A report of the

Career and College Ready Graduates Pilot Implementation in

GEAR UP NC High Schools

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Introduction

Section 10.13 of North Carolina Session Law 2015-241, Career- and College-Ready Graduates (CCRG), requires the State Board of Community Colleges (SBCC) together with the State Board of Education (SBE), to develop a program for reducing the number of community college students required to take developmental mathematics, reading and English curricula (see APPENDIX A). Section 10.13 directs high schools and community colleges to collaborate to provide high school seniors opportunities to satisfy remedial education requirements prior to high school graduation. Although Section 10.13 directed the CCRG program begin statewide during the 2016-2017 academic year, the implementation is postponed to 2020-2021 due to numerous implementation issues. The CCRG program allows high school seniors identified as not being "college-ready" or on track to enroll directly into a gateway math, to be offered developmental mathematics modules before they graduate. They may then be able to enroll directly into the community college gateway mathematics courses required for their chosen career paths.

To identify obstacles and solutions in pre-graduation remediation, the federally-funded Gaining Early Awareness and Readiness for Undergraduates Program (GEAR UP NC) high schools piloted the mathematics portion of the CCRG during the 2017-2018 and 2018-2019 academic years in collaboration with the local community college. This study reports on CCRG implementation and outcomes in GEAR UP high schools during the two pilot years 2017-2019. The North Carolina Community College System (NCCCS) implemented two iterations of CCRG during this period; 1) Multiple Measures Requirements, and 2) Reinforced Instruction for Student Excellence (RISE). The study had four research questions;

1. How were the CCRG modules delivered to students (embedded in a course, stand-alone elective, or lunch-time support);
2. Was successful module completion documented in a way to ensure students who completed modules would not repeat the remedial content upon enrollment at a community college;
3. Did stakeholders (teachers, parents, and students) understand the purpose of high school seniors completing these modules before graduating from high school; and
4. What were the barriers and challenges associated with serving targeted students?

The problem of remedial education

High school graduates without post-secondary education are not eligible for many of North Carolina's knowledge-based jobs (myFutureNC, 2019). Some well-paying jobs in the skilled-service industry do not require a college degree; but most, such as health services, finance, and information technology, and many others require credentials or certificates for employment. Belfield and Bailey report earnings are significantly higher for students who complete health, technical, or occupational programs than for students with only a high school diploma (Belfield & Bailey, 2017).

With a growing need for knowledge workers, many community colleges are updating their curriculum programs to align with high school Career Technical Education (CTE) courses for a seamless transition (Hodara, 2018). Most career paths in community colleges have up to three exit points: earning a certificate (15-18 credits), earning a diploma (30 credits), or earning an associate degree in a vocational and technical field or for college transfer. Entry to each of these credential paths requires students to complete a "gateway" math course. Requirements to enter the gateway math course require prerequisite knowledge. Students must have a score at the

ACT college-ready mathematics benchmark (22), must have a high GPA of 2.8 when graduating from high school, or a student must pass some or all portions of a diagnostic mathematics test. Students who do not meet any of these prerequisites must complete developmental mathematics modules. In general, a vocational course of study requires mastery of five portions of the diagnostic mathematics test and the college transfer course of study requires passing all portions of the diagnostic test.

The number of NC students potentially impacted by pre-graduation remedial education is large. In 2014, about 60% of students graduating from GEAR UP high schools did not meet the Minimum Admission Requirements (MARs) for the University of North Carolina System (UNC System) or Multiple Measures Requirements (MMR)s for the North Carolina Community College System (NCCCS). In 2017, nearly 72% of all North Carolina juniors failed to score the ACT college-ready benchmark in math (NC DPI data). Of the students in 2013, who graduated from high school and immediately enrolled in a North Carolina community college, 52% were required to take up to 10 remedial courses at the community college (General Assembly of North Carolina, 2015). Students who are required to take remedial education courses in college are less likely to graduate or earn a certification for a job which could earn them a living wage (Tippett & Stanford, 2019).

The North Carolina General Assembly has attempted to address the fact that many North Carolina high school graduates do not score the math ACT benchmark (22) or do not meet the GPA requirements. The math ACT benchmark score of 22 is for non-STEM (Science Technology Engineering and Mathematics) majors. To score a 22 on the math subscale of ACT requires understanding arithmetic and some basic algebra concepts that are required for success in many non-STEM careers. Until June 2019, students enrolling in community colleges who did

not meet the Multiple Measures would take North Carolina Diagnostic and Placement test (NC DAP) and the developmental math modules, DMA 010- DMA 080/065 community college modules. Those who do not pass portions of these were to take remedial modules at their community colleges.

The NC DAP, completed in 2014, is a custom assessment that aligns directly to the NCCCS developmental curricula. The College Board created the NC DAP to accurately identify students' developmental mathematic needs. The NC DAP's content, design, and proficiency levels were developed in consultation with 175 North Carolina community college faculty and staff over a two-year period. A condensed version of DMA 060, 070, 080 was eventually created and called DMA 065. In the pilot CCRG program, online EdReady mathematics modules replaced the DMA modules. These math topics covered in the EdReady modules were aligned with the topics covered in each of the DMA modules. High school seniors would be able to enroll in the EdReady system via the partnering community college and complete modules prior to graduation. Ideally, doing so would mean they could enter the gateway mathematics required for their chosen path of study at a community college after high school.

Remedial education among GEAR UP NC students

Math course placement and rigor play a crucial role in achieving the objectives of GEAR UP NC. Although the number of students who successfully complete the math courses required for admission to college has increased in GEAR UP NC high schools from 2012-2019, most students fail to score high enough on the mathematics portion of the ACT to be likely to succeed in college without remediation. Overall, nearly 80% of the GEAR UP students scored below the ACT math and English benchmarks, indicating they were not ready for college-level math or

English classes. Figures 1 and 2 detail the college-ready profile of GEAR UP NC students from 2014 through 2018 with GPA and ACT Math scores of GEAR UP NC seniors.

