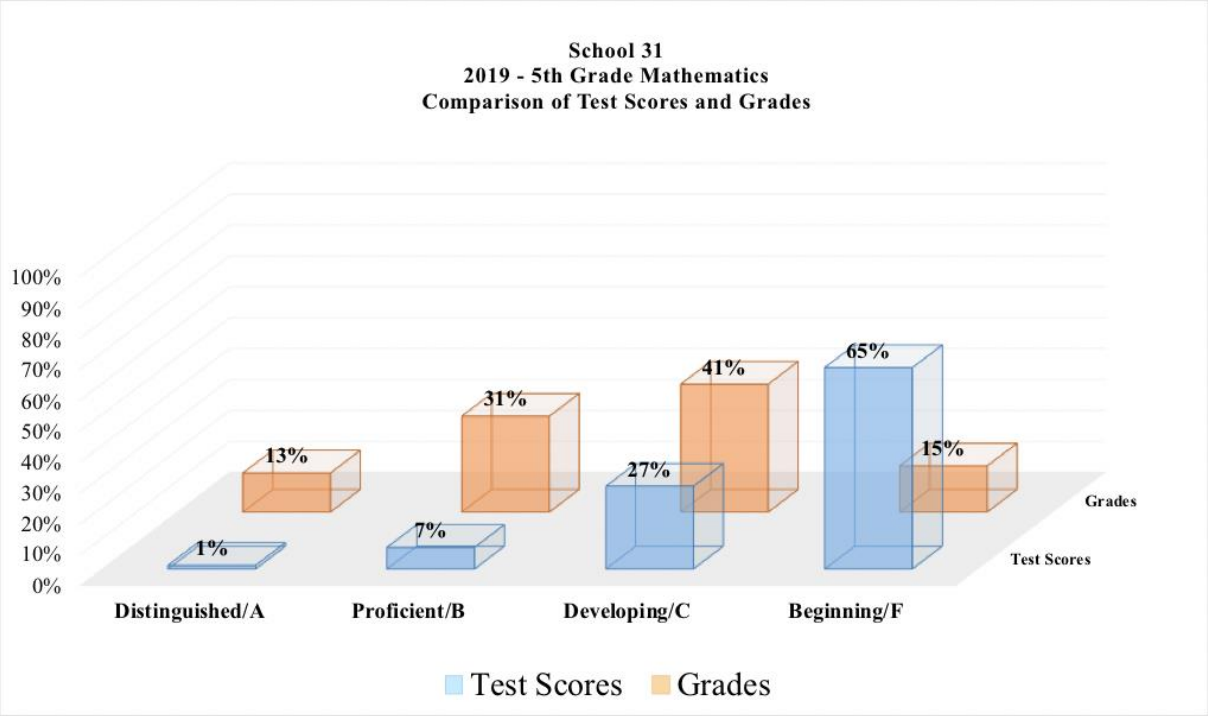
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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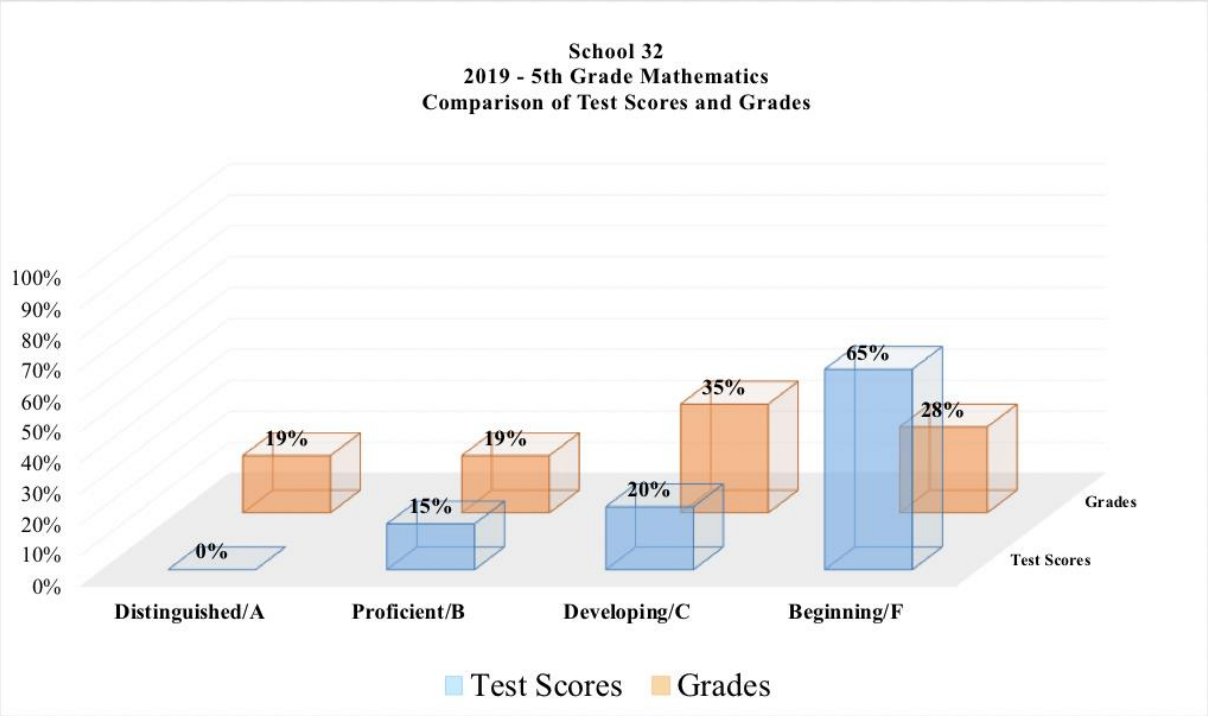
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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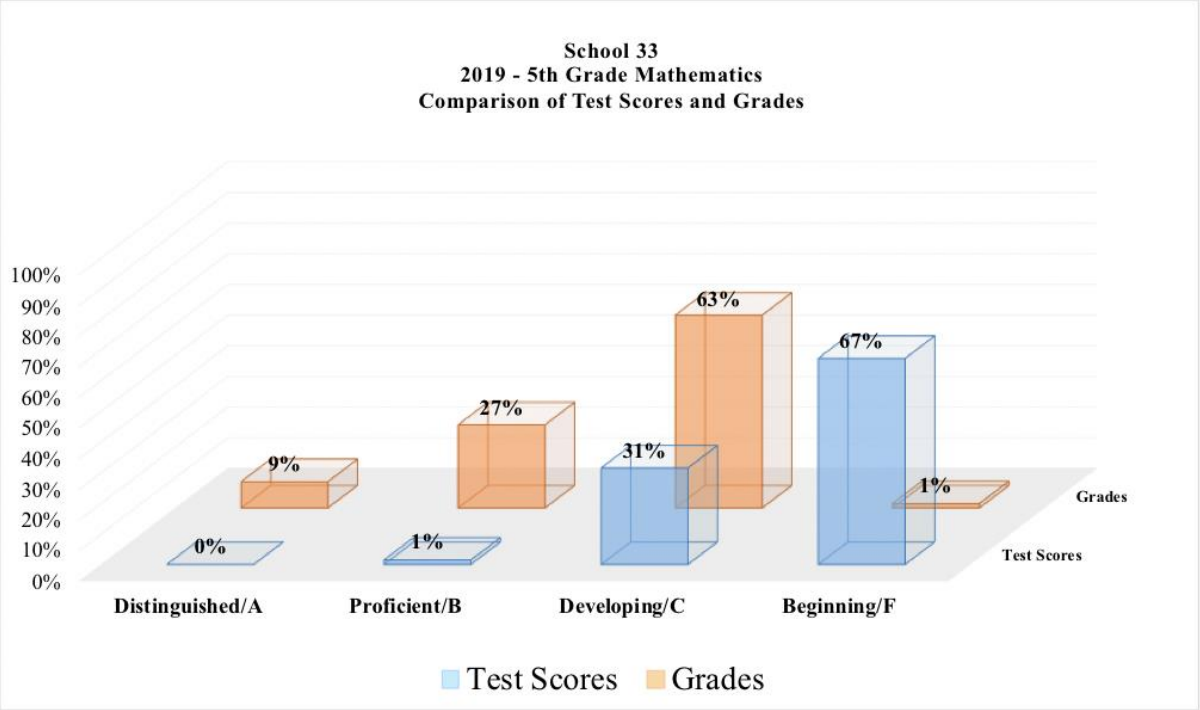
