

Math Placement Testing for College-Bound Students

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- Placement and Diagnostic Testing at Ontario Colleges
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Placement and Diagnostic Testing in Ontario Colleges

Based on a quick internet search, the following colleges employ a mathematics skills assessment.

Seneca College

Mohawk College

Humber College

Conestoga College

Centennial College

Fleming College

George Brown College

Niagara College

Placement and Diagnostic Testing at Fanshawe College

Numeracy Testing

- The MATH Assessment ran from 1979 to 2005
- College-wide
- Students wrote a computerized assessment in a proctored environment; post-admission
- Students would be asked to remediate using a self-study text before starting their program in the fall

Literacy Testing

- The WRIT Assessment was started in 2006 and is still in use
- College-wide
- Students write an essay response in a proctored environment; post-admission
- Students can place out of their first level English class and take an elective in it's place

Research at Fanshawe College

Three quantitative analyses of diagnostic mathematics testing:

Cluett, S., Jarosh, J., Roscoe, W. (2009). *Correlating student mathematics diagnostic testing and high school mathematics grades with performance in the fanshawe college pre-health science program*. Retrieved from http://www.fanshawec.ca/sites/default/files/roles/research_publisher/DRAFT%20D%20PHS%20Diagnostic%20Test%20Research%20Paper.pdf

Henning, M. C. (2007). A study of the level of math preparedness of manufacturing sciences students in the fall semester of 2005. *College Quarterly*. 10(1).
<http://collegequarterly.ca/2007-vol10-num01-winter/henning.html>

“Unabridged” version available at:

http://www.fanshawec.ca/sites/default/files/file_attachments/henning2006.pdf

Henning, M. C. (2009). *A two-step approach to diagnostic assessment in college math, fall 2007*. Retrieved from http://www.fanshawec.ca/sites/default/files/file_attachments/henning2009.pdf

Research at Fanshawe College

Three studies were conducted through the Faculty of Technology and School of Health Sciences between 2005 and 2009. These studies were used to get insight into the effectiveness of diagnostic testing.

After performing their analyses, neither the Faculty of Technology nor School of Health Sciences currently use diagnostic testing.

Faculty of Technology Diagnostic Testing Study #1

- Tested 329 students in various technology and technician programs
- Administered during first week of classes during regular class time
- Two-hour test invigilated by math professors
- No prior notice to students
- Students made aware that test was for research purposes only

Lessons Learned

- The results of diagnostic testing cannot predict individual student success (or “at risk” behaviour) according to this study.
- Students falling into the bottom four deciles (“elbows in the curve”) of the diagnostic test rankings were most likely to either fail first semester math or exhibit “at risk” behaviour.
- Evaluate Secondary School math courses as well

School of Health Sciences Diagnostic Testing Study #2

- Same diagnostic test as Study #1
- Tested 1025 students in Pre-Health Science Program
- Administered after admission, before classes started
- Two-hour test invigilated by support staff
- Prior notice to students
- Students made aware that test was not part of their final grade
- Not every in-coming student performed the test

Lessons Learned

- Students scoring below 40% and above 70% on the diagnostic test had “high” failure/withdrawal rates
- Administer the diagnostic test early enough to receive results prior to the incoming students’ first semester
- Enforce students writing the PHS mathematics diagnostic test prior to starting the semester
- Evaluate secondary school math courses as well

Faculty of Technology Diagnostic Testing Study #3

- Tested 358 students in various technology and technician programs
- **Two** diagnostic tests given to students
- First test administered on first class day with no notice
 - not part of final grade
- Second test administered after two weeks of skills review
 - Students given prior notice
 - Worth 5% of their final grade
- 50-minute tests invigilated by math professors

Lessons Learned

- 67.9% of students who failed the combined diagnostic tests failed first semester mathematics
- The results of the combined diagnostic test results provide a more effective predictive tool than the results from the earlier studies
- Evaluate secondary school math pathways as well

Summary

- Administering diagnostic testing is resource-intensive
- Enforcing testing seems important
- Timing and prior knowledge of diagnostic testing shows different levels of performance
 - Quick skills review can change performance
- Knowing secondary school math courses/pathways an important indicator of success
 - Not as resource-intensive as diagnostic testing and gaining insight into diagnostic testing effectiveness
 - Sometimes a better predictor than diagnostic testing

General Arts and Science at Fanshawe College

Science Studies Major

Interested in progressing to highly-competitive Health Science and Science programs at college and university? If so, this program stream may be well suited to you.