Figure 1. GPA Distribution of GEAR UP NC Seniors (n = 16,006)

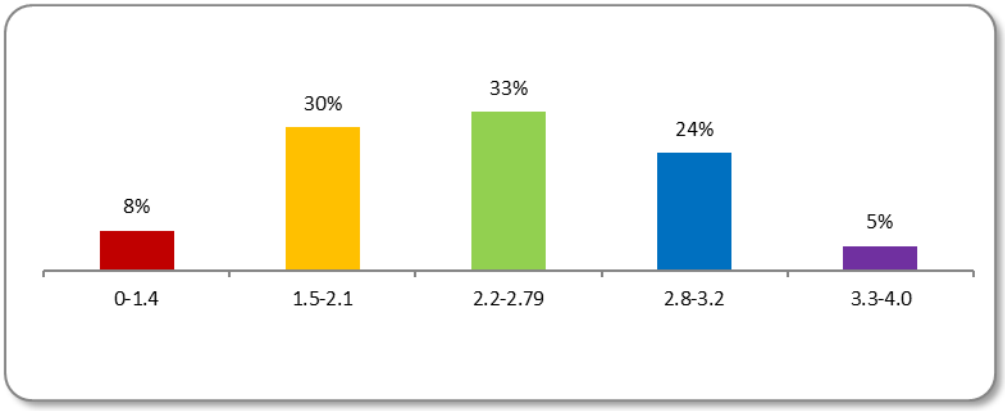
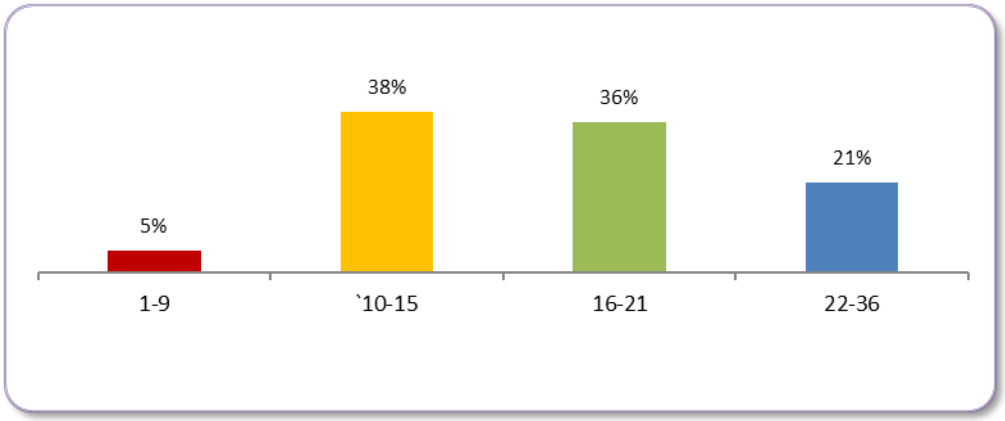


Figure 2. ACT Math Subscale Score Distribution of GEAR UP NC Seniors (n = 16,006)



In general, half of the students who need one semester of mathematics remediation leave school without graduating, and more than 70% of those who need two semesters leave school without graduating (Hughes, Edgecombe, & Snell, 2011). In North Carolina, only about 25% of students enrolled in community colleges ever attempt a college-level math course, and many of them do not successfully complete one. (Dec 2018, RISE presentation). This is reflected in the low graduation rates. The following table shows three-year graduation rates for the community colleges participating in the GEAR UP NC CCRG study.

Table 1. GEAR UP NC CCRG Community College Three-Year Graduation Rate[1]

Community College	Graduation rate
Alamance Community College	30%
College of Albemarle	24%
Craven Community College	21%
Lenoir Community College	17%
Mayland Community College	31%
McDowell Technical Community College	22%
Piedmont Community College	16%
Richmond Community College	25%
Rockingham Community College	23%
Vance Granville Community College	33%

Accountability for college-ready graduates

The increase in the number of graduates who lack readiness for college or careers is being addressed at both state and federal levels. The Education Commission of the States compiled a 50-State comparison report for state legislated developmental education initiatives (Whinnery & Pompelia, 2019). Five key findings from the ECS report are; 1) Thirty-one states have a state or systemwide assessment and placement policy, 2) Twenty-two states have a uniform state or systemwide cut score policy, 3) Nineteen states or systems allow for the use of multiple measures in placement decisions, 4) Twenty-one states or systems have authorized the use of innovative developmental education instructional methods and interventions, and 5) Twenty states have created statutory developmental education reporting requirements.

Although on-time high school graduation is used as a federal and state standard for measuring success of most traditional public schools, a newly published report suggests that North Carolina students are graduating on time without being prepared for post-secondary

[1] Data derived from the College Scorecard. https://collegescorecard.ed.gov/.

success. Since 2007, North Carolina's graduation rates have been growing steadily and consistently for both females and males, and in all five ethnic groups (Tippett & Stanford, 2019). This should be good news, but despite this growth, students are less inclined to aspire to post-secondary education, and the majority of those who do find themselves unprepared (Ganga, Mazzariello, & Edgecombe, 2018; Tippett & Stanford, 2019). In 2017, 47% of North Carolina high school graduates met *no* college readiness benchmarks on the ACT. A score of 22 on the ACT Math subscale is considered the benchmark to be college-ready for a non-STEM career path without the need for remediation courses. In 2017, the average score for North Carolina students was 19.3.

The North Carolina School Report Cards requires high schools to report the percentage of students who took and passed Math III. Nearly all North Carolina high schools report that over 95% of their seniors have successfully completed Math III. Most schools offer versions of Math I, II, and III that teach the course in twice the time of the standard course (a full year over half year block schedule). This slower paced version of mathematics used to be reserved for struggling students. Although participation in rigorous mathematics courses results in higher standardized scores (SAS Institute Inc., 2009), the new NC school report card metric for rigor has led many schools to adopt the practice of enrolling most students in these slower paced courses. On a 2015 survey of GEAR UP NC schools, GEAR UP high school staff reported that the longer, slower-paced versions of Math I, II, and III were indeed for struggling students. Yet analysis of the data for these GEAR UP districts showed that many high achieving students were enrolled in these versions of the courses. Comparing the Math I EOC scores of top scoring mathematics students (Levels 4 or 5 on 8th Grade Math EOG) who took the standard course and those who took the slower paced course showed that standard course students scored

significantly higher on the Math I EOC (82% vs. 41% scored college ready). These outcomes are consistent with a study of the effects of Algebra 1/Math I placement for top scoring NC students, which found that top scoring students who enroll in the most rigorous version of Algebra 1/Math I score significantly higher on college entrance math assessments (SAS Institute Inc., 2009).

