# Program Assessment

2020-2021

## Math

| Math & Physical Science – Math Option | |
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| Date | **5/11/2021** |
| Competency # and Description | 1. Sketch or identify and interpret graphs |
| Course | MATH 2145 – Calculus I<br>MATH 2155 – Calculus II |
| Activity | MATH 2145 – Discuss the continuity of a given function at a point and on an interval<br>MATH 2155 – Find the second derivative, slope of the tangent line and the y direction of a point of a function |
| Measurement (attached copy of instrument with point distribution) | MATH 1613 - Common question assessed on quiz<br>MATH 2145 - Common question assessed on quiz<br>MATH 2155 - Common question assessed on quiz |
| Evaluation Criteria | MATH 1613 - Students will earn 70% or better on quiz<br>MATH 2145 - Students will earn 70% or better on quiz<br>MATH 2155 - Students will earn 70% or better on quiz |
| 2015-2016 Results | MATH 1613 – 75/94 (79.79%) of students met competency<br>MATH 2145 – 17/22 (77.27%) of student met competency<br>MATH 2155 – 12/18 (66.67%) of students met competency<br><br>MATH 1613 – 70/94 (74.47%) of students met competency<br>MATH 2145 – 39/46 (84.78%) of students met competency<br>MATH 2155 – 14/20 (70.00%) of students met competency |
| 2016-2017 Results | MATH 1613 – 39/49 (79.59%) of students met competency<br>MATH 2145 – 9/9 (100%) of students met competency<br>MATH 2155 – 27/35 (77.14%) of students met competency<br><br>MATH 1613 –<br>MATH 2145 – 27/35 (77.14%) of students met competency<br>MATH 2155 – 6/7 (85.71%) of students met competency |
| 2017-2018 Results | MATH 1613 – 19/26 (73.08%) of students met competency<br>MATH 2145 -<br>MATH 2155 – 14/19 (73.68%) of students met competency<br><br>MATH 1613 –<br>MATH 2145 – 10/12 (83.3%) of students met competency<br>MATH 2155 – 11/13 (84.62%) of students met competency |
| 2018-2019 Results | MATH 2145 – 11/16 (68.75%) of students met competency<br>MATH 2155 – 11/16 (68.75%) of students met competency<br><br>MATH 2145 – 18/27 (66.67%) of students met competency<br>MATH 2155 – 3/6 (50%) of students met competency |
| 2019-2020 Results | MATH 2145 – 18/23 (78.26%) of students met competency – both semesters combined**spring COVID-19<br>MATH 2155 – 11/20 (55%) of students met competency – both semesters combined**spring COVID-19 |
| 2020-2021 Results | MATH 2144 – 27/39 (69.2%) of students met competency – both semesters<br>MATH 2154 – 11/15 (73.3%) of students met competency – both semesters |