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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Grades
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Distinguished/A
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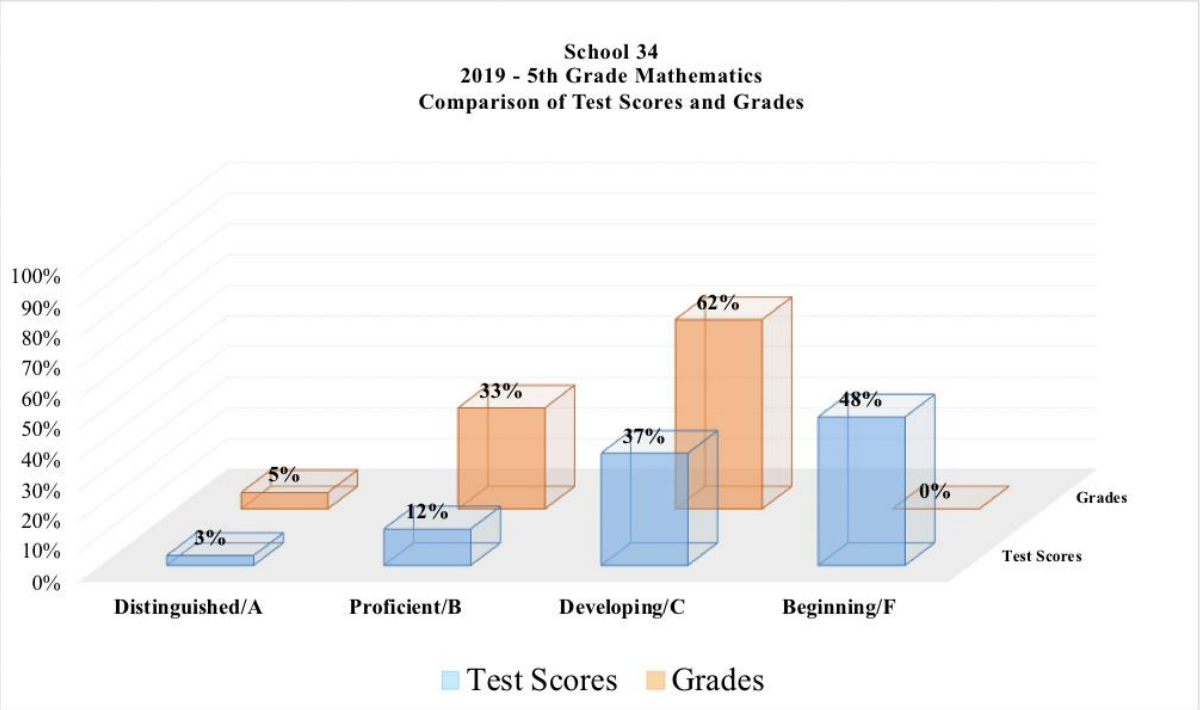
Developing/C
Beginning/F
Test Scores
