Report and Recommendations of the

Task Force on Gateway Mathematics Success

April 2015

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NSHE Task Force on Gateway Mathematics Success 2014-2015

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Part I: Mathematics and Nevada's Completion Agenda

In 2010, under the leadership of Governor Brian Sandoval, Nevada joined the Complete College America (CCA) alliance, and the Board of Regents and Nevada System of Higher Education (NSHE) committed to an aggressive completion agenda to increase the number of students awarded degrees and credentials of value. As NSHE worked with CCA over the last five years to increase college attainment rates in Nevada, numerous policy changes and initiatives have been adopted by the Board of Regents, including limiting the number of credits required for degrees (120/60 credit policy); a low-yield program policy to reinforce degree productivity; an excess credit fee for students who have earned more than 150 percent of the credits required for a degree, but not yet earned a degree; examination of ways to address the challenges of access and affordability for Nevada students; a new funding formula and performance pool that focuses on student and institutional success; and a 15 to Finish campaign to encourage students to enroll full-time and graduate on-time. (For more information on these initiatives, see the NSHE website at www.nevada.edu.)

In addition to the policy changes and initiatives embraced by the Board of Regents to date, modernizing undergraduate mathematics education is a key lever for improving college completion. Data at both the national and state levels indicate that not completing a gateway mathematics course within the first year of instruction correlates with a greatly reduced chance of student success and timely graduation. Complete College America regularly highlights – nationally and for Nevada – the important role that gateway mathematics courses can play in the persistence and success of students in higher education. The national dialogue on reducing barriers to student success includes (1) ensuring that the required mathematics courses are relevant to the programs in which students are enrolled, and (2) decreasing the length of remedial course sequences by offering pathways that accelerate remediation and/or co-requisite model courses, e.g., courses that provide college credit bearing coursework along with remediation in the same semester. Both of the latter models provide opportunities to complete the gateway mathematics course sooner, and earlier completion of the gateway mathematics course correlates strongly with higher rates of persistence and graduation.

Background: NSHE Remedial Transformation Project

In the past five years, the Chancellor's Office, institutional academic officers, and mathematics faculty participated in extensive examinations of remedial/developmental coursework and reviewed data that steered discussions and changes in institutional approaches to gateway courses to promote student success. This work is a critical component to the State's completion agenda adopted by the Board of Regents and the aggressive goals to graduate more students and eliminate unnecessary barriers along the way. Starting in 2010, the Chancellor created the Remedial Transformation Project with two steering committees, one for English and one for mathematics. The work and findings of the steering committees are detailed in the Project's 2012 Report to the Board of Regents. In particular, the report notes:

> *From the beginning, institutions were encouraged to approach change through experimental pilot projects, the testing of new models and a continuous examination of data as they proceeded. Each institution shaped their current remedial program on the basis of the data on their own students' success, and there is no mandate for standardized instructional methodology across all institutions. This commitment to evidence-based change and faculty-driven improvements has been key to the success of this project. In each institution's update [report on pilot programs, etc.], there are many different models. However, there are a number of shared themes or approaches.*

- *Course redesign to enable students to complete remedial instruction and an entry-level course within two semesters;*
- *Curricular alignment between remedial courses and entry-level courses;*
- *Inclusion of reading instruction for students for whom reading is a barrier in mathematics and English;*
- *More accurate student placement through multiple criteria;*
- *Different pathways defined for students based on their level of deficiency and major or course of study;*
- *Conversion of remedial courses at the lowest levels to self-funded skills-based laboratories; and*
- *Partnerships with school districts to offer early testing and to improve college readiness of high school graduates.*

Building on the work of the Remedial Transformation Project, NSHE convened the Gateway Course Success Summit in April 2014 to continue the discussion of improving student success in mathematics. Mathematics faculty and academic officers representing all seven NSHE teaching institutions attended, along with national experts who participated in a panel on co-requisite remediation models. The Task Force on Gateway Mathematics Success is a continuation of that work and aims to build clear and structured pathways into and through entry-level mathematics courses.

NSHE also convened a second summit in November 2014 to focus on English gateway course success, but that work, while related, is not the focus of this report.

Creation of the NSHE Task Force on Gateway Mathematics Success

The Charles Dana Center at the University of Texas-Austin (Dana Center) has for many years been leading the development of curricula for pathways through remediation and a gateway course in mathematics, statistics or quantitative reasoning. In 2014, CCA and the Dana Center began facilitating dialogs in selected states to identify needed mathematics curriculum changes and other related policy changes to improve success in gateway mathematics courses, and on implementing these changes on statewide scales. The momentum created by NSHE's April 2014 summit on mathematics precipitated NSHE's participation in the CCA/Dana Center's *Building Math Pathways into Programs of Study* initiative. Nevada was selected to participate in the initiative, leading to the establishment of the Task Force on Gateway Mathematics Success by the Chancellor.

The Task Force included mathematics faculty from NSHE's four-year and two-year institutions who were charged broadly with making recommendations on changes that the System should make to increase success in gateway mathematics courses, and thereby increase degree completion. The efforts of the Task Force and its recommendations have been driven by data about student performance through the different traditional curricular mathematics pathways and more innovative pathways piloted recently at some institutions. The data described throughout the report are detailed in Tables 1 through 7 of **Appendix A**.

As context for the work of the Task Force, there have been a number of System-wide conversations in recent years regarding the success and desire to scale up co-requisite models of remediation. Co-requisite models allow students who would otherwise be placed into a remedial course to be enrolled in a credit bearing, college level course with additional support in areas where remediation is needed.

Co-requisite models provide remedial support during the same semester as the credit-bearing course. In November 2014, the Chancellor issued a memorandum on e-learning that included a directive to the institutions to establish co-requisite options for students by Fall 2015. The efficacy of co-requisite models has been demonstrated both nationally and, in Nevada, through the work of the University of Nevada, Reno (UNR), where such models were piloted for several years. Therefore, the work of the Task Force began with a review of system-wide data, including data from the co-requisite model pilots.

Changing Landscape Affecting Undergraduate Mathematics Education

Several forces are driving the modernization of mathematics education at postsecondary institutions in Nevada and across the United States and affecting the form such reformative efforts take.

1. **Focus on Completion**
   Across the United States, more and more states are replacing enrollment with completion as the basis of higher education funding. This shift to "performance funding" represents an entirely new approach by which states and legislatures view and measure success in postsecondary education. This change in performance benchmarks is focusing considerable attention on remediation programs and other curricular matters previously under the exclusive purview of campus officials. State executives, legislators, and private foundations are becoming increasingly active in efforts to reform specific aspects of public higher education, and these groups frequently cite mathematics requirements, in particular, lengthy remedial sequences, as a significant factor affecting student success and graduation.

2. **Changes in College Readiness of K-12 Graduates**
   The NSHE 2013-14 Remedial Placement and Enrollment Report shows that 55.6 percent of recent Nevada high school graduates placed into coursework that is below the college level in mathematics, English, or both. Efforts to reform the K-12 curriculum in Nevada and across the nation are well underway. Initiatives like the Common Core State Standards (and, in Nevada, the Nevada Academic Content Standards) seek to better equip Nevada students with skills necessary for success in college and for competing in the 21st century's new economic landscape. These efforts necessitate updating the alignment between secondary and postsecondary curricula. In addition, implementation of a statewide 11th grade assessment tied to the new standards necessitates updating the way student college readiness is evaluated at the higher education institutions.

3. **Economic Forces**
   Many state and national reports highlight the fact that more jobs today require postsecondary education than ever before. For Nevada, by 2020, 58 percent of the jobs will require a career certificate or college degree. Currently, 30 percent of Nevada's young adults have an associate degree or higher; thus, there is a 28 percent "skills gap." This skills gap must be addressed as Nevada's economy continues to diversify and advanced technology plays an ever more important role in the 21st century's "knowledge economy." Workers are far more likely to move between industries over the span of their career and hence will likely require retraining. Upward mobility of Nevada's citizens, and by extension the economic competitiveness of the state, are therefore directly tied to the educational attainment levels and capability of workers to learn new skills.

In summary, the Nevada System of Higher Education's focus on undergraduate mathematics completion is driven by both internal and external forces. The new performance funding mechanism, the ongoing need for remedial education, and the nature of future workforce demand all create a social and economic imperative for improving student success in postsecondary education. These cumulative forces represent the context in which the Task Force on Gateway Mathematics Success conducted its work.