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| Summary of changes for 2018-2019 | MATH 1613 – We are removing the sketch, identify/graph problem. The topic is assessed on chapter tests and previous assessments have had high results. We feel it is more important to address critical thinking/application problems.<br>MATH 2145 – no changes<br>MATH 2155 – no changes |
| Recommendation for changes for 2019-2020 | MATH 1613 – We are removing the sketch, identify/graph problem. The topic is assessed on chapter tests and previous assessments have had high results. We feel it is more important to address critical thinking/application problems.<br>MATH 2145 – no changes<br>MATH 2155 – no changes |
| Recommendation for changes for 2020-2021 | Due to the splitting of the calc courses – we will shift where the certain assessments are given. With the shift to online after spring break some assessments weren't given. |
| Recommendation for changes for 2021-2022 | With the mix of students in person and online live – not sure how accurate results were for the assessments (in particular those in an o-live situation). Will start looking at how assessment results break down between the different modes of instruction (in person, online, and o-live).<br>First full year of the 3 calc sequence courses. Calc I has new instructor could be reason for drop in success. Will see how rates change with more experience to clear up confusion. Assessment results for Calc III were much higher – maybe splitting the courses up helped to allow time for understanding the material. |
| Timeline for Review | Fall/spring data will be collected and reviewed in the spring and instructors from all campuses will determine needed adjustments. |
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| Date | **5/11/2021** |
| Competency # and Description | 2. Manipulate, simplify and/or solve expressions or equations |
| Course | MATH 1613 - Trigonometry<br>MATH 2145 – Calculus I<br>MATH 2155 – Calculus II<br>MATH 2613 – Differential Equations |
| Activity | MATH 1613 – Verify each identity justifying each step<br>MATH 2145 – Fundamental rules of integration.<br>MATH 2155 – Evaluate and apply double and triple integrals in rectangular and polar coordinates<br>MATH 2613 – Solve various type of equations including Laplace transforms and determining if an equation is exact. |
| Measurement (attached copy of instrument with point distribution) | MATH 1613 - Common questions assessed on a quiz<br>MATH 2145 - Common questions assessed on a quiz<br>MATH 2155 - Common questions assessed on a quiz<br>MATH 2613 - Common questions assessed on a quiz |
| Evaluation Criteria | MATH 1613 - Students will earn 70% or better on the quiz<br>MATH 2145 - Students will earn 70% or better on the quiz<br>MATH 2155 - Students will earn 70% or better on the quiz<br>MATH 2613 - Students will earn 70% or better on the quiz |
| 2015-2016 Results | MATH 1613 – 68/92 (73.91%) of students met competency<br>MATH 2145 – 18/22 (81.82%) of students met competency<br>15/22 (68.18%) of students met competency<br>MATH 2155 – 17/19 (89.47%) of students met competency<br>MATH 2613 – 12/12 (100%) of students met competency<br><br>MATH 1613 – 67/91 (73.63%) of students met competency<br>MATH 2145 – 37/47 (78.72%)<br>33/43 (76.74%) of students met competency<br>MATH 2155 – 19/20 (95%) of students met competency<br>MATH 2613 – 13/19 (68.2%) and 11/19 (57.89%) |

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| 2016-2017 Results | MATH 1613 – 20/30 (66.67%) of students met competency<br>MATH 2145 – 7/9 (77.78%) of students met competency<br>MATH 2155 – 30/35 (85.71%) of students met competency<br>MATH 2613 – N/A<br><br>MATH 1613 – N/A<br>MATH 2145 – 6/7 (85.71%) of students met competency<br>MATH 2155 – 24/35 (68.75%) of students met competency<br>MATH 2613 – 21/28 (75%) of students met competency |
| 2017-2018 Results | MATH 1613 – 19/26 (73.08%) of students met competency<br>MATH 2145 – 17/19 (89.47%) of students met competency<br>MATH 2155 – 15/29 (51.72%) of students met competency<br>MATH 2613 – N/A<br><br>MATH 1613 - 9/14 (64.29%) of students met competency<br>MATH 2145 – 20/27 (74.07%) of students met competency<br>MATH 2155 – 7/13 (53.85%) of students met competency<br>MATH2613 – 14/18 (77.7%) of students met competency |
| 2018-2019 Results | MATH 1613 – 12/25 (48%) of students met competency<br>MATH 2145 – 8/16 (50%) of students met competency<br>MATH 2155 – 15/16 (93.75%) of students met competency<br><br>MATH 1613<br>MATH 2145 – 20/27 (74.07%) of students met competency<br>MATH 2155 – 5/6 (83.33%) of students met competency<br>MATH 2613 – 42/60 (70%) of students met competency |
| 2019-2020 Results | MATH 1613 – 43/54 (79.62%) of students met competency – both semesters combined**spring COVID-19<br>MATH2145 – 12/15 (80%) of students met competency – both semesters combined**spring COVID-19<br>MATH 2155 – 25/30 (83.33%) of students met competency – both semesters combined**spring COVID-19<br>MATH 2613 – no data spring COVID-19 |
| 2020-2021 Results | MATH 1613 – 41/59 (69.5%) of students met competency – both semesters combined<br>MATH 2154 – 22/35 (62.9%) of students met competency – both semesters combined<br>MATH 2164 – 9.9 (100%) of students met competency<br>MATH 2613 – 11/12 (91.7%) of students met competency |
| Summary of changes for 2018-2019 | MATH 1613 – Questions to be adjusted for more application and critical thinking<br>MATH 2145 – no changes<br>MATH 2155 – no changes<br>MATH 2613 – no changes |
| Recommendation for changes for 2019-2020 | 1613 – no changes – want to run through another year to gather data and see how question adjustments made an impact or not.<br>Other courses – no changes. Need to focus more in class on content trouble areas. Possibly adjust benchmarks if continue to meet. |
| Recommendation for changes for 2020-2021 | With the splitting of the calc courses – some questions were shifted between courses. Some assessments may not have been administered in spring after the shift to online. |
| Recommendation for changes for 2021-2022 | With the mix of students in person and online live – not sure how accurate results were for the assessments (in particular those in an o-live situation). Will start looking at how assessment results break down between the different modes of instruction (in person, online, and o-live).<br>First full year of the 3 calc sequence courses. What changed from Calc I in previous sequence is now in Calc II – new instructor could be reason for drop in success. Will see how rates change with more experience to clear up confusion. Assessment results for Calc III were much higher – maybe splitting the courses up helped to allow time for understanding the material.<br>Trig feels assessments are where they need to be – almost met the criteria. |
| Timeline for Review | Fall/spring data will be collected and reviewed in the spring and instructors from all campuses will determine needed adjustments. |