Grades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5%
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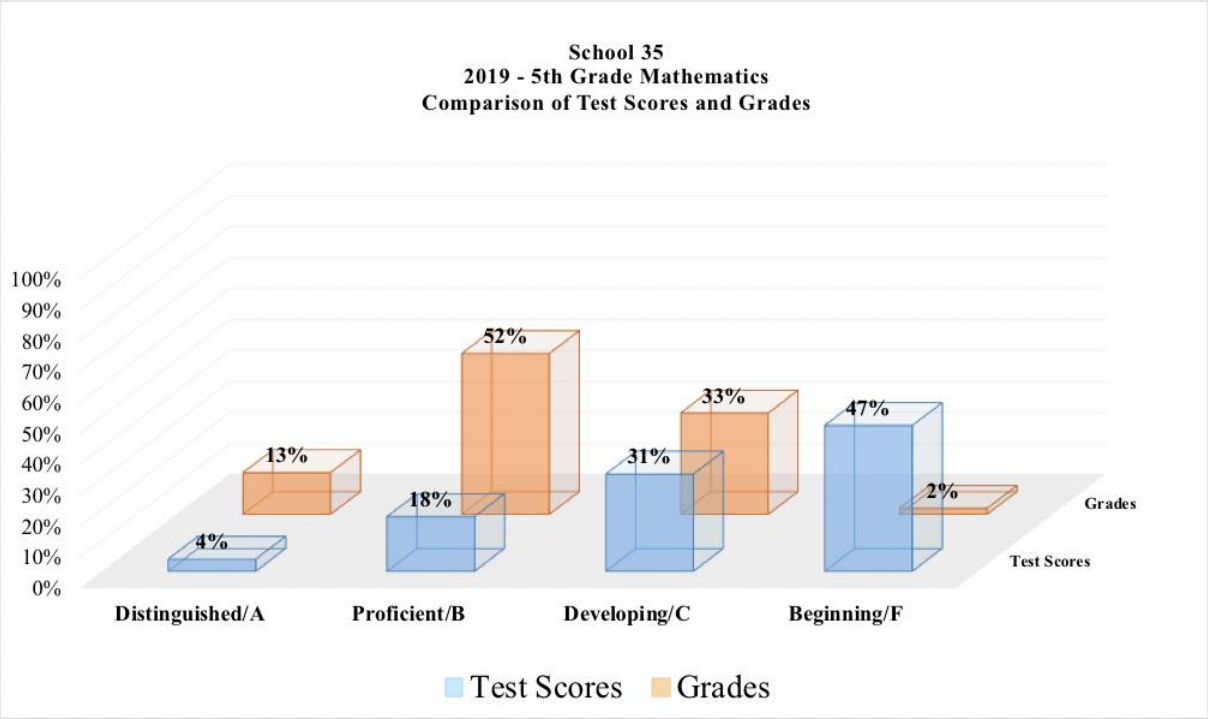
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades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47%
2%
Grades
Test Scores
Distinguished/A
Proficient/B
Developing/C
Beginning/F
Test Scores
Grades