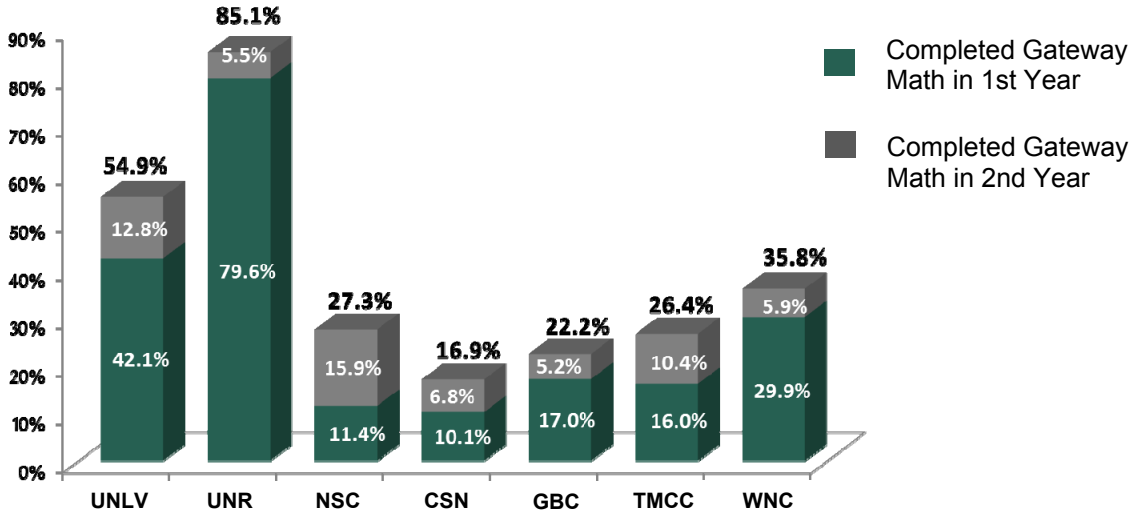
Part II: Data Analysis and Task Force Findings

The Task Force on Gateway Mathematics Success collected and analyzed a variety of system-wide and institution-level data on student performance in NSHE gateway mathematics courses. The data and analyses of the Task Force are summarized here.

A. Importance of Timely Gateway Mathematics Success

Figure 1 indicates the percentage of Fall 2012 first-time, degree-seeking freshmen who completed a gateway mathematics course within the first two years of enrollment at each NSHE institution.

Figure 1. Fall 2012 Cohort - Percent Completed Gateway Math within First 2 Years



Cohort Definition: First-time, degree-seeking freshmen

As Figure 1 shows, outside of the universities only 16.9 to 35.8 percent of first-time, degree-seeking freshman in the Fall 2012 cohort completed a gateway mathematics course within two years of enrollment. For comparison, Fall 2007 data depicted a similar pattern; between 2007 and 2012 there was no evidence of a significant increase in the percentage of students completing the gateway mathematics course within the first two years of enrollment. These data demonstrate that the current NSHE curricular pathways through remedial and gateway mathematics courses have troublingly low success rates. The much higher success rate at UNR, however, gives cause for optimism that scaling up recent successful innovations across the rest of the NSHE System, including co-requisite models and mandating continuous enrollment, will lead to significant improvements in statewide success rates.

It is important to recognize that the data included in Figure 1 does not reflect the impact of many recent institutional initiatives to address concerns raised through the Remedial Transformation Project about the delivery of remediation and methods to ensure students complete the appropriate entry-level English and mathematic coursework within the first 30 college-level credits, as required by current Board policy. One exception is the work done at UNR. The percent of UNR first-time, degree-seeking students that completed the gateway mathematics course within one year increased from 71.2 percent for the Fall 2007 cohort to

79.6 percent for the Fall 2012 cohort. That increase can be attributed in large part to the co-requisite model gateway courses that were piloted in 2010-11 academic year, and implemented at scale in Fall 2012. The Task Force recognizes the importance of completing gateway coursework early, and therefore is recommending revisions to Board policy that are discussed in Part III of this report. These recommendations are intended to ensure that co-requisite models and other accelerated pathways to gateway course completion are available and utilized at all NSHE institutions.

The Task Force recognized that corrective models that prove to be effective at the universities may not necessarily be equally effective at the two-year colleges. The challenges facing NSHE's two-year colleges differ from those of the universities due in part to the open access policies of the community colleges, and also to the older and non-residential student characteristics. For reasons that vary widely, many students enroll in two-year colleges because they do not meet the admission requirements of the universities. These students often have fewer general academic skills, including but not limited to time management, motivation, study skills, commitment, and critical thinking and reasoning skills. Thus, remediation at the two-year colleges is often more involved and complicated and frequently less successful. Even students placing into high level remedial courses or co-requisite model gateway courses often struggle due to these same deficiencies in general academic skills.

Older and non-residential students often have work and family conflicts that limit the time, effort, and concentration they can devote to succeed in gateway courses, especially during their first semester as they adjust their lives to include academics. These factors complicate the challenge of increasing student success rates and reveal the need for more focused innovations. But, clearly, accelerated programs like the co-requisite models recommended in this report appear to result in a significant, overall increase in student success rates through gateway mathematics courses, even if this improvement may not be as great at open access institutions. In fact, many of these negative factors hindering student success among community college students appear to be accentuated by the traditional, extended remedial sequences causing students to drop out early.

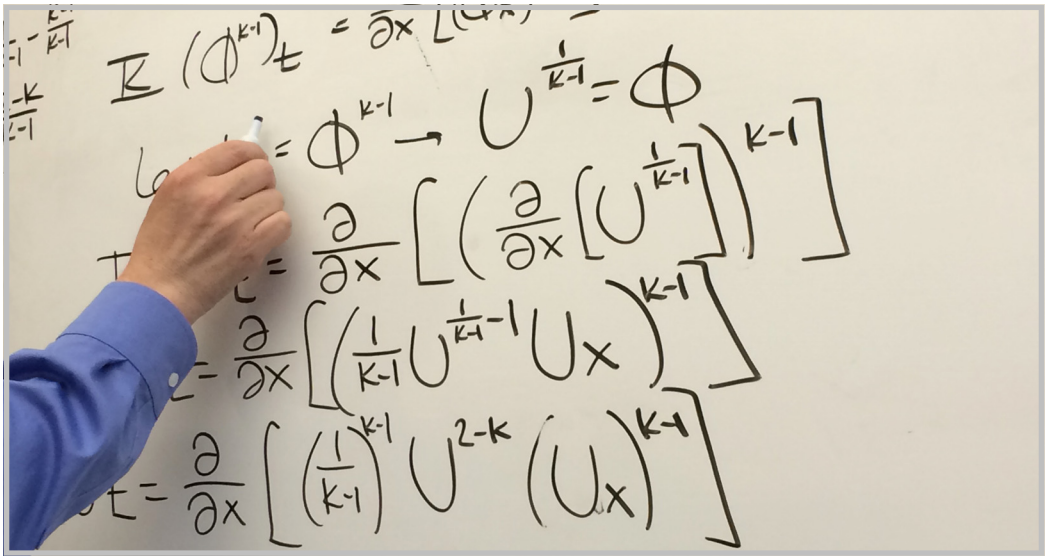


Table 1 suggests that there is a strong positive correlation between timely completion of gateway mathematics courses and graduation. Even with the differences in student preparation and programmatic mission between community colleges and four-year institutions, students who successfully complete a gateway mathematics course within two years of initial enrollment are far more likely to graduate. For this reason, improving the success rates through remediation or co-requisite courses and gateway mathematics courses emerged as a top NSHE priority.

Table 1. Impacts on Graduating Students

Fall 2007 cohort	% Completed Gateway Math in first 2 years	150% Graduation Rate	% not Completed Gateway Math in first 2 years	150% Graduation Rate
UNLV	59.5%	48.8%	40.5%	22.6%
UNR	79.2%	52.0%	20.8%	12.7%
NSC	37.0%	25.0%	63.0%	3.9%
CSN	16.9%	23.2%	83.1%	3.9%
GBC	17.5%	26.8%	82.5%	1.8%
TMCC	18.8%	31.8%	81.2%	1.5%
WNC	35.1%	30.9%	64.9%	0.3%

NOTE: 150% graduation rates include students at the 4-year institutions who received a bachelor's degree within six years and students at the 2-year institutions who received an associate's degree within three years, certificate within 1.5 years, or bachelor's degree within six years.

Task Force Finding: Timely completion of gateway mathematics courses correlates with students persistence and degree completion.

The data included in Table 1 begs the question, why are students not completing the gateway mathematics courses in a timely manner? There are a number of factors that keep students from enrolling in and completing the appropriate gateway mathematics courses. Advising continues to be a factor, in addition to part-time enrollment. It appears that part-time students in particular may be delaying enrollment into the gateway mathematics course beyond the first year of enrollment.

B. The "Right" Math

Much of the national dialog concerning general education mathematics focuses on college algebra and its appropriateness as a "default mathematics requirement." Within NSHE, there are two courses centered on college algebra: Math 124 and Math 126. (Common course numbering across the system requires that courses with comparable content be identified by the same number at all institutions, facilitating transfer/articulation across the state.) Through an examination of system-wide data, the Task Force determined that college algebra is not the default general education mathematics requirement at any NSHE institution.

Each institution offers Math 120, Fundamentals of College Mathematics. This is a course designed to give students outside the quantitative disciplines the broad mathematical and statistical skills they need to be quantitatively literate citizens. Math 120 provides more applications of mathematics to real world settings, including an introduction to probability and statistics that will be valuable for anyone living in the modern information age.