Federal accountability metrics are beginning to change to address the developmental education challenge. For example, in 2019, for the first time, the federal GEAR UP grant accountability report requires that grantees report the number of students who enroll in post-secondary programs who need remediation in math or English.

North Carolina is not alone in addressing the underprepared high school students entering community colleges. The remainder of this report documents implementation of the CCRG utilizing Multiple Measures criteria, a secondary pilot implementation in some GEAR UP high schools of the CCRG RISE criteria, and the barriers and challenges of implementing CCRG in GEAR UP high schools and local community colleges. The report concludes with recommendations for future implementation of collaborative high school and community college remedial education efforts.

Implementation of CCRG in GEAR UP NC high schools

Multiple Measures and NC DAP

In the initial GEAR UP NC CCRG implementation, high school students who did not meet the NCCCS Multiple Measures requirements for direct entry to gateway mathematics courses were to be provided with online mathematics modules during their senior year of high school. In 2017-2018, GEAR UP high schools used EdReady modules that aligned with the math topics covered of the NC DAP and the DMA 010 to DMA 080 community college modules. The original implementation of CCRG Multiple Measures followed the NC DAP and DMA sequences.

The GEAR UP CCRG community colleges managed student accounts in EdReady. Mathematics modules that were hosted at the National Repository for Online Curriculum (NROC). Students participating in CCRG or RISE enrolled in the EdReady modules via their local community college, but completed the module content at their high school. The EdReady modules begin with an assessment of the topics covered in the module, and a final test is given at the completion of that module. The EdReady modules are designed to adapt to each student, providing additional instruction when needed and allowing students to work at their own pace.

Students who completed the EdReady modules that correlate with the DMA developmental math modules would be exempt from having to take those development math courses when they enter the community college after graduation. After one year, a second option was piloted in NC community colleges to address some weaknesses of the Multiple Measures criteria. High schools and community colleges opted into the modified program described next.

Reinforced Instruction for Student Excellence (RISE) Program

In 2018-2019, some North Carolina community colleges implemented the Reinforced Instruction for Student Excellence (RISE) program to address the high need for remediation in college math classes. Five GEAR UP high schools (North Lenoir, Dalton McMichael, Reidsville, Morehead, and Scotland) partnered with community colleges implementing the RISE program. Moving forward, RISE will replace the Multiple Measures, and a fourth math course will no longer be required for community college enrollment. The RISE program is scheduled to be adopted in all community colleges by fall 2020.

In the community colleges piloting RISE, math placement is determined by GPA and ACT math subscale scores rather than the previous Multiple Measures implementation of the NC DAP and up to eight development math modules,. Students who have been out of high school for more than 10 years would take a RISE placement test. More recent high school graduates would either be placed into a developmental transition math course, into a gateway math course with a co-requisite, or directly into their gateway math. Students in the RISE pilots may be exempt from having to take transitional or co-requisite math courses with their gateway math classes. Placement in the RISE pathways at community colleges is determined by GPA and ACT Math score as follows:

- Gateway math class without a co-requisite placement:
    - GPA of 2.8 or higher
    - ACT Math score at least 22 AND GPA between 2.2 and 2.799
- Gateway math class with a co-requisite class
    - ACT Math score below 22 AND GPA between 2.2 and 2.799
    - ACT Math within two points of 22 AND GPA less than 2.2

- Transitional remediation class before enrolling in the gateway class: ACT Math less than 20 AND GPA less than 2.2.

In the community colleges, the content of the transitional remedial courses is comprised of three tiers that correspond with the Tiers 1, 2, and 3 and delivered via EdReady modules. Content mastery level is dependent on the gateway math course required for a student's course of study at the community college. The high school seniors in schools partnering with RISE community colleges used the same EdReady modules as the other high schools. EdReady modules were grouped to correspond with Tiers 1, 2, and 3 as shown in Table 4. A few additional topics are covered in the Tiers that do not align with the DMA modules. For a complete crosswalk, see Appendix B.

Table 4. EdReady modules corresponding to RISE three tiers

	Tier 1	Tier 2	Tier 3
EdReady DMA module	010-030	Topics from 020, 040, and 060	Topics from 050, 060, 070, and 080

Successful completion of each RISE tier required passing a test at the end of each of tier. In the Multiple Measures pilot, GEAR UP high school seniors attempted to complete all three tiers, unlike the RISE implementation at the pilot community colleges where tier completion was dependent on the student's chosen course of study. The next section of this report describes the methodology and findings of the CCRG implementation.

Methodology

The goal of RISE and the original Multiple Measures CCRG model was to shift math remediation from college back to high school. In addition to assessing the outcomes of these models, we also examined how the programs were implemented. We examined ACT and GPA data, surveyed and interviewed high school and community college staffs, reviewed diagnostic placement test scores, and reviewed module-completion data. We conducted site visits to a sample of schools and interviewed the high school staff who worked with the programs to answer the following process implementation questions:

- How were the modules delivered, and for each delivery method (embedded in a course, stand-alone elective, or lunch-time support):
    - What were the obstacles to delivery?
    - How were obstacles overcome?
    - Was the adaptive feature used, or did the teacher override this feature to keep students working together at the same pace?
- What were the issues associated with serving targeted students?
    - How many of the qualifying students were served?
    - Were any students who already met the Multiple Measures Admission Requirements served?
- Was successful module completion documented in a way that will ensure that students who completed modules will not need to repeat them if they enroll at a community college after high school?
- Did stakeholders (teachers, parents, and students) understand the purpose of completing these modules before graduating from high school?

This study examined the following implementation outcomes:

- Did GEAR UP NC graduates who participated in EdReady modules then enrolled in community colleges qualify for gateway math courses?
- Did GEAR UP NC graduates who participated in EdReady modules and then enrolled in community colleges enroll in gateway math courses at higher rates than those from the previous year?
- Did GEAR UP NC graduates who participated in EdReady modules and then enrolled in community colleges successfully complete gateway math courses in their freshman year at higher rates than similar students from the previous year?