Appendix G

Chi-Square Contingency Tables (Manual Calculations)

Table G1

Third Grade Contingency Table (Manual Calculations)

			GMAS Score				
			Beginning	Developing	Proficient	Distinguished	Total
Math Grade	F	Count	11 (13%)	1 (.01%)	1 (.01%)	0 (0%)	13 (14.9%)
		Expected Count	4.9 (5.6%)	5.2 (5.9%)	2.8 (3.2%)	0 (0%)	13 (14.9%)
	C	Count	13 (14.9%)	12 (13.8%)	0 (0%)	0 (0%)	25 (28.7%)
		Expected Count	9.5 (10.9%)	10.1 (11.6%)	5.5 (6.3%)	0 (0%)	25 (28.7%)
	B	Count	9 (10.3%)	14 (16.1%)	4 (4.6%)	0 (0%)	27 (31.0%)
		Expected Count	10.2 (11.7%)	10.9 (12.5%)	5.9 (6.8%)	0 (0%)	27 (31.0%)
	A	Count	0 (0%)	8 (9.2%)	14 (16.1%)	0 (0%)	22 (25.3%)
		Expected Count	8.3 (9.5%)	8.9 (10.2%)	4.8 (5.5%)	0 (0%)	22 (25.3%)
Total		Count	33 (37.9%)	35 (40.2%)	19 (21.8%)	0 (0%)	87 (100%)
		Expected Count	32.9 (37.8%)	35.1 (40.3%)	19 (21.8%)	0 (0%)	87 (100%)

Note. The relation between these variables was significant, X^2 (9, N = 87) = 47.34, 95% CI [2.70, 19.02].

Table G2

Fourth Grade Contingency Table (Manual Calculations)

			GMAS Score				
			Beginning	Developing	Proficient	Distinguished	Total
Math Grade	F	Count	9 (11.3%)	6 (7.5%)	0 (0%)	0 (0%)	15 (18.8%)
		Expected Count	4.5 (5.6%)	7.1 (8.9%)	3.4 (4.3%)	0 (0%)	15 (18.8%)
	C	Count	13 (16.3%)	15 (18.8%)	5 (6.3%)	0 (0%)	33 (41.3%)
		Expected Count	9.9 (12.4%)	15.7 (19.6%)	7.4 (9.3%)	0 (0%)	33 (41.3%)
	B	Count	2 (2.5%)	15 (18.8%)	8 (10%)	0 (0%)	25 (31.3%)
		Expected Count	7.5 (9.4%)	11.9 (14.9%)	5.6 (7%)	0 (0%)	25 (31.3%)
	A	Count	0 (0%)	2 (2.5%)	5 (6.3%)	0 (0%)	7 (8.8%)
		Expected Count	2.1 (2.6%)	3.3 (4.1%)	1.6 (2%)	0 (0%)	7 (8.8%)
Total		Count	24 (30%)	38 (47.5%)	18 (22.5%)	0 (0%)	80 (100%)
		Expected Count	24 (30%)	38 (47.5%)	18 (22.5%)	0 (0%)	80 (100%)

Note. The relation between these variables was significant, X^2 (9, N = 80) = 25.56, 95% CI [2.70, 19.02].