The Task Force spent time discussing what content is most important, timely, and relevant to include in a course like Math 120, whose overarching aim is general mathematics literacy. Mathematics is a dynamic field, and the content and delivery of mathematics instruction continues to evolve. Mathematics, science and statistics standards documents (National Council of Teachers of Mathematics, 2000; American Statistical Association, 2005; Common Core State Standards, 2010; Next Generation Science Standards, 2013) describe the teaching and learning of mathematics as an integrated collection of processes and content elements. Task Force members agreed that courses that fulfill this requirement should include college level mathematics that requires a foundational level of mathematical skill as a prerequisite. The Task Force plans to continue its discussions on the content of such a course.

The remainder of this section focuses on system-wide data that the Task Force examined concerning enrollment patterns and success rates for students who enroll in college algebra courses (Math 124 or Math 126). Math 126, Pre-calculus I, covers the algebra portion—or, more specifically, the non-trigonometric portion—of pre-calculus. That is, it covers functions, domain and range, graphical representation of functions, graphical features such as local maxima, minima and asymptotes, inverse functions, and logarithms and exponentials. Algebraic techniques covered include factoring polynomials to find zeros or solve polynomial inequalities, or completing the square to interpret a quadratic function as a shifted, dilated and/or reflected version of $y=x^2$. These lay the foundation for a thorough treatment of trigonometric functions in the subsequent course, Math 127, Pre-calculus II.

Math 124, taught at some of NSHE institutions, is entitled College Algebra. Math 124 has considerable overlap with Math 126, but delves less deeply into some of these topics, and instead develops row reduction techniques for solving linear systems and introduces the binomial theorem. Math 124 is designed to better prepare students for Math 132, entitled Finite Mathematics, which covers logic, sets, probability, systems of linear equations, and linear programming, with applications to business and social sciences.

College algebra courses are designed to prepare students for higher mathematics and science courses that require more advanced algebra skills and deeper knowledge of functions. For instance, business students may take Math 124 or Math 126 to prepare for Math 176, Introductory Calculus for Business and Social Sciences. On the other hand, students pursuing STEM programs use Math 126 (and the subsequent Math 127 covering the theory of trigonometric functions, identities and techniques) to prepare for Math 181, the gateway into calculus-based science courses. For specific curricular reasons, there are a few programs that require only Math 124 or Math 126 and nothing higher.

Task Force Finding: A comprehensive examination of the mathematics requirements of NSHE programs found no programs requiring college algebra as a default, without any particular curricular reason for the requirement.

C. Subsequent Enrollment Patterns - Math 124 and Math 126

The following data examines the highest subsequent mathematics course students enrolled in within two years of enrolling in Math 124 or Math 126.

Figure 2. Subsequent Mathematics Enrollment within Two Years - By Institution
Fall 2012 Cohort

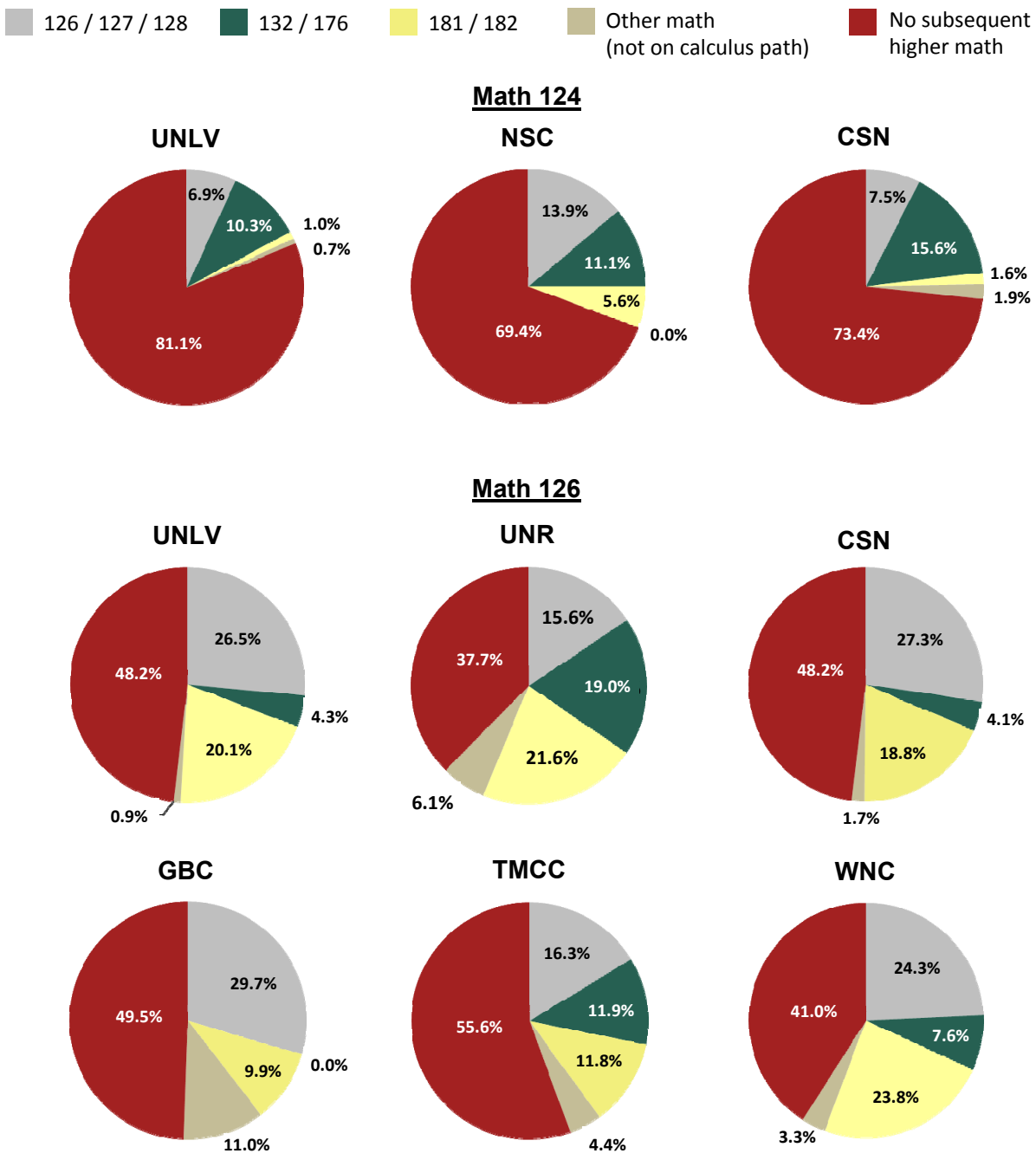


Figure 2 shows that the majority of students across the System who enrolled in college algebra did not go on to complete a higher-level mathematics course. Possible explanations for a student not taking a higher mathematics course after Math 124 or Math 126 include:

- The student's program requires only Math 124 or Math 126, and so by earning credit in this class, the student completed the mathematics requirement for his or her program of study.
- The student needs one or more higher mathematics courses for his or her chosen program of study, but has failed to enroll in the next course.
- The student chose to take Math 124 or Math 126, even though Math 120 satisfies the requirement for the student's selected program of study.

The first of these explains only a fraction of the students, due to the limited number of programs with Math 124 or Math 126 as the required mathematics course.

The second scenario suggests a lack of needed advising, although one must determine to what extent the problem is repeated failure in the college algebra course, and to what extent the problem is a lack of continuously enrolling in mathematics courses.

The third scenario raises the question why non-STEM students are taking Math 124 or Math 126 instead of Math 120. Do they understand their program requirements? Are they enrolling in this college algebra course while planning on a quantitative major, but then changing to a non-quantitative major after earning credit for it? Are they taking Math 124 or Math 126 because they are undecided and these courses satisfy the STEM and non-STEM program requirements?

Table 2. Students Enrolled in College Algebra (Math 124) with No Subsequent Higher Mathematics Enrollment

Students Enrolled 2013-14 - Major by CIP Category	Failed 124 / Enrolled 2013-14							Passed 124 / Enrolled 2013-14						
	Fall 2012 Major Category	Major Category Spring 2014					Enrolled Fall 2013 / Not Spring 2014	Fall 2012 Major Category	Major Category Spring 2014				Enrolled Fall 2013 / Not Spring 2014
		Business	Education	Not STEM	STEM	Completed 120			Business	Education	Not STEM	STEM	
CSN	**99**	**15**	**2**	**32**	**9**	**10**	**31**	**CSN**	**203**	**37**	**4**	**83**	**47**	**32**
Business	27	14		2		1	10	Business	40	24		8		8
Education	2		1				1	Education	1	1				
Non-Degree	12		1	6		2	3	Non-Degree	15	1		10	3	1
Not STEM	34	1		19	1	4	9	Not STEM	81	9	3	55	2	12
STEM	24			5	8	3	8	STEM	66	2	1	10	42	11
NSC	**4**	**1**	**1**	**1**	**0**	**0**	**1**	**NSC**	**31**	**2**	**0**	**5**	**18**	**6**
Business	1	1						Business	1	1				
Education	1		1					Non-Degree	1				1	
Not STEM	1			1				Not STEM	7	1		5		1
STEM	1						1	STEM	22				17	5
UNLV	**207**	**70**	**1**	**60**	**17**	**34**	**25**	**UNLV**	**508**	**246**	**12**	**148**	**67**	**35**
Business	97	65		11	1	6	14	Business	253	227	1	8	2	15
Education	8	1	1	1		5		Education	7		4	1		2
Non-Degree	2			1			1	Non-Degree	1				1	
Not STEM	67	2		39	2	18	6	Not STEM	172	15	5	135	4	13
STEM	33	2		8	14	5	4	STEM	75	4	2	4	60	5
NSHE	**310**	**86**	**4**	**93**	**26**	**44**	**57**	**NSHE**	**742**	**285**	**16**	**236**	**132**	**73**
Business	125	80		13	1	7	24	Business	294	252	1	16	2	23
Education	11	1	3	1		5	1	Education	8	1	4	1		2
Non-Degree	14		1	7		2	4	Non-Degree	17	1		10	5	1
Not STEM	102	3		59	3	22	15	Not STEM	260	25	8	195	6	26
STEM	58	2		13	22	8	13	STEM	163	6	3	14	119	21

NOTE: **Green** figures indicate numbers of students who have met the mathematics requirement for their selected program of study. **Red** figures indicate the number of students whose selected program of study requires a higher level of math that has not been completed.