Take the necessary science and math courses you need to meet the program requirements for college and university programs.

Semester 1	Semester 2
Writing	Communications
Chemistry I	Chemistry II
elective	Math
Biology/Anatomy I	Biology/Anatomy II
Elective	Elective

University Agreements

Our math (and science) equivalencies are based on agreements within Fanshawe College, as well as with various universities:

- Western
- Waterloo
- Brock
- Laurier
- UoIT
- Laurentian
- Trent



FANSHAWE

FOR MORE INFORMATION:
www.fanshawec.ca/gap1
519-452-4430 ext. 4044

Looking to apply to
Western?

As part of your College transfer application to Western University, secondary school level prerequisite courses will be required for admission consideration to the following Western programs:

Management & Organizational Studies, Engineering, Foods & Nutrition, Nursing, and Kinesiology.

The following Fanshawe courses have been evaluated as secondary school equivalents:

BIOL-3012 & BIOL-3013: Biology

CHEM-3014 & CHEM-3015: Chemistry

COMM-3073: Communications

MATH-3079: Calculus & Vectors

MATH-3080: Advanced Functions

PHYS-3005: Physics
+ MATH-3080: Advanced Functions

12U Biology

12U Chemistry

12U English

12U Calculus & Vectors

12U Advanced Functions

12U Physics

Admission is competitive. Completing the secondary school equivalents alone does not guarantee admission. All other admission requirements apply.

FOR MORE INFORMATION:

http://welcome.uwo.ca/admissions/admission_requirements/canadian_college_students.html
519-661-2100

Western 

Math Courses in General Arts and Science

MATH 3068

- Covers arithmetic, percents and an introduction to algebra

MATH 3069

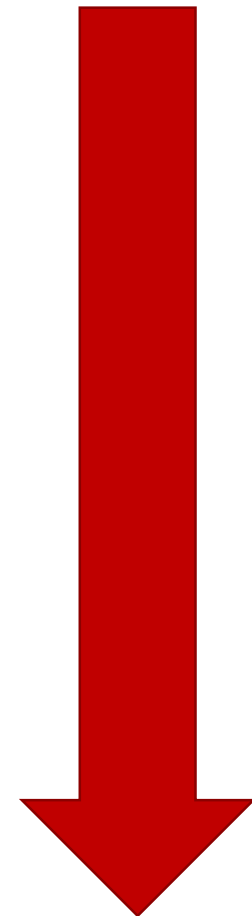
- MAP4C Equivalent
- Covers algebra, trigonometry, geometry, statistics and finance

MATH 3080

- MHF4U Equivalent
- Covers graphing and characteristics of polynomial, rational, trigonometric, exponential and logarithmic functions

MATH 3079

- MCV4U Equivalent
- Covers vectors, intersections, limits, derivatives and applications



General Arts and Science at Fanshawe College

Our dilemma – students were self-selecting into their math courses because as a General Arts and Science program, we wanted to be “open”.

Students picked their courses based on what they needed, not their skill level.