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| Date | **5/11/2021** |
| Competency # and Description | 3. Solve and interpret real world application problems |
| Course | MATH 1613 - Trigonometry<br>MATH 2155 – Calculus II |
| Activity | MATH 1613 – Word problems involving trig functions<br>MATH 2155 – Word problems involving vectors. |
| Measurement (attached copy of instrument with point distribution) | MATH 1613 - Common questions assessed on a quiz<br>MATH 2155 - Common questions assessed on a quiz |
| Evaluation Criteria | MATH 1613 - Students will earn 70% or better on the quiz<br>MATH 2155 - Students will earn 70% or better on the quiz |
| 2015-2016 Results | MATH 1613 – 72/87 (82.73%)<br>MATH 2155 – 17/19 (89.47%)<br><br>MATH 1613 – 74/89 (83.15%)<br>MATH 2155 – 16/20 (80.00%) |
| 2016-2017 Results | MATH 1613 – 39/48 (81.25%) of students met competency<br>MATH 2155 – 31/35 (88.57%) of students met competency<br><br>MATH 1613 – N/A<br>MATH 2155 – 4/7 (57.14%) of students met competency |
| 2017-2018 Results | MATH 1613 – 37/61 (60.66%) of students met competency<br>MATH 2155 – 10/19 (52.63%) of students met competency<br><br>MATH 1613 –30/52 (57.69%) of students met competency<br>MATH 2155 6/13 (46.15%) of students met competency |
| 2018-2019 Results | MATH 1613 – 39/54 (72.22%) of students met competency<br>MATH 2155 – 14/16 (87.5%) of students met competency<br><br>MATH 1613 – 29/40 (72.5%) of students met competency<br>MATH 2155 – 4/6 (66.67%) of students met competency |
| 2019-2020 Results | MATH 1613 – 39/54 (72.22%) of students met competency – both semesters combined**spring COVID-19<br>MATH 2155 – 25/29 (86.2%) of students met competency – both semesters combined**spring COVID-19 |
| 2020-2021 Results | MATH 1613 – 40/58 (69%) of students met competency – both semesters combined<br>MATH 2164 – 9/9 (100%) of students met competency |
| Summary of changes for 2018-2019 | For 1613 reworded problem to make more sense for students. Question was confusing in the description. |
| Recommendation for changes for 2019-2020 | 1613 – run another year to see how rewording makes a difference in success<br>2155 – not always meeting benchmark – need to emphasize more in class and see what is different from fall to spring. Continue to focus on how to analyze word problems. |
| Recommendation for changes for 2020-2021 | With the split of calc – some questions will be shifted to between courses. Some assessments may not have been given in spring when shifted to online. |
| Recommendation for changes for 2021-2022 | With the mix of students in person and online live – not sure how accurate results were for the assessments (in particular those in an o-live situation). Will start looking at how assessment results break down between the different modes of instruction (in person, online, and o-live).<br>First full year of the 3 calc sequence courses. Assessment results for Calc III were higher – maybe splitting the courses up helped to allow time for understanding the material.<br>Trig feels assessments are where they need to be – almost met the criteria set. |