System-wide, 1,470 students enrolled in Math 124 during the Fall 2012 semester and then did not enroll in a higher-level mathematics course. Of those students, 6 percent earned a degree that did not require a subsequent mathematics course while 22 percent stopped or dropped out prior to the 2013-14 academic year. Table 2 breaks out the remaining 72 percent who did enroll in at least one term during the 2013-14 academic year into those who failed or passed Math 124, and further breaks them down by starting major and status and current major, completion of Math 120, or discontinued enrollment as of Spring 2014.

Table 3. Students Enrolled in College Algebra (Math 126) with No Subsequent Higher Mathematics Enrollment

Students Enrolled 2013-14 - Major by CIP Category	Failed 126/ Enrolled 2013-14: Fall 2012 Major Category	Major Category Spring 2014: Business	Education	Not STEM	STEM	Completed 120	Enrolled Fall 2013 / Not Spring 2014	Students Enrolled 2013-14 - Major by CIP Category	Passed 126 / Enrolled 2013-14: Fall 2012 Major Category	Major Category Spring 2014: Business	Education	Not STEM	STEM	Enrolled Fall 2013 / Not Spring 2014
CSN	**69**	**7**	**2**	**15**	**25**	**5**	**15**	**CSN**	**64**	**7**	**0**	**23**	**27**	**7**
Business	8	3		1	1	1	2	Business	4	3				1
Education	2		1	1				Education	0					
Non-Degree	7	2		2	1		2	Non-Degree	4			2	2	
Not STEM	19	1		8	3	3	4	Not STEM	27	2		17	4	4
STEM	33	1	1	3	20	1	7	STEM	29	2		4	21	2
GBC	**12**	**0**	**0**	**0**	**4**	**4**	**4**	**GBC**	**9**	**1**	**1**	**3**	**3**	**1**
Business	0							Business	1	1				
Education	2						2	Non-Degree	3		1	1		1
Not STEM	3					2	1	Not STEM	1			1		
STEM	7				4	2	1	STEM	4			1	3	
TMCC	**128**	**13**	**5**	**28**	**44**	**17**	**21**	**TMCC**	**72**	**5**	**2**	**25**	**23**	**17**
Business	22	12		5	1		4	Business	5	2		1		2
Education	7		4	1			2	Education	1		1			
Non-Degree	6			2	2	1	1	Non-Degree	9		1	3	3	2
Not STEM	51	1	1	16	15	9	9	Not STEM	27	1		20	3	3
STEM	42			4	26	7	5	STEM	30	2		1	17	10
UNLV	**152**	**16**	**1**	**39**	**61**	**13**	**22**	**UNLV**	**45**	**5**	**0**	**23**	**12**	**5**
Business	12	9		1	2			Business	3	2				1
Education	2		1				1	Education	2			1	1	
Not STEM	50	2		26	6	5	11	Not STEM	19			17	1	1
STEM	88	5		12	53	8	10	STEM	21	3		5	10	3
UNR	**165**	**18**	**10**	**58**	**36**	**22**	**21**	**UNR**	**302**	**20**	**31**	**142**	**90**	**19**
Business	28	15		8		1	4	Business	27	12	1	10		4
Education	20		9	5	3	2	1	Education	33		21	8	2	2
Not STEM	62	1	1	36	4	11	9	Not STEM	140	7	6	107	13	7
STEM	55	2		9	29	8	7	STEM	102	1	3	17	75	6
WNC	**14**	**0**	**1**	**1**	**6**	**0**	**6**	**WNC**	**30**	**1**	**1**	**19**	**4**	**5**
Business	2						2	Business	3			3		
Education	1		1					Education	1		1			
Not STEM	4			1	1		2	Not STEM	17			15		2
STEM	7				5		2	STEM	9	1		1	4	3
NSHE	**540**	**54**	**19**	**141**	**176**	**60**	**89**	**NSHE**	**522**	**39**	**35**	**235**	**159**	**54**
Business	72	39		15	4	2	12	Business	43	20	1	14		8
Education	32		16	7	3	2	4	Education	37		23	9	3	2
Non-Degree	15	2		4	3		5	Non-Degree	16		2	6	5	3
Not STEM	189	5	2	87	29	30	36	Not STEM	231	10	6	177	21	17
STEM	232	8	1	28	137	26	32	STEM	195	9	3	29	130	24

NOTE: **Green** figures indicate numbers of students who have met the mathematics requirement for their selected program of study. **Red** figures indicate the number of students whose selected program of study requires a higher level of math that has not been completed.

System-wide, 1,577 students enrolled in Math 126 during the Fall 2012 semester and did not go on to enroll in a higher-level mathematics course. Of those students, 1.5 percent earned a degree or certificate that did not require a subsequent mathematics course while 31 percent stopped or dropped out prior to the 2013-14 academic year. Table 3 breaks out the remaining 67 percent who did enroll in at least one term during the 2013-14 academic year into those who failed or passed Math 126 by the starting major and status including current major, completion of Math 120, or discontinued enrollment as of Spring 2014.

Similar to the findings in Table 2 for Math 124, 390 students out of the 540 students in Table 3 who failed Math 126 did not enroll in a higher-level mathematics course, despite remaining in majors which required more mathematics. Only 60 of the 540 students enrolled in and completed Math 120, suggesting a transition into a non-STEM program of study. For the students who passed Math 126, 198 students out of 522 students did not enroll in a higher mathematics course (during the next three semesters) although they remained enrolled in a major requiring one.

This system-wide data suggests that a significant driver affecting the low completion numbers in gateway mathematics courses is the fact that students at many institutions are not compelled to remain continuously enrolled in mathematics until they complete their required courses. The Task Force identified this as a structural problem that will be addressed during the implementation phase of the Task Force's work.

Task Force Finding: Too many students are not completing the required mathematics course for their major in a timely fashion.

D. Remedial to College-Level Challenges

Remediation in mathematics remains a substantial challenge for students and reformative efforts have proven difficult. Figure 3 below reveals that for the Fall 2013 cohort of first-time, degree-seeking freshmen, 72.1 percent at two-year institutions and 41.5 percent at four-year institutions do not complete a college level mathematics course within one year after enrollment into remedial Math 096.

Figure 3. Completed college-level mathematics within one year after initial enrollment in Math 096 (Fall 2013 cohort)

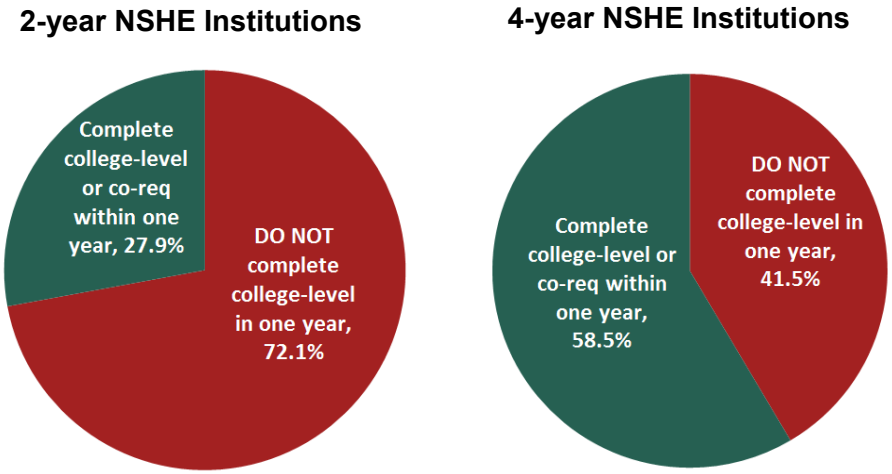


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Table 4 contains institution-specific data on the number of Fall 2013 first-time, degree-seeking students who complete a college-level mathematics course within one year following enrollment in Math 095 or Math 096.