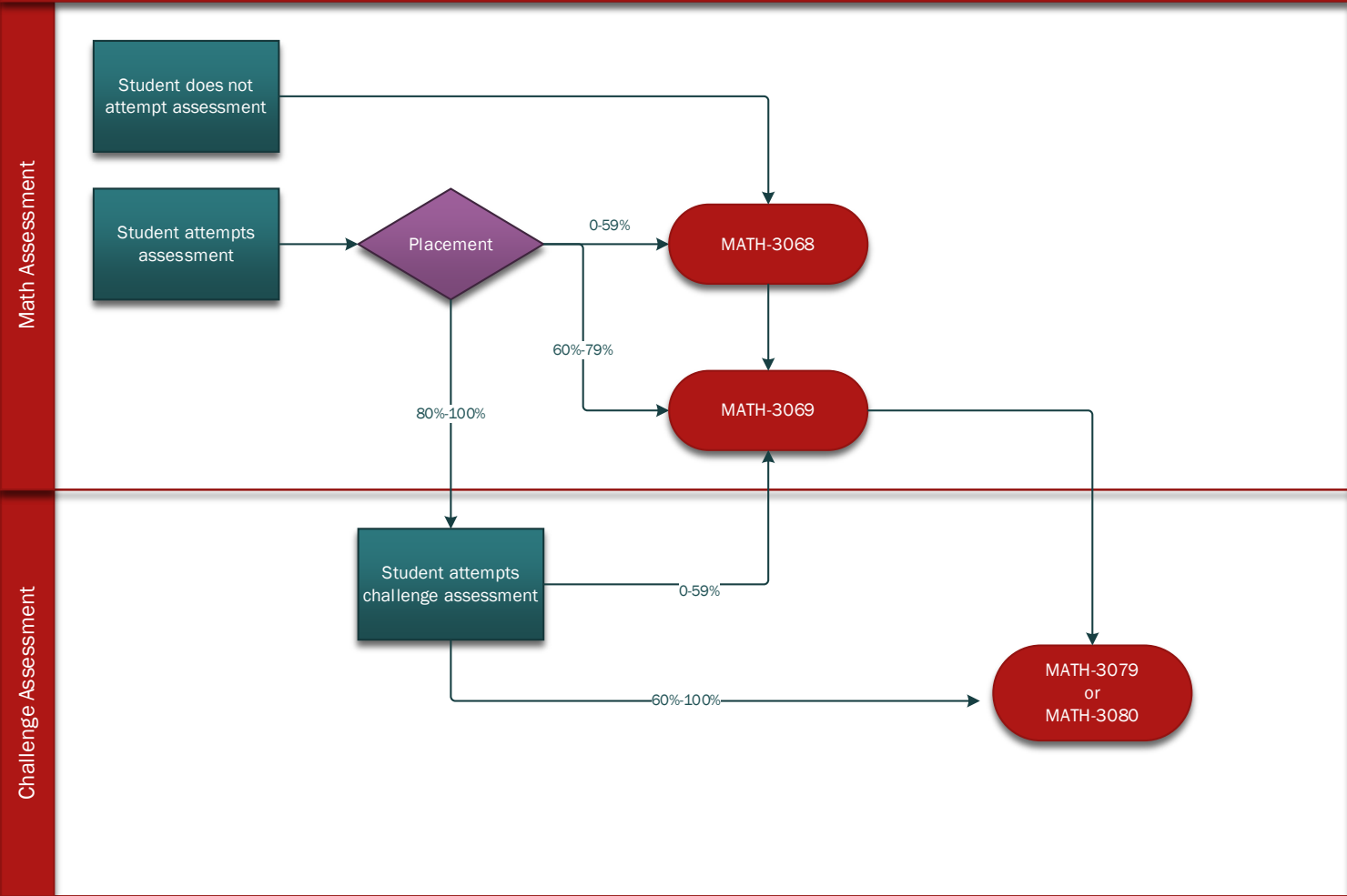
The following data shows our failure and withdrawal rates for the past two years.

	Fall 2013	Winter 2014	Fall 2014	Winter 2015
Fail	30.4%	21.1%	24.7%	14.1%
Withdraw	15.9%	16.3%	22.1%	18.6%
Total	46.3%	37.4%	46.8%	32.7%

Demo

Math Assessment Placement

GAP Science Stream



Math Pathways

Semester 1	Semester 2	Notes
MATH 3068	MATH 3069	<ul style="list-style-type: none">• Most common• Placed into lowest level
elective	MATH 3069	<ul style="list-style-type: none">• Placed out of lowest level• Need a 12C credit
MATH 3069	elective	<ul style="list-style-type: none">• Placed out of lowest level• Need a 12C credit
MATH 3069	MATH 3080	<ul style="list-style-type: none">• Placed out of lowest level• Need a 12U credit
MATH 3080	MATH 3079	<ul style="list-style-type: none">• Placed out of lowest two levels• Need a 12U credit
MATH 3080	elective	<ul style="list-style-type: none">• Placed out of lowest two levels• Need a 12U credit

The General Arts and Science Placement Test

How we built on the previous studies...