CCRG Implementation

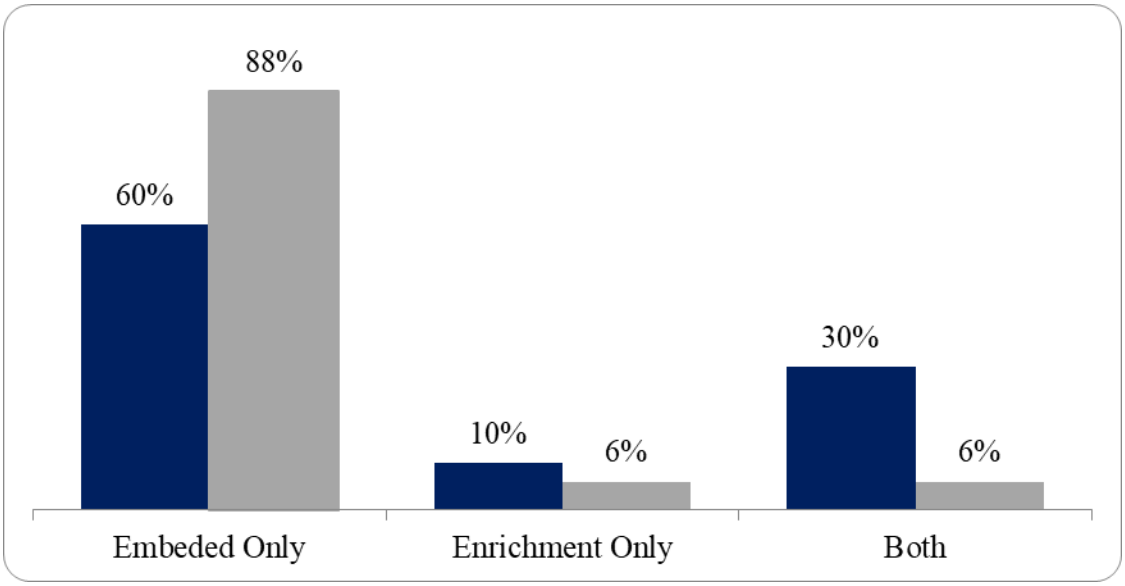
The county funded community college in the GEAR UP high school county partnered in CCRG implementation. These included;

- Alamance Community College
- College of The Albemarle
- Lenoir Community College
- Mayland Community College
- McDowell Technical Community College
- Pamlico Community College
- Piedmont Community College
- Richmond Community College
- Rockingham Community College
- Vance Granville Community College

Mode of Delivery

Figure 3 shows that most of the high schools embedded the modules in an existing mathematics class in the first year. Some used an enrichment time, such as an elective course, after school or during lunch. After the first year, school staff learned from a survey that covering the required material and serving the correct students was difficult when the modules were embedded in an existing math course. Outcomes reported for Phase II CCRG study showed that 64% of students in stand-alone electives successfully completed all of the modules, compared with fewer than 14% of students who did the modules embedded in an existing course (North Carolina State Board of Education & North Carolina State Board of Community Colleges, 2019). Despite this reported impediment, staff increased the embedded mode of delivery.

Figure 3. Percentages of High Schools Implementing CCRG Using Each Delivery Mode.



Obstacles by Mode of Delivery

Embedding into existing math classes. Schools that embedded the EdReady modules into existing mathematics courses embedded them into either Advanced Functions and Modeling (AFM) or Essentials of College Math (ECM). These schools reported several obstacles,

including difficulty covering the standard course material while students completed the modules. Although the modules were designed to be adaptive, meaning students would work at the pace appropriate for them, teachers found having students working on different assignments difficult. When the modules were embedded into ECM, teachers tried to align the EdReady modules with the course curriculum, but this required all students to complete the modules at the same pace. Teachers reported that they had students move to the next module even if they had not passed the previous one, to keep them on the same lessons as the class. This practice was confirmed in the data, which showed 48% of all students moving to a module without having passed the previous one.

Overriding adaptive features of EdReady. Several high schools and community college staff reported teachers overrode the adaptive features of EdReady and had students all work at the same pace, they had issues with data and documentation. The adaptive feature of EdReady allowed students to continue to take tests until they passed them, completing more instructional lessons when needed. When the adaptive feature was off, students could only take tests twice. Students would be given teacher-made tests to show they had demonstrated mastery of the content. Unable to enter the data for these tests into EdReady, the teachers kept spreadsheets of student scores that did not match the data from EdReady. Consequently, data that Edstar received from EdReady did not match the data submitted by the community colleges. In 2018-2019, 15% of the schools reported that they overrode the adaptive features of EdReady, and half said they used the adaptive feature but had students move into a new module to stay with the pace of the class.

Offering in elective courses, at lunch, or after school. The primary obstacle reported for schools using the enrichment method (i.e., schools that provided the modules to students after school or during lunch) was convincing the students to take the modules seriously. Students were not receiving a course grade and did not understand why they would benefit from completing the modules. During the second year of the study, about 20% of the schools provided the course as an elective. The main obstacle reported with using an elective course for delivering the modules was that they had far too many students compared with the number of seats offered.

Overcoming Obstacles

Schools reported that they were not able to overcome the obstacles. In the second year, although embedding CCRG into existing math courses had many issues, all schools continued to use this method, though some used other methods as well. The schools that served students in elective courses, at lunch time, or after school reported difficulty getting staff and students to buy into the importance of completing modules.