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| Timeline for Review | Fall/spring data will be collected and reviewed in the spring and instructors from all campuses will determine needed adjustments. |
| | **Chem/Phys & Pre-Engineering Option** |
| Date | **5/11/2021** |
| Competency # and Description | 4. Use and apply physical data to solve problems |
| Course | MATH 2145 – Calculus I<br>MATH 2155 – Calculus II |
| Activity | MATH 2145 – Word problems involving derivations<br>MATH 2155 – Word problems involving vectors. |
| Measurement (attached copy of instrument with point distribution) | MATH 2145 - Common questions assessed on a quiz<br>MATH 2155 - Common questions assessed on a quiz |
| Evaluation Criteria | MATH 2145 - Students will earn 70% or better on the quiz<br>MATH 2155 - Students will earn 70% or better on the quiz |
| 2015-2016 Results | N/A |
| 2016-2017 Result | MATH 2145 – 7/7 (100%) of students met competency<br>MATH 2155 – 31/35 (88.57%) of students met competency<br><br>MATH 2145 – 26/35 (74.28%) of students met competency<br>MATH 2155 – 4/7 (57.14%) of students met competency |
| 2017-2018 Results | MATH 2145 – 14/19 (73.68%) of students met competency<br>MATH 2155 – 6/12 (50%) of students met competency<br><br>MATH 2145 – 9/12 (75%) of students met competency<br>MATH 2155 – 6/13 (46.15%) of students met competency |
| 2018-2019 Results | MATH 2145 – 8/16 (50%) of students met competency<br>MATH 2155– 14/16 (87.5%) of students met competency<br><br>MATH 2145 – 18/27 (66.67%) of students met competency<br>MATH 2155 – 4/6 (66.67%) of students met competency |
| 2019-2020 Results | MATH 2145 – 17/23 (73.91%) of students met competency – both semesters combined**spring COVID-19 |
| 2020-2021 Results | MATH 2154 – 25/42 (59.5%) of students met competency – both semesters |
| Summary of changes for 2018-2019 | Incorporate more application problems (physics in particular) in the class lecture and homework problems. Students seem to understand concepts, but lack ability to apply those concepts. |
| Recommendation for changes for 2019-2020 | Not always meeting benchmark – need to emphasize more in class. Continue to focus on how to analyze word problems. |
| Recommendation for changes for 2020-2021 | With the split of the calc courses – some questions were shifted between courses. Some assessments may not have been given after the shift to online in the spring. |
| Recommendation for changes for 2021-2022 | With the mix of students in person and online live – not sure how accurate results were for the assessments (in particular those in an o-live situation). Will start looking at how assessment results break down between the different modes of instruction (in person, online, and o-live).<br>First full year of the 3 calc sequence courses. Calc I – new instructor could be reason for drop in success. Will see how rates change with more experience to clear up confusion. Assessment results for Calc III were much higher – maybe splitting the courses up helped to allow time for understanding the material. |