Issue	Solution
Administering is resource-intensive	Students complete the test on their own time before they start the program. Test is online and it is graded online.
Enforcing is important	Modelled after our WRIT test – students can use it to place out of a course.
Skills review shows a different level of performance	Students are given the opportunity to write a pre-assessment to gauge the level of the test; they have one month to remediate; and then they are allowed to write the Placement Test once
Use in conjunction with secondary school grades	Not applicable for our program since students are trying to get their high school equivalents

Low stakes

Results – Fall 2015

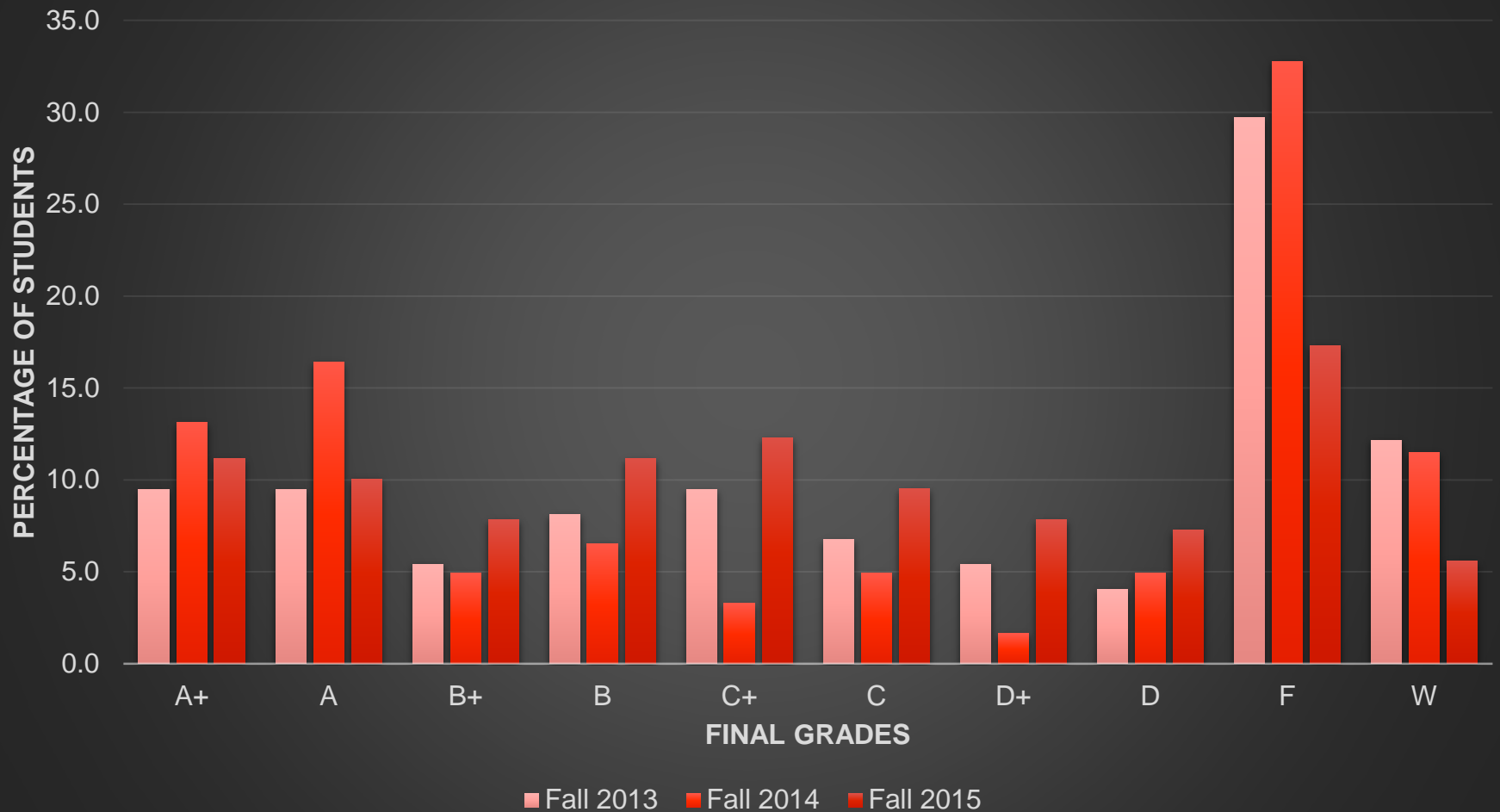
	# of Students in 3068
Fall 2013	74
Fall 2014	61
Fall 2015	179

