

# Toledo Math Score and CHEM 111 Performance

This report explores the association between Toledo Math Scores and CHEM 111 performance. The purpose is to identify a Toledo Math Score at which the likelihood of successfully completing CHEM 111 is low enough to recommend that students do not attempt CHEM 111 until they can improve their math foundation. Successful completion of CHEM 111 is defined as receiving a grade of C or better.

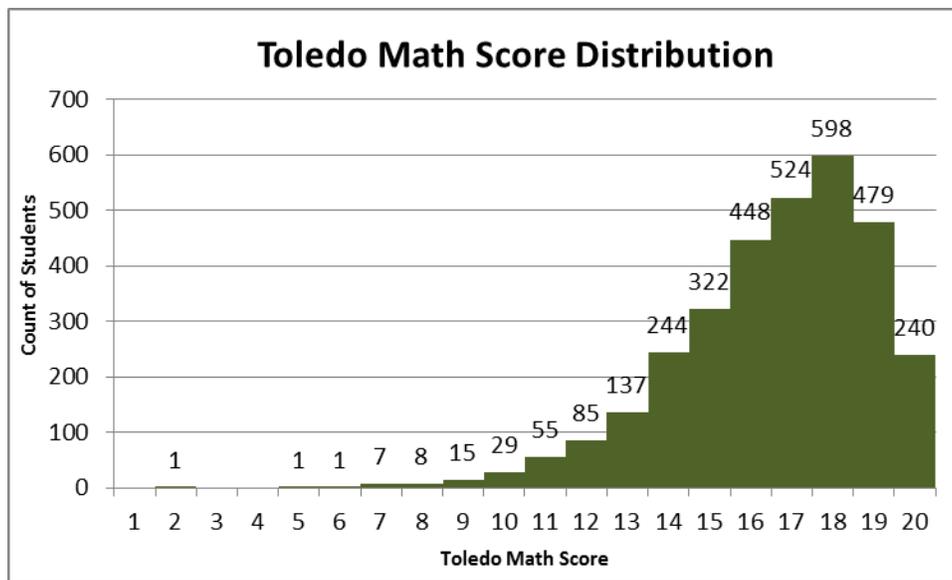
## Data

This report includes all students with Toledo Test scores who took CHEM 111 in FA10, FA11, or FA12 (N=3,194). Approximately 90% of the students who enrolled in CHEM 111 during these semesters have Toledo Test results. The unofficial letter grade is used for students who opted into the Engineering successful/unsuccessful program.

## Toledo Math Score Distributions

Figure 1 below shows the Toledo Math Score distribution for students included in this study.

Figure 1.

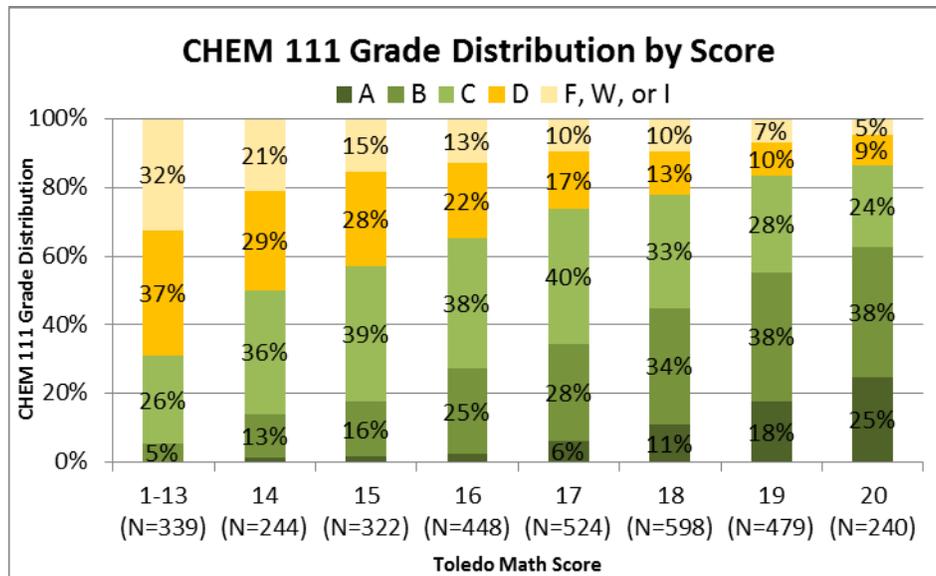


The majority of students receive a Toledo Math Score that is above 13. Only about 11% of students have a score that is equal to or less than 13. All further analyses group the scores of 1 through 13 together. The mode score is 18.

## Association between Toledo Math Score and CHEM 111 grade

Figure 2 shows CHEM 111 grade distribution by Toledo Math Score.