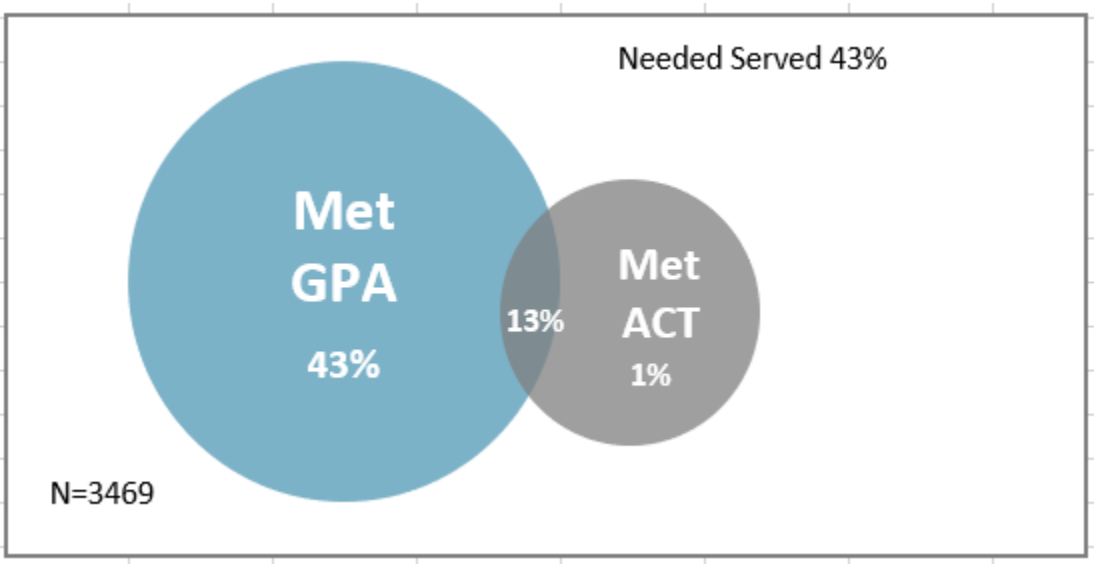
Despite the obstacles with embedding CCRG into an existing course, only one of the schools that used that model in 2017-2018 changed and offered CCRG in an elective course in 2018-2019 in addition to embedding it. All the schools that had served students during an enrichment time changed in 2018-2019 to embedding CCRG into an existing course.

Issues with Serving Targeted Students. Another obstacle evident from the data and reported by staff concerned CCRG eligibility. When CCRG was embedded into an existing math course, many students who met the requirements to participate in CCRG were not in these courses, and students who did not need CCRG requirements were. It is interesting to note that schools that embedded CCRG into existing math classes reported using very specific

participation criteria, and when asked to explain why the data showed many students served did not meet that criteria and students who met the criteria were not served, they explained that they had actually just served all the students enrolled in specific courses. They reported that they believed that most students who fit the criteria would probably take the courses in which they embedded it.

Although schools reported using criteria to identify qualified students, these criteria differed from school to school. Educators did not have a clear understanding of which students should be targeted. One school reported that rather than use GPA and ACT scores, they had a teacher create a placement test to identify students to participate in CCRG. Figure 4 shows the percentages of the 3,469 2018-2019 GEAR UP NC seniors who did not met the GPA or ACT Math score requirements, and the percent needing served.

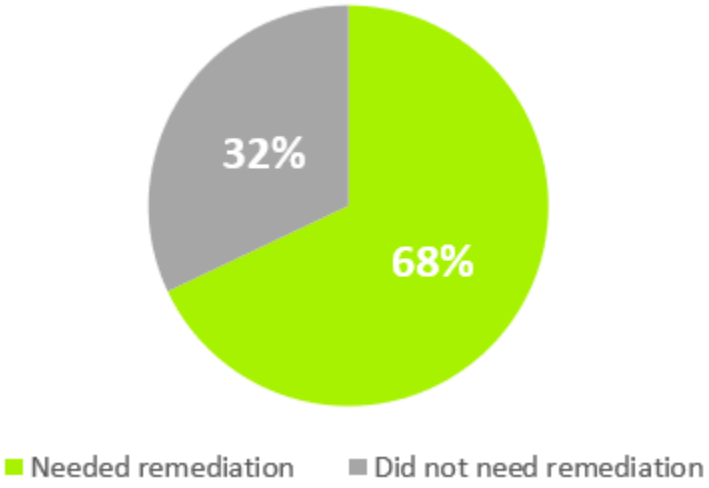
Figure 4. Percentages of 2018-2019 GEAR UP NC Seniors Who Met ACT Math or GPA Benchmarks, Or Needed to Participate in CCRG



Slightly less than half, 46%, of the students served were not seniors in the GEAR UP high schools. This may have been because students who were not seniors may have been

enrolled in courses in which the CCRG modules were embedded. Complete data existed for 80% of the remaining students served who were seniors who participated in CCRG modules. As shown in Figure 5, about a third of the seniors who participated in CCRG met either the GPA or ACT benchmarks and therefore did not need it.

Figure 5. Percentage of 2018-2019 GEAR UP NC Seniors Served by CCRG, Who Needed to Participate or Not



Of the GEAR UP seniors served who did not need remediation, the majority of them did not meet the ACT Math benchmark, but did meet the GPA.

Although the early colleges did not participate in CCRG, up to 50% of their seniors would have qualified to participate.

The data showed that some students took the initial test for a module, passed it, but completed the corresponding EdReady modules anyway. Some students failed post tests for modules, but went onto the next module anyway. Staff explained that this was because they were having all students complete the same modules, overriding the adaptive feature. Many students started modules and never finished them. In 2017-2018, 636 students participated in CCRG and Multiple Measures and enrolled in EdReady. In 2018-2019, 643 students participated in CCRG Multiple Measures and 357 students participated in the CCRG RISE program. Some students in the Multiple Measures program took the modules more than once because they took two math classes in which the modules were embedded.

Table 2. RISE: Numbers and percentages of GEAR UP students attempting, completing, and passing Tier 1, Tier 2, and Tier 3 units.

Tier	Number of Students	Passed	Failed	Did Not Complete
1	357	17%	24%	59%
2	278*	42%	49%	9%
3	47**	8%	8%	84%

*89 of them did not pass Tier 1 and went on.

**18 of them failed Tier 2; 14 had failed both Tier 1 and 2.

Table 3. CCRG: Number and percentages of GEAR UP NC students completing/not completing, passing and failing DMA units. Total unique students is 643; 486 of them are seniors.

DMA Unit	Number of Students	Passed	Failed	Did Not Complete
010	547	42%	36%	22%
020	449	50%	39%	12%
030	399	52%	36%	12%
040	364	59%	25%	17%
050	352	59%	24%	18%
060	198	55%	14%	31%
070	46	52%	43%	4%
080	5	20%	80%	0%

Documenting Module Completion. Originally, module completion was to be documented by students taking the NC DAP, which would then be on file at the community colleges. However, in 2017-2018, 86% of GEAR UP NC students participating in CCRG took the NC DAP before starting the modules, but only 13% took the NC DAP after the modules. Surveys of high school and community college staff showed that no standard plan exists for documenting on student transcripts when they complete EdReady modules. Without documentation, students who completed CCRG modules may still have to complete remedial math courses before enrolling in gateway math in community college. When asked how community colleges would know which modules students completed when they enroll in post-secondary programs, half reported that they did not know. Among those who were aware of the

process to document module completion upon entry to the community college reported the following processes:

- It will be the students' responsibilities to inform the community college of which modules they completed when they enroll.
- The high school teachers will keep a spreadsheet of courses completed and submit this to the community college.
- The module completion is reported to the community college and is then transferred to the students' accounts if they enroll after graduating from high school.