Table 4. Students enrolled in Math 095 or Math 096 in Fall 2013
Percent that complete a college-level course within one year

	Math 095 Enrollment	% Completed College-Level Course w/in one year	Math 096 Enrollment	% Completed College-Level Course w/in one year
UNLV	702	4.7%	274	24.8%
UNR	260	24.6%	435*	80.5%
NSC	22	27.3%	17	41.2%
4-year Total	984	10.5%	726	58.5%
CSN	334	13.2%	210	19.0%
GBC	14	7.1%	17	41.2%
TMCC	134	7.5%	225*	30.2%
WNC	169	13.6%	86	40.7%
2-year Total	651	12.0%	538	27.9%

NOTE: Cohort includes first-time, degree-seeking students only
*co-requisite course enrollments included

The majority of the successes indicated in Table 4 for students at UNR who completed a college-level course within one year of remedial enrollment can be attributed to co-requisite model courses, which enable qualified students to complete their remediation and earn credit in Math 120 or Math 126 in the same semester.

In order to compare success of the co-requisite model curriculum (offered at UNR and TMCC in Fall 2013) with that of the traditional curriculum, Table 4 includes the students at UNR and TMCC who are enrolled in either Math 120 or 126 with a remedial co-requisite. The 435 students at UNR consisted of 180 in Math 096 and 255 enrolled in co-requisite model courses. The rate at which those students enrolled in the co-requisite courses completed a credit bearing math class in the first year was 93 percent, compared with 63 percent for those enrolled in Math 096. The 80.5 percent figure is the completion rate for the combined cohort. These figures suggest that, for the students who meet the placement criterion for a co-requisite pathway, the co-requisite models provide students with considerably higher success rates.

For students starting in Math 095 at UNR, the rate of completion of a credit bearing math class is much lower, at 25 percent. A significant portion of the 75 percent not achieving college credit within one year are STEM majors on the 3-semester pathway to completion of Math 126. Over 50 percent of the students starting out in this class are, at least at the beginning, in STEM majors, business programs, or the education and health programs requiring pre-calculus. Another significant portion passed Math 095 in the fall, but enrolled in Math 096 in the spring, even though their program allowed them to take the co-requisite model non-STEM gateway math course in the spring. This latter portion would benefit from improved advising and/or an automated pop-up indicating "this math class is not required for your declared program" when they enroll in Math 096.

Task Force Finding: Traditional remedial pathways do not result in timely completion of gateway mathematics courses. Co-requisite courses appear to result in much higher rates of successful completion of gateway mathematics courses in the first year of enrollment.

Part III: Task Force Recommendations

Through its deliberations and data-driven discussions, the Task Force makes several recommendations that focus primarily on: 1) Board of Regents' policy concerning the placement of students; 2) future reporting and monitoring of adopted policy changes; and 3) implementation of adopted policy changes and scaling up across the System. The recommendations of the Task Force are outlined here.

Suggested Revisions to Board Policy

After analyzing the System-wide data previously described, the Task Force considered needed changes to the Board's policy on placement (*Title 4, Chapter 16, Section 1*). The Task Force recommends sweeping changes to the policy, shifting the focus to student pathways and the completion of gateway courses, as opposed to cut scores for course placement, while at the same time honoring the ACT "guarantee" that was adopted by the Board of Regents at its December 2014 meeting. The proposed policy revisions are generally organized based on student preparedness (e.g. college ready; high school ready but not high school proficient; and not ready for high school mathematics). It is important to recognize that the work of the Task Force focused on those students who place below the college level, but at least at the high school level. While there remain students in the System who place below the high school level, Task Force members recognized that a discussion of interventions to assist students below the high school level must be considered separately. NSHE and its institutions are working collaboratively with local school districts to help these students while they are still in high school. Initiatives include, but are not limited to, programs to help with academic deficiencies identified through the 11th grade college and career readiness assessment (the ACT) to address those deficiencies during the senior year of high school, as well as efforts to expand dual credit options.

The policy revisions recommended by the Task Force include requiring that students who meet specified benchmarks on college readiness assessments in mathematics and English be exempt from remediation and be placed into a college-level course (as previously adopted by the Board). For students who do not meet these benchmarks or have not taken one of the assessments, institutions must develop an assessment and placement policy that ensures students have an opportunity to enroll in and complete a gateway college course in mathematics and English within one academic year (for those students who place into Math 095 or higher). The proposed revisions provide an exception to the one-year gateway pathway for students seeking a STEM degree who place at the high school Algebra I level (e.g. Math 095) allowing placement into a three-semester sequence of remediation and a gateway course that may include co-requisite coursework. In the view of the Task Force, this three-semester exception for severely unprepared (Math 095 placement) STEM students is needed because a fully successful one-year accelerated pathway has not yet been demonstrated in any pilot form, but the experience with mini-sessions is promising. This exception should not greatly diminish the overall impact of the pathways, since students aspiring to STEM majors are often better prepared for mathematics.

Finally, the proposed revisions mandate that the Chancellor work with the State Superintendent of Public Education to establish educational strategies to encourage high school standards, graduation requirements and assessments aligned with college and workforce readiness expectations.

The specific language changes as proposed by the Task Force to *Title 4, Chapter 16, Section 1* of the Board *Handbook*, are included in **Appendix B.**

Data and Follow-Up Data Collection and Reporting

System-wide data played a critical role in the deliberations of the Task Force, and these data were primary drivers for the Task Force's recommendations. To that end, the Task Force recommends that the Chancellor's Office continue the collection of data to measure ongoing institutional progress and the impacts of the suggested revisions to the Board's placement policy, should it ultimately be adopted.

At the April 2014 NSHE Math Summit, the Chancellor's Office presented system-wide data on the percentage of students that complete a gateway mathematics course within one and two years of enrollment, and the corresponding percentage of students that ultimately graduate. That data set the stage for the work of the Task Force to make recommendations to increase student success in gateway mathematics. The Task Force strongly recommends the continued review of system-wide data to evaluate the efficacy of the curricular changes proposed in the policy revisions.

In addition, Task Force members recognized the unique opportunity provided to the State and NSHE by the statewide administration of the ACT that will occur during the 2015-16 academic year. As a result of statewide administration of the ACT, the Chancellor's Office will for the first time have ACT scores for all entering students who graduate from a public Nevada high school in 2016. The Task Force recommends that the Chancellor's Office utilize the statewide ACT data in an effort to validate the current NSHE ACT college readiness benchmarks, which have been set based on national ACT data in the absence of statewide data. Similar efforts should also be made to validate the SAT, SBAC and PARCC scores, as soon as sufficient data is available for an appropriate validation study to be conducted. Finally, since the Task Force

recommendations require institutions to put in place placement mechanisms for students without ACT, SAT, SBAC or PARCC scores, such data should be gathered and examined to validate the institutional mechanisms, as well.

Implementation and Scaling Up

Finally, the work of the Task Force, as supported by Complete College America and the Charles Dana Center, will continue through the 2015-16 academic year. The Task Force will reconvene, following the Board's consideration of the proposed policy changes in June 2015, to have System-wide discussions on the implementation of the policy revisions. If adopted, the policy will require that NSHE institutions essentially scale up all existing efforts to get students through gateway mathematics courses within one year (or three semesters for students on a STEM pathway who place at or below Math 095).

It was clear from the deliberations of the Task Force that quality student advising and campus protocols to ensure that students do not delay completion of mathematics courses will be a critical part of campus implementation. Therefore, the Task Force recommends that, when it reconvenes in Fall 2015, additional institutional representatives from academic advising, admissions and institutional leadership be brought to the table for discussions that can support institutional implementation by Fall 2016.

Through the implementation process, institutions will examine their capacity for full-scale implementation. It will not be possible for all institutions to scale-up 100 percent by Fall 2016 for a number of reasons including, but not limited to staffing limitations. However, reasonable benchmarks for each institution can be established against which institutional progress to full-scale implementation will be measured.

APPENDIX A

DATA TABLES

See tables on following pages.

- Table 1: Fall 2007 Gateway Course Completion with Graduation Rates (Math Only)
- Table 2: Fall 2012 Gateway Course Completions (Math Only)
- Table 3: Fall 2012 Gateway Course Completions (Math Only)
- Table 4: Fall 2013 Gateway Course Completions (Math Only)
- Table 5: Math Course Number Legend
- Table 6: Highest Subsequent Math Enrolled
- Table 7: Enrollment in Math by Program CIP - Fall 2012

Table 1: Fall 2007 Gateway Course Completions with Graduation Rates (Math Only)

	Total Cohort	Enrolled Remedial					No Remedial				Total			
		Remedial Flag - Yrs 1 or 2	Completed College Level Yr 1		Completed College Level Yr 2		Completed College Level Yr 1		Completed College Level Yr 2		Total % Completed CL Yr 1	Total % Completed CL Yr 2	Total % Completed CL Yr 1 & 2	Did Not Complete College Level Math w/i 2 yrs
CSN	2879	984	96	9.8%	93	9.5%	251	13.2%	47	2.5%	12.1%	4.9%	16.9%	83.1%
GBC	468	169	13	7.7%	25	14.8%	33	11.0%	11	3.7%	9.8%	7.7%	17.5%	82.5%
TMCC	1420	744	39	5.2%	67	9.0%	143	21.2%	18	2.7%	12.8%	6.0%	18.8%	81.2%
WNC	582	228	44	19.3%	36	15.8%	114	32.2%	10	2.8%	27.1%	7.9%	35.1%	64.9%