Table G3

Fifth Grade Contingency Table (Manual Calculations)

			GMAS Score				
			Beginning	Developing	Proficient	Distinguished	Total
Math Grade	F	Count	1 (1.5%)	0 (0%)	0 (%)	0 (0%)	1 (1.5%)
		Expected Count	6.2 (9.4%)	.24 (.4%)	.2 (.3%)	.02 (.03%)	1 (1.5%)
	C	Count	23 (34.8%)	1 (1.5%)	1 (1.5%)	0 (0%)	25 (37.9%)
		Expected Count	14 (21.2%)	6.1 (9.2%)	4.5 (6.8%)	.38 (.58%)	25 (37.9%)
	B	Count	12 (18.2%)	11 (16.7%)	2 (3%)	0 (0%)	25 (37.9%)
		Expected Count	14 (21.2%)	6.1 (9.2%)	4.5 (6.8%)	.38 (.58%)	25 (37.9%)
	A	Count	1 (1.5%)	4 (6.1%)	9 (13.6%)	1 (1.5%)	15 (22.7%)
		Expected Count	8.4 (12.7%)	3.6 (5.5%)	2.7 (4.1%)	.23(.35%)	15 (22.7%)
Total		Count	37 (56%)	16 (24.2%)	12 (18.2%)	1 (1.5%)	66 (100%)
		Expected Count	37 (56%)	16 (24.2%)	12 (18.2%)	1 (1.5%)	66 (100%)

Note. The relation between these variables was significant, X^2 (9, N = 66) = 47.8, 95% CI [2.70, 19.02].

Appendix H

FARROP Findings

Dana

The following summarizes the data obtained from observing Dana's mathematics lessons using the FARROP observation instrument:

The following summarizes the data obtained from observing Dana's mathematics lessons using the FARROP observation instrument:

- Learning Goals – Dana's math lessons usually began with reading the objective that she posted in the classroom. This standards-based objective was taken verbatim from the district's unit of study and was not written in student friendly terms. No explanation, review of vocabulary, or connections to previous learning were made. (Example of Posted Objective: "SWBAT generate, interpret, and analyze number lines IOT represent unit and non-unit fractions by partitioning a number line into equal parts and recognizing the magnitude of fractional intervals.)
- Criteria of Success – Dana made it a practice to post a teacher exemplar for students, shared a student exemplar during the lesson to review the criteria for success and used the exemplars to have a discussion with students about what makes "a good answer."
- Tasks & Activities to Elicit Evidence of Learning – During my observations of Dana's math lessons, she did choose tasks that were connected to the learning goals. However, a few students were unclear about the task and their time was used ineffectively. This made Dana stop and share a student exemplar for clarification.

- Feedback Loops During Questioning – This usually consisted of Dana posing a question, asking a student to respond, and then asking the entire class to indicate whether or not they agreed. In this way, Dana facilitated conversations about the work.
- Descriptive Feedback - As Dana moved around the room, she provided feedback to individual students on how to improve and shared student exemplars tied to the criteria for success.
- Use of Evidence to Inform Instruction - Dana used the evidence from the student work to adjust her instruction during the lesson. For instance, during one lesson, she stopped students from working and showed a student exemplar to clarify expectations. However, she is concerned about moving on to the next lesson regardless of the number of students that achieved the objective. She stated,

> The Exit Ticket showed that most of my students just weren't ready. I just can't move on and allow them to fail. The concepts build on each other. If I move on too fast, the kids will have gaps in their knowledge and won't demonstrate mastery on the test.