Results – Fall 2015

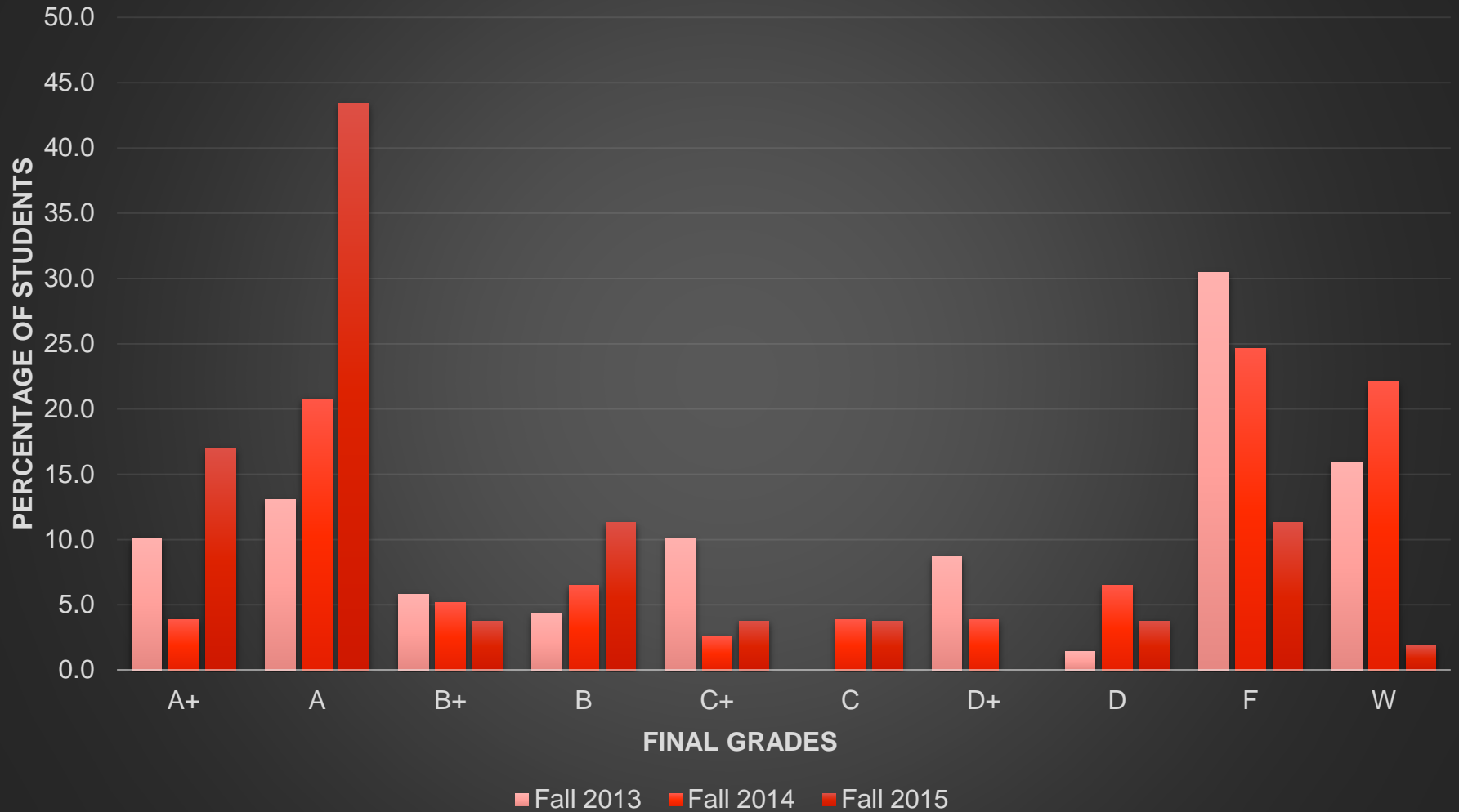
	Total	Percent
Students enrolled in GAS MATH courses	268*	-
EMM Registrants	149	56%
3068 Placements (Level 1)	37	25%
3069 Placements (Level 2)	25	17%
3079/3080 Placements (Levels 3 and 4)	11	7%
Incomplete	76	51%

	Average Time Spent	Minimum	Maximum
Pre-Test	33 minutes	6 minutes	162 minutes
Remediation	65 minutes	0 minutes	570 minutes
Placement Test	25 minutes	0 minutes	116 minutes