	Awards Conferred-150% time to degree			
CSN	19.3%	32.9%	23.2%	3.9%
GBC	30.4%	22.2%	26.8%	1.8%
TMCC	30.8%	34.1%	31.8%	1.5%
WNC	33.5%	21.7%	30.9%	0.3%

	Total Cohort	Enrolled Remedial					No Remedial				Total			
		Remedial Flag - Yrs 1 or 2	Completed College Level Yr 1		Completed College Level Yr 2		Completed College Level Yr 1		Completed College Level Yr 2		Total % Completed CL Yr 1	Total % Completed CL Yr 2	Total % Completed CL Yr 1 & 2	Did Not Complete College Level Math w/i 2 yrs
NSC	162	111	29	26.1%	9	8.1%	19	37.3%	3	5.9%	29.6%	7.4%	37.0%	63.0%
UNLV	2446	255	34	13.3%	58	22.7%	1197	54.6%	167	7.6%	50.3%	9.2%	59.5%	40.5%
UNR	1400	396	156	39.4%	73	18.4%	841	83.8%	39	3.9%	71.2%	8.0%	79.2%	20.8%

	Awards Conferred-150% time to degree			
NSC	27.1%	16.7%	25.0%	3.9%
UNLV	49.1%	47.1%	48.8%	22.6%
UNR	53.3%	41.1%	52.0%	12.7%

Cohort: Fall 2007 First-time, degree-seeking Freshmen

Table 2: Fall 2012 Gateway Course Completions (Math Only)

One Year				Remedial						Bridge - 120 or 126			College Level			
Math Summary	Total Cohort	No Math		Remedial Total	Enrolled College Level	Completed College Level	Enrolled Bridge	Completed Bridge	% Completed CL within one year	Enroll	Complete	% Completed	Enroll	Complete	% Completed CL within one year	Total % Completed CL within one year
CSN01	4354	2947	67.7%	832	92	68			8.2%				575	371	64.5%	10.1%
GBC01	230	89	38.7%	110	17	14			12.7%				31	25	80.6%	17.0%
NSC01	132	43	32.6%	75	5	4			5.3%				14	11	78.6%	11.4%
TMCC1	1231	384	31.2%	711	142	92			12.9%	3	2	66.7%	133	103	77.4%	16.0%
UNLV1	2688	508	18.9%	912	179	128			14.0%				1268	1004	79.2%	42.1%
UNR01	2425	111	4.6%	558	293	264	41	38	54.1%	91	87	95.6%	1665	1542	92.6%	79.6%
WNC01	598	180	30.1%	271	56	50			18.5%				147	129	87.8%	29.9%

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Cohort: Fall 2012 First-time, degree-seeking Freshmen

Two Years				Remedial						Bridge - 120 or 126			College Level			
Math Summary	Total Cohort	No Math		Remedial Total	Enrolled College Level	Completed College Level	Enrolled Bridge	Completed Bridge	% Completed CL within two years	Enroll	Complete	% Completed within two years	Enroll	Complete	% Completed CL within two years	Total % Completed CL within two years
CSN01	4354	2531	58.1%	1158	364	290			25.0%				665	448	67.4%	16.9%
GBC01	230	77	33.5%	120	34	25			20.8%				33	26	78.8%	22.2%
NSC01	132	39	29.5%	79	29	25			31.6%				14	11	78.6%	27.3%
TMCC1	1231	324	26.3%	771	267	210			27.2%	3	2	66.7%	133	113	85.0%	26.4%
UNLV1	2688	357	13.3%	1007	423	333			33.1%				1324	1142	86.3%	54.9%
UNR01	2425	87	3.6%	574	354	323	74	72	68.8%	92	88	95.7%	1672	1580	94.5%	85.1%
WNC01	598	168	28.1%	285	101	87			30.5%				145	127	87.6%	35.8%

Table 3 - Fall 2012 Gateway Course Completions (Math Only)

Cohort: Fall 2012 First-time, degree-seeking Freshmen				FIRST MATH ENROLLMENT												
				Remedial						Co-Requisite - 120 or 126 (96)			College Level			
Math Summary	Total Cohort	No Math		Remedial Total	Enrolled College Level	Completed College Level (D+)	Enrolled Co-Req Following Remedial	Completed Co-Req (D+) Following Remedial	% Completed CL within one year	Enroll	Complete (D+)	% Completed	Enroll	Complete (D+)	% Completed CL within one year	Total % Completed CL within one year
CSN01	**4354**	2947	67.7%	832	92	68			8.2%				575	371	64.5%	10.1%
91	[redacted]	[redacted]		108	4	3			2.8%							
93				45	1	1			2.2%							
95				523	47	34			6.5%							
96				156	40	30			19.2%							
GBC01	**230**	89	38.7%	110	16	14			12.7%				31	25	80.6%	17.0%
91	[redacted]	[redacted]		60	2	2			3.3%							
95				22	2	2			9.1%							
96				18	8	7			38.9%							
97				10	4	3			30.0%							
NSC01	**132**	43	32.6%	75	5	4			5.3%				14	11	78.6%	11.4%
93	[redacted]	[redacted]		45	0	0			0.0%							
95				18	1	1			5.6%							
96				12	4	3			25.0%							
TMCC1	**1231**	384	31.2%	711	142	92			12.9%	3	2	66.7%	133	103	77.4%	16.0%
92	[redacted]	[redacted]		2	2	2			100.0%							
95				131	17	11			8.4%							
96				279	121	77			27.6%							
SKC				299	2	2			0.7%							
UNLV1	**2688**	508	18.9%	912	179	128			14.0%				1268	1004	79.2%	42.1%
91/93	[redacted]	[redacted]		2	1	0			0.0%							
95				637	53	36			5.7%							
96				273	125	92			33.7%							

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Table 3 continued - Fall 2012 Gateway Course Completions (Math Only)

Cohort: Fall 2012 First-time, degree-seeking Freshmen				FIRST MATH ENROLLMENT												
				Remedial						Co-Requisite - 120 or 126 (96)			College Level			
Math Summary	Total Cohort	No Math		Remedial Total	Enrolled College Level	Completed College Level (D+)	Enrolled Co-Req Following Remedial	Completed Co-Req (D+) Following Remedial	% Completed CL within one year	Enroll	Complete (D+)	% Completed	Enroll	Complete (D+)	% Completed CL within one year	Total % Completed CL within one year
UNR01	**2425**	111	4.6%	558	293	264	41	38	54.1%	91	87	95.6%	1665	1542	92.6%	79.6%
19				3	3	3			100.0%							
95				10	1	0	2	2	20.0%							
96				545	289	261	39	36	54.5%							
WNC01	**598**	180	30.1%	271	56	50			18.5%				147	129	87.8%	29.9%
92				23	15	12			52.2%							
95				168	13	12			7.1%							
96				72	28	26			36.1%							
98				8	0	0			0.0%							
2-yr	**6413**	3600	56.1%	1924	306	224	0	0	11.6%	3	2	66.7%	886	628	70.9%	13.3%
91/92/93				238	24	20	0	0	8.4%							
95				844	79	59	0	0	7.0%							
96				525	197	140	0	0	26.7%							
97/98				18	4	3	0	0	16.7%							
SKC				299	2	2	0	0	0.7%							
4-yr	**5245**	662	12.6%	1545	477	396	41	38	28.1%	91	87		2947	2557	86.8%	58.7%
92/93				50	4	3	0	0	6.0%							
95				665	55	37	2	2	5.9%							
96				830	418	356	39	36	47.2%							

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Table 4 - Fall 2013 Gateway Course Completions (Math Only)

Cohort: Fall 2013 First-time, degree-seeking Freshmen				FIRST MATH ENROLLMENT												
				Remedial						Co-Requisite - 120 or 126 (TMCC 92/UNR 96)			College Level			
Math Summary	Total Cohort	No Math		Remedial Total	Enrolled College Level	Completed College Level (D+)	Enrolled Co-Req Following Remedial	Completed Co-Req (D+) Following Remedial	% Completed CL within one year	Enroll	Complete (D+)	% Completed	Enroll	Complete (D+)	% Completed CL within one year	Total % Completed CL within one year
CSN01	**4979**	3529	70.9%	811	127	93			11.5%				639	454	71.0%	11.0%
91				1	0				0.0%							
93				266	10	9			3.4%							
95				334	52	44			13.2%							
96				210	65	40			19.0%							
GBC01	**199**	64	32.2%	107	20	13			12.1%				28	22	78.6%	17.6%
91				71	3	3			4.2%							
95				14	3	1			7.1%							
96				17	11	7			41.2%							
97				5	3	2			40.0%							
NSC01	**226**	61	27.0%	146	19	14			9.6%				19	15	78.9%	12.8%
93				107	2	1			0.9%							
95				22	6	6			27.3%							
96				17	11	7			41.2%							
TMCC1	**1218**	457	37.5%	606	100	70			11.6%	13	11	84.6%	142	99	69.7%	14.8%
92				2	0				0.0%							
95				134	17	10			7.5%							
96				212	80	57			26.9%							
SKC				258	3	3			1.2%							
UNLV1	**3139**	515	16.4%	977	177	101			10.3%				1647	1172	71.2%	40.6%
93				1	0				0.0%							
95				702	47	33			4.7%							
96				274	130	68			24.8%							

p = |22|

Table 4 continued - Fall 2013 Gateway Course Completions (Math Only)