Vivian

The following summarizes the data obtained from observing Vivian's mathematics lessons using the FARROP observation instrument:

- Learning Goals – In Vivian's math class, there was no learning goal aligned to the standard was posted in writing inside the classroom. However, Vivian did use student-friendly language at the beginning of the lesson to share the learning goals, and she also made superficial connections to previously taught concepts. For example, "Today we're going to review fractions."
- Criteria of Success – Vivian did not provide criteria of success or exemplar for students.
- Tasks & Activities to Elicit Evidence of Learning – Vivian engaged students in a variety of tasks aligned to the standard in her lesson plan. The performance tasks and work produced by the students did provide insight into the evidence of student learning. In some cases, students worked cooperatively and support was provided by teachers and peers in order to complete the tasks.
- Feedback Loops During Questioning – Vivian made it a practice to ask questions throughout each lesson at various points to encourage student discourse and check for understanding. Also, students were encouraged to talk in small groups.
- Descriptive Feedback – Vivian's feedback to students lacked specificity for improvement and was not tied to instructional outcomes or criteria for success. Students received a smiley face for correct answers and the problem was circled if it was wrong. Students were given the opportunity to make corrections.

- Use of Evidence to Inform Instruction – During a debriefing conference, Vivian stated that she uses the student work to identify patterns of understanding and makes inferences about students' strengths and weaknesses. When asked how did she know if students achieved the goals of the lesson she stated, "I can see patterns in what my kids know just by walking around and observing. I make notes on the students' papers as I make my laps. The smiley faces show me who has it and the circles let me know who needs to revisit the problem." She acknowledged that "about 70%" of her students demonstrated mastery, but when asked about whether or not the students' work led her to deviate from her lesson plan she stated, "No, that was the objective for the week. We need to keep moving."

Saul

The following summarizes the data obtained from observing Saul's mathematics lessons using the FARROP observation instrument:

- Learning Goals – Saul's practice was to display the standards-based learning goal as an "I Can. . ." statement on the Smartboard. For example, "I can express whole number fractions on the number line when the unit interval is 1." His learning goals were appropriate for students and were expressed in language that was accessible for students. He also made vague connections to previous learning (i.e. "That's where we have been but today we're going somewhere else. We're writing whole numbers as fractions.")
- Criteria of Success – Saul modeled expectations for students to show them what quality work looked like.
- Tasks & Activities to Elicit Evidence of Learning – Saul required his students to work independently to solve problems. As they worked, he made laps around the room. After students were given the opportunity to work independently on white boards and then did a "Show Call" in which students would hold up their whiteboards. Saul called out student names of students that got correct answers.
- Feedback Loops During Questioning – There was no exchange between the teacher and one or more students. There was also no questioning to support deeper thinking.
- Descriptive Feedback – Informal feedback for Saul was brief and non-descript such as "Good". There were times when Saul would have students stand with

correct answers and then had them share their responses with other students at the board. The feedback was not tied to the criteria for success.

- Use of Evidence to Inform Instruction – Saul was not concerned about analyzing the evidence to identify patterns of understanding. He stated that they just needed to move on to the next lesson. He stated, "What I do is what we do daily. I then give a quiz or test over it. The same questions that we practice, I give a test over it. I don't do anything different. If they paid attention, they can put it together."

Rachael

The following summarizes the data obtained from observing Rachael's mathematics lessons using the FARROP observation instrument:

- Learning Goals – The standards-based learning goal was written and shared with students in student-friendly terms.
- Criteria of Success – Rachael's practice was to go through multiple examples to provide an exemplar for students and gave a checklist or algorithm to use when approaching a certain type of problem.
- Tasks & Activities to Elicit Evidence of Learning – The tasks were well-aligned to the learning goals. The majority of students were clear about the task and were able to begin work efficiently.
- Feedback Loops During Questioning – Students had to work together to model for the class. This encouraged dialogue and required that more students engage in the work and thinking about the problem.
- Descriptive Feedback – Rachael gave feedback that was directly tied to the criteria for success. She specifically pointed out where they had gone wrong and reminded them of the process to use. Rachael also reported the results of students who did well to the entire class.
- Use of Evidence to Inform Instruction – Rachael used a clipboard to walk around and make notes about how students performed. These notes were used to determine groups of students to work with during small group instruction time. Rachael also used the end-of-week quiz results to seat her students in groups in

the classroom. High-achieving students are motivated to compete for the "first chair" position in the classroom.