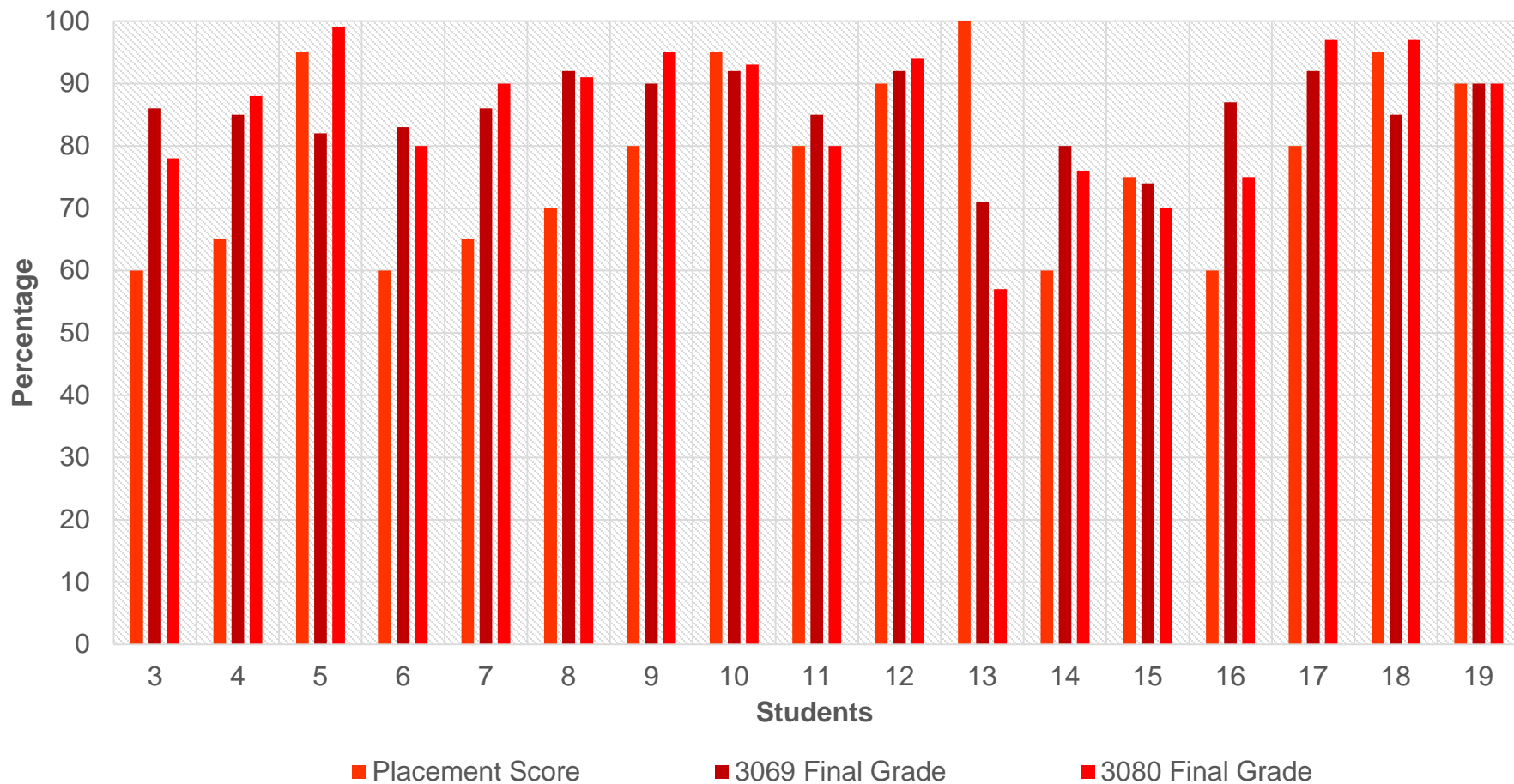
MATH 3068



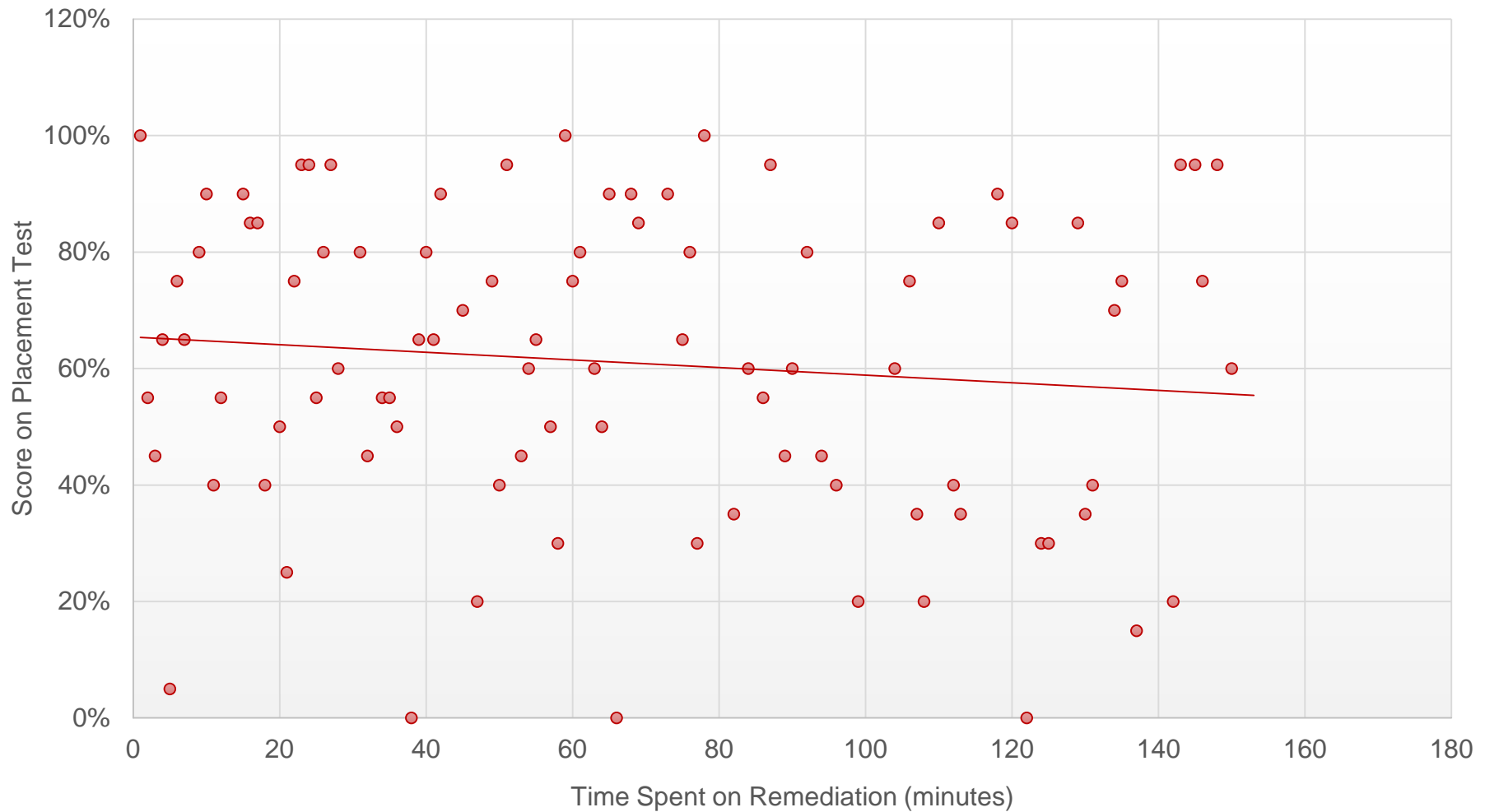
MATH 3069



Student Grades for Placement Test, MATH 3069 and MATH 3080



Remediation



FANSHAWE

Conclusions

Where are we going from here?

- Track students as they move on in their next programs
- Collect more data
- Change to CSAP assessment?
- Expand to other programs across the college

What problems do we still have?

- Large gap between 3069 and 3080
- Cheating?