Cohort: Fall 2013 First-time, degree-seeking Freshmen				FIRST MATH ENROLLMENT												
				Remedial						Co-Requisite - 120 or 126 (TMCC 92/UNR 96)			College Level			
Math Summary	Total Cohort	No Math		Remedial Total	Enrolled College Level	Completed College Level (D+)	Enrolled Co-Req Following Remedial	Completed Co-Req (D+) Following Remedial	% Completed CL within one year	Enroll	Complete (D+)	% Completed	Enroll	Complete (D+)	% Completed CL within one year	Total % Completed CL within
UNR01	**2613**	125	4.8%	441	137	123	60	54	40.1%	255	237	92.9%	1792	1644	91.7%	78.8%
92				1					0.0%							
95				260	24	19	50	45	24.6%							
96				180	113	104	10	9	62.8%							
WNC01	**633**	201	31.8%	288	92	74			25.7%				144	120	83.3%	30.6%
92				29	21	16			55.2%							
95				169	28	23			13.6%							
96				86	43	35			40.7%							
98				4	0				0.0%							
2-yr	**7029**	4251	60.5%	1812	339	250	0	0	13.8%	13	11	84.6%	953	695	72.9%	13.6%
91/92/93				369	34	28	0	0	7.6%							
95				651	100	78	0	0	12.0%							
96				525	199	139	0	0	26.5%							
97/98				9	3	2	0	0	22.2%							
SKC				258	3	3	0	0	1.2%							
4-yr	**5978**	701	11.7%	1564	333	238	60	54	18.7%	255	237	92.9%	3458	2831	81.9%	56.2%
92/93				109	2	1	0	0	0.9%							
95				984	77	58	50	45	10.5%							
96				471	254	179	10	9	39.9%							

p = |23|

Table 5 - Math Course Number Legend

	CSN01	GBC01	NSC01	TMCC1	UNLV1	UNR01	WNC01	Pre-Requisite
120: Fund of College Mathematics	X	X	X	X	X	X	X	
124: College Algebra	X		X		X			
126: Precalculus I	X	X	X	X	X	X	X	
127: Precalculus II	X	X	X	X	X	X	X	
128: Precalculus & Trig	X	X	X	X	X	X	X	
132: Finite Mathematics	X		X		X			Math 124: College Algebra
176: Calculus for Business				X		X	X	Math 126: Precalculus I
181: Calculus I	X	X	X	X	X	X	X	Math 126/127 or Math 128
100: Math for Allied Health	X			X			X	
104: Applied Mathematics	X							
105R: Math for Radiologic Tech				X				
106: Geometry				X				
107: Real Estate Math				X				
108: Math for Technicians				X				
110: Shop Mathematics							X	
111: Math Electronics Applications	X							
116: Technical Mathematics	X	X						
122: Numb Concpt Elem Schl Tch	X	X	X	X	X	X	X	
123: Stat Geomt Cncpt Elem Tch	X	X	X	X	X	X	X	

p = |24|

Table 6 - Highest Subsequent Math Enrolled

Fal 2012 Math Enrolled	Total	No Subsequent Higher-Level Math		124		126 / 127 / 128		132		176		181/182		122/123	STAT152	APST270	Other	Percent Other
CSN01																		
120	**483**	400	82.8%	39	8.1%	23	4.8%	4	0.8%			8	1.7%	4			5	1.9%
124	**756**	555	73.4%			57	7.5%	118	15.6%			12	1.6%	4	4		6	1.9%
126	**469**	226	48.2%			128	27.3%	19	4.1%			88	18.8%	3	1		4	1.7%
GBC01																		
120	**151**	110	72.8%		0.0%	26	17.2%		0.0%	1	0.7%	4	2.6%		10			6.6%
126	**91**	45	49.5%			27	29.7%		0.0%			9	9.9%		10			11.0%
NSC01																		
120	**94**	71	75.5%	8	8.5%	3	3.2%		0.0%			1	1.1%	10			1	11.7%
124	**72**	50	69.4%			10	13.9%	8	11.1%			4	5.6%					0.0%
TMCC1																		
120	**252**	201	79.8%		0.0%	42	16.7%		0.0%	5	2.0%	3	1.2%				1	0.4%
126	**570**	317	55.6%			93	16.3%		0.0%	68	11.9%	67	11.8%	7	17	1		4.4%
UNLV1																		
120	**482**	441	91.5%	19	3.9%	14	2.9%	2	0.4%			1	0.2%	2			3	1.0%
124	**1067**	865	81.1%			74	6.9%	108	10.1%	2	0.2%	11	1.0%	5	2			0.7%
126	**558**	269	48.2%			148	26.5%	23	4.1%	1	0.2%	112	20.1%	4			1	0.9%
UNR01																		
120	**402**	346	86.1%	2	0.5%	39	9.7%		0.0%	10	2.5%	5	1.2%					0.0%
126	**1682**	634	37.7%			263	15.6%	3	0.2%	316	18.8%	364	21.6%	35	48	19		6.1%
WNC01																		
120	**262**	213	81.3%			27	10.3%		0.0%	2	0.8%	7	2.7%	5	3		5	5.0%
126	**210**	86	41.0%			51	24.3%		0.0%	16	7.6%	50	23.8%	4	3			3.3%
2-yr																		
120	**1148**	924	80.5%	39	3.4%	118	10.3%	4	0.3%	8	0.7%	22	1.9%	9	13	0	11	2.9%
124	**756**	555	73.4%			57	7.5%	118	15.6%	0	0.0%	12	1.6%	4	4	0	6	1.9%
126	**1340**	674	50.3%			299	22.3%	19	1.4%	84	6.3%	214	16.0%	14	31	1	4	3.7%
4-yr																		
120	**978**	858	87.7%	29	3.0%	56	5.7%	2	0.2%	10	1.0%	7	0.7%	12	0	0	4	1.6%
124	**1139**	915	80.3%			84	7.4%	116	10.2%	2	0.2%	15	1.3%	5	2	0	0	0.6%
126	**2240**	903	40.3%			411	18.3%	26	1.2%	317	14.2%	476	21.3%	39	48	19	1	4.8%
System																		
120	**2126**	1782	83.8%	68	3.2%	174	8.2%	6	0.3%	18	0.8%	29	1.4%	21	13	0	15	2.3%
124	**1895**	1470	77.6%			141	7.4%	234	12.3%	2	0.1%	27	1.4%	9	6	0	6	1.1%
126	**3580**	1577	44.1%			710	19.8%	45	1.3%	401	11.2%	690	19.3%	53	79	20	5	4.4%

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Table 7 - Enrollment in Math by Program CIP - Fall 2012

	CSN			GBC		TMCC		WNC		NSC		UNLV			UNR	
	120	**124**	**126**	**120**	**126**	**120**	**126**	**120**	**126**	**120**	**124**	**120**	**124**	**126**	**120**	**126**
Liberal Arts, Social Sciences, Languages, Performing Arts, Services, Public Administration, Social Services, Legal, Trades/ Tech, Education, Other	264	282	131	52	19	150	202	175	108	47	25	332	381	146	350	554
Business (52-Business, Mgmt, Mktg, and Related Support Svcs)	29	220	37	17	5	13	92	12	18	3	11	9	519	41	4	346
STEM	190	254	301	82	67	89	274	75	84	44	36	141	167	371	48	782

Liberal Arts, Social Sciences, Languages, Performing Arts, Services, Public Administration, Social Services, Legal, Trades/Tech, Education, Other

- 05-Area, Ethnic, Cultural, Gender, and Group Studies
- 09-Communication, Journalism, and Related Programs
- 10-Communications Technologies/Technicians and Support Services
- 12-Personal and Culinary Services
- 13-Education
- 16-Foreign Languages, Literatures, and Linguistics
- 19-Family and Consumer Sciences/Human Sciences
- 22-Legal Professions and Studies
- 23-English Language and Literature/Letters
- 24-Liberal Arts and Sciences, General Studies, and Humanities
- 30-Multi/Interdisciplinary Studies
- 31-Parks, Recreation, Leisure, and Fitness Studies
- 32-Basic Skills and Developmental/Remedial Education
- 36-Leisure and Recreational Activities
- 38-Philosophy and Religious Studies
- 42-Psychology
- 43-Homeland Security, Law Enforce, Firefighting, & Related Protective Svcs
- 44-Public Administration and Social Service Professions
- 45-Social Sciences
- 46-Construction Trades
- 47-Mechanic and Repair Technologies/Technicians
- 48-Precision Production
- 49-Transportation and Material Moving
- 50-Visual and Performing Arts
- 54-History

STEM

- 01-Agriculture, Agricultural Operations, and Related Sciences
- 03-Natural Resources and Conservation
- 04-Architecture and Related Services
- 11-Computer and Information Sciences and Support Services
- 14-Engineering
- 15-Engineering Technologies and Engineering-Related Fields
- 26-Biological and Biomedical Sciences
- 27-Mathematics and Statistics
- 40-Physical Sciences
- 41-Science Technologies/Technicians
- 51-Health Professions and Related Programs
- A S - Associate of Science