As a follow up, colleges were asked to report on the number of students who were eligible to enroll in gateway math courses. Community college were not able to report how many 2018 high school graduates who enrolled in their school were eligible to take gateway math because of their CCRG module completions.

Stakeholders' Understanding. A survey of high school staff revealed that they did not understand why students would benefit from completing these modules. One high school teacher who taught the CCRG course for two years commented on a survey, *"A lot of my students in the CCRG see no benefit in the work just to get college credit for the module if they pass it."* The teacher further commented that although many of her students say they plan to go to community college when they graduate, the teacher did not think they would ever enroll. The teacher did not believe students need to have documented completion or credit for completion of the modules. This feedback and understanding reflects both low expectations for these students and a misunderstanding of CCRG. Comments like this were not unusual. One teacher commented that

a solid plan for implementing CCRG is needed. Although schools originally planned to explain the importance of CCRG in written communication to parents, none did.

Recommendations

Based on evaluation of the CCRG process and outcome implementation, the following recommendations are offered for future implementation success.

Rigorous Course Placement

GEAR UP NC data and shows that high achieving students who enroll in the most rigorous mathematics courses score higher on math standardized tests. The North Carolina General Assembly recently passed legislation requiring that students who score at the highest levels on standardized tests be offered enrollment in the most rigorous mathematics courses. The changes about to occur in state standardized tests may make implementing this new legislation difficult, as standardized tests may be eliminated or made non-standard. LEAs that want to minimize the number of students who will need remediation should strive to enroll students in the most rigorous mathematics courses for which they are prepared to succeed. Students likely to succeed in the most rigorous courses can be identified with EVAAS Academic Preparedness Reports (SAS Institute Inc., 2009).

Course Implementation

Schools had difficulty implementing the EdReady course, whether embedding it in some other course or treating it as an elective. To create a course for CCRG, the North Carolina Department of Public Instruction (NC DPI) would have to create a course code, objectives and standards, and possibly a final exam. This would require planning and involving the Curriculum and Testing and Accountability departments. The Community College and University Boards

would need to decide whether to accept the course as a fourth math class. Although the March 2019 Implementation Report from the North Carolina State board of Education and the State Board of Community Colleges draft reads:

> Fall 2017, 14 math faculty from [*sic*] the community college system, high school math teachers, and the Wake County Math Curriculum coordinator met to create an enhanced version of the statewide math course. It was delivered to UNC-SO [System Office] for review. The CCRG math course will be accepted at NC's 16 public universities as part of the minimum course requirements. This acceptance will hopefully allow the high schools to offer the course as an alternative to the existing fourth year math classes. This same course will be presented to the State Board of Education, seeking approval for a fourth math class for high school graduation. (p. 15)

However, this course was not approved by the NC DPI and was not created. If the topics covered in RISE differ from the DMA 010 – 080 modules for which this course was designed, the course designed by this committee may need to be modified.

Professional Development

Teachers need professional development regarding how to teach a course in which the students are using adaptive software and moving at different paces. Before implementing this program statewide, professional development should stress using the adaptive feature and share information about the obstacles that are encountered when all students start at the same modules.

Documenting completion

A statewide consistent way to document course completion should be developed. When the RISE model is adopted state-wide in fall of 2020, high school transcripts may reflect whether students have completed and mastered each of the three tiers in EdReady.

Implementation

To implement pre-graduation remediation so that fewer students need to take remedial math in North Carolina community colleges, the following steps are recommended:

1. Identify students who need to be served by CCRG prior to enrolling for courses in the fall of their senior year of high school. This should be done electronically, using data files. Most schools report currently that they manually review transcripts which is time consuming and error ridden.
2. Notify students who need to enroll in CCRG and explain to them what successfully completing the modules will mean. Include a link to an online table of North Carolina community college courses of study and the gateway math courses for each of them. Explain CCRG in terms of those gateway math courses.
3. Enroll appropriate students into the CCRG course.
4. Include Tier 1, 2, and 3 completion/passing information on student high school transcript.

References

Belfield, C., & Bailey, T. (2017). *The labor market returns to sub-baccalaureate college: A review*.

Ganga, E., Mazzariello, A., & Edgecombe, N. (2018). *Developmental education: An introduction for policymakers*. Denver, CO.

General Assembly of North Carolina. *Senate Bill 561: Career- and college-ready graduates*. , (2015).

Hodara, M. (2018). *Why postsecondary education matters*. Portland, OR.

Hughes, K., Edgecombe, N., & Snell, M. (2011). Developmental education: Why and how we must reform it. *League for Innovation in the Community College Annual Conference*. Retrieved from https://ccrc.tc.columbia.edu/media/k2/attachments/developmental-education-why-reform.pdf

My Future NC. (2019). A call to action for the state of North Carolina. A report by the Commissioners of myFutureNC. https://www.myfuturenc.org/wp-content/uploads/2019/04/A-Call-to-Action-Final-Report_040319.pdf

North Carolina State Board of Education, & North Carolina State Board of Community Colleges. (2019). *Progress on the implementation of the Career and College Ready Graduates program: A report to the Joint Legislative Education Oversight Committee (draft)*. Raleigh, NC.

SAS Institute Inc. (2009). *Identifying students who are ready for Algebra I: Algebra readiness curriculum supplement*. Raleigh, NC.

Tippett, R., & Stanford, J. (2019). *North Carolina's leaky educational pipeline & pathways to 60% postsecondary attainment: Report for the John M. Belk Endowment*. Chapel Hill, NC.