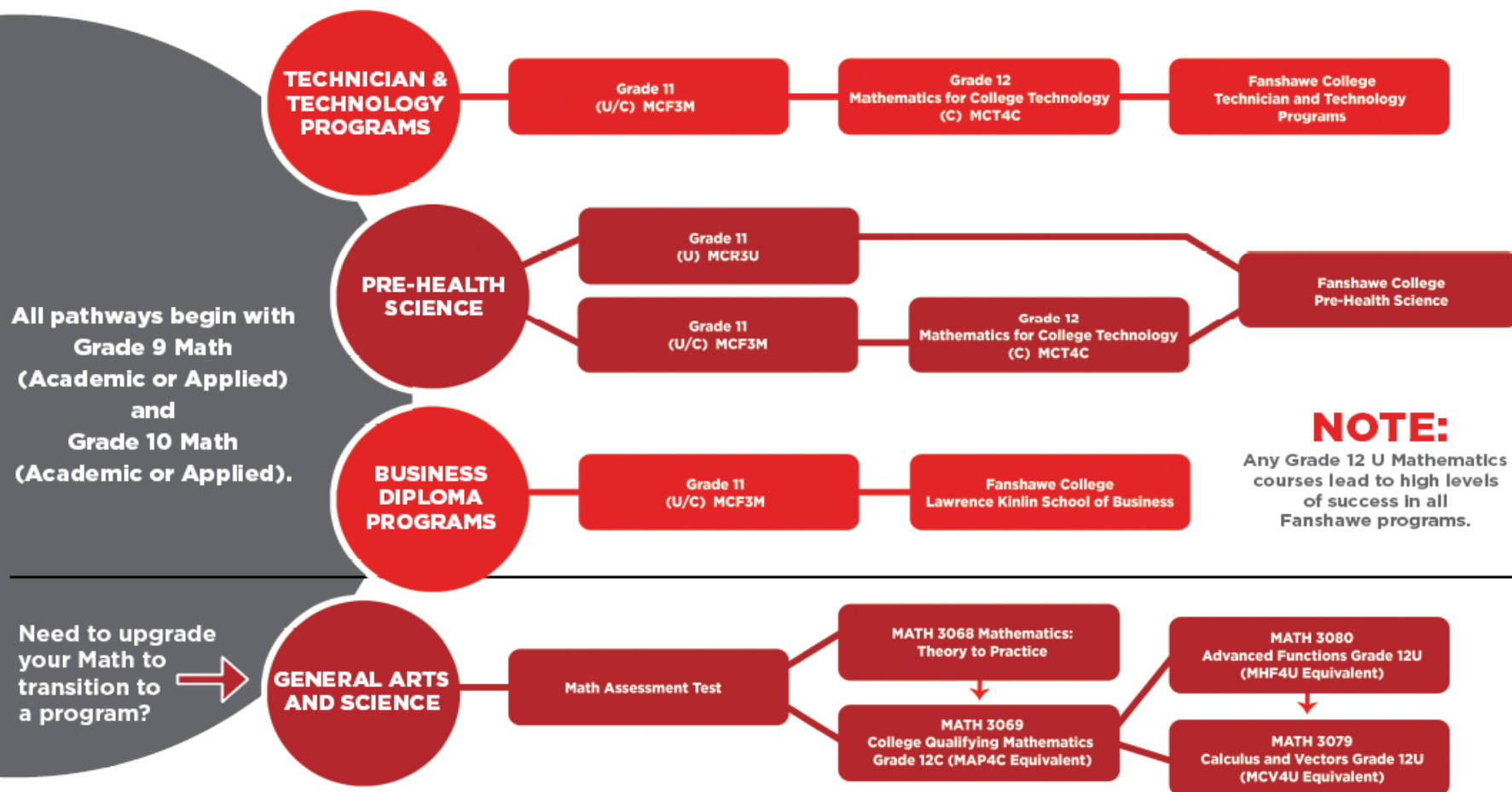
Questions

References

- Cluett, S., Jarosh, J., Roscoe, W. (2009). *Correlating student mathematics diagnostic testing and high school mathematics grades with performance in the fanshawe college pre-health science program*. Retrieved from http://www.fanshawec.ca/sites/default/files/roles/research_publisher/DRAFT%20D%20PHS%20Diagnostic%20Test%20Research%20Paper.pdf
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- Jarosh, J. (2014). *Fanshawe diagnostic testing for OCMC Spring 2014*

RECOMMENDED MATH PATHWAYS FOR SUCCESS

Students who take the **recommended** pathways have a higher rate of **success** in their first year math courses at Fanshawe College.



NOTE:

Any Grade 12 U Mathematics courses lead to high levels of success in all Fanshawe programs.