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Table 7 continued - Enrollment in Math by Program CIP - Fall 2012

	2-yr						4-yr						System					
	120		124		126		120		124		126		120		124		126	
Liberal Arts, Social Sciences, Languages, Performing Arts, Services, Public Administration, Social Services, Legal, Trades/Tech, Other	641	46.3%	282	20.4%	460	33.3%	729	39.7%	406	22.1%	700	38.1%	1370	42.6%	688	21.4%	1160	36.0%
Business (52-Business, Mgmt, Mktg, and Related Support Svcs)	71	16.0%	220	49.7%	152	34.3%	16	1.7%	530	56.8%	387	41.5%	87	6.3%	750	54.5%	539	39.2%
STEM	436	30.8%	254	17.9%	726	51.3%	233	14.7%	203	12.8%	1153	72.6%	669	22.3%	457	15.2%	1879	62.5%

Liberal Arts, Social Sciences, Languages, Performing Arts, Services, Public Administration, Social Services, Legal, Trades/Tech, Education, Other

05-Area, Ethnic, Cultural, Gender, and Group Studies
09-Communication, Journalism, and Related Programs
10-Communications Technologies/Technicians and Support Services
12-Personal and Culinary Services
13-Education
16-Foreign Languages, Literatures, and Linguistics
19-Family and Consumer Sciences/Human Sciences
22-Legal Professions and Studies
23-English Language and Literature/Letters
24-Liberal Arts and Sciences, General Studies, and Humanities
30-Multi/Interdisciplinary Studies
31-Parks, Recreation, Leisure, and Fitness Studies
32-Basic Skills and Developmental/Remedial Education
36-Leisure and Recreational Activities
38-Philosophy and Religious Studies
42-Psychology
43-Homeland Security, Law Enforce, Firefighting, & Related Protective Svcs
44-Public Administration and Social Service Professions
45-Social Sciences
46-Construction Trades
47-Mechanic and Repair Technologies/Technicians
48-Precision Production
49-Transportation and Material Moving
50-Visual and Performing Arts
54-History

STEM

01-Agriculture, Agricultural Operations, and Related Sciences
03-Natural Resources and Conservation
04-Architecture and Related Services
11-Computer and Information Sciences and Support Services
14-Engineering
15-Engineering Technologies and Engineering-Related Fields
26-Biological and Biomedical Sciences
27-Mathematics and Statistics
40-Physical Sciences
41-Science Technologies/Technicians
51-Health Professions and Related Programs
A S - Associate of Science

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APPENDIX B

POLICY PROPOSAL
TITLE 4, CHAPTER 16, SECTION 1
Placement into College-Level Courses

Additions appear in ***boldface italics***; deletions are [~~stricken~~ and bracketed]

Section 1. NSHE Placement Policy

The placement policies of the Nevada System of Higher Education (NSHE) are intended to ensure a foundation of knowledge and competencies that will assist students in successfully pursuing and attaining an academic degree. Students are strongly encouraged to prepare for the rigors of higher education prior to entering the NSHE.

1. Pursuant to federal regulations, institutions may make ability-to-benefit determinations using federally approved tests and passing scores to receive federal student aid. The NSHE reserves the right to cancel the admission or registration of any individual whose attendance at a university or college, in the opinion of the appropriate administrative officer and the President, would not be mutually beneficial, as determined by the ability-to-benefit test, to that individual and the university or college.

~~2. [Effective Fall 2016, entering students from Nevada high schools will have participated in a statewide administration of the ACT exam in their junior year of high school, and some students may elect to take the ACT exam more than one time. Any student]~~

2. Initial Placement of Students into English and Mathematics Courses.

a. Exemption from Remedial Instruction. ***Degree-seeking students*** who meet[s] or exceed[s] the ***minimum*** English or mathematics scores ***on*** ~~[for the ACT]~~ ***any one of the college readiness assessments listed below*** ~~[under subsection 4]~~ must be placed into a college-level course in that subject ~~[based on the student's highest ACT test score]~~ ***and are exempt from being placed into any form of remedial instruction in that subject provided that the student:***

i. Was continuously enrolled in an English course and a mathematics course in his or her senior year of high school unless an exception is approved on a case by case basis by an NSHE institution; and

ii. Enrolls in an NSHE institution after high school in any term (summer/fall/winter/ spring) during the academic year following high school graduation.

Institutions may use other factors including high school transcript, grade point average, or additional testing to determine the appropriate first college-level course. ~~[, or to place a student who did not meet the placement scores under subsection 4 into a college-level course.~~ ***Institutions are not required to honor initial placement decisions pursuant to this subsection for students who fail to remain continuously enrolled in required mathematics and English courses until the core mathematics and English requirements are completed.***

~~[This subsection applies only to students who:~~

~~a. Were continuously enrolled in an English and mathematics course in their senior year of high school unless an exception is approved on a case-by-case basis by an NSHE institution; and~~

College Readiness Assessments - English	
Test Score	***Minimum Score***
ACT English	***18***
SAT Critical Reading	***500***
Smarter Balanced	***2583 (Achievement Level 3)***
PARCC	***Level 4 Score***

College Readiness Assessment - Mathematics	
Test Score	***Minimum Score***
ACT Mathematics	***22***
SAT Mathematics	***500***
Smarter Balanced	***2628 (Achievement Level 3)***
PARCC	***Level 4 Score***

b. Placement of Students without an Exemption from Remedial Instruction. For degree-seeking students who have not met the English or mathematics college readiness assessment score on one of the tests in subsection a or who have not taken any of the tests in subsection a, institutions must develop an assessment and placement policy that ensures students who place at high school or above levels have an opportunity to enroll in and complete gateway college courses in mathematics and English within one academic year. The assessment and placement policy may use multiple measures, including, but not limited to placement exams; high school GPA; course selection and performance in the senior year of high school; and intended postsecondary program of study to determine appropriate placement into one the following options:

- ***i. Placement into college-level courses without any additional academic support or remediation;***
- ***ii. Placement into a co-requisite course where academic support is provided to students while enrolled in college-level gateway courses;***
- ***iii. Placement into a single semester of remedial education that is followed by either a gateway college-level course or co-requisite gateway course option; or***
- ***iv. For students who are seeking a STEM (science, technology, engineering or mathematics) degree or program of study that requires college algebra or pre-calculus and who place at the high school Algebra 1 level (e.g. Math095), placement into a three-semester sequence culminating in the gateway college algebra course. The sequence may include co-requisite coursework.***

c. Institutions may establish alternative pathways to those described in subsection b for those degree-seeking students whose mathematics or English skills are below the high school level as established by the institution's assessment and placement policy set forth in subsection b.

3. ~~[All degree-seeking students must complete the appropriate entry-level English and mathematics course work within the first 30 college-level credits year of enrollment unless otherwise authorized by the institution. Institutions should support enrollment in the appropriate entry-level, credit bearing college course immediately upon completion of any required remedial work. In addition]~~ ***Unless an institutional exception is made***, all degree-seeking students [~~should~~] ***must*** be continuously enrolled in [~~the~~] appropriate mathematics and English courses until the institutional core curriculum mathematics and English requirements are completed.

4. ~~[Except as otherwise provided in subsection 2, a student's English and mathematics placement test scores will serve as the foundation for decisions about the appropriate first college-level course. However, in addition to these scores, institutions may rely on other factors such as high school courses and grade point average, demonstrable competencies, and work experience to determine a student's college-content readiness and recommend placement.~~

    a) ~~English Placement. The following scores are minimum scores on tests a student may take or an institution may administer for placement into an entry-level, credit bearing college English course. Other appropriate placement tools may be used for English placement including reading tests, departmental diagnostic tests or other proprietary tests if supported by institutional research.~~

~~Test Score~~	~~Minimum Score~~
~~ACT English~~	~~18~~
~~SAT Critical Reading~~	~~440~~
~~Compass Writing Skills~~	~~69~~
~~Accuplacer Sentence Skills~~	~~80-86~~

    b) ~~Mathematics Placement. The following scores are minimum scores on tests a student may take or an institution may administer for placement into an entry-level, credit bearing college mathematics course. Other appropriate placement tools may be used for mathematics placement including reading tests, departmental diagnostic tests or other proprietary tests if supported by institutional research.~~

~~Test Score~~	~~Minimum Score~~
~~ACT Math~~	~~22~~
~~SAT Math~~	~~500~~
~~Compass Mathematics~~	~~65~~
~~Accuplacer College Level Math~~	~~50-63]~~

5. ~~Remedial education at NSHE institutions shall utilize instructional methods, including but not limited to co-requisite models in mathematics and English, and course designs that are most effective in ensuring that students are ready for and successful in completing an entry-level college course in English and mathematics.]~~

~~[6]~~***4***. Requirements for college readiness and college-level course enrollment shall be publicized by each institution to the appropriate Nevada school districts. ***In addition, the Chancellor will work with the State Superintendent of Public Instruction to publicize these requirements to all Nevada school districts and to establish educational strategies to encourage high school standards, graduation requirements, and assessments that are aligned with college and workforce readiness expectations.***

5. For purposes of this section, "college-level" means courses that are numbered 100-level and above.