Figure 2.



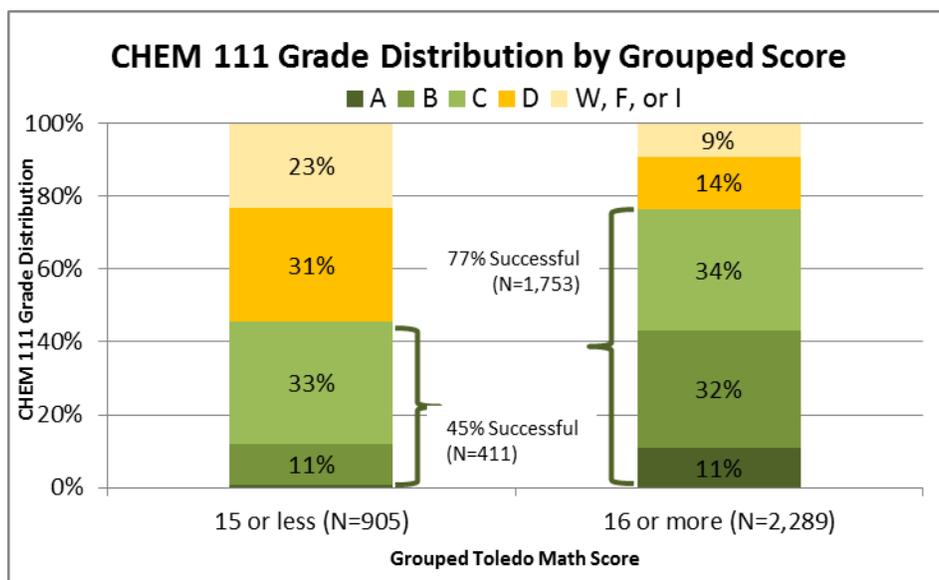
There is a strong positive association between Toledo Math Score and CHEM 111 success.

- 87% of students who receive a Toledo Math Score of **20** are successful in CHEM 111
- 84% of students who receive a Toledo Math Score of **19** are successful in CHEM 111
- 78% of students who receive a Toledo Math Score of **18** are successful in CHEM 111
- 74% of students who receive a Toledo Math Score of **17** are successful in CHEM 111
  - The second largest percentage point change (8.7 PP) in successful completion of CHEM 111 is between a score of 16 and 17
- 65% of students who receive a Toledo Math Score of **16** are successful in CHEM 111
  - The third largest percentage point change (8 PP) in successful completion of CHEM 111 is between a score of 15 and 16
- 57% of students who receive a Toledo Math Score of **15** are successful in CHEM 111
  - Based on figure 1, 28% of students earn a Toledo Math Score of 15 or less
- 50% of students who receive a Toledo Math Score of **14** are successful in CHEM 111
  - The largest percentage point change (19 PP) in successful completion of CHEM 111 is between a score of 14 and 13 or less
- 31% of students who receive a Toledo Math Score of **13** or less are successful in CHEM 111

Considering the number of students who receive a given Toledo Math Score and the percentage point change in successful CHEM 111 attempts by score, the following analysis groups students into two levels by their Toledo Test Score (15 or less and 16 or more).

Figure 3 shows the CHEM 111 grade distribution by the grouped Toledo Test Scores.

Figure 3.



Seventy-seven percent of students with a Toledo Math Score of 16 or more are successful in CHEM 111 compared to only 45% of students who earn a Toledo Math Score that is 15 or less. Among the 411 students who are successful CHEM 111 and are in the lower Toledo Score grouping, the majority (73%, N=302) of these students earn a C rather than a B or higher. In contrast, only 44% (N=767) of the 1,753 students who are successful CHEM 111 and are in the higher Toledo Score grouping earn a C.

### Conclusions

There is a strong positive association between successful CHEM 111 performance and Toledo Math scores; however, it is also important to consider the number of students earning a given score. The current unofficial cutoff score of 13 is non-discriminant because so few students earn that low of a score. The data suggest that 16 is a reasonable cutoff score given the performance gap between students who earn a 15 or less and those who a 16 or higher. Approximately 72% of CHEM 111 students earn a Toledo Math score of 16 or more.

Among students who earn a Toledo Math Score of 15 or less only 45% successfully complete CHEM 111. However, among students who earn a Toledo Math Score of 16 or more about 77% of successfully complete CHEM 111.

CHEM 111 instructors could recommend that students who earn a Toledo Math Score of 15 or less wait to take CHEM 111 until the student has the opportunity to improve their math preparation with additional math courses. More than a quarter of CHEM 111 students earn a 15 or less (about 28%); therefore, this recommendation would have a significant impact on CHEM 111's enrollment of underprepared students and the subsequent DFW rate.