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| Timeline for Review | Fall/spring data will be collected and reviewed in the spring and instructors from all campuses will determine needed adjustments. |
| | **Chem/Phys & Pre-Engineering Option** |
| Date | **5/11/2021** |
| Competency # and Description | 5. Use logical reasoning to solve problems |
| Course | MATH 2145 – Calculus I<br>MATH 2155 – Calculus II |
| Activity | MATH 2145 – Word problems involving derivations<br>MATH 2155 – Word problems involving vectors. |
| Measurement (attached copy of instrument with point distribution) | MATH 2145 - Common questions assessed on a quiz<br>MATH 2155 - Common questions assessed on a quiz |
| Evaluation Criteria | MATH 2145 - Students will earn 70% or better on the quiz<br>MATH 2155 - Students will earn 70% or better on the quiz |
| 2015-2016 Results | N/A |
| 2016-2017 Results | MATH 2145 – 7/7 (100%) of students met competency<br>MATH 2155 – 31/35 (88.57%) of students met competency<br><br>MATH 2145 – 26/35 (74.28%) of students met competency<br>MATH 2155 – 4/7 (57.14%) of students met competency |
| 2017-2018 Results | MATH 2145 – 14/19 (73.68%) of students met competency<br>MATH 2155 – 6/12 (50%) of students met competency<br><br>MATH 2145 – 9/12 (75%) of students met competency<br>MATH 2155 – 6/13 (46.15%) of students met competency |
| 2018-2019 Results | MATH 2145 – 8/16 (50%) of students met competency<br>MATH 2155 – 14/16 (87.5%) of students met competency<br><br>MATH 2145 – 18/27 (66.67%) of students met competency<br>MATH 2155 – 4/6 (66.67%) of students met competency |
| 2019-2020 Results | MATH 2145 – 17/23 (73.91%) of students met competency – both semesters combined**spring COVID-19 |
| 2020-2021 Results | MATH 2154 – 25/42 (59.5%) of students met competency – both semesters |
| Summary of changes for 2018-2019 | Incorporate more application problems (physics in particular) in the class lecture and homework problems. Students seem to understand concepts, but lack ability to apply those concepts. |
| Recommendation for changes for 2019-2020 | Not always meeting benchmark – need to emphasize more in class and see what is different from fall to spring. Continue to focus on how to analyze word problems. |
| Recommendation for changes for 2020-2021 | With the split of the calc courses – some questions were shifted between courses. Some assessments may not have been given after the shift to online in the spring. |
| Recommendation for changes for 2021-2022 | With the mix of students in person and online live – not sure how accurate results were for the assessments (in particular those in an o-live situation). Will start looking at how assessment results break down between the different modes of instruction (in person, online, and o-live).<br>First full year of the 3 calc sequence courses. Calc I – new instructor could be reason for drop in success. Will see how rates change with more experience to clear up confusion. Assessment results for Calc III were much higher – maybe splitting the courses up helped to allow time for understanding the material. |

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| Timeline for Review | Fall/spring data will be collected and reviewed in the spring and instructors from all campuses will determine needed adjustments. |
| Biological Science Degree – Pre-Pharmacy Option | |
| Date | **5/11/2021** |
| Competency # and Description | 6. Demonstrate effective implementation of the scientific method and written and oral expression of scientific concepts and data. |
| Course | MATH 2103 – Elementary Calculus |
| Activity | MATH 2103- Word problem involving revenue and marginal revenue |
| Measurement (attached copy of instrument with point distribution) | MATH 2103 - Common questions assessed on a quiz |
| Evaluation Criteria | MATH 2103 - Students will earn 70% or better on the quiz |
| 2015-2016 Results | N/A |
| 2016-2017 Results | MATH 2103 – 12/15 (80%) of students met competency |
| 2017-2018 Results | MATH 2103 – 8/10 (80%) of students met competency |
| 2018-2019 Results | MATH 2103 – 12/16 (75%) |
| 2019-2020 Results | MATH 2013 – 4/5 (80%) of students met competency |
| 2020-2021 Results | MATH 2013 – none given (new instructor, assessment wasn't passed along by mistake) |
| Summary of changes for 2018-2019 | Continuing with same questions to get another year of assessment to see where changes should be made. |
| Recommendation for changes for 2019-2020 | Work on another year – new instructor and want to see if there is any consistency in results before adjusting. |
| Recommendation for changes for 2020-2021 | With switching to online mid-semester and such a small group – need to really look when we can collect more data. |
| Recommendation for changes for 2021-2022 | No changes as it wasn't given – new instructor wasn't given assessment info by mistake |
| Timeline for Review | Fall/spring data will be collected and reviewed in the spring and instructors from all campuses will determine needed adjustments. |