Bethany

The following summarizes the data obtained from observing Bethany's mathematics lessons using the FARROP observation instrument:

- Learning Goals – Bethany's standards-based learning goal was posted in the classroom, printed on each student activity and communicated to students in student-friendly terms. For example, "SWBAT build on students' work of adding fractions IOT extend that work into multiplication." She went on to make connections for students, "We've been working on adding fractions but now we're going to multiply them. Remember we learned a while ago that multiplication is just repeated addition."
- Criteria of Success – Brittany deconstructed the standard that she was working on into a list of skills that show what students should be able to do in order to demonstrate mastery. She then created a matrix (rubric) with each student's name and the individual skills needed to show mastery to make notes on student progress.
- Tasks & Activities to Elicit Evidence of Learning – Students were given a variety of tasks that were created for them to be able to demonstrate mastery of one or multiple skills from the standard.
- Feedback Loops During Questioning – Because the instruction is so individualized, students worked independently. However, Brittany moved throughout the room to discuss with students what they were doing and give students individualized feedback to assist them in making their answers better.

- Descriptive Feedback – Brittany's feedback to students was both written and oral. She referred to her success criteria in her feedback and used the language of the standard to support vocabulary development for her students. The feedback was completely individualized pointing out examples and referring students to an exemplar.
- Use of Evidence to Inform Instruction – Brittany used the formative assessments (i.e. independent practice, questions, exit ticket, etc.) throughout her lessons to decide next steps for students. She stated,

> It's not time to give grades yet. I have to use this information to let me know what skills within the standard that my students can show mastery. These tasks just help me to know what they can do and whether or not they are ready to move to the next skill. I have to do all of this before I create an assessment for grading that is totally aligned to the standard.

Kelly

The following summarizes the data obtained from observing Kelly's mathematics lessons using the FARROP observation instrument:

- Learning Goals – The standards-based learning goal was posted and articulated to students in student-friendly terms. Kelly used the learning goal to help students make connections to previous learning.
- Criteria of Success – Kelly modeled for the students to set an exemplar and criteria for success. She reiterated for students over and over again the process that they should use.
- Tasks & Activities to Elicit Evidence of Learning – The tasks that Kelly selected were connected to the learning goal and incorporated the use of previously-taught skills within the current concept. Kelly reviewed students' progress throughout the lesson.
- Feedback Loops During Questioning – Kelly encouraged students to collaborate and build on other students' responses. She presented questions to help them clarify their thinking.
- Descriptive Feedback – Kelly made laps around the room and provided individualized feedback to students that supported the learning goal. After each round of laps, she brought the class back together as a whole group to talk about trends that she saw in their work based on the learning goal and provided opportunities for students to ask questions and apply their knowledge in meaningful ways.

- Use of Evidence to Inform Instruction – Kelly used a system of quick ratings as she made laps around the room. Along with conferencing with students, she placed a smiley face, check or question mark on student work that she can use later to plan for instruction. When asked about her system, Kelly gave the meaning of her rating code.
    - Smiley face – Student has mastered the concept.
    - Check – Student is moving in the right direction and needs more "at-bats".
    - Question Mark – Student is unsure, still has questions, and needs re-teaching.

Barbara

The following summarizes the data obtained from observing Barbara's mathematics lessons using the FARROP observation instrument:

- Learning Goals – The learning goal for the previous concept was posted in the room. Barbara began the lessons using very brief descriptions (i.e. "We're moving on to line plots.")
- Criteria of Success – It was Barbara's practice to model one and only one problem for students as an attempt to share criteria for success. Modeling only one problem for students frequently left them unable to complete the task on their own.
- Tasks & Activities to Elicit Evidence of Learning – Students were frequently unclear about the task and time was wasted because repeat explanations were needed.
- Feedback Loops During Questioning – After allowing students to struggle on their own, Barbara attempted to have a discussion about the sample problems that students had difficulty solving. The discussion consisted of a guided practice where they solved problems as a whole group and she elicited help from students regarding what to do next.
- Descriptive Feedback – Barbara made no comments to students to provide feedback or re-teach them as she made laps around the room.
- Use of Evidence to Inform Instruction – There was evidence that Barbara made a mental note of how students were performing because after allowing them to work independently, she selected problems that she saw that the majority of

students had difficulty solving. Then she tried to guide them through the process as a whole group. Barbara stated,

> I walk around while students are working independently to see what they can do by themselves. I don't want to hold their hands like most people do with special education students. It does no good for them. After I see what the majority of them are having difficulty with, I then guide them slowly through the steps so they can get it.