Whinnery, E., Pompelia, A. (2019) 50-State Comparison: Developmental Education Policies. Education Commission of the States. https://www.ecs.org/50-state-comparison-developmental-education-policies/

APPENDIX A: Session Law 2015-241 Section 10.13

CAREER- AND COLLEGE-READY GRADUATES

SECTION 10.13.(a) The State Board of Community Colleges, in consultation with the State Board of Education, shall develop a program for implementation in the 2016-2017 school year that introduces the college developmental mathematics and developmental reading and English curriculums in the high school senior year and provides opportunities for college remediation for students prior to high school graduation through cooperation with community college partners. Students who are enrolled in the Occupational Course of Study to receive their high school diplomas shall not be required to participate in the program or be required to take mandatory remedial courses as provided for in this section, unless a parent specifically requests through the individualized education program (IEP) process that the student participates. The program shall require the following:

(1) Establishment by the State Board of Community Colleges of measures for determining student readiness and preparation for college coursework by using ACT scores, student grade point averages, or other measures currently used by the State Board of Community Colleges to determine college readiness for entering students.

(2) Changes in curriculum, policy, and rules as needed by the State Board of Community Colleges and State Board of Education to make remedial courses mandatory for students who do not meet readiness indicators by their junior year to ensure college readiness prior to high school graduation. These changes shall include the flexibility for students to fulfill senior mathematics and English graduation requirements through enrollment in mandatory remedial courses or to enroll in those courses as electives.

(3) High schools to use curriculum approved by the State Board of Community Colleges, in consultation with the State Board of Education.

(4) Determinations by the State Board of Community Colleges on the following:

a. Appropriate measures of successful completion of the remedial courses to ensure students are prepared for coursework at a North Carolina community college without need for further remediation in mathematics or reading and English.

b. The length of time following high school graduation in which a student who successfully completed high school remedial courses will not be required to enroll in developmental courses at a North Carolina community college.

(5) Delivery of remedial courses by high school faculty consistent with policies adopted by the State Board of Community Colleges and the State Board of Education. The policies shall include, at a minimum, the following requirements:

a. High school faculty teaching the approved remedial courses must successfully complete training requirements as determined by the State Board of Community Colleges, in consultation with the State Board of Education.

b. The North Carolina Community College System shall provide oversight of the remedial courses to ensure appropriate instructional delivery.

SECTION 10.13.(b) The State Board of Community Colleges and the State Board of Education shall report on progress of implementation of the program statewide, including the requirements in subsection (a) of this section, to the Joint Legislative Education Oversight Committee no later than March 15, 2016.

Appendix B. Crosswalk of EdReady DMA and RISE aligned modules.

Tiers. Unit	DMA	Unit	Lesson	Topic
T1.1	010	Whole Numbers	Introduction to Whole Numbers	Place Value and Names for Whole Numbers
T1.1	010	Whole Numbers	Introduction to Whole Numbers	Rounding Whole Numbers
T1.1	010	Whole Numbers	Introduction to Whole Numbers	Comparing Whole Numbers
T1.1	010	Whole Numbers	Adding and Subtracting Whole Numbers	Adding Whole Numbers and Applications
T1.1	010	Whole Numbers	Adding and Subtracting Whole Numbers	Subtracting Whole Numbers and Applications
T1.1	010	Whole Numbers	Adding and Subtracting Whole Numbers	Estimation
T1.1	010	Whole Numbers	Multiplying and Dividing Whole Numbers	Multiplying Whole Numbers and Applications
T1.1	010	Whole Numbers	Multiplying and Dividing Whole Numbers	Dividing Whole Numbers and Applications
T1.1	010	Whole Numbers	Properties of Whole Numbers	Properties and Laws of Whole Numbers
T1.1	010	Whole Numbers	Properties of Whole Numbers	The Distributive Property
T1.1	010	Whole Numbers	Exponents, Square Roots, and the Order of Operations	Understanding Exponents and Square Roots
T1.1	010	Whole Numbers	Exponents, Square Roots, and the Order of Operations	Order of Operations
T1.2	020	Fractions and Mixed Numbers	Introduction to Fractions and Mixed Numbers	Introduction to Fractions and Mixed Numbers
T1.2	020	Fractions and Mixed Numbers	Introduction to Fractions and Mixed Numbers	Proper and Improper Fractions

Tiers. Unit	DMA	Unit	Lesson	Topic
T1.2	020	Fractions and Mixed Numbers	Introduction to Fractions and Mixed Numbers	Simplifying Fractions
T1.2	020	Fractions and Mixed Numbers	Introduction to Fractions and Mixed Numbers	Comparing Fractions
T1.2	020	Fractions and Mixed Numbers	Multiplying and Dividing Fractions and Mixed Numbers	Multiplying Fractions and Mixed Numbers
T1.2	020	Fractions and Mixed Numbers	Multiplying and Dividing Fractions and Mixed Numbers	Dividing Fractions and Mixed Numbers
T1.2	020	Fractions and Mixed Numbers	Adding and Subtracting Fractions and Mixed Numbers	Adding Fractions and Mixed Numbers
T1.2	020	Fractions and Mixed Numbers	Adding and Subtracting Fractions and Mixed Numbers	Subtracting Fractions and Mixed Numbers
T1.3	020	Decimals	Introduction to Decimals	Decimals and Fractions
T1.3	020	Decimals	Introduction to Decimals	Ordering and Rounding Decimals
T1.3	020	Decimals	Decimal Operations	Adding and Subtracting Decimals
T1.3	020	Decimals	Decimal Operations	Multiplying and Dividing Decimals
T1.3	020	Decimals	Decimal Operations	Estimation with Decimals
T1.4	030	Ratios, Rates, and Proportions	Ratio and Rates	Simplifying Ratios and Rates
T1.4	030	Ratios, Rates, and Proportions	Proportions	Understanding Proportions
T1.5	030	Percents	Introduction to Percents	Convert Percents, Decimals, and Fractions
T1.5	030	Percents	Solving Percent Problems	Solving Percent Problems
T1.6	030	Measurement	U.S. Customary Units of Measurement	Length
T1.6	030	Measurement	U.S. Customary Units of Measurement	Weight
T1.6	030	Measurement	U.S. Customary Units of Measurement	Capacity
T1.6	030	Measurement	Metric Units of Measurement	The Metric System
T1.6	030	Measurement	Metric Units of Measurement	Converting within the Metric System