| Summary of Program and Divisional Changes | |
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| 2016-2017 | • Began offering a few pilot sections of College Algebra Supplement and Math Applications Supplement on all three campuses.<br>• Increasing the offerings of Calc I and II to meet the needs of students. |
| 2017-2018 | • Supplements offered nearly full scale on each campus |
| 2018-2019 | • Continuing to adjust how supplements are run and offered on each campus.<br>• Calc I and II offered each semester – ITV Calc I off semesters and Calc II due to decrease in numbers. Will adjust as numbers increase with Enid getting Engineering program.<br>• Changed the name from College Algebra to Algebra for STEM starting summer 2019. Changed name from Pre-College Algebra to Pre-STEM Algebra starting summer 2019.<br>• Allowed College Algebra and Trig to be taken concurrently due to low Fast track numbers. |

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| 2019-2020 | • Started to offer calc as a 3-semester sequence (4 credit hours each) with Calc I in spring of 2020 (finished 2 semester sequence with Calc II spring 2020)<br>• Began offering Math Functions on Tonkawa and Enid campuses fall 2019<br>• Began offering Math Functions online spring 2020 |
| 2020-2021 | • Looking at just offering business calc in person in spring, online in summer.<br>• Going to try a calc III in the summer 2021 to catch anyone that may be leaving before fall semester.<br>• Offered calc over 3 courses.<br>• Added Pre-STEM online |

| Recommendations for Program Changes | |
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| 2017-2018 | • Increase the offerings of Supplement offerings to more full scale.<br>• Begin work on new remedial course to replace concepts and intermediate to prepare for college algebra to implement fall 2018.<br>• Continue to watch Calculus numbers to gauge the need for offering both each semester.<br>• Start offering Supplement to Math Functions fall 2017.<br>• Offer Math Functions on all campuses when degree requirements make changes. |
| 2018-2019 | • Removing the pre-requisite for Statistics and starting Supplement for Statistics fall 2018<br>• Changing the name of Intermediate to Pre-College Algebra – to stress for college algebra track only<br>• Offer Math Functions on Enid and Tonkawa campuses as soon as we hear approval from some transfer colleges<br>• Holistic placement |
| 2019-2020 | • Considering to adjust the Calc offerings from 2 5-credit hour courses to 3 courses (4-3-3).<br>• Adding Math Functions in Enid and Tonkawa with the adjustments to degree sheets being made.<br>• Look to add Math Functions online in the spring. |
| 2020-2021 | • Adding Pre-STEM online fall 2020<br>• Possibly add online or zoom supplement for online courses |
| 2021-2022 | • Removing Stat supplement for fall 2021, can take stat with 19 ACT. If below 19, will need to take Math Apps or Math Functions with supplement (or Pre-STEM or Algebra for STEM with supplement – not recommended).<br>• Approved to start teaching MATH 1813 in Stillwater to replace MATH 1613 (due to OSU changes). Will start spring 2022.<br>• Consider some online live only sections of certain courses.<br>• Look to tie supplements to specific sections of the main course (like science labs possibly) |

## Math

| | | Program Level Outcomes Timeline | | | | |
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| **Program Objectives – Math** | Course Map | 2015-2016 | 2016-2017 | 2017-2018 | 2018-2019 | 2019-2020 |
| 1. Sketch or identify and interpret graphs | MATH 1613<br>MATH 2145<br>MATH 2155 | X | X | X | X | X |

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| 2. Manipulate, simplify and/or solve expressions or equations. | MATH 1613<br>MATH 2145<br>MATH 2155<br>MATH 2613 | X | X | X | X | X |
| **3.** Solve and interpret real world application problems. | MATH 1613<br>MATH 2155 | X | X | X | X | X |
| Use and apply physical data to solve problems | MATH 2145,<br>MATH 2155 | X | X | X | X | X |
| Use logical reasoning to solve problems | MATH 2145,<br>MATH 2155 | X | X | X | X | X |
| Demonstrate effective implementation of the scientific method and written and oral expression of scientific concepts and data. | MATH 2103 | X | X | X | X | X |