Tiers. Unit	DMA	Unit	Lesson	Topic
T1.6	030	Measurement	Metric Units of Measurement	Using Metric Conversions to Solve Problems
T1.7	010	Geometry	Basic Geometric Concepts and Figures	Properties of Angles
T1.7	030	Geometry	Basic Geometric Concepts and Figures	Triangles
T1.7	010	Geometry	Basic Geometric Concepts and Figures	The Pythagorean Theorem
T1.7	010	Geometry	Perimeter, Circumference, and Area	Perimeter and Area
T1.7	020	Geometry	Perimeter, Circumference, and Area	Circles
T1.8	030	Real Numbers	Introduction to Real Numbers	Variables and Expressions
T1.8	010	Real Numbers	Introduction to Real Numbers	Integers
T1.8	020	Real Numbers	Introduction to Real Numbers	Rational and Real Numbers
T1.8	010	Real Numbers	Operations with Real Numbers	Adding Integers
T1.8	020	Real Numbers	Operations with Real Numbers	Subtracting Integers
T1.8	020	Real Numbers	Operations with Real Numbers	Multiplying Integers
T1.8	020	Real Numbers	Operations with Real Numbers	Dividing Integers
T1.8	020	Real Numbers	Operations with Real Numbers	Adding Real Numbers
T1.8	020	Real Numbers	Operations with Real Numbers	Subtracting Real Numbers
T1.8	020	Real Numbers	Operations with Real Numbers	Multiplying and Dividing Real Numbers
T1.8	020	Real Numbers	Simplifying Expressions	Order of Operations
T2.11	060	Exponents and Polynomials	Integer Exponents	Exponential Notation
T2.11	060	Exponents and Polynomials	Integer Exponents	Simplify by Using the Product, Quotient, and Power Rules
T2.11	060	Exponents and Polynomials	Integer Exponents	Products and Quotients Raised to Powers
T2.11	020	Exponents and Polynomials	Integer Exponents	Scientific Notation
T2.11	060	Exponents and Polynomials	Polynomials with Single Variables	Introduction to Single Variable Polynomials
T2.11	060	Exponents and Polynomials	Polynomials with Single Variables	Adding and Subtracting Polynomials

Tiers. Unit	DMA	Unit	Lesson	Topic
T2.11	060	Exponents and Polynomials	Polynomials with Single Variables	Multiplying Polynomials
T2.11	060	Exponents and Polynomials	Polynomials with Single Variables	Multiplying Special Cases
T2.11	060	Exponents and Polynomials	Polynomials with Single Variables	Dividing by a Monomial
T2.11	060	Exponents and Polynomials	Polynomials with Several Variables	Simplifying and Evaluating Polynomials with More than One Term
T2.11	060	Exponents and Polynomials	Polynomials with Several Variables	Operations with Polynomials
T2.9	040	Solving Equations and Inequalities	Solving Equations	Solving One-Step Equations Using Properties of Equality
T2.9	040	Solving Equations and Inequalities	Solving Equations	Solving Multi-Step Equations
T2.9	040	Solving Equations and Inequalities	Solving Equations	Special Cases and Applications
T2.9	040	Solving Equations and Inequalities	Solving Equations	Formulas
T2.9	040	Solving Equations and Inequalities	Solving Inequalities	Solving One-Step Inequalities
T2.9	040	Solving Equations and Inequalities	Solving Inequalities	Multi-Step Inequalities
T3.13	060	Factoring	Introduction to Factoring	Greatest Common Factor
T3.13	060	Factoring	Factoring Polynomials	Factoring Trinomials
T3.13	060	Factoring	Factoring Polynomials	Factoring: Special Cases
T3.13	060	Factoring	Solving Quadratic Equations	Solve Quadratic Equations by Factoring
T3.13	050	Graphing	Graphs and Applications	The Coordinate Plane
T3.13	050	Graphing	Graphs and Applications	Graphing Linear Equations
T3.13	050	Graphing	Slope and Writing the Equation of a Line	Finding the Slope of a Line
T3.13	050	Graphing	Slope and Writing the Equation of a Line	Writing the Equation of a Line
T3.13	050	Graphing	Slope and Writing the Equation of a Line	Parallel and Perpendicular Lines
T3.15	070	Rational Expressions	Operations with Rational Expressions	Introduction to Rational Expressions

Tiers. Unit	DMA	Unit	Lesson	Topic
T3.15	070	Rational Expressions	Operations with Rational Expressions	Multiplying and Dividing Rational Expressions
T3.15	070	Rational Expressions	Operations with Rational Expressions	Adding and Subtracting Rational Expressions
T3.15	070	Rational Expressions	Rational Equations	Solving Rational Equations and Applications
T3.15	070	Rational Expressions	Formulas and Variation	Rational Formulas and Variation
T3.16	080	Radical Expressions and Quadratic Equations	Introduction to Roots and Rational Exponents	Roots
T3.16	080	Radical Expressions and Quadratic Equations	Introduction to Roots and Rational Exponents	Squares, Cubes, and Beyond
T3.16	080	Radical Expressions and Quadratic Equations	Introduction to Roots and Rational Exponents	Rational Exponents
T3.16	080	Radical Expressions and Quadratic Equations	Operations with Radicals	Multiplying and Dividing Radical Expressions
T3.16	080	Radical Expressions and Quadratic Equations	Operations with Radicals	Adding and Subtracting Radicals
T3.16	080	Radical Expressions and Quadratic Equations	Operations with Radicals	Multiplication of Multiple Term Radicals
T3.16	080	Radical Expressions and Quadratic Equations	Radical Equations	Solving Radical Equations
T3.16	080	Radical Expressions and Quadratic Equations	Solving Quadratic Equations	The Quadratic Formula

EdReady Modules included in RISE but not in DMA:

	Unit	Lesson	Topic
T1.2	Fractions and Mixed Numbers	Introduction to Fractions and Mixed Numbers	Factors and Primes
T1.7	Geometry	Volume of Geometric Solids	Solids
T1.8	Real Numbers	Properties of Real Numbers	Associative, Commutative, and Distributive Properties
T2.12	Concepts in Statistics	Statistical Graphs and Tables	Graphing Data
T2.12	Concepts in Statistics	Statistical Graphs and Tables	Other Types of Graphs
T2.9	Solving Equations and Inequalities	Compound Inequalities and Absolute Value	Compound Inequalities
T3.16	Radical Expressions and Quadratic Equations	Operations with Radicals	Rationalizing Denominators